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Via HAND DELIVERY
The Honorable Vernon A. Williams
Secretary
Surface Transportation Board
1925 K Street, NW
Washington, DC 20423

PUBLIC VERSION

Re: **STB Docket No. 41191 (Sub-No.1),** ***AEP Texas North Company v. The Burlington Northern and Santa Fe Railway Company***

Dear Secretary Williams:

Enclosed for filing in the above-captioned matter are the original and ten copies of the Public version of the Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company. The Public version of this Reply Evidence and Argument consists of two volumes containing the Narrative and a single volume containing the Exhibits. Also enclosed are three copies of a CD containing a PDF version of the Public Narrative. BNSF is filing the Highly Confidential version of this Reply Evidence and Argument today under a separate cover letter.

Included with this letter is a copy of the signed verification page of BNSF Witness Anthony W. Deichert that was not received until this afternoon and therefore could not be inserted into Section IV prior to the volumes being bound. The original signed verification page is attached to the letter accompanying BNSF's Highly Confidential filing.

Please date stamp the extra copy of this cover letter and return it to the messenger who delivered this filing.

Sincerely,

Samuel M. Sipe, Jr.

Enclosures
cc: Counsel for Complainant

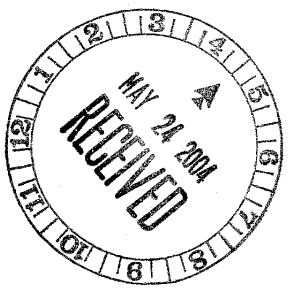
I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Anthony W. Deichert

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PUBLIC VERSION



BEFORE THE
SURFACE TRANSPORTATION BOARD

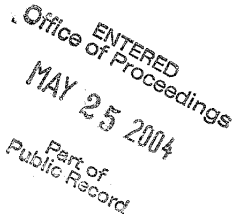
STB Docket No. 41191 (Sub-No. 1)

AEP TEXAS NORTH COMPANY
v.
THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

Reply Evidence of
The Burlington Northern and Santa Fe Railway Company

NARRATIVE

Volume I of II



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May 24, 2004

I. COUNSEL'S ARGUMENT AND SUMMARY OF THE EVIDENCE

This is the Reply Evidence and Argument of defendant The Burlington Northern and Santa Fe Railway Company ("BNSF") in STB Docket No. 41191 (Sub-No. 1), *AEP Texas North Co. v. The Burlington Northern and Santa Fe Railway Co.* This Reply Evidence and Argument responds to Opening Evidence of complainant AEP Texas North Co. ("AEP Texas") filed on March 1, 2004, as modified by errata filed on March 19, 2004 and April 12, 2004. The format of BNSF's Reply complies with the Board's March 12, 2001 decision in STB Ex Parte No. 347 (Sub-No. 3), *General Procedures for Presenting Evidence in Stand-Alone Rate Cases.*

A. INTRODUCTION

In 1996, the Board carried out a detailed SAC analysis that identified the maximum reasonable rates that the Burlington Northern Railroad Company, now BNSF, could charge for transportation of coal from the PRB to AEP Texas' Oklaunion Station. The SAC analysis covered a 20-year period extending from 1995 to 2014. Those maximum rate calculations were contained in a workpaper that the Board subsequently adopted as the basis for a rate prescription on movements through 2014 from one PRB mine, the Rawhide mine, to the Oklaunion Station. The complainant and defendant in this case were the parties through predecessor entities to the earlier proceeding that produced those SAC calculations. BNSF has not charged AEP Texas a rate for movements from any PRB mine that exceeds the maximum reasonable SAC rates calculated in that 1996 decision, and the challenged rates in this proceeding are all at or below those maximum reasonable rates.

The Board's 1996 Decision produced a 31 percent reduction from BNSF's common carrier rate in 1996. This enormous rate reduction was the result of overly aggressive projections of revenue and traffic volume increases, which the Board adopted over BN's strenuous protest. In retrospect, the projections have turned out to be substantially overstated, as discussed below.

If the Board had accepted BN's evidence, no rate reduction would have been imposed. However, the lower rates were adopted by the Board and BNSF has never charged a rate since 1996 for any movement to AEP Texas from the PRB that exceeded the maximum reasonable rates that the Board calculated in its 1996 SAC analysis.

AEP Texas nevertheless asks the Board to find that BNSF has violated the governing statute by charging rates that are unreasonably high. According to AEP Texas, BNSF should have charged rates in 2003 that are nearly one-third lower than the rates that were already reduced by the Board in its 1996 decision. *See* AEP Texas Opening Nar. at Table III-H-1. AEP Texas points to no significant change in market or economic conditions since 1996 that would justify its claim that the Board's 1996 calculations produced maximum reasonable rates that were too *high*. Instead, AEP Texas bases its claim for a rate reduction on a new SAC presentation that relies heavily on a vastly larger traffic group featuring cross-over traffic and the fictional rerouting of traffic. No cross-over traffic was included in the SAC analysis that produced the 1996 maximum rate calculations.

Far from showing that the Board's 1996 calculations were wrong, AEP Texas' new SAC evidence merely demonstrates the extent to which complainants in SAC cases are using cross-over traffic and the rerouting of traffic to distort SAC results in their favor. The use of cross-over traffic in a SAC analysis frustrates the fundamental purpose of the SAC test, which is to compare the total costs to serve the traffic group at issue with the total revenues generated by that traffic. The introduction of cross-over traffic was intended to simplify SAC analyses, but it has become a vehicle for manipulating and distorting SAC results. AEP Texas' SAC evidence purporting to show dramatically lower SAC rates than the rates calculated by the Board in 1996

for the same transportation service is proof positive of the abuses that can result from a complainant's heavy reliance on cross-over traffic.

BNSF presents in this Reply detailed SAC evidence responsive to AEP Texas' opening SAC presentation demonstrating that the challenged rates do not exceed a reasonable maximum rate when appropriate SAC assumptions and methodologies are applied. But a new SAC analysis should not be required here. The Board already carried out a multi-year SAC analysis in 1996 that covers the same time periods and the same transportation services at issue here. Although it was bitter medicine, BNSF has abided by that decision. SAC calculations by the Board should be presumed to be valid over the entire SAC analysis period in the absence of evidence of changed circumstances or material error. Indeed, to find that the challenged rates in this case are unreasonable, the Board would have to conclude that rates that were reasonable as determined in its 1996 SAC calculations have now become unreasonable. AEP Texas has presented no evidence that would support such a conclusion, and there is no such evidence.

AEP Texas' opening evidence does not contain a single word explaining why its SAC results depart so substantially from the Board's 1996 SAC calculations. AEP Texas' new SAC results cannot be attributable to changes in the rates charged to AEP Texas because BNSF has not charged AEP Texas rates that exceed the reasonable maximum rate in the 1996 SAC calculations. In any event, the rates charged to AEP Texas would not be expected to have any significant effect on SAC results since the revenues contributed by AEP Texas to the stand-alone railroad are dwarfed by the revenues contributed by other shippers, including the new cross-over traffic that AEP Texas has added to the SAC analysis.

In the absence of a showing by AEP that the Board's 1996 SAC calculations were erroneous, the Board cannot ignore those maximum rate calculations now, after BNSF has

adhered to those maximum rates since 1996 for all movements of PRB coal to the Oklaunion Station. The Board's 1996 SAC calculations were based on a multi-year analysis. Maximum rates were set for each year of the analysis period at a level that generated sufficient revenue in each year to cover stand-alone costs over the entire 20 year DCF period. If rates are reduced now, the stand-alone costs calculated in the 1996 SAC calculations would not be covered. The Board's regulatory standard is intended to give railroads the opportunity to achieve revenue adequacy by allowing them to charge rates that cover the full economic costs of a hypothetical stand-alone railroad that serves the issue traffic as well as other traffic grouped with it. BNSF would be unfairly treated, and the objective of the SAC test would be frustrated, if BNSF was prevented from charging rates for each year of the SAC analysis period up to but not exceeding the level necessary to cover SAC costs.

Moreover, accepting AEP Texas' new SAC analysis would have the perverse effect of penalizing BNSF for charging rates that the Board has declared to be reasonable rates. AEP Texas seeks a continuous ratcheting down of rates by applying an additional rate reduction on top of the rate reduction that the Board already established in the 1996 SAC calculations. According to the Board's 1996 SAC calculations, the rate challenged in the 1996 case would have risen to $24.17/ton in 2003 absent the prior prescription. *See* May 29, 2003 Decision at Table 1. But AEP Texas asks the Board to calculate a new maximum reasonable rate by applying a further rate reduction based on its new SAC calculations from the starting point of the lower maximum reasonable rates that the Board calculated in 1996. Such a result would be flagrantly inconsistent with the statutory revenue adequacy requirement.

The Board should also reject AEP Texas' rate reasonableness claims because AEP Texas continues to defy the governing statute and to flout Board orders by refusing to pay the rates on

the non-Rawhide movements that it seeks to challenge. While the Board on March 19, 2004 rejected BNSF's motion to dismiss AEP Texas' complaint based on AEP Texas' refusal to pay the challenged rate on non-Rawhide movements, the Board reiterated the well established rule that a litigant challenging the reasonableness of a rate must pay that rate while the rate challenge is pending. The Board expressly stated that "AEP Texas must pay the existing legally established common carrier rate in full." March 19, 2004 Order at 3. Indeed, AEP Texas appears to acknowledge this basic legal principle in connection with movements from the Rawhide mine, as it has paid the challenged rate on recent movements from that mine origin. However, AEP Texas continues to refuse to pay the challenged rates on the non-Rawhide movements while it litigates this case. AEP Texas' persistent defiance of the Board on this issue is a direct challenge to the Board's authority over rate reasonableness litigation. BNSF continues to urge the Board to dismiss AEP Texas' claims in order to preserve the integrity of the statutory scheme and the Board's rate reasonableness procedures.

B. THE BOARD HAS ALREADY DETERMINED THE REASONABLENESS OF THE RATES ON THE TRAFFIC AT ISSUE IN THIS PROCEEDING AND BNSF HAS NEVER CHARGED A RATE HIGHER THAN THE MAXIMUM REASONABLE RATES DETERMINED BY THE BOARD

BNSF described the long and complicated history of litigation over PRB rates to the Oklaunion Station in BNSF's Opening Argument at I-3 to I-9, and that discussion is not repeated in detail here. As explained in BNSF's Opening Argument, the Board in 1996 carried out a SAC analysis to determine the maximum reasonable rates for the same transportation service at issue here. The 1996 SAC case involved the same parties that are involved in this case. The 1996 SAC analysis covered movements of PRB coal from Eagle Butte in the north to Black Thunder in the south, the same basic mine origins that are the subject of this case. The coal was delivered to the same coal burning facility that is the destination of the issue traffic here. The SAC

analysis period in the 1996 Decision was 1995-2014, thus encompassing all of the historic time periods at issue in this case. The SARR shipper group in the 1996 SAC Decision included 11 shippers, and all 11 shippers are included in AEP Texas' proposed shipper group in this case.

The Board apparently believes that it is not bound by its prior decision, but that is wrong on both legal and policy grounds.

1. AEP Texas Should Be Precluded From Relitigating The Reasonableness Of The Rates At Issue Here

SAC calculations are made at an aggregate level that compares total revenues generated by the SARR shipper group to total costs. The Board does not make mine-specific SAC calculations to determine maximum reasonable rates for movements from particular mine origins, although it does make mine-specific variable cost calculations. Moreover, the tariff rate at issue in the Board's 1996 Decision did not distinguish between mine origins, *i.e.*, the same rate applied regardless of mine origin. Therefore, if the Board's 1996 SAC calculations had applied to all PRB movements covered by the challenged tariff, the same SAC maximum reasonable rates would have applied to all PRB movements to the Oklaunion Station regardless of the mine origin.

In this case, AEP Texas has again submitted SAC evidence that covers multiple PRB mine origins. Like the Board's 1996 SAC analysis, AEP Texas' SAC calculations cover the Rawhide mine as well as other PRB mine origins. AEP Texas Opening Nar. at III-A-4. And like the Board's 1996 SAC calculations, AEP Texas' SAC maximum rate calculations do not distinguish between mine origins. AEP Texas assumes, consistent with the basic SAC methodology, that the SAC maximum reasonable rate for one PRB mine to Oklaunion is the same as the maximum reasonable rate for the other PRB mine origins covered by the SAC calculations.

The Board's 1996 SAC calculations, however, already established the maximum reasonable rate for movements to Oklaunion from the Rawhide mine. Indeed, if the Board's rate prescription for the Rawhide mine remained in effect, AEP Texas would be precluded from relitigating the reasonableness of the Rawhide rate under the doctrine of res judicata. As the Board has acknowledged, "[u]nder the doctrine of res judicata, a judgment on the merits in a prior suit bars a second suit involving the same parties or their privies based on the same cause of action."[1] Under AEP Texas' own assumptions, the maximum reasonable rate for movements to Oklaunion from one PRB mine applies to all mine origins. Therefore, were it not for the Board's vacation of the rate prescription adopted pursuant to the 1996 Decision, which BNSF believes was erroneous, the Board would be required to find that the rate for movements from Rawhide do not exceed a reasonable maximum rate since BNSF has never charged a rate exceeding the maximum rates established in the Board's 1996 SAC calculations. By extension, the Board would be required to find that the rates for movements from the other mine origins also do not exceed a reasonable maximum rate because those rates have never exceeded the maximum rates in the Board's 1996 SAC calculations.

BNSF has appealed the Board's March 19, 2004 vacation order to the U.S. Court of Appeals for the District of Columbia Circuit. BNSF will demonstrate in that appeal that the standard applied by the Board -- that "the complaining shipper should be entitled to have [a rate] prescription vacated upon request" -- is unlawful because it is inherently one-sided and prejudicial to the defendant in a rate reasonableness proceeding when the purpose of the rate

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[1] *Santa Fe Southern Pacific Corp. -- Control -- Southern Pacific Trans. Co.*, 1996 WL 706768, *3 at n.12, Docket No. 30400 (served December 10, 1996). The doctrine of res judicata does not preclude the reopening of a rate determination on the basis of "new evidence that warrants the change," but AEP Texas has presented no such evidence here. *Tesoro Alaska Petroleum Co. v. FERC*, 234 F.3d 1286, 1290 (D.C.Cir. 2000).

vacation is to permit the complainant to bring another rate reasonableness challenge. March 19, 2004 Order at 3. The defendant can challenge the continuing validity of a rate prescription only if it presents proof of substantial changed circumstances. Otherwise it is bound by the terms of the rate prescription for the entire period of the SAC analysis. Under the Board's standard, however, the complainant can walk away from a rate prescription and bring a new complaint whenever it chooses, without having to make any evidentiary showing. There is no statutory basis for such a one-sided standard.

BNSF will also demonstrate that the Board's vacation order is arbitrary because it ignores the multi-period analysis that is the basis for its SAC calculations. Using the results of the SAC test, the Board sets rates for each year of the 20-year analysis period at a level that generates sufficient revenue to cover SAC costs over the entire 20-year period. The Board has acknowledged that "[t]he SAC constraint is designed to determine the maximum reasonable rate a carrier may charge annually over the 20-year period of the SAC analysis." May 29, 2003 Decision at 3. If a complainant were permitted to walk away from a rate prescription mid-way through the analysis period without any showing of changed circumstances and then seek lower rates through new SAC litigation, the SAC principle of full-cost recovery would be violated. A railroad could be forced to charge rates that never recover the full costs of the service at issue.

Finally, the Board's March 19, 2004 Order is inconsistent with the policies underlying the statutes governing the Board's regulation of rates. SAC cases are time-consuming, expensive and burdensome. Once a SAC determination is made, the defendant should not be required to go through litigation again unless there is a showing of changed circumstances. Subjecting railroads

to repetitive rate litigation goes directly against the congressional policy of minimizing federal regulatory intervention in the rail industry.[2]

BNSF seeks a determination from the appellate court that the Board's vacation order was erroneous. If the rate prescription is reinstituted, that rate prescription would once again establish the maximum reasonable rate for one of the PRB mine origins that is covered by AEP Texas' current rate case. Since AEP Texas itself assumes that the maximum reasonable rate for all PRB mine origins should be the same, the Board would be required to enter a finding that the challenged rates from origins other than Rawhide do not exceed a reasonable maximum rate.

2. AEP Texas Has Failed To Present Any Evidence That Would Support A Departure From The Board's 1996 SAC Maximum Rate Calculations In This Case

Regardless of the Board's legal authority to vacate the 1996 Decision, there is no factual basis for concluding that the Board's SAC maximum rates were too high when they were calculated in 1996 or that they are too high now. The Board itself acknowledged in its March 19, 2004 Order that SAC determinations should not be changed unless changes in circumstances affect the continued validity of the maximum rate calculations in the original determination. The Board specifically justified its decision to vacate the 1996 Decision based on the possibility of changed circumstances:

> The economic and regulatory conditions reflected in the SAC analysis can change significantly over [the 20-year DCF] time period. The rate prescription, which was imposed to protect the captive shipper from unreasonably high rates, should not become the source of a rate that would now be considered unreasonable under a SAC analysis.

March 19, 2004 Order at 3.

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[2] *See* 49 U.S.C. § 10101(2),(15).

AEP Texas apparently recognizes that any change in the Board's prior SAC calculations should be based on changed circumstances. AEP Texas states in its Opening evidence that it is asking the Board to establish "new maximum rates . . . in this proceeding that reflect current costs, traffic conditions, and modern interpretations of the *Coal Rate Guidelines*." AEP Texas Opening Nar. at I-13. However, AEP Texas presents no evidence of changed circumstances in its Opening Evidence in this case. In fact, there have been no changes in costs, traffic conditions or legal standards that would support a significant change from the 1996 SAC calculations, particularly not a reduction in the maximum rates. BNSF's status as a revenue inadequate railroad certainly has not changed since 1996.

To demonstrate that changes in economic factors could not justify the reduction in rates AEP Texas is seeking, BNSF modified the Board's 1996 SAC calculations to account for any differences between actual cost inflation and the Board's inflation projections in 1996 and the differences between actual rail industry cost of capital since 1996 and the Board's projected cost of capital. BNSF also modified the capital recovery pattern in the Board's 1996 SAC calculations to reflect the Board's post-1996 decision to allocate capital recovery based on time rather than traffic volumes. Making these changes alone produces a slightly *higher* 2003 maximum reasonable rate than the $18.04 rate produced by the Board's 1996 SAC calculations. *See* Section III.A.1.a.(iii). There have been changes in traffic patterns and revenue levels since 1996, but those changes also would not justify any reduction in the maximum reasonable rates as calculated in the Board's 1996 SAC analysis. As BNSF demonstrates in Table III.A-1, revenues actually generated by the traffic included in the 1996 SAC analysis did not increase at the levels projected by the Board in that decision. In fact, rate levels declined to such an extent that the shippers included in the SARR would have generated 45 percent less revenue in 2003 than the

Board predicted in its 1996 calculations. Even if the SARR attracted additional traffic, SAC revenues would still have been 25 percent lower in 2003 than projected by the Board.[3]

A single factor is primarily responsible for the differences between AEP Texas' current SAC presentation and the Board's 1996 SAC calculations -- the expansion of the SARR traffic group to include substantial reliance on cross-over traffic. The basic route of AEP Texas' TNR remains the same; the same core customers are served; the same basic operating conditions apply. AEP Texas simply added a substantial volume of cross-over traffic to the core system that was used in 1996 as the basis for the Board's SAC calculations. Most of that cross-over traffic uses the TNR facilities only in the PRB and exits the TNR at Alliance, NE, for movement on BNSF over different rail lines than those used to serve AEP Texas.

AEP Texas cannot argue that the use of cross-over traffic is a recent development that post-dates the Board's 1996 SAC analysis. Complainants have sought to use cross-over traffic in SAC presentations since the mid-1980s. Indeed, in the 1986 *OPPD* decision, the ICC found that a complainant could use cross-over traffic in a SAC presentation without hypothesizing the construction of all facilities needed to handle the traffic. *OPPD*, 3 I.C.C.2d at 138-144. However, the ICC also made it clear in that case that the complainant could not merely *assume* that cross-over traffic made a positive contribution to the SARR. Rather, the complainant had to present evidence demonstrating that cross-over traffic had some revenue to contribute, and this could only be the case if the full off-line costs of the cross-over movements were covered.

> The Burlington Northern first challenged the absence of off-line costs and revenues in its evidence to the Administrative Law Judge. Omaha Power responded with exhibits that purported to

[3] In the 1996 case, BN presented evidence that the increases in volume and revenue posited by the complainant would not be realized by the SARR, and real world developments have borne out BN's predictions. If BN's evidence had been accepted in the 1996 case, the Board would not have established any rate reduction.

> show the total costs and revenues (including auxiliary costs and investments) under the "Appendix F" methodology for a group of unit train coal shippers constituting part, but not all, of the original CMV traffic. OPPD also filed an engineering cost workup for the same group of shippers. *Both of the rebuttal workups indicate a complete recovery of all stand-alone costs, including auxiliary costs and investments.*

Id. at 142 (footnotes omitted; emphasis added). The ICC made it clear that in the absence of such a showing, reliance on cross-over traffic in a SAC presentation would not be consistent with the *Coal Rate Guidelines*. *Id.* at 144.

In this case, AEP Texas assumes that the new cross-over traffic will contribute substantial revenue to the SARR over and above the amount needed to cover the incremental capital and operating costs caused by the addition of that cross-over traffic to the core 1996 SARR network. As discussed in Section III.A.1.a.(iii) below, the total capital costs of the TNR are only 17 percent higher than the total capital costs of the 1996 SARR, while the revenues of the TNR are 59 percent higher. This excess of incremental revenues over incremental capital costs reflects the contribution assumed to be made to the TNR by the massive volume of cross-over traffic that AEP Texas added to the core 1996 SARR, and this excess of revenue is the principal source of the purported differences between the Board's 1996 SAC results and AEP's current SAC results. But the ICC found in *OPPD* that a positive contribution from cross-over traffic can be assumed only if the complainant demonstrates that off-line costs are covered. Such a showing is particularly important when the magnitude of the contribution is as large as it is in this case and where the existence of this massive contribution is the principal basis on which AEP Texas seeks a reduction in the rate that the Board previously found to be reasonable for the service at issue. AEP Texas has offered no such showing here.

In light of AEP Texas' failure to present any evidence that would support a departure from the Board's 1996 SAC calculations, the Board should dismiss AEP Texas' complaint. The

Board's 1996 SAC calculations should be presumed to reflect the maximum reasonable rate for the traffic at issue here. Since BNSF has never charged a rate in excess of those maximum reasonable rates, the Board should conclude that the challenged rates are reasonable.

C. BNSF'S SAC EVIDENCE DEMONSTRATES THAT WHEN PROPER ASSUMPTIONS ARE USED, THE CHALLENGED RATES DO NOT EXCEED A REASONABLE MAXIMUM RATE

As discussed above, there is no reason to consider new SAC evidence in this case. The 1996 SAC calculations covered the same transportation services at issue here and AEP Texas has submitted no evidence that would justify a departure from the 1996 SAC calculations. Nevertheless, BNSF has thoroughly analyzed AEP Texas' new SAC evidence. BNSF demonstrates in the Narrative below and in the accompanying Exhibits and workpapers that AEP Texas's SAC presentation is based on numerous erroneous, improper and unsupported assumptions. When SAC assumptions are made that are consistent with underlying SAC principles, it is clear that the challenged rates do not exceed a reasonable maximum rate.

The most significant flaws in AEP Texas' SAC presentation relate to its misuse of cross-over traffic. BNSF explained above that there is no basis for including any cross-over traffic in this SAC analysis, given that the 1996 analysis was carried out with no cross-over traffic and AEP Texas has provided no evidence that would support an assumption that the new cross-over traffic has revenues to contribute to the SARR in excess of the incremental costs associated with the new cross-over traffic. If all cross-over traffic were eliminated from AEP Texas' SAC case, there would be little to distinguish this SAC analysis from the SAC analysis conducted in 1996 except for the reduced revenues and the changes in inflation and cost of capital that were addressed above. Those changes, however, would not support a conclusion that the Board's 1996 SAC calculations produced rates that are too *high*, but rather would lead to the conclusion that the prescribed rate was too *low*. In recognition of the fact that the Board has been reluctant

to exclude cross-over traffic from a SAC presentation, BNSF's alternative SAC evidence does not exclude all cross-over traffic, although it believes that it would be proper to do so. Instead, BNSF presents alternative SAC evidence in this Reply that corrects only the most obvious abuses of cross-over traffic in AEP Texas' presentation.

AEP Texas' operating statistics and operating costs are based on the Rail Traffic Controller ("RTC") model that BNSF has used in prior SAC cases. AEP Texas' decision to use the RTC model resulted in a substantial improvement in the quality of its operating cost evidence as compared to operating cost evidence presented by complainants in past cases. However, in applying the RTC model, AEP Texas ignored several real world operating constraints and applied unrealistic operating assumptions that resulted in an understatement of the capacity and equipment needs of the TNR. BNSF has corrected these errors. AEP Texas also provides a totally inadequate maintenance plan for its heavy-haul, high-density TNR, which BNSF has corrected.

As to construction costs, AEP Texas' evidence is superficial and replete with errors. AEP Texas glosses over many cost items without serious consideration and ignores numerous other costs. In several areas, AEP Texas makes inappropriate construction choices based only on the objective of reducing costs without investigating the feasibility of its choices or the impact of those choices on the TNR's construction schedule. AEP Texas ignores the engineering and construction management costs that would be incurred to achieve the aggressive construction schedule it assumes in order to reduce capital carrying charges. The contingency that AEP Texas assumes is totally inadequate for the level and quality of design work underlying its cost estimate. The result of these and numerous other errors is that AEP Texas' estimate of the cost to design and build the TNR is unrealistic and unsuitable for use in any SAC analysis.

AEP Texas also asks the Board to implement several new SAC methodologies in this case in carrying out its DCF analysis. It urges the Board to apply an inflation index adjusted to account for supposed productivity improvements that a SARR would experience; it asks the Board to substantially reduce the cost of capital used in the DCF based on an assumption that the TNR would refinance the debt incurred to construct the TNR; and it sponsors an alternative to the Board's percent-reduction methodology for setting a rate prescription based on the results of the SAC analysis. BNSF explains why each of these proposals is inappropriate and should be rejected.

BNSF presents the results of its alternative SAC analysis in Table III.H-1 below:

Summary of Stand-Alone Cost Results - TNR
(All Figures in Millions of Dollars)

Year	Annual Revenue	Stand-Alone Cost	Difference
2000	$346.2	$445.5	($99.3)
2001	$654.6	$804.2	($149.7)
2002	$657.0	$809.5	($152.6)
2003	$629.8	$828.0	($198.2)
2004	$636.6	$843.0	($206.4)
2005	$615.9	$846.7	($230.8)
2006	$634.1	$869.7	($235.6)
2007	$649.9	$894.6	($244.6)
2008	$668.1	$916.6	($248.5)
2009	$687.2	$946.2	($259.0)
2010	$673.8	$970.8	($297.0)
2011	$690.9	$996.2	($305.3)
2012	$710.4	$1,023.6	($313.2)
2013	$726.3	$1,050.6	($324.3)
2014	$744.8	$1,076.6	($331.9)
2015	$761.6	$1,103.0	($341.5)
2016	$782.9	$1,131.9	($349.1)
2017	$800.2	$1,159.9	($359.7)
2018	$812.1	$1,185.8	($373.7)
2019	$833.8	$1,216.1	($382.4)
2020	$851.7	$1,246.7	($395.1)

As shown in Table III.H-1, SAC revenues for the TNR do not exceed SAC costs. If the Board does carry out a full SAC analysis in this case, it should therefore conclude that the challenged rates do not exceed a reasonable maximum rate. Indeed, this is the only logical conclusion that the Board could reach since the rates BNSF is charging are set at levels that the Board has found to be reasonable.

1. AEP Texas Overstated the Traffic and Revenue that Would Be Available to the TNR

The basic concept of AEP Texas' traffic group is flawed. AEP Texas has transformed the bona-fide stand-alone rail network that was the basis of the 1996 Decision into a fragment of a

rail network that does not stand alone. AEP Texas' TNR does not carry most of its traffic from origin to destination. It is dominated by cross-over traffic and it depends on the residual incumbent to provide through transportation service for that traffic.

Reliance on cross-over traffic precludes a complete comparison of the revenues generated by the movements in the traffic group and the full costs of serving that traffic, which is the essence of a properly conducted SAC test. Moreover, the need to allocate revenue on cross-over movements reinstitutes the very problem of arbitrary allocations that the ICC thought it was avoiding when it adopted CMP. The Board should reject AEP Texas' traffic group because its heavy reliance on cross-over movements is inconsistent with SAC principles.

Apart from this threshold issue, AEP Texas' inclusion of many of the movements in its traffic group is impermissible for other reasons. AEP Texas has included in its traffic group substantial volumes of rerouted coal traffic that should be excluded under Board precedent. In 2001, the first full year of SARR operations, AEP Texas rerouted over 28 million tons of coal traffic that originated at the three southernmost PRB mines -- Antelope, North Antelope and North Rochelle. In the real world, this 28 million tons of coal was routed south on BNSF via Guernsey out of the PRB. Rather than following the real world route, AEP Texas takes this traffic over a much longer route north out of the PRB via Donkey Creek and Edgemont to Alliance, Nebraska, where it is interchanged with the residual incumbent. Under recent Board precedent, there is a presumption that traffic rerouted over a longer haul should not be included in the stand-alone traffic group.[4] AEP Texas has not demonstrated that this longer route is as efficient as the real world BNSF route. Moreover, on its real world route over Guernsey, the coal traffic from the three southern mines would share only minimal facilities with the issue

[4] *Duke/CSX* at 15; *see also CPL/NS* at 21.

traffic on the TNR. It would violate SAC principles of cost sharing to allow rerouted traffic to contribute substantial revenue to the coverage of the costs of facilities used by the issue traffic on the SARR when that traffic does not share those facilities in the real world or shares them only to a limited extent.[5]

The foregoing principles that require exclusion of certain rerouted traffic also apply to the coal traffic destined to Georgia Power's plant Scherer that AEP Texas includes in its traffic group as of 2004. { } AEP Texas' rerouting of this traffic is impermissible. As explained in section III.A.1.b, BNSF excludes several other movements that were improperly included in the TNR shipper group.

There are very significant flaws in AEP Texas' coal volume projections. Several of these involve selective departures by AEP Texas from BNSF's Long Range Plan for coal, which AEP uses to adjust coal volumes between 2003 and 2008. Another particularly significant error involves AEP Texas' projection of coal volume changes between 2002 and 2003. Although AEP Texas acknowledges in it workpapers that coal volumes transported by BNSF declined by { } percent between 2002 and 2003, it engages in a convoluted calculation of coal consumed (rather than delivered by rail) in these two years to increase coal deliveries by 2.6 percent from 2002 through 2003. AEP Texas also overstates volumes by improperly calculating the cap on volume growth for deliveries to coal-fired plants served by the TNR.

AEP Texas substantially overstates revenues for the SARR. A major source of the overstatement is AEP Texas' use of the MSP method for allocating revenues on cross-over traffic movements. AEP Texas makes no showing whatever that the assumed revenues are

[5] *PPL II* at 7; *Duke/CSX* at 16.

available to the TNR. In lieu of MSP, BNSF has proposed to allocate revenues on cross-over movements by using its Density Adjusted Revenue Allocation Procedure ("DARA"). DARA is a superior revenue allocation procedure to MSP for three distinct reasons.

First, DARA explicitly distinguishes between attributable and unattributable costs to implement the Board's instruction in *TMPA* that "[t]he revenue each carrier receives should cover the attributable costs of the service it provides and make some contribution to its unattributable costs."[6] MSP does not explicitly ensure coverage of attributable costs.

Second, DARA allocates revenue sufficient to cover directly attributable costs by calculating URCS-based variable costs, which is a more precise way of accounting for the costs of originating and terminating unit coal train traffic than the 100-mile origination and termination block credit used in MSP. The use of 100-mile origination blocks in MSP substantially overcompensates the SARR for the costs of originating western unit coal train movements and therefore gives complainants the incentive to include large volumes of relatively short haul coal traffic in the stand-alone traffic group. By developing origination and termination costs in accordance with URCS, DARA eliminates the imprecision resulting from the use of 100-mile blocks.[7]

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[6] *TMPA*, slip op. at 31, n. 73

[7] BNSF shows in Reply Exh. III.A-9 that it is possible to develop mileage block credits that reflect more accurately the costs to originate and terminate various categories of traffic (e.g., unit train coal traffic) than the system average 100-mile block. Using URCS, BNSF shows that a 25-mile origination and termination credit would be more appropriate for unit coal train service in shipper-owned cars, the predominant traffic type on AEP Texas' TNR. BNSF also shows that MSP's 100-mile blocks *understate* the credit that should be given to the originating and terminating carrier for non-coal traffic, where the origination and termination costs are significantly *above* average.

BNSF urges the Board to apply DARA in the event it accepts the use of any cross-over traffic in this case. However, if the Board were to apply MSP, it would be critically important

Third, DARA takes account of economies of density by allocating the revenue available to cover unattributable costs in inverse proportion to relative densities on the on-SARR and off-SARR segments. The failure of MSP to account for density means that it does not fairly reflect the relative costs of on-SARR and off-SARR segments. The only factor considered by MSP, other than origination and termination costs, is mileage. MSP therefore assumes that the average costs of on-SARR and off-SARR segments of cross-over movements are the same regardless of the density of the on-SARR and off-SARR line segments. But this assumption is contrary to established principles of railroad economics. Economies of density exist precisely because average costs per unit of traffic decline with increasing use of fixed plant. Thus, average costs per unit of traffic are lower on high density line segments than on lower density segments. A fair division of revenues must take account of this fact, as DARA does.

Beyond the base year, AEP Texas' revenue forecast is overstated. AEP Texas assumes that contract rates will remain in effect upon expiration of contracts to both competitively served and solely served destinations. BNSF explains in section III.A.4 why this assumption is inconsistent {with BNSF's recent historical experience}.

2. AEP Texas Understated TNR Capacity By Failing To Model The Operations Of TNR Trains Under Real World Operating Conditions

AEP Texas uses the RTC model to assess the capacity requirements of the TNR. BNSF has been a strong proponent of the use of the RTC model in SAC analyses because that model is reliable, widely used in real world applications, and produces output that can easily be evaluated. AEP Texas' use of the RTC model in this case will allow the Board to focus on the reasonableness of the underlying operating assumptions rather than the reliability of the model's

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that the Board adopt revised origination and termination block credits to reflect more accurately the relative costs of those activities for the traffic included in the stand-alone traffic group.

internal operations or output. This is a substantial improvement in the quality of operating cost evidence in SAC cases and it should simplify the Board's consideration of that evidence.

However, AEP Texas made several inappropriate assumptions that distort the RTC model results. BNSF describes in Section III.B.1.a of the Narrative several areas in which AEP Texas used operating assumptions in its RTC analysis that ignored real world operating constraints that would affect any railroad that originates coal traffic in the PRB, including the hypothetical, efficient TNR. In many cases, these operating constraints cannot be assumed away on grounds that the SARR is an efficient railroad because the constraints involve other parties. Three of AEP Texas' most significant assumptions are summarized here:

- AEP Texas assumes that the PRB mines will have an available loading slot -- a free 5 to 6 hour period of time necessary to load a unit coal train -- whenever there is a TNR train available to be loaded. AEP Texas ignores the fact that most of the PRB mines handle Union Pacific trains and many of the mines cannot load multiple trains at once. A realistic capacity plan for a SARR that originates PRB coal must account for the occasional need to hold empty trains at a yard or siding while the train waits for a loading slot to become available. BNSF corrected this flaw in AEP Texas' operating plan by incorporating into the model real world data on the availability of mine loading slots during the historical period that AEP Texas used in its RTC simulation.

- AEP Texas assumed that no unexpected maintenance outages would occur during the simulation period. While it may be acceptable to assume that program maintenance will not be scheduled to occur during a peak traffic period, there is no basis for assuming that no unplanned outages will occur. BNSF identified the actual unplanned outages that occurred during the historical period used in the RTC simulation and used those outages as the proxy for maintenance outages that could be expected to occur on the TNR.

- AEP Texas used actual BNSF trains during a historic period of time to populate the RTC model with simulated trains. However, AEP Texas then ignored the actual times that these trains arrived at the TNR's hypothetical interchange points to determine the starting point for each train's cycle on the TNR and instead assumed that the TNR would operate a scheduled coal service. No railroad originating coal trains in the PRB could operate on a scheduled basis. BNSF's experts found that the TNR's model results are sensitive to assumptions about when individual trains will be received in

interchange from the residual incumbent. AEP Texas' use of a hypothetical schedule produced an unrealistic depiction of TNR operations.

After correcting AEP Texas' unrealistic operating assumptions, BNSF ran the RTC model with two traffic groups. First, it ran the model with AEP Texas' traffic group. As discussed in Section III.B.1.b below, the model could not run to completion, indicating that AEP Texas had not provided sufficient capacity to support the operations of its assumed traffic group. BNSF then ran the RTC model using the revised traffic group that is the basis for BNSF's alternative SAC evidence. BNSF found that with a few minor exceptions, the capacity used by AEP Texas in its SAC presentation was appropriate for BNSF's traffic group. BNSF's specific conclusions are discussed in Section III.B.1.b below.

BNSF has accepted most of AEP Texas' assumptions about yard capacity and configuration with one major exception. AEP Texas provided a yard at Las Animas, CO, where loaded trains would be inspected and fueled. These functions are carried out today on BNSF's network at Amarillo, TX. BNSF explains in Section III.B.3 below that it would not be feasible to carry out these functions at Las Animas because trains moving beyond Las Animas would run out of fuel before they returned to a fueling location on the TNR to be refueled. BNSF therefore moved the TNR's Las Animas yard to Amarillo, where these operations are carried out today, and redesigned the Amarillo Yard to include facilities sufficient to provide the fueling and inspections that would need to be performed on southbound loaded trains moving beyond Amarillo and the empty trains returning to the PRB.

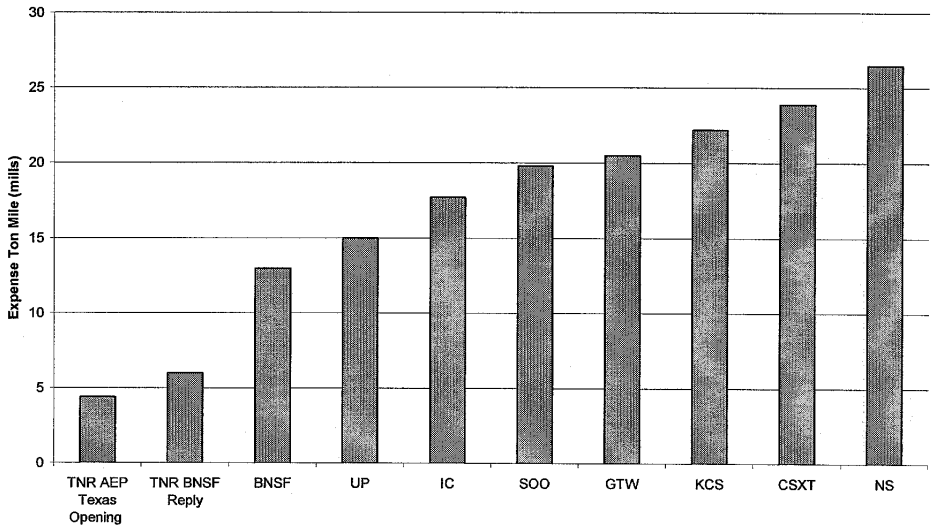
3. AEP Texas Understated TNR Operating Costs

As noted above, the operating assumptions that AEP Texas uses in its RTC model ignore several real world operating constraints that would affect a railroad originating coal in the PRB. The result is that AEP Texas' RTC analysis produced an unrealistic depiction of TNR train

operations. Since the TNR's equipment requirements are based in part on the transit time assumptions in the flawed RTC analysis, AEP Texas' calculations of equipment requirements for the TNR are unreliable. In addition, AEP Texas used a convoluted and improper methodology to translate operating statistics produced by the RTC model for the year 2020 into base year operating statistics and operating costs. Among other things, the effect of this flawed methodology was to understate base-year operating costs, an error which flows through the remainder of the DCF period. In areas where operating costs are not based on output from the RTC model, such as maintenance of way, AEP Texas made numerous unsupported and unreasonable assumptions that produced cost estimates that are vastly understated.

The result of these and other errors is that AEP Texas' operating cost estimate for the TNR is totally out of line with real world experience. It would not be feasible to operate even an optimally efficient railroad at the level of expenditures contemplated by AEP Texas. Figure III.D.3-7 from BNSF's Narrative, reproduced below, shows that the operating expenses per ton mile for the TNR as calculated by AEP Texas are substantially lower than the most efficient real world Class I railroad.

2001 Operating Expense Per Ton Mile (mills) Class I Railroads



The Source for Class I Data is *Analysis of Class I Railroads 2001

There is no basis for assuming that the TNR could achieve such dramatic improvements in operating efficiency. Even though the hypothetical TNR would carry primarily a single commodity, there are only limited ways in which it could expect to achieve operating cost efficiencies compared to its real world counterparts. Take, for example, the four main operating costs in a SAC analysis -- fuel, MOW, crew and locomotive equipment ownership. As to fuel, long, heavy unit coal trains actually burn fuel at rates that are significantly greater than average, so there is no reason to believe that economies could be achieved in this important operating cost category. See the discussion in Section III.D.1 below. Similarly, as to MOW expenses, a heavy-haul, high-density railroad like the TNR could expect to have substantially *higher* MOW expenses than a railroad with a mix of high and low density lines. As to crew, while it is possible that a hypothetical new entrant could achieve some cost savings through changes in personnel management, existing Class I railroads have become extremely lean over the past 20

years, to the point that recent crew shortages at some railroads have had an adverse impact on service. See the discussion in Section III.D.3.a.(1) below. Further reductions in crew staffing could actually produce less efficient operations. As to equipment ownership, AEP Texas assumes that the TNR will merely participate in the pool of locomotives managed jointly by the TNR and the residual incumbent to provide through service to the TNR shippers. The TNR would not be independent of the residual incumbent with respect to equipment ownership, so it could not expect to achieve significant cost savings in that area either.

AEP Texas creates the appearance of significant cost savings by using inappropriate and unsupported assumptions and methodologies in the calculation of the TNR's operating costs. The most significant flaws in AEP Texas' operating cost assumptions are summarized below.

Locomotive Equipment: There are two significant errors in AEP Texas' calculation of locomotive equipment costs. First, AEP Texas used a flawed formula to identify the TNR's base year locomotives. In translating peak year statistics into base year statistics, AEP Texas used inappropriate ratios that produce an understatement of base year requirements. *See* Section III.D below. The base year understatements are then perpetuated through the 20-year DCF period.

AEP Texas also understates locomotive equipment ownership costs by assuming a lease rate for locomotive leases in the base year that is too low to generate revenues over the life of the lease to cover the full costs of the locomotives. The real world locomotive leases that AEP Texas used to calculate locomotive ownership costs have an irregular payment schedule, with low initial lease payments and substantially higher payments over the remaining life of the lease. AEP Texas used only the low, early year payments as the basis for its locomotive ownership cost and assumed, contrary to the lease schedule, that those low payments would continue through the

life of the lease. BNSF corrected AEP Texas' assumptions by adjusting the base year lease payment to ensure a full payment of the lease over the DCF period.

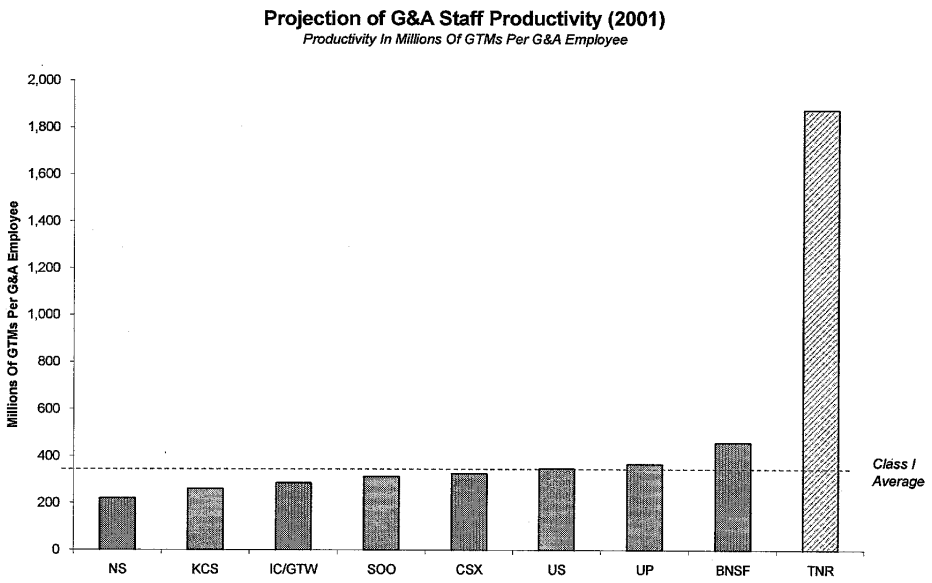
Crew: AEP Texas assumes that its train and enginemen will work 270 days per year. No real world railroad has ever been able to achieve and sustain this extraordinarily high workload on the part of its train and enginemen. Nevertheless, the Board has accepted this assumption in past cases on grounds that it is theoretically possible to staff a railroad with highly productive crew personnel. While BNSF believes this approach is contrary to the feasibility requirement of the SAC test, BNSF nevertheless accepts AEP Texas' assumption that TNR crew will work 270 train starts per year. However, if this assumption is used to establish the number of TNR train and enginemen, it is necessary to assume that the TNR would pay these crew a salary that is commensurate with the high workload that would be expected. BNSF therefore adjusted AEP Texas' crew salary assumptions to reflect salaries that are actually paid in the real world to crew personnel that work 270 train starts per year.

Fuel: BNSF has shown in past SAC cases that unit coal trains consume fuel at a rate that significantly exceeds BNSF's system average fuel consumption rate. In *TMPA*, the Board accepted BNSF's fuel consumption evidence, which showed that SARR trains would consume fuel at a rate that exceeds the BNSF's system average based on a study of unit coal trains providing service to the complainant in that case. *TMPA,* slip op. at 82. BNSF presented similar evidence in the pending *Xcel* case. Here, BNSF has taken the results of those fuel studies and applied them to the TNR trains to calculate the amount of fuel that would be consumed in TNR operations. See Section III.D.1.

BNSF also demonstrates in Section III.D.1 that AEP Texas understated the TNR's fuel costs by assuming that the TNR could obtain fuel at BNSF's system-average fuel price as

reported in the R-1. BNSF shows that BNSF's cost of fuel at Alliance and Amarillo, the TNR's primary fueling facilities, exceeds the system-average cost in BNSF's R-1. The TNR could not reasonably expect to obtain fuel at those locations for less than BNSF obtains it. In addition, AEP Texas ignores the additional cost that would be incurred to dispense fuel through direct-to-locomotive services. BNSF has corrected AEP Texas' fuel cost assumptions.

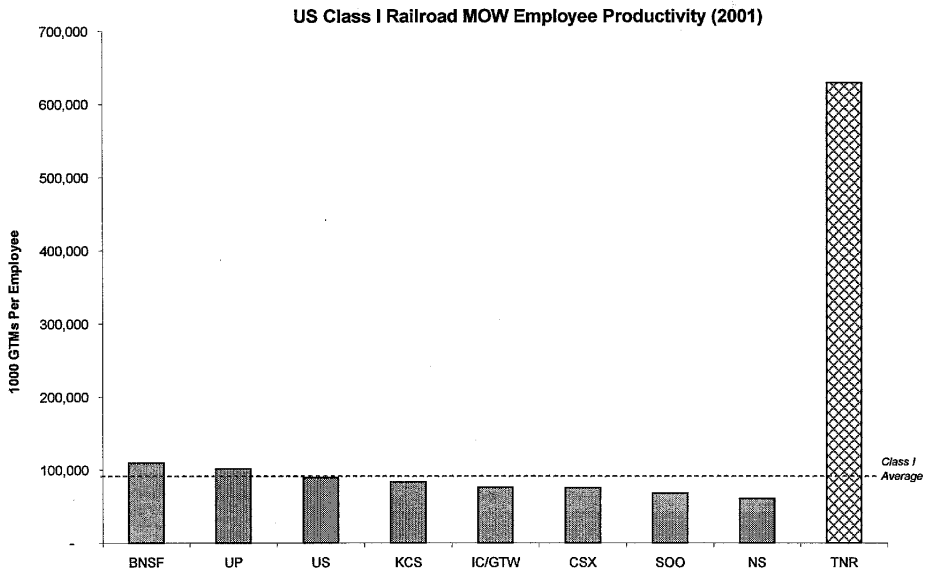
G&A: AEP Texas posits G&A costs for the TNR that defy credibility. The flaws with AEP Texas' numerous staffing and cost assumptions are addressed in detail in Section III.D.3 below and are not addressed here. However, it is clear without the need for a detailed analysis that AEP Texas' G&A assumptions are unrealistic and should not be used even as the starting point for the SAC analysis. Figure III.D.3-9 from BNSF's Narrative, reproduced below, shows that AEP Texas assumes an unheard of level of G&A staff productivity.



Given the discrepancy between AEP Texas' G&A assumptions and real world experience, it was incumbent upon AEP Texas to support its calculations with verifiable evidence. AEP Texas failed to do so and its G&A cost estimate should be rejected.

MOW: AEP Texas' MOW plan and MOW costs are totally inadequate for a high-volume, high-density railroad such as the TNR. As BNSF explains in Section III.D.4 of the Narrative below, AEP Texas' MOW plan is incapable of handling the routine maintenance needs of the TNR and it is totally insufficient to deal with unplanned outages that have the potential to bring operations to a grinding halt. BNSF's MOW experts explain that AEP Texas' MOW plan would not support operations that could meet existing service requirements of the TNR shippers because maintenance failures would be far more prevalent and intrusive than they are on the incumbent's lines.

BNSF's MOW witness Mr. Albin shows that AEP Texas assumes a meager in-house MOW workforce of one-quarter the number of BNSF's MOW employees on the same lines that are replicated by the TNR. Similarly, BNSF's witness Mr. Rennicke shows in Figure III-7 of Exhibit III.D.4-2, which is reproduced below, that AEP Texas assumes an MOW employee productivity for the TNR that is more than 500% of that achieved by even the most efficient Class I railroad.



Such an extreme departure from real world experience cannot be justified, particularly in light of the enormous improvements that the Class I railroads have achieved in MOW employee productivity over the past 20 years. *See* Figure III-1 of Exhibit III.D.4-2.

AEP Texas' assumption that the TNR would rely extensively on outsourcing of MOW functions cannot justify its unprecedented low MOW costs or staffing assumptions. As Mr. Albin explains, BNSF already uses outsourcing on many of the MOW functions that AEP Texas assumes will be done by outside contractors. *See* Section III.D.4.a.(6). In other areas, AEP Texas assumes a cost for outsourced work that is totally unsupported and out of line with the MOW requirements of the TNR. BNSF provides several examples of AEP Texas' outsourcing assumptions that cannot be justified when examined in light of real world MOW requirements. *Id.* AEP Texas uses its outsourcing assumption as a shell game to avoid scrutiny of the real world MOW requirements of the TNR. Mr. Rennicke presents a chart showing that even if AEP Texas' outsourcing expenses were accounted for, the TNR's MOW cost

assumptions are far short of the MOW costs incurred by existing Class I railroads. *See* Figure III-8 of Exhibit III.D.4-2.

AEP Texas' vague claims that it would achieve unspecified efficiencies cannot justify its massive understatement of MOW costs for the TNR. BNSF's witness Mr. Albin presents a detailed, bottom-up evaluation of the specific tasks that would need to be supported by an MOW workforce and the costs that the TNR would incur to provide adequate MOW support for the TNR.

4. AEP Texas Understated SAC Construction Costs

BNSF's detailed review of AEP Texas' construction and engineering cost assumptions is set out in Section III.F of the Narrative below. As BNSF's experts explain, AEP Texas made numerous errors and applied unreasonable assumptions and methodologies to produce a cost estimate that cannot be used as the basis for SAC calculations in this case.

The Board should give particular attention to two issues that have an important impact on the reliability of any construction cost estimate used in a SAC case. The first issue involves the trade-offs between the proposed construction schedule for the SARR and the level of engineering and construction management expenses. Complainants attempt to reduce the SARR's construction schedule as much as possible in order to minimize financing costs during construction. But if the complainant posits the absolute shortest possible construction period for the SARR, as AEP Texas purports to do here, then it must provide the engineering resources necessary to accomplish that schedule. As BNSF's experts explain, the only way to achieve an aggressive construction schedule for a massive project like the TNR is to break up the project into hundreds of smaller projects. While it is possible to manage a project in this way, it requires significant engineering and construction management expenditures. AEP Texas' engineering costs do not reflect the costs that would be incurred on a typical project the size of its TNR, let

alone the engineering costs that would be required to meet the aggressive construction schedule that AEP Texas assumes for the TNR. *See* Section III.F.12 and Exhibit III.F-4.

The second issue involves the proper level of contingency. It is beyond serious dispute that the level of contingency for a large construction project is heavily dependent upon the amount of effort that has been spent on design and cost estimation at the time the cost estimate is produced. A cost estimate that is based on extremely detailed design specifications and firm bids from contractors obviously justifies a lower contingency than a cost estimate that is prepared at a preliminary phase of the project's evolution. BNSF's experts explain that the level of detail supporting AEP Texas' cost estimate clearly places it in the category of a preliminary or feasibility study that would justify a contingency no lower than 20 percent. *See* Section III.F.11. As Mr. Rennicke explains, guidelines established by the Federal Transit Administration, a branch of the Department of Transportation, would not support anything lower than a 20 percent contingency in this case. *See* Exhibit III.F-4. While the Board has consistently applied a 10 percent contingency in recent SAC cases, that contingency cannot be justified in light of well recognized engineering and regulatory standards.

5. AEP Texas' Proposed Modifications To The Board's DCF Methodology Are Flawed

AEP Texas proposes that the Board use an inflation index in the DCF analysis that is modified to account for supposed productivity that the TNR will achieve. It also proposes a modification in the Board's longstanding approach to assessing the SARR's cost of capital. Both proposals should be rejected.

a. Productivity Adjusted Inflation Index

AEP Texas urges the Board to abandon its use of the RCAF-U as the basis for its estimates of future inflation in the DCF analysis. *See* AEP Texas Opening Nar. at III-G-5 to 20.

AEP Texas argues that the RCAF-U should not be used because the inflation index used in the DCF analysis must account for the possibility that the SARR will achieve productivity in the future. AEP Texas acknowledges that the Board has rejected the use of the RCAF-A in SAC cases, but it claims that a different productivity adjustment factor -- one developed by the EIA in its Annual Energy Outlook -- could be used in place of the RCAF-A.

BNSF explains in detail in Section III.G below why the supposed productivity adjustment developed by the EIA would not be appropriate to use in a SAC case. First, the EIA's factor suffers from the same basic flaw that makes the RCAF-A inappropriate for use in a SAC case, namely that it assesses productivity improvements that have been achieved by existing railroads. As the Board has acknowledged, an index based on the historical experience of existing railroads would substantially overstate any conceivable productivity improvements that could be expected by a new, hypothetically efficient railroad that enters the market with brand new assets and new technology:

> While it is difficult to imaging that there would not be some areas in which the [SARR] might realize productivity improvements over the course of the SAC analysis period, the potential impact of such improvements is far less than it would be for existing railroads, which make changes incrementally as older technology assets wear out or become obsolete.[8]

The fact that the EIA productivity factor focuses on the experience of coal railroads, unlike the RCAF-A which addresses freight railroads in general, does not cure this fundamental problem with the use of an index that is tied to the historical experience of entities that are very different from a SARR.

Further, BNSF demonstrates that the EIA productivity factor includes the effects of numerous developments in rail markets that would be totally irrelevant to a SARR. As Mr. Klick

[8] *CPL/NS*, at 27-28.

explains, the EIA analysis is not a true measure of rail productivity, but rather is a comparison of rail rate escalation to a measure of input price inflation. The EIA factor relied on by AEP Texas therefore merely reflects the fact that rail rates have not increased as rapidly as railroad input prices. This, however, is the product of numerous developments in rail markets. Productivity improvements account for some of this difference, but other factors such as increased competition in coal transportation and the effect of historical mergers play a critical role.

Another fundamental flaw in AEP Texas' approach to productivity is that AEP Texas assumes that a productivity adjustment should be applied from the beginning of the DCF analysis. Even if a SARR could be assumed to achieve some productivity improvements over the 20-year DCF period, it is clear that those improvements would not come in the early years of the DCF period. In a SAC case, the complainant posits a hypothetical, least-cost, efficient railroad that achieves at its inception state-of-the-art railroad productivity. Accordingly, its operating costs are substantially lower than the operating costs of real world railroads. As discussed above, the TNR's operating costs are far lower than those experienced by the most efficient existing Class I railroad. A SARR's very low early year operating costs indicate that the SARR has already taken full advantage of any meaningful productivity improvements that might be available to the rail industry in the near term. Therefore, to the extent the SARR can be assumed to experience any productivity gains, those gains must be assumed to occur well into the DCF period.

New technologies may come into existence in the future that are unknown today and that enhance the productivity of freight railroads. It is possible that a SARR would be able to take advantage of those new technologies to improve productivity. But there are several reasons that the prospect of those future technologies should not affect the SAC analysis. First, any

assessment of the effect of unidentified new technologies would be pure speculation. SAC analyses are supposed to be based on verifiable evidence, and the mere possibility that there will be future, unspecified technological developments is clearly not verifiable. Second, new technology will come at a price, and those additional costs are not factored into the SAC analysis. For example, new fuel efficient locomotives might be developed but their cost would almost certainly exceed the cost of the locomotives that AEP Texas has included in the SAC analysis.[9] Finally, it is unlikely that any technology that significantly improves operating performance will be available for several years. If viable new technologies were close to being marketable, complainants would clearly use those technologies in their SAC presentations.

Given the uncertainties over future technology and the effects of future technologies on a SARR, as well as the extremely low starting point for operating costs of a SARR, the RCAF-U continues to be far superior to either the RCAF-A or an EIA-adjusted index. However, to address the Board's concern that the inflation index used in a SAC analysis should account for the possibility of future productivity, BNSF proposes an adjustment that is linked to the unique characteristics of the SARR used in a SAC analysis. BNSF has examined each operating cost category used in SAC calculations to determine where productivity might be achieved by a hypothetical efficient SARR. Based on this analysis, BNSF has developed an adjustment to the RCAF-U that takes account of the likely timing and extent of productivity that might be experienced by a SARR. That adjustment is described in Section III.G-2. BNSF has applied this adjusted index in its DCF analysis.

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[9] Indeed, AEP Texas bases its locomotive ownership costs on long-term leases. The SARR cannot assume the benefits of long-term leases, *i.e.*, reduced lease rates, and then ignore the long-term commitment to the use of the locomotives that enables the SARR to obtain the benefit of low lease rates.

b. Cost Of Capital

AEP Texas' DCF analysis uses the average industry cost of capital from 1998-2000. Until 2002, when it assumes that the SARR will "refinanc[e] debt and otherwise tak[e] advantage of opportunites to lower [its] capital carrying charges." AEP Texas Opening Nar. at III-G-5. AEP Texas then applies the railroad industry 2002 cost of capital for the remainder of the DCF period *i.e.*, 2002-2020. The use of a single year's cost of capital to estimate the SARR's cost of capital for future years has been squarely rejected by the ICC and the Board.

In the *WTU* decision, the Board addressed the proper treatment of both the debt and equity portions of a SARR's cost of capital. The Board specifically rejected the defendant's use of a single year's cost of debt to reflect debt costs over the 20-year DCF period, explaining that "averages, rather than single year data, are generally used to predict the future."[10] While the Board acknowledged that a refinancing of debt was theoretically possible, AEP Texas has provided no evidence that would support an assumption that the SARR would be able to refinance its massive debt here at the low rates it has assumed and it has provided no evidence of the financing fees that would be required to refinance a debt burden of this size.

As to equity, the Board also rejected the use of a single year's cost of capital:

> Because equity costs fluctuate from year-to-year, we estimate the cost of equity for future time periods using an average of a known historical period. Absent evidence projecting the cost of equity for the future, the cost of equity over several years provides a more reliable estimate of future equity costs. Using data for a single year increases the risk that the single period is aberrational.[11]

In short, the use of a single year's cost of capital is inconsistent with longstanding precedent and introduces distortions in the SAC analysis resulting from short-term anomalies.

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[10] *WTU*, 1 S.T.B. at 712.

[11] *Id.* at 713.

See Section III.G.1. Instead, BNSF applies standards that have been consistently applied in recent SAC cases.

6. AEP Texas' Proposed Modification to the Board's Percentage Rate Reduction Approach Is Unwarranted

AEP Texas proposes a modification to the Board's percent rate reduction approach to determining the SAC maximum rate. This proposal would result in a substantially lower SAC maximum rate than under the Board's accepted rate reduction methodology. The Board need not reach this issue because revenues do not exceed costs under a properly performed SAC analysis. Apart from this, AEP Texas' proposal is flawed for many reasons and would have to be rejected if a rate reduction were warranted.

The predicate for AEP Texas' proffer of an alternative rate reduction approach is that the Board's percentage reduction approach is subject to "gaming" by the defendant. In the recent *CP&L* decision, the Board observed that a defendant railroad could manipulate the percent reduction method by "setting a challenged rate at an artificially high level to limit the impact of a SARR over-recovery."[12] That observation has absolutely no relevance here. AEP does not allege that BNSF set the challenged rates at an "artificially high level;" nor could it. The rates challenged in this case have been set at the level of the Board prescribed rates on the Rawhide movement. Those rates are presumptively reasonable, and not artificially high.

AEP Texas ignores the fact that the Board also found in *CP&L* that complaining shippers could "game" the percent reduction method by loading the SARR with highly rated non-issue traffic.[13] Here AEP Texas has attempted to manipulate the SAC analysis by including massive amounts of cross-over traffic in its stand-alone shipper group. The inclusion of revenues from

[12] *CP&L* at 32.

[13] *Id.* at 31.

cross-over traffic distorts the SAC analysis, allowing AEP to claim that it is entitled to a rate reduction on a rate that the Board has already determined to be reasonable. Although there is no need to invoke it here (because costs exceed revenues), BNSF identifies in Section III.G.5 of its narrative an alternative approach to calculating the percentage rate reduction which has the effect of mitigating the distortions caused by the introduction of cross-over traffic into the SAC analysis.

AEP Texas' claim that its alternative rate reduction procedure comports with Ramsey pricing procedures is wrong. The ICC determined that calculating Ramsey prices as a means to determine maximum reasonable rates was not feasible as a general matter due to the complexity of the undertaking.[14] The suggestion that AEP Texas has found a shortcut approach to determining relative demand elasticities is not credible. In fact, the procedures AEP Texas advocates provide no basis for determining Ramsey prices or relative demand elasticities. On the cross-over traffic movements that dominate AEP Texas' SARR, the revenue factors used by AEP Texas (calculated on the basis of the MSP revenue allocation procedure) are not prices for through service and they could not possibly reflect demand because there is no shipper demand for a portion of a through movement. Moreover, the marginal costs that AEP Texas claims to have calculated bear no relationship to the economic costs that must be used for purposes of calculating demand elasticities.[15]

The flaws in AEP Texas' supposed Ramsey calculations are set out in detail in section III.G.5 of BNSF's Reply Narrative and Exhibit III.G-1, the Declaration of Richard S. Higgins

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[14] *Coal Rate Guidelines* at 527.

[15] *See id.* at 532 n.31.

and Fred S. McChesney. Drs. Higgins and McChesney demonstrate that AEP's calculations are based on mutually contradictory assumptions and are inconsistent with Ramsey principles.

D. AEP TEXAS' CLAIMS RELATING TO COAL DELIVERIES PRIOR TO AUGUST 11, 2001 ARE BARRED BY THE STATUTE OF LIMITATIONS

Under 49 U.S.C. § 11705(c), a shipper must file a complaint with the Board to challenge the reasonableness of a rate within two years after a claim accrues. Under 49 U.S.C. § 11705(g), a claim accrues upon delivery or tender of delivery by the rail carrier. AEP Texas filed its complaint in this case on August 11, 2003. For deliveries of coal that occurred before August 11, 2001, any claim that AEP Texas had as to the reasonableness of rates is therefore time barred.

AEP Texas asserts two grounds for ignoring the plain language of the limitations provision contained in Section 11705(c). AEP Texas Opening Nar. at I-36. AEP Texas first argues that it "perfected" its challenge to the rates at issue here in November 2000 when the Board granted a limited reopening of the 1996 Decision. Alternatively, AEP Texas argues that the Board should toll the running of the statutory period on equitable grounds because the Board led AEP Texas to believe that it could challenge the reasonableness of the rates through a reopening of the 1996 Decision and that it therefore did not need to file a new complaint. AEP Texas asserts that the Board can apply such equitable tolling by exercising its exemption authority under 49 U.S.C. § 10502. *Id.* AEP Texas is mistaken on all counts.

1. The Limitations Period That Applies To AEP Texas' Complaint Begins With The Filing Of That Complaint, Not With The Initiation Of A Separate Reopening Proceeding.

The governing statute of limitations, 49 U.S.C. § 11705(c), is clear on its face: "A person must file a complaint to recover damages under section 11704(b) of this title within 2 years after the claim accrues." Moreover, the point in time that a claim accrues is clearly established by 49

U.S.C. § 11705(g), which states: "A claim accrues under this section on delivery or tender of delivery by the rail carrier." Neither provision contains any ambiguity or indication that there is any flexibility in how the limitation operates. Section § 11705 contains no provisions that give the agency discretion in applying the limitations period that Congress established.

The limitations period contained in Section 11705(c) is defined by reference to two specific events—the accrual of a claim and the filing of a complaint. Both events are easily identified in this proceeding. AEP Texas initiated this proceeding when it filed its verified complaint with the Board on August 11, 2003. There is no dispute about this date. Under Sections 11705(c) and (g), any claim that AEP Texas had with respect to rates on deliveries of coal before August 11, 2001 accrued outside the two-year period preceding the filing of AEP Texas' complaint. Section 11705(c) clearly and unequivocally bars those claims.

AEP Texas urges the Board to ignore the clear language of Section 11705(c), asserting instead that the limitations period is defined not by reference to the filing of a complaint, but by reference to the point at which a challenge to the reasonableness of a rate is "perfected." AEP Texas Opening Nar. at I-36. AEP Texas argues that it "perfected" its challenge to the reasonableness of rates for the movement of coal from non-Rawhide origins when the Board decided to reopen the 1996 Decision in its November 2000 Decision.

AEP Texas' theory about the "perfection" of a claim is an invention that has nothing to do with the statute at issue here. Section 11705(c) defines the limitations period by reference to the filing of a complaint. Whether AEP Texas "perfected" its right to pursue a limited reopening of the 1996 Decision when the Board issued its November 2000 Decision is beside the point. AEP Texas may not have been time barred in 2003 from pursuing a limited reopening of the 1996 Decision after negotiations between BNSF and AEP Texas terminated. However, AEP

Texas chose not to pursue that reopening and instead pursued a separate legal action that it initiated by filing a new complaint in 2003. The limitations period for AEP Texas' new claims under that complaint extends back two years from the date that the complaint was filed, August 11, 2003.

2. AEP Texas Cannot Avoid The Clear Language Of The Statute By Invoking The Doctrine Of Equitable Tolling

AEP Texas presents a fallback argument based on the doctrine of equitable tolling. Specifically, AEP Texas argues that it did not file a complaint within the limitations period for claims before August 11, 2001 because it was supposedly misled by the Board into believing that it could pursue a rate reasonableness challenge in the context of the reopened proceeding without any restrictions on the evidence that it could present. AEP Texas Opening Nar. at I-37. Because AEP Texas was supposedly misled by the Board into its belief that it did not need to file a complaint, AEP Texas argues, the Board should apply the doctrine of "equitable tolling" to extend the statutory period applicable to AEP Texas' 2003 complaint beyond the statutorily prescribed cut-off date, August 11, 2001. The doctrine of equitable tolling does not apply here.

First, the limitations statute is "jurisdictional" and therefore not subject to equitable tolling. When a statute of limitations governing proceedings before an agency or court is considered to be jurisdictional, it is immutable, leaving a court or agency completely without discretion to extend the time period, even at the request of a late-filing party who has been diligent in pursuing her claim. *Miller v. New Jersey Dept. of Corrections*, 145 F.3d 616, 617-8 (3rd Cir. 1998); *U.S. v. BCCI Holdings (Luxembourg)*, 916 F.Supp. 1276, 1282 (D.C. D.C. 1996). A limitations period that is jurisdictional is not subject to waiver, estoppel or equitable tolling. *See, Zipes v. Trans World Airlines, Inc.*, 455 U.S. 385, 393 (1982); *Heideman v. PFL, Inc.*, 904 F.2d 1262, 1265 (8th Cir. 1990); *Miller*, 145 F.3d at 617-8.

The Supreme Court has repeatedly held that the limitations period governing rate reasonableness complaints against common carriers is a jurisdictional statute that defines the scope of the agency's jurisdiction to exercise regulatory authority. *See, U.S. ex rel. Louisville Cement Co. v ICC*, 246 U.S. 638, 642 (1918) *superceded by statute on other grounds* ("We agree with the conclusion of the Commission that the two-year provision of the act is not a mere statute of limitations, but is jurisdictional—is a limit set to the power of the Commission as distinguished from a rule of law for the guidance of it in reaching its conclusion."); *Kansas City Southern Ry. Co. v. Wolf*, 261 U.S. 133, 139 (1923) (holding that the lapse of Section 11705's predecessor not only bars the remedy, but destroys any liability of the carrier as to those claims); *Danzer & Co. v. Gulf & S.I.R. Co.*, 268 U.S. 633, 636 ("On the expiration of the two year period, it was as if the liability had never existed."); *Louisville & N.R. Co. v. Sloss-Sheffield Steel & Iron Co.*, 269 U.S. 217, 227 (1925) ("It is true that the two-year requirement is jurisdictional."); *Midstate Horticulture Co. v Pennsylvania R.R. Co.*, 320 U.S. 356, 361-367 (1943). The strong deregulation policy and congressional desire to restrict the scope of ICC and Board regulation expressed in the Staggers Act and the ICCTA reinforce the Supreme Court's pre-Staggers Act findings that the statute is jurisdictional limit on the Board's regulatory authority.[16]

Second, regardless of how the statute of limitations is characterized, there are no circumstances here that would justify the application of the exceptional remedy of equitable

[16] One appellate decision has questioned the jurisdictional nature of Section 11705(g), although it did so without addressing the long line of Supreme Court precedent that is cited above, or the deregulatory policy of the Staggers Act and ICCTA. In *Atchison, Topeka and Santa Fe Ry. Co. v ICC*, 851 F.2d 1431, 1438-9 (D.C. Cir. 1988), the D.C. Circuit identified two arguments as potential support for construing the limitations periods of Section 11705 as non-jurisdictional. However, it found it unnecessary to explore the validity of those arguments, and it expressly declined to reach the issue of whether the statute is jurisdictional, concluding that the statute of limitations applied in the circumstances of that case whether the limitations provision was considered jurisdictional or not.

tolling. Courts have repeatedly held that equitable tolling is an extraordinary remedy that is used rarely, and only under extraordinary circumstances. *Irwin v. Department of Veterans Affairs*, 498 U.S. 89 (1990); *Smith v. McGinnis*, 208 F.3d 13, 17 (2nd Cir. 2000); *Miller,* 145 F.3d at 618. "Extraordinary circumstances" generally exist only where the failure to comply with the statute resulted from factors beyond the control of the litigant. *Harris v. Hutchinson*, 209 F.3d 325, 330 (4th Cir. 2000); *U.S. v. Cicero*, 214 F.3d 199, 203 (D.C. Cir. 2000).

AEP Texas contends that equitable tolling applies when a court or agency has misled a litigant into thinking that the litigant has done everything necessary to avoid operation of the statute of limitations. AEP Texas Opening Nar. at I-37. However, the courts apply equitable tolling only where there is affirmative conduct of the court or agency which actively misleads the litigant. For instance, in *Carlile v. South Routt School District RE 3-J*, cited by AEP Texas, the court allowed equitable tolling only because the court had issued (and the plaintiff relied on) an unsolicited and explicit order declaring that the plaintiff's case was considered commenced by the court, although the claim was otherwise untimely filed. 652 F.2d 981, 986 (10th Cir. 1981). In *North Carolina Alliance for Transportation Reform v. U.S. Dept. of Transportation*, the court allowed equitable tolling of the Equal Access to Justice Act's 30-day limitations provision in light of the fact that the conflicting 60-day limitations provision which was diligently observed by the plaintiff was created by that court's local rule to apply to the litigant's claim. 104 F.Supp.2d 559, 606 (D.C. N.C. 2000). In *Gonzalez-Aller Balseyro v. CTE Lenkurt, Inc.*, equitable tolling was permitted where the court's clerk had unambiguously told the plaintiff his improper filing would toll the limitations period while pursuing counsel. 702 F.2d 857 (10th Cir. 1983).

What does *not* trigger equitable tolling is mere uncertainty over the scope of existing legal standards. The proceedings in *ATSF*, for example, involved a long and "unfolding saga" over the applicability of a territorial average rate ceiling established by the Board. 851 F.2d at 1437. After five years of litigation, the ICC concluded that shippers had to file individual refund claims, even though many claims were now time barred under the two-year limitations period. The D.C. Circuit did not allow equitable tolling, characterizing the proceedings as "the stuff that adjudications are made of: the law is unclear; opposing parties mount reasonable arguments on both sides; the adjudicator says what the law is." *Id.* The court expressly found that everyday legal uncertainty "did not create any significant degree of unfairness much less the high degree of unfairness necessary for application of the equitable tolling doctrine." *Id.* at 1439.

There is nothing about AEP Texas' position in this case that would justify the application of equitable tolling here. The essence of AEP Texas' position is that it was misled by the Board into believing that the scope of a reopened proceeding would allow it to posit an entirely new set of SAC assumptions. But the Board did nothing to mislead AEP Texas. Ever since the Board first raised the possibility of a reopening in its 1996 Decision, the Board has consistently portrayed the reopening as a proceeding limited in scope. In the 1996 Decision, the Board noted that it would consider extending the Rawhide rate prescription based on "appropriate supplemental evidence" pertaining to the non-Rawhide mines. 1996 Decision, 1 S.T.B. at 644. In its November 2000 Decision, the Board again noted that the question was whether there was evidence that would allow it to extend the existing Rawhide prescription to the non-Rawhide movements. November 2000 Decision, slip op. at 4-5. In its March 2001 Decision, the Board again reiterated the limited nature of the proceedings, listing three categories of "supplemental evidence" the Board required. March 2001 Decision, slip op. at 3.

If AEP Texas refrained from filing a complaint challenging the non-Rawhide rates based on the belief that it would be able to mount a new, separate rate challenge in the context of a limited reopening, that view was the result of its own evaluation of the case law governing SAC proceedings. There is nothing approaching affirmative, misleading conduct by a tribunal that constitutes the "high degree of unfairness that is required for equitable tolling." *ATSF*, 851 F.2d at 1439.

3. The Board Cannot Grant An Exemption To The Statute of Limitations under Section 10502

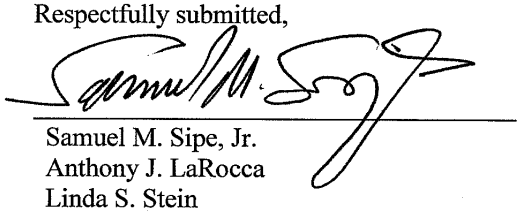
AEP Texas claims that the exemption provisions of Section 10502 give the Board the authority to toll the statute of limitations. But the plain language of the exemption provision makes it clear that Congress intended this provision to be used to limit the scope of regulatory oversight, not to expand it. The power to exempt conduct from regulation could not possibly be used to create jurisdiction over conduct that is otherwise outside the scope of the Board's authority. The courts have made it clear that the Section 10502 exemption authority is available only in situations where the Board is pursuing deregulation. In *Brae Corp. v. U.S.*, the D.C. Circuit held that the ICC's power under Section 10502 was limited to the power to deregulate and remove regulatory burdens. 740 F.2d 1023, 1055 (D.C. Cir. 1984). In light of the plain language of the statute and the legislative history, the court concluded that "any other reading would give the Commission cart blanche to rewrite the Interstate Commerce Act under the umbrella of its exemption powers." *Id.* The Board cannot use its exemption authority to expand its jurisdiction to cover a challenge to rates that is otherwise barred by the statute of limitations.

E. CONCLUSION

For the reasons explained above, the Board should dismiss AEP Texas' challenge to the reasonableness of rates for BNSF's transportation of PRB coal to the Oklaunion Station. Those

rates have never exceeded the maximum reasonable rates that the Board determined in its 1996 SAC calculations for the same transportation service at issue here. AEP Texas has provided no reason for concluding that the maximum reasonable rates for this transportation should be lower than the level already established by the Board in its 1996 SAC calculations.

Respectfully submitted,



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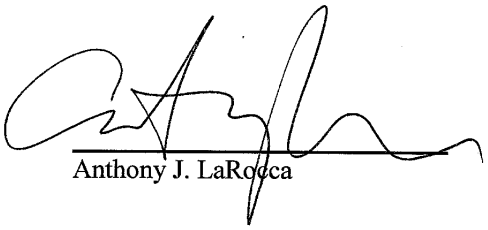
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May 24, 2004

CERTIFICATE OF SERVICE

I hereby certify that this 24th day of May, 2004, I served a copy of the foregoing Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company to the following by hand delivery:

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II. MARKET DOMINANCE

A. QUANTITATIVE EVIDENCE

1. Variable Costs

BNSF's reply evidence on quantitative market dominance is principally sponsored by Benton V. Fisher and Deborah G. Newland, who also sponsored BNSF's variable cost evidence on opening. On reply, Mr. Fisher and Ms. Newland provide a comprehensive critique of AEP Texas' opening evidence. They also present BNSF's updated variable costs for the Oklaunion movement. Anthony W. Deichert, BNSF's General Superintendent Coal Operations, sponsors evidence relating to Oklaunion train operations.

In BNSF's opening evidence, Mr. Fisher and Ms. Newland calculated BNSF's variable cost of service for moving coal from the Buckskin, Jacobs Ranch, Black Thunder and Eagle Butte mines in the PRB to AEP Texas' Oklaunion Generating Station near Vernon, Texas. In order to calculate BNSF's variable costs, they relied on 2001 and 2002 BNSF URCS unit costs.[1] They incorporated the results of a movement-specific study of locomotive ownership to adjust URCS system-average costs. For a few trains moving at the end of the Second Quarter 2003, they also incorporated the results of a movement-specific study of fuel consumption for recent AEP Texas movements. The traffic and operating characteristics they used were based on Oklaunion shipments that moved under the challenged common carrier rate, and were delivered on or after August 11, 2001. Movements occurring prior to Third Quarter 2001 were not costed as those movements are outside the statute of limitations. The BNSF Third Quarter 2001 through Second Quarter 2003 variable costs calculated by Mr. Fisher and Ms. Newland ranged

[1] As explained on opening, Mr. Fisher and Ms. Newland developed BNSF's URCS unit costs using standard Board procedures and publicly available documents. BNSF Opening Nar. at II-2.

between $8.98 and $10.45 per net ton, depending upon the origin mine and quarter. Since the challenged rate went into effect, AEP Texas has short-paid BNSF based on a rate of $13.68. The resulting revenue-to-variable costs ratios ("R/VC") based on the revenues BNSF has actually realized from these movements averaged between 1.31 and 1.52. Even using the rate challenged but not paid by AEP Texas, the R/VC ratios ranged between 1.62 and 1.78. BNSF Nar. at II-3, Table II.A-1 and Table II.A-2.

In its opening evidence, AEP Texas' witness, Joseph Plaistow, calculated that Second Quarter 2001 through Second Quarter 2003 variable costs ranged between $6.14 and $7.42 per net ton depending on the origin mine and quarter. Mr. Plaistow also estimated costs for movements that occurred prior to Third Quarter 2001 and other that occurred after Second Quarter 2003. AEP Texas' variable cost evidence was based on 2000, 2001, and 2002 BNSF URCS. Mr. Plaistow adjusted BNSF's URCS system-average costs to reflect the results of AEP Texas' alleged movement-specific studies.

As Mr. Fisher and Ms. Newland explain, a substantial amount of the difference between AEP Texas' and BNSF's variable-cost evidence is attributable to the parties' development of road-property costs. BNSF used system-average road-property costs. Despite BNSF's representations to AEP Texas that the segment-specific data produced by BNSF cannot be used to develop a reliable ownership cost for any route, AEP Texas sponsors a route-specific adjustment using these data. As a result, AEP Texas substantially understates net investment for the line segments traversed by the Oklaunion trains. Moreover, AEP Texas' approach to calculating road-property ownership is flawed because, among other things, it fails to adjust the variability factor to reflect the densities on the issue route. This and the other differences between the parties are discussed further below.

The remainder of the difference between the parties' variable cost evidence is principally a result of AEP Texas'

- improper use of SFGT to adjust BNSF's system-average MOW costs;
- misapplication of BNSF's maintenance contracts with third parties to develop an adjustment to BNSF's system-average locomotive maintenance costs;
- improper reliance on abandoned availability guarantees in BNSF's locomotive maintenance contracts to estimate the locomotive spare margin;
- use of system-average locomotive ownership and lease costs;
- flawed development of BNSF's crew wage costs;
- flawed development of switching costs;
- improper development of freight-car ownership, lease and operating costs;
- development of helper costs based on a flawed study of the frequency that Oklaunion trains are helped;
- failure to adjust the BNSF URCS to include Account 90 and exclude Account 76; and
- use of the obsolete URCS linking factor.

Following the filing of opening evidence and pursuant to *Ex Parte No. 638*, the parties participated in a technical conference and held additional meetings in order to reach agreement to the extent possible on traffic and operating characteristics for use in the variable-cost calculations. The parties stipulated to many of the traffic and operating characteristics of the AEP Texas movement.[2] The parties' agreements on these characteristics extend only to the mines and time periods that both parties costed in their opening evidence. As BNSF explained in its opening evidence, it does not believe that the Board should develop, or has sufficient data to

[2] BNSF Reply electronic workpapers "Letter to the Board 3_30.pdf," "Letter to the Board 4_12.pdf," Letter to the Board 5_3.pdf," and "Letter to the Board 5_12.pdf."

develop, costs for certain mine origins and time periods. As to those movements, AEP Texas submitted traffic and operating characteristics, many of which were estimated or extrapolated based on shipments from other mines or that occurred in other quarters. BNSF has not investigated the validity of those characteristics. BNSF acknowledges that if the Board does not accept BNSF's position that variable costs should not be developed for those mines and time periods, the only information in the record as to the traffic characteristics for those movements is the data submitted by AEP Texas. However, if the Board used those data on traffic characteristics to calculate variable costs, it should apply the variable-cost methodologies used by BNSF to develop variable costs. BNSF presents evidence in this Reply showing how AEP Texas' data on traffic characteristics could be used with BNSF's costing methodologies to produce variable costs for all moves (including the low volume movements that BNSF did not cost) that occurred between Third Quarter 2001 and Second Quarter 2003, inclusive.[3]

In this Reply, Mr. Fisher and Ms. Newland have adjusted their calculation of variable costs for Third Quarter 2001 through Second Quarter 2003 to reflect the *Ex Parte No. 638* agreement. First and Second Quarter 2003 costs have been updated to reflect BNSF's 2003 URCS. Mr. Fisher and Ms. Newland have also adjusted their calculations to accept certain movement-specific adjustments after correcting AEP Texas' calculation and methodological errors described below and to address some minor errors in BNSF's opening evidence. The resulting variable costs for Third Quarter 2001 through Second Quarter 2003 in this reply evidence range from $8.88 to $11.57 per net ton. The resultant R/VC ratios based on the revenues BNSF has actually realized from these movements averaged between 1.18 and 1.54.

[3] As BNSF explains in its Argument, the Board does not have jurisdiction over moves occurring before the Third Quarter 2001. As to moves after the Second Quarter 2003, there are insufficient data on which variable costs can be calculated.

Even using the rate challenged but not paid by AEP Texas, the R/VC ratios ranged between 1.29 and 1.85. The R/VC ratios are set out below in Section II.A.2., Table II.A-6 and Exhibit II.A-1.

The organization of this section of the narrative is consistent with the Board's Decision on *General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases.*[4] Section II.A.1.a. addresses the difference in the general cost-estimating procedures used by each party. Section II.A.1.b. describes the remaining differences in the traffic and operating characteristics used by each party and explains why the assumptions used by Mr. Fisher and Ms. Newland in areas where the parties could not reach agreement are superior to AEP Texas'. Section II.A.1.c. examines the differences in certain cost adjustments made by the parties. Finally, Section II.A.2. presents the variable costs and R/VC ratios for Third Quarter 2001 through Second Quarter 2003.

a. Differences in General Cost Estimating Procedures

(1) General Overhead Ratio for Return on Investment

The Board recognized in *TMPA* that "unless the construction projects included in Account 90 are long-term in nature," it is appropriate and consistent with ICC precedent to *include* expenditures in Account 90 (Construction in Progress) and *exclude* expenditures in Account 76 (Interest During Construction) when determining the General Overhead ratio for Return on Investment.[5] AEP Texas presented no evidence in its case-in-chief to meet its burden of showing that the "construction projects included in Account 90 are long-term in nature." Accordingly, BNSF's variable-cost evidence properly includes the adjustment to BNSF URCS to include Account 90 and to exclude Account 76. Because AEP Texas did not make this same

[4] *Ex Parte No. 347 (Sub-No.3)* (STB served March 12, 2001).

[5] *TMPA* at 40.

adjustment in its opening evidence, AEP Texas understated the URCS General Overhead ratio for Return on Investment and, as a result, understated the variable costs of service for Oklaunion trains.

(2) Other Mine Origins and Time Periods

There are a number of differences between the time periods and mine origins costed by each party.

First, AEP Texas costed shipments that moved outside the statute of limitations, *i.e.*, shipments that were delivered more than two years prior to the August 11, 2003 filing of AEP Texas' complaint. BNSF did not cost these shipments. As BNSF explains in the Argument, the Board does not have jurisdiction to review the reasonableness of these rates.

Second, AEP Texas costed shipments that moved in Third and Fourth Quarters 2003 and First Quarter 2004 – after the date for which discovery data were available. BNSF costed shipments through Second Quarter 2003. At the beginning of the case, the parties agreed that BNSF would produce data for shipments that moved through Second Quarter 2003. As a result, AEP Texas does not have data from which to calculate variable costs for shipments in the most recent periods. Specifically, AEP Texas had insufficient data from which to derive cycle times, number of locomotives, round-trip miles, and crew operations. Therefore, to develop variable costs for Third Quarter 2003 through First Quarter 2004, AEP Texas generally hypothesized these critical items based on data from prior quarters. The resulting calculations are little more than a guess as to the actual variable costs of those movements.

One problem with AEP Texas' approach to costing post-Second Quarter 2003 movements is that significant operational changes have been made to the Oklaunion train. These changes included the addition of approximately eleven cars in June 2003, increasing the

Oklaunion train's ideal tender to 128; and a change in the routing between Pueblo, Colorado, and Amarillo, Texas in September 2003. In light of these changes, the use of operating assumptions from prior quarters will obviously produce distorted costs. In prior cases, the Board has rejected variable-cost evidence for periods in which there was insufficient evidence in the record.[6] Consistent with that precedent, the Board should reject AEP Texas' hypothesized variable-cost estimates for Oklaunion shipments that moved after Second Quarter 2003.

Third, AEP Texas sponsored Second Quarter 2003 variable-cost estimates for six PRB mine origins from which it originated no coal destined for Oklaunion under the challenged rates.[7] It also sponsored Second Quarter 2003 variable costs for four other mines from which AEP Texas had originated coal in prior quarters, but originated no coal in Second Quarter 2003.[8] In *TMPA*, the complainant also submitted variable-cost evidence relating to mines from which no coal had moved under the challenged rate during the period costed. Because there was insufficient information to develop variable costs for such hypothetical movements, the Board rejected such evidence, and it should do so here.[9]

Fourth, AEP Texas calculated variable costs for shipments from the Rawhide mine. During the period costed, the Rawhide shipments to Oklaunion moved under a Board prescribed rate and are not subject to challenge in this proceeding. Since the filing of opening evidence, however, the Board has vacated the rate prescription for shipments from Rawhide, and AEP Texas has filed a supplemental complaint to include in this proceeding a challenge to the rate

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[6] *TMPA* at 38.

[7] Belle Ayre, Dry Fork, Fort Union, Clovis Point, Rochelle, and Coal Creek.

[8] Buckskin, Black Thunder, Jacobs Ranch, and North Rochelle.

[9] *TMPA* at 38.

charged for Rawhide shipments originating on or after April 18, 2004. BNSF is appealing the Board's decision to vacate the Rawhide prescription.[10]

Finally, AEP Texas costed shipments from each mine that originated any coal destined for Oklaunion in the quarter costed. BNSF costed movements from a mine origin in a quarter only if that mine accounted for at least ten percent of the total coal originated to Oklaunion in that quarter. By applying a ten-percent threshold, BNSF eliminated mine origins from which four or fewer shipments originated. BNSF believes that such a limited number of trains provides insufficient information from which to develop reliable variable costs. Nevertheless, BNSF has included in BNSF Reply Exhibit II.A-1 variable-cost estimates for such shipments. To develop these estimates, Mr. Fisher and Ms. Newland relied on the traffic and operating characteristics used by AEP Texas in its opening evidence with the exception of switching, helper services, and locomotive consist size. For locomotive consist size, they use AEP Texas' consist size assumptions set forth in the parties' joint letter to the Board dated April 12, 2004. They apply the same costing methodologies that they use in this reply evidence to develop variable costs for the quarters and mines costed on opening.

b. Differences in the Traffic and Operating Characteristics Developed By BNSF and AEP Texas

Table II.A-1 sets forth a comparison of the traffic and operating characteristics for the issue traffic used by the parties to develop BNSF's First Quarter 2003 variable costs for the issue movements from Eagle Butte. The traffic and operating characteristics by quarter and by mine

[10] In addition, discovery in this case did not cover Rawhide movements so there is an inadequate basis in the record to make calculations for Rawhide. Nevertheless, as it has done in other areas, BNSF calculates variable costs for the Rawhide movement for Second Quarter 2003 using AEP Texas' proposed characteristics and BNSF's costing assumptions. These calculations are included in BNSF Reply Exhibit II.A.1.

origin for all shipments costed are presented in BNSF Reply Exhibit II.A-2. Table II.A.1 and Exhibit II.A-2 reflect the *Ex Parte No. 638* agreements on traffic and operating characteristics. Discussion of the differences between the parties' evidence on traffic and operating characteristics follows the table.[11]

Table II.A-1
Comparison of the Parties' Traffic and Operating Characteristics for Movements Originating at Eagle Butte to Oklaunion Station
First Quarter 2003

Item	BNSF Reply	AEP Texas Opening*
1. Name of origin mines	Eagle Butte	Eagle Butte
Name of destination	Oklaunion Station	Oklaunion Station
2. Milepost(s) at origin	MP 9.5 Campbell Sub (Eagle Butte)	MP 9.5 Campbell Sub (Eagle Butte)
Milepost at destination	MP 155.5 Red River Valley Sub (Oklaunion)	MP 155.5 Red River Valley Sub (Oklaunion)
3. Annual tons	See Below	See Below
4. Date of first shipment	January 4, 2003	January 4, 2003
5. Alpha-numeric car type	See Below	See Below
6. Weight of lading per car (in tons)	{ }	{ }
7. Tare weight per car (in tons)	{ }	{ }
8. Identity of car owner	BNSF	BNSF
9. Identity of locomotive owner	BNSF	BNSF
10. Car lease rental (railroad supplied cars)	See Below	See Below
11. Locomotive lease rental	See Below	See Below
12. Present rates per net ton (1Q 04)	$18.83	$18.83
13. Proposed rate	N/A	N/A
14. Initial rate and effective date	See Below	See Below
15. Amounts (or percent) of rate escalation and date	N/A	N/A
16. Cars per train or per shipment	{ }	{ }
17. Loaded miles (excluding loop track)	1,111.1	1,111.1
18. Empty miles	1,109.1	1,109.1
19. Length of origin loop track	Loaded: 3.32 Empty: 4.28	Loaded: 3.32 Empty: 4.28
20. Length of destination track	Loaded: 4.7 Empty: 5.1	Loaded: 4.7 Empty: 5.1
21. Number of locomotive units	3.47	3.47

[11] Although the inputs listed in Table II.A.1 are limited to First Quarter 2003 movements, the discussion following the table applies to all issue movements for all quarters.

Item	BNSF Reply	AEP Texas Opening*
22. Loading hours	Included in Item 24	Included in Item 24
23. Unloading hours	Included in Item 24	Included in Item 24
24. Cycle hours	{ }	{ }
25. Number of train sets	N/A	N/A
26. Trips/year per train set	N/A	N/A
27. Crew districts, loaded	See Below	See Below
28. Crew districts, empty	See Below	See Below
29. Turnaround crews	See Below	See Below
30. Locomotive units required	See Below	See Below
31. Cars required (RR-supplied)	See Below	See Below
32. Cabooses	N/A	N/A
33. Locomotive spare margin	{ }	{ }
34. Car spare margin	See Below	See Below
35. Switching by road-haul locomotives	0.63 minutes/car	0 minutes/car
36. Switching by yard locomotives	4.27 minutes/car	0.02 minutes/car
37. Helper service	See Below	See Below
38. Helper crew	See Below	See Below
39. Location of interchanges	N/A	N/A
40. Location of inter- and intra-train switches	N/A	N/A

*Adjusted to reflect the *Ex Parte No. 638* agreements on various traffic and operating inputs.

(1) Name of Mines and Power Plant (Item 1)

The parties agree that from Third Quarter 2001 through Second Quarter 2003, AEP Texas originated coal destined for Oklaunion Generating Station from the following PRB mines: Black Thunder, Buckskin, Caballo, Caballo Rojo, Cordero, Eagle Butte, Jacobs Ranch, North Rochelle, and Rawhide.[12] As discussed above, however, AEP Texas also presents Second Quarter 2003 variable costs for ten PRB mine origins from which it is undisputed that no Oklaunion coal originated in that quarter.[13]

[12] BNSF Opening electronic workpaper "opstats.xls."

[13] *See* mines lined in n.6, 7.

(2) Annual Tons (Item 3)

The parties generally agree on the annual tons originated during the period Second Quarter 2001 to Second Quarter 2003.

(3) Alpha-Numeric Car Type (Item 5)

The parties agree that the plain gondolas (AAR car types J and G) are the predominant car type used in Oklaunion service. They also agree that the remaining cars used in Oklaunion service are special service open-top hoppers (Type K) and general service open-top hoppers (Type H). They disagree, however, on the mix of units and the appropriate methodology used to calculate car costs. These issues are discussed below in Section II.A.1.c.(12).

(4) Locomotive Lease Rental (Item 11)

BNSF acquired the locomotives used to power Oklaunion trains through purchases and operating leases. BNSF used detailed accounting data produced by BNSF in discovery to calculate locomotive ownership costs. AEP Texas used URCS system-average locomotive ownership costs.[14] The differences between the parties are described below in Section II.A.1.c.(14)(b).

(5) Initial Rate and Effective Date (Item 14)

BNSF charged a rate of $15.78 per net ton for all non-Rawhide movements of the issue traffic from August 11, 2001 until August 2002. In August 2002, the rate increased to $17.25 per net ton. In May 2003, the rate increased to $18.04 per net ton and was applied to all

[14] BNSF Opening electronic workpaper "AEP Loco Ownership.xls." and AEP Opening electronic workpapers "VC AEPTEX Open 2000.123," "VC AEPTEX Open 2001.123," "VC AEPTEX Open 2002.123," and "VC AEPTEX Open 2003.123."

shipments until the end of 2003.[15] Notwithstanding BNSF's establishment of the above rates, AEP Texas has paid and continues to pay $13.68 per net ton.

(6) Crew Districts, Loaded Direction (Item 27)

The parties generally agree on the crew districts in the loaded direction, for the period Second Quarter 2001 to Second Quarter 2003.[16] AEP Texas misidentified, however, the starting point of the first crew district as "PRB mine origins" and the ending point of the last crew district as "Oklaunion." The first district commences at Gillette, Wyoming, and the last district terminates at Wichita Falls, Texas.

(7) Crew Districts, Empty Direction (Item 28)

The parties agree that, from Second Quarter 2001 to Second Quarter 2003, the Oklaunion train typically traveled, in reverse direction, the same crew districts traversed by the loaded train. See Crew Districts, Loaded Direction (Item 27) above.

(8) Turnaround Crews (Item 29)

Except for BNSF's Gillette-based loading crews that operate trains loading at Black Thunder, most BNSF crews that work the Oklaunion trains operate in straight-away service.

(9) Locomotive Units (Item 30)

The parties agree that the Oklaunion trains are powered predominantly by 4,000 HP SD70MACs drawn from BNSF's Alliance locomotive pool. At the *Ex Parte No. 638* Technical Conference, the parties stipulated to the number of locomotive units used on the Oklaunion trains

[15] When the rate changed during a quarter, Mr. Fisher and Ms. Newland applied a weighted average rate that reflected all shipments that occurred in the quarter to calculate R/VC ratios. AEP Texas used the rate in effect at the end of the quarter, thereby producing overstated R/VC ratios.

[16] AEP Texas Opening Nar. at II-A-26.

for the movements that both parties costed on opening.[17] The parties disagree on the development of locomotive ownership and maintenance costs for the units that powered the Oklaunion trains. These issues are discussed below in Section II.A.1.c.(14).

(10) Locomotive Spare Margin (Item 33)

Mr. Fisher and Ms. Newland include a locomotive spare margin based on data produced to AEP Texas in discovery showing the actual availability and utilization of the locomotives used to power the Oklaunion trains.[18] Their development of the spare margin is described in Section II.A.1.b.(1)(b) of BNSF's Opening evidence. AEP Texas relied on system-average locomotive ownership costs which already incorporate a spare margin. Nevertheless, AEP Texas developed a separate annual locomotive spare margin for each year 2000 through 2003, but does not use those spare margins to calculate locomotive-ownership costs.[19] To develop its spare margins, AEP Texas misapplied BNSF's locomotive maintenance contracts to estimate a factor that is significantly below BNSF's actual spare margin. The difference between the parties' development of locomotive spare margin is described below in Section II.A.1.c.(14)(a).

(11) Car Spare Margin (Item 34)

BNSF uses URCS system-average car costs that incorporate spare-margin requirements for the Oklaunion train. AEP Texas uses a car spare margin that is based on a flawed and irrelevant study of spare-car requirements for shipper-owned equipment, as set forth in BNSF

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[17] BNSF Reply electronic workpaper "Letter to the Board 4_12.pdf."

[18] BNSF Opening electronic workpaper "Spare Margin.xls."

[19] AEP Texas Opening electronic workpapers "2000 LOCO MAINT AEPTEX.123," "2001 LOCO MAINT AEPTEX.123," "2002 LOCO MAINT AEPTEX.123," and "2003 LOCO MAINT AEPTEX.123."

coal transportation contracts.[20] The difference between the parties is discussed below in Section II.A.1.c.(12)(b).

(12) Helper Service (Item 37)

The parties disagree on the location of the helper services that assist the Oklaunion train. To the extent the parties agree that a particular helper service assists the Oklaunion trains, they disagree as to the frequency that the helper services assist the Oklaunion train. These issues are discussed below in Section II.A.1.c.(11).

(13) Helper Crews (Item 38)

See Helper Service (Item 37) above.

(14) Joint Facility Payments (Item 41)

The parties agree on the joint facilities used by Oklaunion trains but differ on how payments should be treated in developing BNSF's variable costs. These differences are discussed below in Section II.A.c.(16).

c. Differences in Variable Costs Developed by BNSF and AEP Texas

Table II.A-2 compares AEP Texas' Opening cost calculations with BNSF's Reply calculations for shipments originating from Eagle Butte in First Quarter 2003. For this comparison, Mr. Fisher and Ms. Newland adjusted AEP Texas' opening evidence to reflect the traffic and operating characteristics to which the parties agreed pursuant to *Ex Parte No. 638* subsequent to the filing of opening evidence in this proceeding.[21] BNSF Reply Exhibit II.A-3

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[20] AEP Texas Opening electronic workpaper "Shipper Contract Spare Margin.123."

[21] To adjust AEP Texas' evidence to reflect the *Ex Parte No. 638* agreement on various traffic and operating characteristics, Mr. Fisher and Ms. Newland simply replaced the relevant inputs in AEP Texas' variable-cost program with the stipulated values. BNSF Reply electronic (Continued ...)

presents similar comparisons for each issue movement by origin mine, rate, and quarter. The differences between the parties' calculations of the individual cost components are discussed in detail below.

Table II.A-2
Comparison of Variable Costs Per Carload and Ton
Eagle Butte Mine to Oklaunion Station
First Quarter 2003

Item	BNSF Reply	AEP Texas Opening*	Difference
1. Carload O/T - Clerical Expense	{ }	{ }	$1.98
2 Carload Handling - Other Expense	{ }	{ }	$0.00
3. Switching Expense - Yard Locos	{ }	{ }	($24.92)
4. Loop Track Expense (GTM and LUM)	{ }	{ }	$2.13
5. Switching Expense - Road Locos	{ }	{ }	($2.05)
6. Gross Ton-Mile Expense (GTM)	{ }	{ }	($127.18)
7. Train-Mile Expense – Other Than Crew	{ }	{ }	($1.81)
8. Locomotive Unit-Mile Expense (excl.uding Ownership)	{ }	{ }	($35.84)
9. Train-Mile-Expense - T&E Crew	{ }	{ }	($6.86)
10. Helper Expense - LUM	{ }	{ }	$2.72
11. Helper Expense - Crew	{ }	{ }	$2.66
12. Freight Car Expense (RR-Owned Only)	{ }	{ }	($75.52)
13. User Responsibility for Freight Car Repairs	{ }	{ }	$0.00
14. Loss & Damage Expense	{ }	{ }	$0.00
15. Locomotive Ownership Expense	{ }	{ }	($92.90)
16. EOTD Ownership Expense	{ }	{ }	$0.09
17. Joint Facility Charge	{ }	{ }	$8.28
18. Total Variable Cost per Carload (Lines 1-18)	$1,142.56	$793.36	($349.20)
19. RFA-URCS Linking Factor	N/A	0.9934	N/A
20. Linked Variable Cost Per Carload	**$1,142.56**	**$788.13**	**($354.43)**
21. Net Tons Per Carload	109.9	109.9	0.00
22. Variable Cost Per Ton	**$10.40**	**$7.17**	**($3.23)**
23. Rate Per Ton	$17.25	$17.25	$0.00

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workpapers "VC AEPTEX Open 2001_Revised.123," "VC AEPTEX Open 2002_Revised.123," and "VC AEPTEX Open 2003_Revised.123."

Item	BNSF Reply	AEP Texas Opening*	Difference
24. R/VC Ratio	**1.66**	**2.41**	**0.75**

*Adjusted to reflect the *Ex Parte No. 638* agreements on various operating and traffic characteristics.

(1) Carload Originated or Terminated – Clerical

Both parties apply the standard *Ex Parte No. 399* trainload adjustment to URCS system-average unit costs for station clerical expense. Differences between the parties are a result of Mr. Fisher and Ms. Newland's use on reply of BNSF's 2003 URCS to develop variable costs for shipments in the first two quarters of 2003.

(2) Carload Handling – Other

The parties stipulated to carload handling costs used to calculate variable costs for the issue movement.[22]

(3) Switching Expenses - Yard Locomotive

The parties differ on their development of yard switching costs. On opening Mr. Fisher and Ms. Newland relied on URCS system-average switching. In developing the URCS switching costs, Mr. Fisher and Ms. Newland applied the *Ex Parte No. 399* trainload adjustments to reflect the efficiencies of coal unit-train service.[23] AEP Texas relies on a flawed study to support an implausible *less-than-two seconds per train* of yard switching for the Oklaunion train.[24]

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[22] BNSF Reply electronic workpaper "Letter to the Board 4_12.pdf."

[23] As the URCS switching costs include switching at origin and destination, they did not develop origin and destination loop track costs.

[24] AEP Texas Opening Exh. II-A-25.

AEP Texas' study is based on the erroneous assumption that BNSF's Train Activity Reports ("TARs") reflect yard switching. The TARs on which AEP Texas based its study were completed by road crews. Road crews, however, seldom perform yard switching, particularly at Alliance and Guernsey – the two major yards where the Oklaunion train is worked and bad order cars are switched. Yard crews, who perform the majority of switching in yards, do not complete TARs. Thus, it is not surprising that AEP Texas' study of road crew TARs yielded just two instances of yard switching in more than 100 trains.[25]

Other data that BNSF produced in discovery clearly show that yard switching activity on the Oklaunion train is considerably more frequent than once every 51 trains. BNSF's train movement data includes car count information that records the number of cars on the Oklaunion train when it arrived at the yard and the number of cars on the train when it departs. A change in car counts indicates that switching occurred on the train. This approach has its limitations, however, since it detects switching only when the total car counts changes from arrival to departure and reflects only the absolute change in car counts. If, for example, three cars were switched out at Alliance and three fill cars were switched in, the switching activity would not be reflected by comparing the car counts as the train arrived and departed with the same number of cars. Similarly, if three cars were switched out and four cars were switched in, the train movement records would confirm only that at least one car was switched. Even with these limitations, the train movement records reflect markedly higher yard switching than AEP Texas' study suggests.[26]

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[25] *Id.*

[26] For a sample of 42 Oklaunion shipments from the train movement records submitted with its opening evidence, BNSF identified changes in absolute car counts on more than 60

(Continued ...)

AEP Texas further understates BNSF switching costs by applying the URCS system-average I&I switching cost.[27] That URCS-generated cost is heavily influenced by block switching between manifest trains. Switching on unit coal trains, however, generally involves only one or two cars at a time. The switching can also be more time consuming as it takes considerably longer to cut out a bad order car from the middle of a coal train, than to cut out a block of fifty cars from the end of a general-freight train. On a per-car basis, the difference is even more significant. Assume, for example, that it took 30 minutes to cut out a bad order car from a unit coal train and spot it on the RIP track, and that it took 20 minutes to cut out a block of 50 cars from the end of a merchandise train and spot them on an industry track. This equals 30 minutes per car of switch on the unit coal train versus less than 30 seconds per car on the general-freight train. Clearly, I&I switching, which is largely reflective of the block switching between manifest trains, substantially understates the time it takes to switch single cars on unit trains.

(4) Origin and Destination Loop Track Expenses

The parties stipulated to the loaded and empty loop track miles at origin and destination. Because BNSF used system-average switch minutes, which includes expenses associated with loop-track operations, BNSF did not separately calculate loop-track expenses. In any event, AEP Texas' development of loop-track expenses relies on understated locomotive maintenance costs.

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percent of the trains at Alliance and Guernsey. BNSF Reply electronic workpaper "train movement examples.xls."

[27] *Id.*

(5) Switching Expense - Road Locomotive - Non Yard Tracks

AEP Texas also performed a study to identify frequency of switching en route. AEP Texas identified 26 cars switched out en route to Oklaunion on 59 trains.[28] For each car switched, AEP Texas applied URCS system-average I&I switching costs. BNSF does not take issue with this frequency, but disagrees with the use of average I&I time that AEP Texas applies to each of these switches.

As explained in Section II.A.1.c.(3) above, application of I&I switching to coal-unit trains is inappropriate and substantially understates the actual switching cost for yard switching. The understatement is even more dramatic for en route switching of bad order cars. When a crew is alerted to a problem with a car it must stop the train and walk the length of the train until it locates the problem. It must then cut-out the offending car, which, unless the bad order car is at either end of the train, requires the crew to split the train and reposition the trainset so that the bad order car can be accessed, cut out, and, moved to a siding. The train must then be reassembled. This can be an intensive, time-consuming activity measured in hours, not minutes.

AEP Texas also understates the number of switches necessary to return to Alliance or Guernsey on manifest trains a car that was removed as bad order. Each time a car is switched from one train to another counts as two switches (one switch off the first train and one switch on to the second train). AEP Texas apparently includes only one switch for these events.[29]

(6) Gross Ton-Mile Expense

Disagreement on gross ton-mile ("GTM") expense accounts for most of the total difference between the parties' variable-cost evidence. GTM expenses include expenses

[28] AEP Texas Opening electronic workpaper "AEP-Tex Train Dispatch Summary.123."

[29] AEP Texas Opening electronic workpaper "AEP TX switching summary.123."

associated with maintenance of way, road-property ownership, fuel, locomotive maintenance, and other locomotive and train administrative activities. The parties' disagreements encompass all of these categories. The differences between BNSF's and AEP Texas' GTM expense per carload for the representative movement used in this Reply (*i.e.*, Eagle Butte-Oklaunion Station, First Quarter 2003) are shown in Table II.A-3.

Table II.A-3
Comparison of GTM Expense Per Carload
Eagle Butte to Oklaunion Station
First Quarter 2003

Item	BNSF Reply	AEP Texas Opening*	Difference
Maintenance of Way	$71.26	$52.15	($19.11)
Road Property Ownership	{ }	{ }	($145.31)
Fuel	$92.87	$91.07	($1.81)
Locomotive Maintenance**	{ }	{ }	$5.69
Other GTM	$61.96	$56.21	($5.74)
TOTAL	**$476.01**	**$298.35**	**($177.66)**

*Adjusted to reflect the *Ex Parte No. 638* agreements on various traffic and operating characteristics.
**Excludes costs associated with AEP Texas' application of the departmental overhead, which are included in "Other GTM" for comparison to BNSF's expenses.

(a) Maintenance of Way ("MOW")

On opening, Mr. Fisher and Ms. Newland developed variable costs using BNSF's URCS system-average MOW costs. In its opening, AEP Texas sponsors a flawed "route-specific" adjustment to BNSF's system-average costs using the SFGT formula that the Board rejected in *TMPA* as obsolete.[30] AEP Texas makes no effort to address the numerous deficiencies in the decades' old SFGT formula that caused the Board to reject its use in *TMPA*. Rather AEP Texas claims to have "benchmarked" the SFGT formula against BNSF's actual MOW costs for the issue route. But AEP Texas' calculation of BNSF's purported actual MOW costs relies on BNSF engineering cost center data that are incomplete and unusable for the purpose of

[30] *TMPA* at 54-55.

developing a route-specific MOW cost. BNSF identified and explained these concerns when it produced the data.[31] Nevertheless, AEP Texas attempts to develop a route-specific MOW cost to validate its use of the SFGT formula. In doing so, AEP Texas not only uses data that cannot reliably be used for such a purpose, it uses a methodology that is fundamentally flawed, inconsistent with URCS, and rife with errors. As a result, AEP Texas' estimate of BNSF's MOW costs significantly understates BNSF's actual MOW costs for the issue route. The engineering cost center data cannot be relied upon to calculate variable MOW costs or to validate SFGT.

To calculate its adjustment, AEP Texas performs the following steps. AEP Texas first identifies from the BNSF discovery data approximately { } million in 2001 MOW expenditures showing specific location IDs along the issue route.[32] AEP Texas divides its calculation of BNSF's segment-specific expenditures by the segment's corresponding GTMs to develop a direct cost per gross ton-mile for each segment.[33] It adds to the direct costs an allocation that purportedly captures expenses BNSF reports to a state level but does not assign to specific locations. Next, AEP Texas identifies the miles that each segment is traversed by Oklaunion trains and attempts to incorporate the different mix of routes that are used. It then weights the results for each segment by the number of AEP Texas gross ton- miles to produce an average 2001 MOW expenditure of { } per million GTM ("MGTM") for the AEP Texas route.[34] AEP Texas increases this result by { } percent to account for expenses BNSF

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[31] BNSF.RP.WP.II.A-0005 to 0006.

[32] AEP Texas Opening Exh. II-A-11 and electronic workpaper "Total Route-2001 Origins loc.xls," Tab "Route - Jacobs Ranch."

[33] *Id*

[34] *Id.*

reports at only a system-wide level, based on a study BNSF produced in discovery, but then reduces this result by { } percent,[35] purportedly to account for the difference between the MOW data by cost center that BNSF provided in discovery and the expenditures reported in Schedule 410 to the R-1.

Next, AEP Texas applies the URCS system-average variability for running MOW of 66 percent to the result for the AEP Texas route.[36] Finally, AEP Texas compares its result ($237 per MGTM) to the URCS variable running MOW system-average cost ($359 per MGTM) and concludes that MOW costs for the issue route are only two-thirds (66 percent) of BNSF's system-average MOW costs.[37]

AEP Texas then develops MOW costs for the issue route using the SFGT formula and compares the results of its two methodologies. AEP Texas claims that the results are close enough to validate SFGT. It then uses SFGT results to adjust BNSF's system-average MOW costs to calculate variable costs for the Oklaunion movement.

AEP Texas commits several errors in its calculation of the engineering cost center data-based benchmark. Specifically, AEP Texas

1. ignores the fact that the records it compiled for the issue route do not reflect all MOW expenses associated with the issue route;

2. includes a UP segment over which BNSF operates the Oklaunion trains via trackage rights and misapplied the mix of routes that were used;

3. incorrectly assumes that the difference between BNSF MOW cost center data and MOW expenditures reported in Schedule 410 to the R-1 was attributable to the AEP Texas route;

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[35] AEP Texas Opening Exh. II-A-11 and electronic workpaper "Total Route-2001 Origins loc.xls," Tab "MOW Adj Ratio - Jacobs Ranch."

[36] *Id.*

[37] *Id.*

4. incorrectly applies the URCS system-average variability factor to the segment specific results; and

5. inappropriately uses expense data from only one year, despite the fact that URCS recognizes a longer maintenance cycle and normalizes roadway maintenance costs over a five-year period.

i) AEP Texas Ignores The Fact That The Data On Which It Relies Do Not Reflect All MOW Expenses Associated With The Issue Route

In discovery, BNSF explained to AEP Texas that a significant amount of MOW expenses reported to BNSF cost centers and in Schedule 410 to the R-1 is not reflected in any line-specific data maintained by BNSF.[38] Certain MOW expenses are recorded at only a system, regional, or supervisory level.

A significant component of expenses recorded at system, regional, or supervisory levels is BNSF's contract maintenance activities. Payments for rail grinding, vegetation control, and other maintenance functions performed by third parties are not reported to specific line segments but are maintained at the system level. Another example is replacement parts, the cost of which may be charged to the regional location of the manager who placed the order even though the parts are used in various locations. It is also common for BNSF to record ballast expenditures at the system level because of difficulties in associating the underlying Authorization for Expenditure ("AFE") with a more specific geographic location.[39]

Other expenditures may be assigned to specific geographic regions even though they support transportation over other parts of the BNSF rail network. For example, BNSF's maintenance expense for its operations control center in Forth Worth, Texas, is recorded in

[38] November 25, 2003 letter from Brooke Gaede to Christopher Mills, included as BNSF.RP.WP.II.A-0005-0006.

[39] *Id.*

BNSF line segments associated with Fort Worth, although the control center obviously benefits all line segments, including segments traversed by the Oklaunion train.[40]

ii) AEP Texas Includes a UP Segment and Incorrectly Weights the Different Routes That Are Used

AEP Texas makes two errors in weighting its segment-specific results. First, in identifying the segments traversed by the Oklaunion trains, AEP Texas included the segment between Sterling and Union, Colorado, that BNSF uses via a trackage-rights agreement with UP.[41] As BNSF operates over this segment pursuant to trackage rights, its MOW costs are reflected in its joint facility payments. Those payments are not included in the engineering cost center data used by AEP Texas. In calculating the average MOW expense per GTM across segments, AEP Texas includes the GTMs for this segment even though the engineering cost center data includes minimal costs for the segment. As a result, AEP Texas' approach understates the maintenance costs per GTM that it calculates across all segments. AEP Texas compounds this error by multiplying its already understated GTM unit cost by a GTM total that excludes the GTMs over this segment.[42]

Second, as described above, AEP Texas calculates the total gross ton-miles generated by Oklaunion trains over the routes traversed. When determining the proportion that each route is used, AEP Texas uses a simple average of the frequency of shipments in the loaded and empty direction. Because AEP Texas is weighting costs per gross ton-mile, however, its calculation

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[40] *Id.*

[41] AEP Texas Opening Exh. II-A-11 and electronic workpaper "Total Route-2001 Origins loc.xls," Tab "Route - Jacobs Ranch."

[42] AEP Texas Opening Exh. II-A-36, at 7 and electronic workpaper "VC AEPTEX Open 2001.123," Tab "K."

should reflect the fact that more gross ton-miles are generated in the loaded direction. By failing to account for this, AEP Texas' weighted result for the issue route distorts its segment-specific results.

iii) AEP Texas' Reduction To Account For a Difference Between Discovery Data And R-1 Is Improper

AEP Texas makes an additional { }-percent reduction to account for a difference between the expenditures reported to BNSF engineering cost centers and the total MOW expenses reported by BNSF in its R-1.[43] AEP Texas determines that the total expenditures in the MOW discovery records { } exceed the MOW expenditures that BNSF reported in Schedule 410 to its 2001 R-1 ($595 million).[44] To account for this difference, AEP Texas improperly ratchets down the MOW costs for the issue route derived from the discovery data before comparing to the URCS system-average cost.[45] This reduction assumes that the line-specific costs that AEP Texas uses to develop MOW expenses for the issue route include monies that are not reported as MOW expenses in the R-1. As explained below, however, there is no basis for this assumption or for AEP Texas' adjustment.

When it produced the data in discovery, BNSF explained that certain costs that are included in the engineering costs centers are not reported in Schedule 410 to MOW accounts in the R-1.[46] The expenses that are not reported in the R-1 as MOW expenses include, for example, mechanical expenses that BNSF captures in its engineering cost centers. Mechanical expenses

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[43] AEP Texas Opening Exh. II-A-11 and electronic workpaper "Total Route-2001 Origins loc.xls," Tab "MOW Adj Ratio - Jacobs Ranch."

[44] *Id.*

[45] *Id.*

[46] November 25, 2003 letter from Brooke Gaede to Christopher Mills, included as BNSF.RP.WP.II.A-0005 to 0006.

are typically incurred at yard and shop facilities. Because AEP Texas has excluded all expenses associated with yard locations or shop facilities from its study of the issue route,[47] the route-specific data used by AEP Texas likely include little or no mechanical expenses that are a principal, if not the entire, source of the difference between the expense totals on which AEP Texas bases its reduction. Absent a burdensome special study, BNSF is unable to determine how much of the difference between the R-1 MOW data and the engineering cost center data results from mechanical costs and other costs not included in the line-specific data used by AEP Texas. It is clear, however, that AEP Texas' { }-percent reduction is wrong. Indeed, the difference between the discovery data and the R-1 data and the inability to reconcile the two demonstrate why these data cannot be used to develop movement or even route-specific MOW costs.

iv) AEP Texas Applies The Wrong Variability Factor

As demonstrated in Table II.A-3 in Section II.A.1.c.(7)(b) below, URCS recognizes that the variability of MOW expenses changes with traffic density. As density changes, so does the percentage of MOW expenses that is variable. AEP Texas' line-specific adjustment ignores this relationship. To calculate the MOW variable costs for the AEP Texas route, AEP Texas developed a system-wide variability factor from BNSF's 2001 URCS.[48] Since the density on the route traversed by Oklaunion trains is two-to-three times the system-average level,[49] AEP Texas' application of BNSF's system-wide variability to line-specific MOW costs is inappropriate.

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[47] AEP Texas Opening Exh. II-A-11 and AEP Texas Opening electronic workpaper "Total Route-2001 Origins loc.xls," Tab "Route - Jacobs Ranch."

[48] AEP Texas Opening Exh. II-A-11 and AEP Texas Opening electronic workpaper "Total Route-2001 Origins loc.xls," Tab "MOW Adj Ratio - Jacobs Ranch."

[49] The average densities of the routes traversed by Oklaunion trains from Buckskin and Jacobs Ranch are more than 70 million gross tons and 60 million gross tons, respectively. "SFGT FOR AEP TEXAS OPENING 2001.123," Tab "calc detail."

v) AEP Texas' Reliance On Just One Year Of Data Is Inconsistent With URCS

AEP Texas' use of only 2001 data is inconsistent with URCS MOW costs that reflect a five-year outlook.[50] URCS' five-year approach recognizes that MOW spending cycles extend well beyond one year. Measuring costs over a five-year period properly smoothes out the peaks and valleys that are common with MOW costs. AEP Texas' results based on just one year of data are inappropriate.[51]

(b) Road Property Ownership

On opening, AEP Texas tenders an analysis of the property accounting records that BNSF provided in discovery. In several prior rate cases, BNSF opposed production of these data on the ground that there were unusable for purposes of developing a route-specific adjustment to BNSF's system-average road property investment costs.[52] The Board compelled BNSF's production of the road property data on the ground that BNSF's objections went to the weight and credibility of the data and not their discoverability.[53] In light of these decisions, BNSF produced road property data to AEP Texas. In doing so, BNSF advised AEP Texas of the problems with the data that made them unusable for purposes of developing route-specific road property investment and depreciation.[54] In light of these problems with the data, on opening, Mr.

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[50] URCS Worktable D1, BNSF Reply electronic workpaper "2003 URCS.zip."

[51] AEP Texas claims that the quality of BNSF's produced data compelled it to restrict its analysis to just one year. AEP Texas Opening Nar. at II-A-33, n.25. But it is precisely because of the characteristics of BNSF's line-specific MOW data that it is not possible to develop a reliable line-specific adjustment.

[52] BNSF Reply Exh. II-A-4.

[53] *OTP*, Docket No. 42071 (STB served Nov. 15, 2002), at 9.

[54] BNSF.RP.WP.II.A-0008 to 0012.

Fisher and Ms. Newland used URCS system-average road property investment and depreciation costs in developing variable costs for the issue movement.

AEP Texas' adjustment to BNSF's URCS system-average road property ownership costs accounts for more than fifty percent of the difference between the parties' variable cost evidence in many of the quarters costed by both parties. Despite the significance of this adjustment, AEP Texas proffers no explanation as to how its analysis overcomes the problems raised by BNSF, including the fact that BNSF's Fixed Asset Database ("FADB") gross investment line-specific data are incomplete and the accumulated depreciation data estimated by the FADB calculator significantly overstate depreciation and are inconsistent with the depreciation reported in the R-1.[55] Indeed, AEP Texas' witness, Joseph Plaistow, acknowledged in the *AEPCO* rate case that BNSF's line-segment specific road property data *could not* be used to develop a movement-specific adjustment to BNSF's system-average road ownership costs.[56] Nevertheless, AEP Texas attempts to do just that here. AEP Texas' flawed analysis does not address the problems with using BNSF's accounting records to develop a movement-specific adjustment, and does not even attempt to demonstrate that such data can be used to make an accurate or reliable adjustment to URCS system-average costs.

[55] *OTP*, Docket No. 42071 (STB served Nov. 15, 2004), at 9.

[56] AEPCO Rebuttal (Public Version) II-A-57, n.51.

i) AEP Texas Uses Data That Cannot be Used to Develop a Movement-Specific Road Property Ownership Adjustment

a) The FADB Line-Specific Data Cannot Be Used to Make a Movement-Specific Adjustment

Cami A. Elliott, BNSF's General Director with responsibility for property accounting, submitted a verified statement in support of BNSF's opposition to a motion to compel the road property data filed in the Otter Tail case. That opposition and Ms. Elliott's statement are included here as BNSF Reply Exhibit II.A-4.[57] In her statement, Ms. Elliott explains in detail the reasons why the FADB *gross* investment data and the data generated by the FADB depreciation calculator cannot be used to develop a movement-specific adjustment to road property costs.[58]

First, she explains that the line-specific gross investment data produced by BNSF do not include all investments on a specific line-segment. BNSF identified three categories of investment that are either not accounted for in the FADB gross investment data produced by BNSF or are accounted for in a way that renders a line-specific adjustment unreliable. The three categories are:

- investments in service but not yet allocated to a line segment;
- investments that benefit AEP Texas traffic, but are not assigned to a line segment on the AEP Texas route; and
- investment on the AEP Texas route that is not fully accounted for in the line segment-specific road property ownership data because the investment has been assigned on a regional, state, divisional, or system-wide basis.

The first category of investments, *i.e.*, investments that have not yet been allocated to a line segment, primarily consists of some $3.0 billion in BNSF's Property In Service Not Unitized

[57] Ms. Elliott's statement is referred to as "Elliott VS."

[58] Elliott VS at 23 to 26.

Account (PISNU) and another $3.0 billion in Purchase Accounting from the BN/ATSF merger. AEP Texas addresses the PISNU data in its opening evidence, but its treatment of PISNU is improper. AEP Texas accounts for the fact that PISNU is not reflected in the line-segment specific data by removing it from the system-wide investment figure that it adjusts.[59] This approach would be reasonable if the investments reflected in PISNU were spread evenly across BNSF's system. What is far more likely however, is that a disproportionate amount of the PISNU investments were made on BNSF's highest density lines.[60]

There is another problem with AEP Texas' treatment of PISNU. The investments reflected in PISNU are likely to be more expensive than the older assets that they replaced because they were recently placed in service. In addition, the PISNU investments will have little accumulated depreciation associated with them because they are new. Thus, because they include assets that have already been replaced by assets reflected in PISNU, the FADB data relied on by AEP Texas understate gross investment and the depreciation data overstate the accumulated depreciation of the assets actually in service. The overstatement of accumulated depreciation is compounded by AEP Texas' use of the flawed data generated by the depreciation calculator which, as explained below, significantly overstates accumulated depreciation.

With respect to the third category of investments, *i.e.,* those that BNSF assigns on a broader geographical basis because it is unable to identify the specific line segments on which they were made, AEP Texas' approach is also problematic. Like AEP Texas' treatment of PISNU, AEP Texas' exclusion of these investments assumes that they are made evenly across

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[59] AEP Texas Opening electronic workpapers "RD INV AEP TEXAS 2003.123," "RD INV AEP TEXAS 2002.123," "RD INV AEP TEXAS 2001.123," "RD INV AEP TEXAS 2000.123," Tab "URCS Inv."

[60] Elliott VS at 26.

the system, which they are not. Investments in ballast are a prime example of this third category of investments. Typically, BNSF does not track its investment in ballast at a level that would allow it to pinpoint the amount of ballast installed on any one specific line segment.[61] If BNSF knows the particular region in which the ballast was used, it will assign the investment evenly to all lines in that region even though the ballast may have been used on only a handful of line segments in that region.[62] Spreading the ballast investment across all line segments in the region obviously results in FADB data that understates the investment in ballast on the lines in which the ballast was actually used.

AEP Texas relies on the *TMPA* decision as a basis for using the FADB data and accumulated depreciation data to make a movement-specific adjustment to road property ownership costs. AEP Texas Opening Nar. at II-A-35. Although the Board accepted complainant's adjustment in that case, the Board did not address fundamental problems with the data and complainant's methodology there.[63]

In *TMPA*, the Board accepted an adjustment to BNSF's system-average road property costs based on a reconciliation of BNSF's system-wide FADB road property gross investment to the R-1.[64] BNSF does not dispute that, at the system-wide level, the FADB *gross* investment data are consistent with the R-1 data, so long as the investment data not recorded on a segment-specific basis (PISNU, unassigned investment and purchase accounting) are added to the

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[61] *Id.* at 25.

[62] *Id.* at 26.

[63] Also, for procedural reasons, the Board did not consider BNSF's argument regarding the variability factor. *See TMPA* at 56, n.94, 57.

[64] *TMPA* at 57.

segment-specific amounts. But the existence of a system-wide reconciliation does not address the problems with using the FADB data to make a line-specific adjustment.

b) The Accumulated Depreciation Data Significantly Overstates Depreciation and is Inconsistent with the R-1

The depreciation data generated by the depreciation calculator do not correspond to the depreciation data reported in BNSF's R-1. As Ms. Elliott explains, the FADB database and depreciation calculator are legacies of the former Atchison Topeka & Santa Fe Railway ("ATSF"). When the BN merged with the ATSF, BN's property investment data were merged into the ATSF's FADB.[65] As a consequence, the depreciation calculator continues to reflect asset history and depreciation rates of the ATSF.[66] To estimate depreciation the FADB applies a historical depreciation rate to each year of an asset's life and sums up the results for all assets. Ms. Elliott also explains that this approach is inconsistent with the railroad's use of group life accounting.[67] The Board has approved BNSF's use of group life accounting, and BNSF's road property data in the R-1 are based on group life accounting.[68] It would therefore be inappropriate for the Board to calculate variable costs based on depreciation data using a different and less accurate approach.

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[65] The data relied upon by the former BN in the *1996 Decision* were drawn from BN's property accounting records and not ATSF's FADB system as suggested by the Board in *TMPA* at 56-57.

[66] Elliott VS at 30. This fact alone presents insurmountable challenges to developing an accurate estimate of net investment for the Oklaunion route, which is comprised of a mix of former BN and ATSF lines.

[67] *Id.* at 27-29.

[68] *Id.* at 27.

BNSF has demonstrated that the depreciation calculator vastly overstates BNSF's actual depreciation. As Table 1 to the Elliott VS shows, the FADB calculator estimates that the investments in all road accounts are 38 percent depreciated, more than twice the amount reported in the R-1. For the route at issue, the depreciation calculator estimates accumulated depreciation for rail that is three times BNSF's system-average accumulated depreciation for rail as reported in the R-1.[69] Since BNSF does not use these depreciation data for purposes of financial reporting, these data should not be used here.[70]

In any event, unlike FADB system-wide gross investment data, the FADB depreciation calculator estimates of accumulated depreciation have never been reconciled with the accumulated depreciation reported in BNSF's R-1. If it is proper to make a segment-specific adjustment only after showing that the data used for the adjustment reconcile with the R-1 -- a proposition that seems beyond dispute -- then AEP Texas' adjustment based on net investment cannot be used because there is no evidence that the accumulated depreciation data used for the adjustment reconcile with the R-1 data used by the Board for regulatory costing purposes. In fact, the accumulated depreciation data used by AEP Texas do not and cannot, reconcile with BNSF's R-1 data. As explained below, the two sets of BNSF depreciation data – the accumulated depreciation estimated by the FADB calculator and the accumulated depreciation reported in the R-1 – are irreconcilable because they are generated using totally different methodologies. The R-1 depreciation is based on group-life accounting, while the FADB

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[69] BNSF Reply electronic workpaper "rail depreciation.xls."

[70] Indeed, BNSF does not maintain in the ordinary course of business the accumulated depreciation data used by AEP Texas. Those data were estimated by BNSF using the depreciation calculator for this litigation in light of the Board's rulings on motions to compel this same data in other SAC cases. In agreeing to produce this data, BNSF explained to AEP Texas the problems with the data and the source of the data. BNSF.RP.WP.II.A-0008 to 0012.

calculator simply sums up annual depreciation estimates that are based on application of annual depreciation rates to particular assets over the course of the assets' lives.[71] The two approaches produce vastly different depreciation estimates. The FADB calculator data, which AEP Texas uses to produce its segment-specific adjustment, significantly *over*states depreciation compared to group-life accounting used in the R-1 and therefore *under*states the net investment on which AEP Texas bases it variable costs.[72] Indeed, the magnitude of the disconnect is enormous. The sum of segment-specific depreciation estimated by the FADB calculator is *62 percent* greater than the depreciation recorded in the R-1.[73]

Given the large and irreconcilable differences between the depreciation data used by AEP Texas for its segment-specific adjustment and the regulatory data that the Board uses to calculate variable costs, AEP Texas' segment-specific road property costs should be rejected.

ii) AEP Texas' Methodology Contains Major Errors

Apart from the problems in the data themselves, AEP Texas' methodology for developing a line-specific adjustment is flawed. AEP Texas attempts to develop line-specific unit costs per gross ton-mile for the *running* portion of road property ownership (*i.e.*, ownership costs associated with running track and not yard track) by calculating a ratio of the investment and depreciation per gross ton-mile for the valuation sections traversed by Oklaunion trains to the BNSF system-average investment and depreciation per gross ton-mile.[74] AEP Texas then multiplies the adjustment ratio (based on the valuation sections that the Oklaunion trains

[71] Elliott VS at 22, 27-31.

[72] *Id.* at 22.

[73] *Id.*

[74] AEP Texas Opening Exh. II-A-4.

traverse) by the URCS system-average unit costs to develop its movement-specific unit costs.[75] This process is depicted in the following equation, assuming an adjustment to the URCS unit cost for the running portion of return on road property investment:

$$\text{AEP Texas Segment Return Per GTM, Running Portion of Road Property} = \frac{\text{Net investment per GTM, AEP Texas Segments}}{\text{Net investment per GTM, BNSF System}} \times \text{BNSF System-Average Return Per GTM, Running Portion of Road Property}$$

The major flaws in AEP Texas' methodology include:

- Use of segment-specific accumulated depreciation, which is based on FADB calculator depreciation data and BNSF's URCS system-average accumulated depreciation, which is based on group-life accounting, to develop an adjustment ratio;
- Use of FADB calculator depreciation data to develop an adjustment to BNSF's URCS system-average net investment, which uses group-life accounting;
- Inclusion of *yard* investment in developing an adjustment to BNSF's net investment in the *running* portion of road property investment;
- Weighting the segments by total GTMs rather than by GTMs for the issue traffic;
- Erroneous application of ATSF Purchase Accounting in Calculating Investment in the Denver-to-Pueblo segment;
- Use of a variability factor that fails to account for density.

a) AEP Texas Impermissibly Uses In Its Adjustment Ratio Both System-Wide Depreciation Data And Segment-Specific Depreciation Data That Were Developed Using Different Methodologies

First, in calculating the adjustment ratio, AEP Texas uses depreciation data estimated by the depreciation calculator for the issue route (the numerator) and uses depreciation data from the

[75] *Id.*

R-1 for the system (the denominator).[76] The depreciation calculator, which is unreliable and unusable for reasons discussed above, estimates depreciation utilizing a methodology that is totally different than the group-depreciation methodology that BNSF uses, with the Board's approval, to track the accumulated depreciation that is reported in the R-1.[77] The two sets of data are wholly incompatible. Such an apples-to-oranges comparison produces meaningless results that are well below system-average for most line segments, due to the significant difference between the accumulated depreciation that FADB depreciation calculator estimates versus that reported in the R-1.

b) Use Of FADB Depreciation Data To Adjust BNSF's URCS Net Investment Costs Is Improper

The problem is not simply that AEP Texas uses FADB depreciation calculator data in the numerator and not in the denominator. The problem is in the use of the data in any capacity to adjust net investment that is based on group-life accounting. Even if AEP Texas were consistent in its use of a depreciation methodology other than group-life accounting in developing its adjustment ratio, it would still fall short of adequately addressing this concern. Because the FADB calculator uses a methodology other than BNSF's group-life accounting, there is no way of knowing whether the comparison of route-specific net figures to system-average net figures using the FADB calculator would produce the same result, or even a comparable result, as a comparison of route-specific net investment to system-average net investment using group-life accounting. Given the massive overstatement of depreciation by the FADB calculator, the probability of the same or even a comparable result is extremely low, and applying any results to

[76] *Id.*

[77] Elliot VS at 27.

adjust the URCS system-average and calculate variable costs would likely produce unreliable results that could not be validated.

To justify use of FADB calculator data, it would have to be assumed that the massive overstatement of depreciation by the FADB calculator has no impact on the resulting ratio that would be used to adjust BNSF's system-average road property investment. If this were the case, then a comparison of net investment per GTM for the route to net investment per GTM for the system would be the same using either the FADB calculator or group-life accounting. But there is no reason to believe that the adjustment ratio would be the same regardless of which depreciation methodology is used. Indeed, even if the ratio of route-specific depreciation under the group-life accounting method (a calculation that BNSF neither maintains nor calculates) to system-wide depreciation under the group-life accounting method were the same as the ratio using the FADB calculator, the use of the calculator's depreciation estimates would still suggest a reduction to the system-average cost that is not warranted.

Take the following example. Assume that a route has the following characteristics: gross investment of $50, accumulated depreciation under the group-life accounting method of $10, and gross ton-miles of 40. The route-specific net investment is $40 ($50-$10), or $1 per GTM ($40 / 40 GTM). Assume that system-wide gross investment is $1000, accumulated depreciation under the group-life accounting method is $100, and gross ton-miles total 900. The system-wide net investment is $900 ($1000-$100), or $1 per GTM ($900/900 GTM). Since the route-specific and system-wide net investment are the same, $1 per GTM, no adjustment to the system-wide road property costs would be necessary.

Now assume that that a simplified depreciation calculator estimates accumulated depreciation of $20 for the same route and $200 for the system. While the depreciation

calculator overstates the accumulated depreciation for both the route and the system, in this example the ratio of route-specific accumulated depreciation to system-wide accumulated depreciation is the same as under the group-life method (10 / 100 = 20 / 200). In other words, the calculator overstates accumulated depreciation to the same extent for the route as for the system. However, using the FADB calculator estimates in lieu of the group-life accounting figures results in route-specific net investment of $30 ($50-$20), or $0.75 per GTM ($30 / 40 GTM) while producing system-wide net investment of $800 ($1000-$200), or $0.89 per GTM ($800 / 900). Thus, use of the estimates from a calculator that overstates depreciation would suggest a *16-percent reduction* (0.75 / 0.89 = 0.84) when *none* is warranted.

Further, one of the primary differences between the FADB calculator and group-life accounting relates to the treatment of early retirements.[78] The impact of early retirements on net investment will be affected by numerous factors such as density and other line characteristics.[79] If some characteristic of the line segments at issue here caused the FADB calculator to overstate depreciation to a larger extent for these line segments than for other line segments on BNSF's system, then the resulting comparison of segment-specific net investment to system-average net investment would be distorted. The massive difference between the depreciation amounts generated using the FADB calculator and using the group-life methodology suggests that such distortions will improperly impact any resulting comparisons.

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[78] Elliott VS at 27-31.

[79] *Id.*

c) AEP Texas Improperly Includes *Yard* Investment In Developing Its Adjustment To The *Running* Portion Of Road Property Investment

Another flaw in AEP Texas' methodology is its inclusion of yard investment in calculating the adjustment ratio.[80] Because AEP Texas adjusts the URCS unit costs related only to the *running* portion of road property investment,[81] the adjustment ratio should reflect only road investment (*i.e.*, exclude yard investment). AEP Texas' inclusion of both *running* and *yard* investments produces adjustment ratios that are inconsistent with their application to unit costs that reflect only the *running* portion of return and depreciation.

d) AEP Texas Improperly Weighted Segments By Total GTMs

AEP Texas improperly weighted its segment-specific results by the total GTMs that moved over the segment rather than by the issue-traffic GTMs.[82] In *WPL*, the Board held that such an approach "improperly assumed that all traffic traverses the entire WPL route, when in fact most traffic does not." Consequently, it "inappropriately assigned to non-WPL traffic a share of investment associated with line segments over which that traffic does not use."[83] Thus, AEP Texas' approach further understates BNSF's road property investment in the issue route.

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[80] *See, e.g.*, AEP Texas Opening Exh. II-A-14 at 5.

[81] Mr. Plaistow adjusts only the cost per *gross ton-mile*, (AEP Texas Opening electronic workpapers "Rd Inv AEP Texas 2000.123," "Rd Inv AEP Texas 2001.123," "Rd Inv AEP Texas 2002.123," and "Rd Inv AEP Texas 2003.123"), which reflects only the *running* portion of investment. The portion of BNSF's road property investment in yard tracks is included in the URCS cost per switch engine minute.

[82] Column 9 of pages 2 through 6 of AEP Texas Opening Exhibit II-A-17, for example, report GTM totals in the billions, much higher than the total for just the Oklaunion trains. In AEP Texas Opening Exhibit II-A-18 at page 6, AEP Texas acknowledges that the GTM data is "the gross ton-miles for the route traversed by AEP Texas."

[83] *WPL II* at 18.

e) AEP Texas Calculations Produce Erroneous Results For The Denver-To-Pueblo Segment

AEP Texas' calculation of net investment in the Denver-to-Pueblo segment is clearly erroneous. Its calculations of net investment per GTM suggest that net investment for Denver-Pueblo segment is between five and ten percent of system-average and less than ten percent of the net investment in the adjacent segments on the issue route.[84]

One explanation for this substantial understatement is AEP Texas' failure to reflect properly purchase accounting (*i.e.*, the ATSF write-up) in this former ATSF segment. AEP Texas allocates purchase accounting evenly across all miles of the former ATSF. Clearly, the higher density lines such as the Denver-Pueblo segment should be allocated a greater share of purchase accounting. Therefore, AEP Texas' approach understates investment in the segment. In any event, AEP Texas grossly understated purchase accounting which is in the billions and not millions as AEP Texas suggests.[85]

f) AEP Texas Ignores The Relationship Between Density And Variability

John C. Klick also submitted a verified statement in support of BNSF's opposition to the motion to compel the road property data in the Otter Tail case ("Klick VS"). That statement, which is included in Exhibit II-A-4, explains that AEP Texas' approach ignores the relationship between density and variability.[86] A fundamental principle underlying URCS is that, as densities increase, so does the portion of total expenses that are variable. This logical conclusion is driven

[84] AEP Texas Opening Exh. II-A-15 at 6.

[85] AEP Texas Opening Exh. II-A-14, at 6; BNSF Reply electronic workpaper "ATSF.pdf."

[86] Klick VS at 35 to 42.

by the fact that, as densities increase, total costs are increasing. Because fixed costs remain fixed, it is true that both (1) the total variable costs are increasing and (2) the variable costs' portion of total costs is increasing.[87] Mr. Klick demonstrates this with a simple example.[88] The real-world effect of this fact also can be confirmed by reviewing the URCS calculation of variable costs. URCS assigns each carrier's costs to specific functional groupings, and then calculates the portion of total costs that are determined to vary with changes in the traffic based on an associated measure of output, or service unit.[89] As examples, URCS develops the variable portion of a railroad's running track maintenance costs based on the relationship of costs related to trailing gross ton-miles and costs related to track miles (*i.e.*, density per track-mile), and develops the variable portion of a railroad's running crew wage costs based on the relationship between train-miles and track miles.[90]

Mr. Fisher and Ms. Newland examined the expense groupings and calculations of variable expenses from BNSF's 1996 and 2001 URCS runs. From this examination, FTI determined that the relevant measure of density increased between these two years and, as a result, the percentage of costs that are variable also increased over this time frame. Table II.A-4 presents the results for four of the URCS expense groupings.

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[87] The fact that the percentage of total costs that is variable increases as density increases is a manifestation of the same economic principle discussed below in Section III.A.3.c. as underlying the density adjusted revenue allocation procedure that BNSF recommends for allocating cross-over traffic revenues between the OTRR and the residual BNSF. That is, as density increases, the variable component of costs increases proportionately, but the fixed and common costs remain unchanged, resulting in lower fixed, joint, and common costs per unit of volume. As a result, total costs per unit of volume decline as density increases.

[88] Klick VS at 41.

[89] URCS Work Table D at BNSF Reply electronic workpapers "2003 URCS.zip," "2002 URCS.zip," and "2001 URCS.zip."

[90] URCS Work Table C at BNSF Reply electronic workpapers "2003 URCS.zip," "2002 URCS.zip," and "2001 URCS.zip."

Table II.A-4
Comparison of Densities and Percents Variable
BNSF URCS, 1996 and 2001

Expense Group and Associated Service Unit[91]	*Changes in Percent Variable and Service Units*		
	1996	2001	Increase
1. Running Track Maintenance	66.6%	72.0%	8%
Trailing GTM / Track Mile	15,875	20,376	28%
2. Running Crew Wages	80.5%	83.1%	3%
Train-Mile / Track Mile	2,979	3,545	19%
3. Running Locomotive Maintenance	71.0%	73.1%	3%
Locomotive Unit-Mile / Track Mile	9,624	10,661	11%
4. General & Administrative	80.2%	85.0%	6%
Trailing GTM / Track Mile	15,470	21,721	40%

Source: BNSF Reply electronic workpaper "Variability change by density.123."

As Table II.A-4 shows, as the measure of density increases, whether measured in gross ton-miles, train-miles, or locomotive unit-miles per track-mile, the variable portion of costs calculated by URCS also increases. AEP Texas' approach, however, ignores this interrelationship.

(c) Fuel

Except for the three 128-car Oklaunion trains originating at Eagle Butte in the Second Quarter 2003, the parties stipulated to the mileages and locomotive consist sizes, and both use BNSF's system-average fuel consumption to calculate variable costs for the issue movements. As explained on opening, for the three longer Eagle Butte trains in Second Quarter 2003, BNSF calculated fuel consumption based on the results of a special study of fuel consumption of recent

[91] URCS normalizes running track maintenance expenses and service units over a five-year period, running locomotive maintenance expenses and service units over a three-year period, and running crew wage and general and administrative expenses over a one-year period. URCS Worktables D1 and D3, BNSF Reply electronic workpaper "2003 URCS.zip."

Oklaunion trains. BNSF Nar. at II-14 and BNSF Opening Exhibit II.A-3. In this reply, BNSF updates its fuel study results to reflect BNSF's 2003 URCS.[92]

(d) Locomotive Maintenance Costs

The parties disagree on locomotive maintenance costs. As BNSF does not maintain data that capture the costs of maintaining any specific locomotive or class of locomotives, BNSF uses URCS system-average locomotive maintenance costs consistent with Board precedent. *See* BNSF Nar. at II-14. In its opening submission, AEP Texas also uses BNSF's system-average locomotive maintenance costs for the locomotives used in AEP Texas service that were not subject to a maintenance contract with the locomotive manufacturer during the period costed.[93] For locomotives used in AEP Texas service that were subject to a maintenance contract with a third-party vendor, however, AEP Texas misapplies the terms of those contracts and excludes overhaul costs to produce costs estimates that are, implausibly, as much as 60 percent below BNSF's system-average. *Id.* This results in an overall weighted-average reduction to BNSF's 2000 - 2003 system-average locomotive costs of nearly 20 percent. *Id.*

There are several problems with AEP Texas' approach and errors in its development of a locomotive maintenance adjustment, including its

- Failure to account for non-routine locomotive maintenance costs;
- Failure to normalize overhaul costs;

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[92] 128-car Oklaunion trains also originated at Caballo Rojo, Cordero, and Rawhide in Second Quarter 2003. On opening, BNSF did not cost these moves as the first two each accounted for less than ten percent of the coal originated in that quarter and Rawhide was not then at issue to the case. On reply, however, to address Board staff concerns, BNSF includes cost evidence for these movements. In estimating the variable costs for these movements, Mr. Fisher and Ms. Newland apply the results of the fuel study to reflect the movement of these longer trains. BNSF.RP.WP.II.A-0014 to 0027 and BNSF Reply electronic workpaper "Reply Fuel Adjustments.xls."

[93] AEP Texas Opening Exh. II-A-19.

- Failure to include overhaul costs for 209 Alliance pool SD70MAC locomotives that, according to AEP Texas' approach, would have been overhauled in 2003;
- Reversal of the base years for the Fourth and Fifth Amendments for purposes of calculating when locomotives would be overhauled;
- Understatement of BNSF's overhaul costs per mile by dividing overhaul cost by the guaranteed mileage under the contract rather than the lower actual miles utilized; and
- Understatement of the cost-per-mile BNSF pays for routine maintenance covered by maintenance contracts by substituting hypothetical utilization mileages for the lower actual mileage and by using the wrong per-mile contract rate.

i) AEP Texas Fails to Account for Non-Routine Locomotive Maintenance Costs

As the Board recognized in *TMPA*, payments made pursuant to BNSF's locomotive maintenance contracts[94] account "for only routine locomotive maintenance costs."[95] These payments, however, do not include substantial expenses that BNSF incurs for { }[97] BNSF is unable to identify these costs on a locomotive

[94] The { } contracts used by AEP Texas are the same locomotive maintenance contracts that complainants used in the *TMPA* case. { } BNSF.RP.WP.II.A-0043 and 0050.

[95] *TMPA* at 58.

[96] The maintenance agreements do not cover all repairs. For example, failures due to { } *See* BNSF.RP.WP.II.A-0030, 0032, 0034, 0039, and 0044 to 0045. { { } also provides for regular meetings between { } and BNSF to determine the responsibility for repair costs.} BNSF.RP.WP.II.A-0033. { { } under the contract.}

series, pool, or unit specific basis. Without an ability to discern the magnitude of these items, the Board should find, as it did in the recent *TMPA* decision,[98] that system-average locomotive maintenance costs are applicable to all units that power the Oklaunion trains.

ii) AEP Texas Fails to Account for Overhaul Expenses

AEP Texas purports to have included overhaul costs for each locomotive used in Oklaunion service by spreading the cost of the overhaul over the miles the locomotive was utilized in the year that AEP Texas estimated that the unit would have been overhauled. The problem with this approach is it produces substantial swings in locomotive maintenance costs. Locomotives that AEP Texas calculates as having maintenance costs that are on average 56 percent of system-average in 2001 and 2003 are over 300 percent of system-average in 2002 when AEP Texas estimates that they were overhauled.[99] To avoid these wild cost fluctuations, URCS normalizes locomotive repair costs over a three-year period to reflect a longer maintenance cycle.[100] Normalization of these repair costs recognizes that such costs can vary significantly from year-to-year, and a longer maintenance cycle than AEP Texas' one-year

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[97] There are hundreds of BNSF mechanical personnel who work in the Alliance shop that { }. That agreement provides that { } reimburse BNSF for { } *See* BNSF.RP.WP.II.A-0048. These costs, which the Board has consistently found are includable in variable cost analyses, are entirely absent from AEP Texas' adjustment because they are not covered by the { } contract. *E.g.*, *FMC* at 86; *WPL* at 57. In addition, BNSF incurs { } contracts. BNSF.RP.WP.II.A-0037 and 0042.

[98] *TMPA* at 58.

[99] AEP Texas Opening Exhibit II-A-19 shows that AEP Texas' locomotive repair costs for the units used in Oklaunion service increase by nearly 80 percent (from { } per mile in 2000 to { } per mile in 2001) and then decrease by 25 percent (to { } per mile in 2002) in consecutive years.

[100] *See* URCS Worktable D3.

snapshot should be recognized when calculating variable costs. Because AEP Texas does not normalize costs, its approach is inconsistent with URCS and should be rejected.

In any event, AEP Texas makes several errors in calculating overhaul costs which, when corrected, suggest that BNSF's locomotive maintenance costs for the units used on the Oklaunion train are well above system-average, even using AEP Texas' approach.

The Fourth and Fifth Amendments to the Amended and Restated Maintenance Agreement between BNSF and { } provide for overhaul either { } miles, whichever comes first.[101] Based on its estimate of average locomotive utilization of 9,442 miles per month, AEP Texas determines that Fourth and Fifth Amendment locomotives used in AEP Texas service require overhauling every { } years.[102] For each locomotive, AEP Texas calculates the date of overhaul starting with the base year of the locomotive maintenance contract covering the unit. Under this approach the 209 Alliance Pool SD70MAC locomotives that are covered by the Fourth Amendment would have been overhauled in { }.[103] But AEP Texas included no overhaul costs for these units.[104]

One reason that AEP Texas included no overhaul costs for the Fourth Amendment units is that it reversed the base years for the Amendments, incorrectly assuming that the Fifth Amendment base year was 1997 and the Fourth Amendment base year was 1999. As a result, AEP Texas calculated that the 138 Alliance Pool SD70MAC locomotives covered by the Fifth

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[101] BNSF.RP.WP.II.A-0037 and 0042.

[102] AEP Texas Opening Exh. II-A-19. 9442 miles * 12 months = 113,304 miles; { } miles / 113,304 miles = { } years.

[103] The Fourth Amendment, which is dated January 12, 1998, applies to { } Alliance pool locomotives that BNSF acquired in 1997. For purposes of calculating the date of overhaul, 1997 is the correct base year. BNSF.RP.WP.II.A-0035 and 0036.

[104] AEP Texas Opening Exh. II-A-19, at 4.

Amendment were due to be overhauled in { }. Nevertheless, AEP Texas included no overhaul costs for the units covered by the Fifth Amendment either.[105]

Moreover, for those units that AEP Texas included an overhaul cost, it understated those costs. To calculate the cost per mile, AEP Texas divided the overhaul cost by the minimum number of miles guaranteed under the contract. As the actual miles utilized were less than the guaranteed miles, dividing the overhaul cost by the higher guaranteed mileage produces a lower overhaul cost per mile that, when applied to the actual miles in Oklaunion service, results in understated variable costs for AEP Texas. This error alone reduced overhaul costs for the SD70MAC locomotives from { } per LUM to approximately { } per LUM – an 82-percent reduction.[106] When AEP Texas' understatement of overhaul costs and its omission of overhaul expenses for the Fourth Amendment locomotives are corrected, and overhaul costs are spread evenly over actual miles utilized, AEP Texas' approach produces an *increase* to BNSF system-average costs of three percent.[107]

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[105] *Id.*

[106] *Compare* BNSF Reply electronic workpaper "2001 LOCO MAINT AEPTEX CORRECTED.123" with AEP Texas Opening electronic workpaper "2001 LOCO MAINT AEPTEX.123." Correcting the base years and AEP Texas' calculation of a per mile overhaul costs produces a 37.5-percent *increase* to BNSF's system-average costs. BNSF Reply electronic workpapers "2000 LOCO MAINT AEPTEX CORRECTED.123, 2001 LOCO MAINT AEPTEX CORRECTED.123, 2002 LOCO MAINT AEPTEX CORRECTED.123, 2003 LOCO MAINT AEPTEX CORRECTED.123, AEPTX BNSF IIA Loco Maint Comparison.xls."

[107] BNSF Reply workpapers "2000 LOCO MAINT AEPTEX CORRECTED Normalized Overhaul.123, 2001 LOCO MAINT AEPTEX CORRECTED Normalized Overhaul.123, 2002 LOCO MAINT AEPTEX CORRECTED Normalized Overhaul.123, 2003 LOCO MAINT AEPTEX CORRECTED Normalized Overhaul.123, AEPTX BNSF IIA Loco Maint Comparison.xls."

iii) AEP Texas Misapplies BNSF's Maintenance Contracts

AEP Texas misapplies BNSF maintenance contracts in developing its adjustment to locomotive maintenance costs. Specifically, it miscalculates BNSF payments under these contracts. BNSF's maintenance contracts provided for different rate "tiers," based on the relative utilization of the units. The greater mileage levels that BNSF guaranteed, the lower the per-mile maintenance rate.[108] For example, under the rate structure set forth in the Fifth Amendment to the Amended and Restated Maintenance Agreement (covering, among other locomotives, { }), if BNSF guarantees { } miles. The { }mile tier is the lowest rate tier under the contract.[109] Because BNSF never achieved an average of { } miles per month in any year between 2000 - 2003, however, its true cost per actual mile is higher than the contractual rate per guaranteed mile that AEP Texas used.[110]

In discovery, BNSF disclosed all the information necessary for AEP Texas to determine the actual amount of BNSF's payments for routine locomotive maintenance to SD70MACs under the { } contract on the correct per-mile basis. BNSF disclosed the 2002-2003 contract payments for that period.[111] BNSF also disclosed the miles per unit for the SD70MACs under contract.[112] In order to calculate a locomotive maintenance contract cost per mile for 2000 through 2003, AEP Texas could have divided the contract payment total by the total actual miles

[108] BNSF.RP.WP.II.A-0041.

[109] *Id.*

[110] BNSF.RP.WP.II.A-0052 to 0055.

[111] BNSF.RP.WP.II.A-0049.

[112] *Id.*

those locomotives moved during that period, figures that were also provided in discovery.[113] AEP Texas did not do this. In any event, calculation of a locomotive maintenance contract per mile cost is meaningless because it fails to account for all locomotive maintenance costs.

In fact, AEP Texas completely ignores the fact that BNSF's payments are based on a guaranteed number of miles, ignores the actual contract rates paid by BNSF, and ignores the actual utilization data. Rather, AEP Texas inexplicably calculates a hypothetical contract rate that differs from the rate BNSF actually paid, and a hypothetical locomotive utilization that differs from actual utilization.[114] AEP Texas' hypothetical contract rate is apparently based on the rate and escalation provisions provided for under the original locomotive maintenance contracts.[115] Its hypothetical locomotive utilization is based on the number of miles that BNSF theoretically could utilize its locomotives in AEP Texas service in a month if the AEP Texas cycle time averaged between 165 and 183 hours. AEP Texas' approach is unnecessary and improper, as BNSF provided to AEP Texas in discovery the actual locomotive utilization data, contract rate information, and payment information. These data show that BNSF actually utilized its locomotives at a *lower* rate than AEP Texas estimates and also paid a *higher* per-mile rate than AEP Texas calculates, each of which contributes to AEP Texas' understatement of the actual costs that BNSF paid to contractors for the locomotives in Oklaunion service.[116] AEP Texas provides no explanation as to why it disregards this information.

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[113] BNSF Reply electronic workpaper "MAC payments 00 - 03 Reply.xls."

[114] AEP Texas Opening Exh. II-A-19.

[115] *Id.*

[116] *Compare* BNSF Reply electronic workpaper "MAC payments 00 - 03 Reply.xls," *with* AEP Texas Opening Exhibit II-A-19.

Correcting all of the errors in AEP Texas' approach would produce an average increase to BNSF's system-average costs of ten percent.[117] Nevertheless, because of the fundamental errors in AEP Texas' approach, Mr. Fisher and Ms. Newland continue to use BNSF's URCS system-average locomotive maintenance costs.

iv) There is No Reason to Expect BNSF's Maintenance Costs for the Locomotives that Power the Oklaunion Trains to be Less than BNSF's System-Average Maintenance Costs

AEP Texas suggests that its locomotive maintenance adjustments are "likely closer to BNSF's actual costs of maintaining the locomotives used than system-average costs" for the Oklaunion trains. AEP Texas Nar. at II-A-37 to 38. The justification for this assertion is that "[n]ewer locomotives need repairs less frequently than older locomotives." *Id.* However, locomotive age is not a reliable indicator of dependability. BNSF locomotives typically undergo a major overhaul every seven years. After an overhaul, a locomotive should operate like new. Therefore, assuming that age indicates a unit's reliability, a new locomotive used on Oklaunion trains should generally have the same reliability as average seven-year-old locomotives, because the average system unit would have just been overhauled.

AEP Texas also claims that the ICC has already found that higher utilization associated with coal unit-train service produces maintenance costs well below system-average. *Id.* at II-A-38, *citing Nevada Power I.* The fifteen-year-old *Nevada Power I* decision is not relevant to this case. It involved a different railroad, operating over a different geographical area, with different equipment and different traffic characteristics than today's BNSF. AEP Texas has presented no

[117] BNSF Reply electronic workpaper "AEPTX BNSF IIA Loco Maint Comparison.xls."

evidence that any alleged higher utilization results in maintenance costs that are lower than system-average.

(e) Other GTM

The differences between BNSF and AEP Texas in the category of other gross ton-mile expenses are primarily due to the impact on overhead costs of AEP Texas' locomotive maintenance adjustment, discussed above.

(7) Train-Mile Expense - Other Than Crew

Differences in the parties' "train mile-other" expenses are minimal.

(8) Locomotive Unit-Mile Expense

The parties disagree on the locomotive unit-mile expense. This expense (excluding locomotive ownership[118]) is comprised of (1) fuel; (2) locomotive maintenance; (3) locomotive servicing; and (4) other expenses, including overheads. The differences between the parties with respect to fuel and locomotive maintenance are addressed in Sections II.A.1.c.(6)(c) and II.A.1.c.(6)(d) respectively. The parties agree on the unit costs for locomotive servicing. They present differing costs for other expenses, due to the impact on overhead costs of AEP Texas' inappropriate adjustments to locomotive maintenance expenses discussed in Section II.A.1.c.(6)(d) above.

(9) Train-Mile Expense - Crew

The parties disagree on train crew expenses. On opening, Mr. Fisher and Ms. Newland used URCS system-average train crew expenses. BNSF Nar. at II-10. AEP Texas performed a study of train crew expenses for the Oklaunion train using some of the train crew wage data that

[118] Locomotive ownership is discussed in Section II.A.1.(c)(14).

BNSF provided in discovery. On reply, Mr. Fisher and Ms. Newland accept AEP Texas' movement-specific crew wage costs after correcting several errors and omissions.[119] Those errors and omissions include the following:

- AEP Texas omitted productivity fund payments;
- AEP Texas improperly developed its mark-up ratio to account for personal leave, vacation, and other pay not directly associated with a specific train;
- AEP Texas omitted payments to BNSF loading crews for shipments originating at the Black Thunder mine;
- AEP Texas improperly adjusted BNSF's crew wage data; and
- AEP Texas uses incomplete data to develop crew wages for shipments originating at the Rawhide mine. [120]

(a) Productivity Fund Payments

AEP Texas failed to include in its variable-cost calculations the payments that BNSF makes to a "productivity fund" for train-crew employees (*i.e.*, conductors and brakemen).[121] Generally, when train-crew employees work a road train (including PRB loading crews) with less than a conductor and two brakemen (called a "short-crew"), each train-crew employee receives a special allowance that is reported in the BNSF payroll records as "CA Code 32-Reduced Crew Allowance."[122] In addition to this allowance, the appearance of this allowance in the payroll system triggers a separate payment into a "productivity fund" of { } for each

[119] BNSF.RP.WP.II.A-0060 to 0067.

[120] AEP Texas also failed to index the Fourth Quarter 2002 crew wage costs in developing First Quarter 2003 crew wage costs.

[121] BNSF/AEPTX 6460-6462 and 58994-58996, included as BNSF Reply electronic workpaper "productivity fund.pdf."

[122] *Id.*

short-crew.[123] Payments are made from the fund to each qualifying crew member annually.[124] In this reply evidence, consistent with Board precedent, Mr. Fisher and Ms. Newland include the productivity payments that BNSF made to the "productivity fund" for short-crews on the Oklaunion trains.[125]

(b) Mark-up Ratio

AEP Texas developed flawed single mark-up ratios for each occupation (*i.e.*, engineers, conductors, and brakemen) that are not specific to the crew wages to which they are applied. To develop each of these occupation specific mark-ups, AEP Texas combined the non-train related wages for all crews. For example, its mark-up for engineers is based on the combination of non-train related wages paid to all engineers, regardless of whether the engineer worked a loading, helper, and/or road crew. This approach ignores the fact that the relationship between direct and non-train related wages is not the same for all types of crews.

By combining all of these crews, AEP Texas produced mark-ups that are inconsistent with the train-related wages to which they are applied. For example, although AEP Texas road crew wages comprise the vast majority of the total crew wages per Oklaunion train, the road crew payroll records comprise less than 60 percent of the total records used to calculate the mark-up ratios in each of 2002 and 2003.[126] Payroll records for loading crews comprise 14

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[123] *Id.*

[124] *Id.*

[125] *1996 Decision*, 1 STB at 726; BNSF Reply electronic workpaper "BNSF REPLY AEPTX-Open Wages comparison.xls."

[126] AEP Texas Opening electronic workpaper "Open-Crew Wage Processing Steps.xls," Tab "Mark Ups."

percent of the data used to develop the mark-up ratios even though AEP Texas includes no direct wages paid to loading crews in its crew-wage study.[127]

AEP Texas further erred by excluding guarantee payments made in 2003 in calculating its mark-ups. In calculating the mark-up ratio for engineers for 2002, AEP Texas correctly included guarantee pay reported to occupation code "00," which was identified in materials BNSF produced in discovery as engineer guarantee pay.[128] In calculating the engineer mark-up ratio for 2003, however, AEP Texas did not include the { } in guarantees paid to the engineers in 2003.[129] Correction of this error increases AEP Texas' engineer mark-up ratio from { } percent.

In addition, AEP Texas based the mark-up ratios it applied to the 2003 base wages on BNSF payroll records from the six months of 2003 that were produced in discovery. Review of the non-train related wages for the prior 18 months indicates that a higher proportion of vacation and guarantee pay was reported in the last six months of the year.[130] By using less than a full year's worth of wages, AEP Texas understated the full train crew cost that BNSF actually incurs throughout the year. BNSF overcomes this concern by using the ratios of non-train related pay to train-related pay for the full year 2002.[131]

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[127] *Id.*

[128] BNSF/AEPTX 36202, included as BNSF Reply electronic workpaper "occupation codes.pdf."

[129] AEP Texas Opening electronic workpaper "Open-Mark-ups, 2003 total data.xls," Tab "Final," cell "E7."

[130] BNSF Reply electronic workpaper "aeptx.bnsf markup guarantee analysis.xls."

[131] BNSF Reply electronic workpaper "BNSF REPLY Open-Road Crew Wages, 2003.xls."

In this reply, Mr. Fisher and Ms. Newland present mark-up ratios that are determined separately for the road crews, helper crews, and BNSF loading crews, and apply the mark-up ratios calculated for the full-year 2002 to develop the 2003 costs.

(c) BNSF Loading Crew Payments

BNSF's Superintendent Coal Operations, Anthony W. Deichert, explains that BNSF utilizes a Gillette-based BNSF loading crew to load Oklaunion trains originating at Black Thunder mine. Mr. Fisher and Ms. Newland included one-half of a loading crew's wages for each Oklaunion train originating from Black Thunder based on information provided by Mr. Deichert.[132]

(d) AEP Texas' Inappropriate Adjustments to Crew Wage Data

AEP Texas makes a number of inappropriate adjustments to BNSF's crew-wage records.[133] In several instances AEP Texas eliminates wages paid to a particular crew member because of alleged anomalies in the data.[134] Eliminating single wage records understates the wages that BNSF actually paid to crews working the Oklaunion trains. Moreover, most of AEP Texas' adjustments are unjustified. AEP Texas eliminated wages paid to a crew member because he/she reported a different number of cars, number of miles, or time than was reported by other crew members working the train. In most of these cases, however, the date, train symbol, and crew districts and either the miles or the cars matched those reported by the other

[132] BNSF Reply electronic workpaper "BNSF-T&E-ADJ-02&03 REPLY.123."

[133] AEP Texas Opening electronic workpaper "Open-Road Crew Wages, 2002.xls," Tab "adjustments."

[134] *Id.*

crew members.[135] The matching information makes it clear that the crew member correctly reported working the Oklaunion train. Nevertheless, AEP Texas improperly eliminated the wages paid to such crew members. Mr. Fisher and Ms. Newland correct these errors in their restatement of AEP Texas' crew-wage study.

(e) AEP Texas' Inappropriate Development Of Rawhide Crew Wages

As the Rawhide movement was not the subject of discovery, AEP Texas lacks crew wage data for all Rawhide shipments. Nevertheless, it attempted to construct average train wages for Rawhide originations using BNSF's full-wage files for crew persons that worked Oklaunion trains from other origins. Those records include crew wages for a subset of crew persons that worked the Rawhide–Oklaunion trains. If a crew person who worked the Rawhide move also worked an Oklaunion train originating elsewhere, then his or her crew wages for the Rawhide move were included in the full-wage file.[136] As a result, AEP Texas' compilation does not contain complete payroll records for each Rawhide shipment. AEP Texas further errs by dividing its results by the wrong number of trains and produces an average wage figure that is six percent below the average for originations from the adjacent Eagle Butte mine.[137] Mr. Fisher and Ms. Newland use the average for the more complete records for shipments from Eagle Butte to estimate the variable costs for the Rawhide movement.[138]

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[135] *Id.*, and BNSF Reply electronic workpaper "BNSF corrections to base wages.xls."

[136] AEP Texas Opening electronic workpaper "Open-Road Crew Wages, 2003.xls," Tab "Rawhide."

[137] *Id.* at Tab "summary w mu's."

[138] BNSF Reply electronic workpaper "BNSF-TBE-ADJ-02&03 REPLY.123."

In some instances, AEP Texas excluded wages for all crews that worked a particular train due to a problem with the data for one of the crews.[139] As AEP Texas computes an average crew wage across all trains that moved in a quarter, this approach generally does not distort its results. Accordingly, BNSF does not dispute those adjustments.

Table II.A-5
Comparison of BNSF and AEP Texas Average Crew Wages per Train

	Period	BNSF Reply	AEP Texas Opening	Difference
Buckskin	3rd Qtr 2001	{ }	{ }	(1,163)
Buckskin	4th Qtr 2001	{ }	{ }	(1,163)
Jacobs Ranch	1st Qtr 2002	{ }	{ }	(915)
Black Thunder	2nd Qtr 2002	{ }	{ }	(1,517)
Black Thunder	3rd Qtr 2002	{ }	{ }	(1,669)
Jacobs Ranch	4th Qtr 2002	{ }	{ }	(1,112)
Eagle Butte	1st Qtr 2003	{ }	{ }	(725)
Eagle Butte	2nd Qtr 2003	{ }	{ }	(744)

Source: BNSF Reply electronic workpaper "BNSF-T&E-ADJ-02&03 REPLY.123"; AEP Texas Opening electronic workpaper "Open-Wages Summary.123."

(10) Helper Expense - LUM

The parties disagree on the location of the helper services that assist AEP Texas trains. They also disagree on the frequency that Oklaunion trains are helped at these locations. These issues are discussed in Section II.A.1.c.(11).

(11) Helper Expense – Crew

The parties disagree on helper-crew wages for the Oklaunion trains. AEP Texas helper crew wages were developed based on a flawed study of the locations where the AEP Texas train is helped and the frequency that the train is helped at each location. On opening BNSF used URCS system-average crew wages and, therefore, did not separately develop helper-crew

[139] AEP Texas Opening electronic workpaper "Open-Road Crew Wages, 2002.xls," Tab "adjustments."

expense. In this reply, however, BNSF accepts AEP Texas' movement-specific approach and corrects its analysis. Accordingly, Mr. Fisher and Ms. Newland accept the use of movement-specific helper-crew wages but develop them based on the testimony of BNSF's operating witness, Anthony Deichert.

Mr. Deichert explains that *all* loaded unit coal trains originating in the PRB that travel east from Donkey Creek are helped at Crawford Hill and generally, at one other location. Loaded unit coal trains that originate on the Joint Line and exit it via Donkey Creek are helped at Belle Ayr. Loaded unit coal trains that originate at mines located on the Campbell Subdivision, including Buckskin, Eagle Butte, and Rawhide, are helped at Campbell. Prior to Third Quarter 2002, when a fourth locomotive was placed on the train between Alliance/Guernsey and Amarillo, Texas, all loaded Oklaunion trains were also helped at Palmer Lake, south of Denver, Colorado.

According to AEP Texas, most Oklaunion trains are helped at Crawford and, up until Third Quarter 2002, at Palmer Lake.[140] AEP Texas contends that Oklaunion trains are rarely helped at Belle Ayr/White Tail. AEP Texas further contends that Oklaunion trains are not helped at any other helper location.[141] AEP Texas evidence is based on a flawed study, that fails to identify all helper services that assist the Oklaunion trains and understates the frequency that Oklaunion trains are helped by the helper services that it correctly identified.

To determine whether an Oklaunion train was helped at a particular location, AEP Texas examined the Train Activity Reports ("TARs") completed by the road crews that purportedly operated the train as it traversed the helper district. If the TARs indicated that the train was

[140] AEP Texas Opening electronic workpaper "AEP TX TRAIN ACTIVITY SUMMARY.123."

[141] AEP Texas Opening Nar. at II-A-28.

helped, AEP Texas should have included it as having been helped. If, however, the TARs made no mention of the train being helped, AEP Texas assumed that the train was not helped.

Mr. Deichert explains that TARs are not a reliable indicator of whether a train was helped or not. In most cases, cutting on and off the helper locomotive is performed quickly and is not a source of delay for the train. Since it is a routine event that is part of the standard operating procedure for the train, many crews do not report the fact that the train was helped, although reporting practices vary by territory and by crew.

In any event, AEP Texas makes several errors. On a number of instances, AEP Texas claims that the Oklaunion train was not helped even though the TARs clearly shows the helper being added to the train.[142] There are also a number of instances where AEP Texas uses the wrong TAR, selecting either the TARs for crews reporting to a non-Oklaunion train symbol or the TARs for crews that worked the empty train from Gillette to the mine but did not work the loaded train.[143] As a result, AEP Texas incorrectly concludes that a loaded Oklaunion train moved without a helper, when in fact the TARs on which it relies do not depict the movement of a loaded Oklaunion train over a helper district.

Mr. Deichert explains that BNSF maintains what are known as "exception helpers" at Logan, Bridgeport, and Palmer Lake.[144] Exception helpers do not assist every train, but only those trains that need assistance because of operational conditions, *e.g.* a locomotive powering the train is suffering mechanical problems or there are severe weather conditions. They serve to keep the flow of traffic through the helper district fluid. As such, an allocation to the Oklaunion

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[142] BNSF.RP.WP.II.A-0069 to 0071.

[143] BNSF.RP.WP.II.A-0069, 0072 to 0074.

[144] Prior to Third Quarter 2002, the Palmer Lake helper assisted all loaded Oklaunion trains.

train of the crew wages paid to these helpers is appropriate as it benefits from these helpers' presence. AEP Texas ignored these exception helpers in developing variable costs for the issue movement. Mr. Fisher and Ms. Newland have calculated crew wages for the exception helpers by applying a pro rata share of the cost of each helper based on the ratio of Oklaunion trains to total loaded coal trains that traverse each helper district.[145]

(12) Freight Car Expense (RR-Owned Only)

The parties disagree on the ownership and operating costs of the railroad-supplied cars that are used on the Oklaunion train. On opening, Mr. Fisher and Ms. Newland relied on URCS system-average freight-car costs for plain gondolas, the predominant car type used on the Oklaunion train.[146] On reply, they continue to use URCS system average costs, but refine those costs to reflect the use of special service open-top hoppers and general service open-top hoppers.[147]

(a) Freight Car Ownership And Lease Costs

In its opening evidence, AEP Texas used a similar approach to BNSF's, *i.e.*, it used a system-average ownership costs by car type and the relative mix of car types used in Oklaunion service. But AEP Texas' approach differs from BNSF in three important respects. AEP Texas' system-average car costs are *not* URCS-based; it applies an inappropriate adjustment that distorts the mix of car types used on Oklaunion trains; and it calculates a flawed spare margin. As a

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[145] BNSF Reply electronic workpaper "2002 Palmer and Logan.xls."

[146] BNSF Opening Nar. at II-5 and BNSF Opening electronic workpaper "car type.xls." Plain gondolas comprised 83 percent of AEP Texas shipments in the last two quarters of 2001, 93 percent in 2002, and 95 percent in the first two quarters of 2003. BNSF Opening electronic workpaper "car type.xls."

[147] BNSF Reply electronic workpapers "car type reply.xls," "BNSF AEP REPLY PRG.123," Tab "URCS."

result, AEP Texas' car-ownership evidence is inconsistent with URCS and understates BNSF's car-ownership costs.

To develop freight-car acquisition costs, AEP Texas first calculated a non-URCS based system-wide investment cost for the types of cars used in AEP Texas service – plain gondolas, special service open-top hoppers, and general service open-top hoppers. To do this, AEP Texas divided BNSF's investments reported in BNSF's R-1 by the corresponding car counts also reported in the R-1. Next, AEP Texas calculated a non-URCS based system-wide lease costs for each of the three car types by dividing BNSF's lease costs reported in the R-1 by the car counts. It then identified the mix of gondolas and hoppers used in Oklaunion service and the mix of owned and leased cars. It adjusted these mixes to exclude non-railroad owned freight cars for which AEP Texas claimed it did not have lease information. Finally, AEP Texas applied the system-average investment or lease cost as appropriate for each car type to the adjusted mix of cars to calculate the ownership costs for freight cars used in Oklaunion service.

Although AEP Texas represents its evidence as movement-specific, this clearly is not the case. AEP Texas evidence reflects, at best, a flawed calculation of BNSF's system-wide investment and lease costs by car type. It does not reflect investment for the actual cars used on the Oklaunion train. In discovery, BNSF produced or made available detailed accounting data and lease documents for the vast majority of freight cars used in Oklaunion service. So AEP Texas could have developed a movement-specific car cost for the actual cars used on the Oklaunion train, but chose not to.

Its development of a car specific system-wide cost using R-1 data is unnecessary as URCS generates these data. AEP Texas' calculations are inconsistent with URCS and produce results that are unreliable. For example, AEP Texas calculated that BNSF's average investment

in gondolas in 2001 was $57,795. For 2002 and 2003, however, it calculated that BNSF's average investment in gondolas was just $32,838 – more than 40 percent lower than 2001.[148] Such substantial fluctuations conflict with URCS running return-on-investment costs which increased by less than six percent from 2001 to 2002, from $0.0070 per mile to $0.0074.[149] AEP Texas' costs for special-service open-top hoppers display a similarly erratic shift between 2001 and 2002, from $22,558 to $34,363[150] – an increase of more than 50 percent, despite the fact that the corresponding URCS ROI cost changes – in fact, decreases – by less than ten percent.[151]

AEP Texas' exclusion of private-marking cars from the mix of owned units and its exclusion of cars without lease information from the mix of leased units are also inappropriate and distort the actual mix of gondolas versus hoppers and owned units versus leased used in Oklaunion service. The majority of these private marking cars bear the initials { }. Under an agreement with Western Farmers, BNSF swaps railroad owned gondolas for the { } owned cars.[152] BNSF uses its own cars in { } trains and uses { } cars elsewhere, including in Oklaunion service. In fact, { } cars account for approximately half of the cars used in Oklaunion service in 2002.[153]

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[148] AEP Texas Opening Exh. II.A-23.

[149] BNSF Reply electronic workpaper "BNSF AEP REPLY PRG.123," Tab "URCS," row 185.

[150] AEP Texas Opening Exh. II.A-23.

[151] $0.0112 to $0.0102. BNSF Reply electronic workpaper "BNSF AEP REPLY PRG.123," Tab "URCS," row 209.

[152] BNSF.RP.WP.II.A-0076 to 0079.

[153] AEP Texas Opening electronic workpaper "Freight Car Capital.xls," Tab "2002."

As the { } cars are gondolas (as are the cars BNSF provides in exchange to { }[154]), excluding them from the calculation of the mix of car types significantly understates the percentage of gondolas used. Approximately 93 percent of cars used in Oklaunion service in 2002 were gondolas and nearly half of the cars were owned by { }. By excluding the { }, AEP Texas incorrectly calculated that only 76 percent of BNSF-owned Oklaunion cars were gondolas in 2002.[155]

Similarly, excluding the { } cars suggests a much higher percentage of leased cars than is actually the case. This is because the cars that BNSF provides to { } in exchange for the cars used in Oklaunion service are owned units. As BNSF and { } each remains financially responsible for its own cars, the cost of ownership to BNSF for the { } cars used in is that of the BNSF cars used in { } service.[156] By excluding the { } cars, which are all appropriately treated as owned units, AEP Texas suggests that the percentage of owned units is far smaller than it is. AEP Texas' calculation of the equipment distribution is incorrect and should be rejected.

(b) Freight Car Spare Margin

The parties also disagree on the spare margin that should be used in developing freight car costs. BNSF's costs are based on URCS system-average which incorporates BNSF's spare margin needs. Accordingly, Mr. Fisher and Ms. Newland do not apply a separate spare margin.

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[154] BNSF Reply III-C electronic workpaper "AEPTX.BNSF cars stats by destination.xls."

[155] AEP Texas Opening Exh. II-A-23.

[156] BNSF's traffic tapes produced in discovery identified the cars used in Western Farmers service. Accounting data and leases produced or made available to AEP Texas during discovery identify the ownership and lease costs of these cars.

AEP Texas uses a spare margin of 5.3 percent based on a flawed study of spare-car requirements in contracts for coal transportation in shipper-supplied cars. [157]

AEP Texas assumes without explanation that spare-car requirements in transportation contracts for shipper-supplied cars reflect the railroad's total spare-car margin requirements for movements in railroad-supplied cars. They do not. These requirements are negotiated and may reflect many factors, including the critical fact that BNSF can provide additional spares if the shipper's spare supply is inadequate. In fact, BNSF supplied spare cars have been used to handle each of the 25 contract movements included in AEP Texas' study.[158] For example, {

}[159] Based on this information, AEP Texas calculates a spare margin of { } percent for this shipper.[160] BNSF traffic records show, however, that BNSF supplies {

},[161] suggesting a "spare margin" under AEP Texas' approach of { } percent.[162] Similarly, BNSF traffic records demonstrate that the railroad provides { } percent of the equipment used to handle { } traffic, which when added to AEP Texas' calculated shipper-provided spare margin of { } percent produces an actual spare margin of { } percent. Finally,{ } maintains { } percent shipper spares under the contract and utilizes { } percent railroad-supplied cars for a { } spare margin. In

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[157] AEP Texas Opening Exh. II.A-24.

[158] BNSF 2002 traffic data; see BNSF Reply electronic workpaper "Shipper Contract Spare Margin_BNSF Reply.xls."

[159] AEP WP 02986.

[160] { }.

[161] BNSF 2002 traffic data; see BNSF Reply electronic workpaper "Shipper Contract Spare Margin_BNSF Reply.xls."

[162] { } percent railroad-provided equipment.

traffic densities."[46] This passage clearly contemplates that the shipper may only benefit from the traffic densities that exist on the route that it selects. The complainant may select the route with the greatest traffic densities to serve the issue traffic, but it has no right to create artificial densities by rerouting traffic that does not use the facilities of the selected issue traffic route.

The Board's recent formulation of the rule regarding traffic rerouting and sharing of facilities applies here. In *Duke/CSX* the Board stated, "where traffic does not already utilize lines replicated by the SARR, the traffic may not be included in the SAC analysis absent a compelling justification that the defendant carrier should itself be routing the traffic in this manner and that it is inefficient for it not to do so."[47] In establishing this rule, the Board recognized that "it is not appropriate to divert traffic from other parts of the defendant carrier's system to help defray costs of the portion of the system used by complainant." *Id.* Precluding a shipper from including in its traffic group rerouted traffic that does not actually share facilities with the issue traffic on the SARR route prevents the shipper from manipulating the SAC results by rerouting traffic to pay for facilities that it does not use.

The rationale for exclusion logically applies to traffic whose real world route involves only minimal use of the SARR facilities used by the issue traffic. In such a circumstance, the complainant seeks to have the rerouted traffic contribute revenue that is disproportionately large given the limited sharing of facilities that occurs in the real world. In this case, AEP Texas has rerouted the southern PRB coal traffic so that loaded movements travel between 270 and 286 miles on the SARR, whereas their real world routing would have them on SARR facilities for no more than 48.6 miles at most, and even less for most of the movements. *See* Table III.A-3

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[46] *Coal Rate Guidelines*, 1 I.C.C.2d at 543-544.

[47] *Duke/CSX* at 16.

fact, the shippers in AEP Texas' study receive, on average, more than six percent of their traffic in BNSF equipment, suggesting a spare margin in excess of the standard ten-percent spare margin used in prior rate cases. Nevertheless, contract spare margin requirements are not an appropriate basis for developing spare margin needs.

(c) Freight Car Operating & Maintenance Expense:

The parties also disagree on freight-car maintenance and operating costs. Mr. Fisher and Ms. Newland use URCS system-average costs. AEP Texas makes two improper adjustments to the BNSF system-average URCS freight-car costs.

First, AEP Texas' applies what it describes as "a standard 'active to calendar-day' adjustment." AEP Texas Opening Nar. at II-A-45. In *TMPA*, the Board correctly described this adjustment as "a collateral attack on the [URCS] model itself." *TMPA* at 63. For the same reasons that the Board rejected this adjustment in *TMPA*, it should reject it here. This adjustment reduces BNSF's gondola costs by more than 50 percent and BNSF's open-top hopper costs by more than 90 percent in each year 2000 through 2003.[163]

AEP Texas further reduces BNSF's unit costs for gondolas and for open-top hoppers by an additional 50 percent in 2002 and 2003 by applying a "Percent Maintained" factor. This adjustment is based on the erroneous assumption that BNSF operates most of the equipment used in AEP Texas service under a full-service lease.[164] Although AEP Texas provides no explanation for this adjustment, its workpapers indicate that AEP Texas excludes all freight cars initialed { } from its calculations of the "pool" used in Oklaunion

[163] AEP Texas Opening Exh. II.A-22.

[164] AEP Texas Opening Exh. II.A-22.

trains.[165] As materials provided to AEP Texas in discovery indicate, BNSF uses this equipment as its own in an exchange with { }, and has not acquired it under a full-service lease.[166] By excluding this equipment – which AEP Texas' own workpapers indicate provided nearly one-half of all trips in privately-marked cars to Oklaunion in 2002[167] – from its determination of the cars used in Oklaunion service, AEP Texas significantly overstates the percentage of equipment under full-service lease. For example, AEP Texas concludes that more than 60 percent of the 2002 shipments to Oklaunion in gondolas were under a full-service lease.[168] Correcting AEP Texas' calculation to include only the { }-marked equipment in the "pool" indicates that at most one-third of AEP Texas' traffic moved in such equipment in 2002, and increases AEP Texas' understated gondola costs by more than 70 percent.

In any event, since AEP Texas' car lease costs are based on a system average car type-specific cost, its "Percent Maintained" adjustment is wholly improper. That adjustment appears to be predicated on the assumption that maintenance costs for the cars under a full-service lease are already accounted for in the lease costs, and, therefore the operating costs should be adjusted to avoid a double-count.[169] AEP Texas' lease payment, however, is based on the system-wide

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[165] AEP Texas Opening electronic workpaper "Freight Car Capital.xls," Tab "Sheet1."

[166] BNSF/AEP 33906, included as BNSF.RP.WP.II.A-0079.

[167] AEP Texas Opening electronic workpaper "Freight Car Capital.xls," Tab "Sheet1."

[168] AEP Texas Opening Exh. II.A-22.

[169] A footnote to AEP Texas Opening Exh. II.A-22 states that "Maintenance for these [full-service lease] cars included in revised lease payment."

average lease payment by car type,[170] and does not specifically reflect the higher lease costs of any cars used in Oklaunion service that were under a full-service lease, as AEP Texas implies.

Further, AEP Texas' analysis of maintenance and operating costs started with system-average URCS unit costs that already reflect the fact that a percentage of the cars have been acquired under full-service leases. Thus, there is no need to adjust further downward its results, as the costs already reflect the associated "Percent Maintained" factor.

(13) Loss and Damage Expenses

The parties stipulated to the amount of loss and damage expense to include in their variable cost calculations.[171]

(14) Locomotive Ownership Expense

The parties disagree about the proper calculation of locomotive ownership expense. The differences in the parties' calculations are primarily due to the different approaches they take with respect to the following factors: (a) spare margin; (b) development of lease and acquisition costs; and (c) the parties' different treatment of Accounts 76 and 90 (discussed above in Section II.A.1.a.(1)).

(a) Spare Margin

The Board has often applied a 10-percent spare margin in rate reasonableness cases, but has acknowledged that a different percentage may apply if supported by empirical evidence.[172] On opening, BNSF presented empirical evidence supporting a spare margin above ten percent

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[170] AEP Texas Opening Exh. II.A-23.

[171] BNSF Reply electronic workpaper "Letter to the Board 4_12.pdf."

[172] *See, e.g., 1996 Decision*, 1 STB at 728 (stating that BN had failed to "substantiate the use of a spare margin different from the 10 percent accepted in past cases").

and explained the basis for its spare margin. BNSF Opening Nar. at II-15 to 16. It continues to rely on that special study of locomotive spare margin in this reply. AEP Texas presents locomotive spare-margin evidence purporting to show that BNSF's spare margin is lower than ten percent.[173]

AEP Texas' spare margin evidence, which ranges from { } percent, improperly relies on "availability guarantees" contained in BNSF's locomotive maintenance contracts with third parties.[174] Many of the locomotives used to power the Oklaunion train, however, were not subject to a maintenance contract during the period costed.[175] For those locomotives, AEP Texas used the 10-percent spare margin the Board has accepted in prior rate cases. AEP Texas' spare margin is weighted to reflect the relative utilization (*i.e.*, locomotive hours) in Oklaunion service of the units covered by a maintenance contract and units not subject to a maintenance contract. As explained below, the availability guarantees in the locomotive maintenance contracts are not an appropriate basis for developing BNSF's locomotive spare margin.

The Board has already recognized in its *TMPA* decision that BNSF's locomotive maintenance contracts do not account for all maintenance needs with respect to units covered by such contracts.[176] It follows that "unavailability" time under the contract does not include all time that a locomotive is unavailable to the railroad for revenue service. For example,

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[173] AEP Texas presented this evidence apparently in anticipation of BNSF's position that the real spare margin exceeds ten percent. It does not actually apply any spare margin in its locomotive ownership calculations.

[174] AEP Opening Texas electronic workpapers "2000 Loco Maint AEPTEX.123;" "2001 Loco Maint AEPTEX.123;" "2002 Loco Maint AEPTEX.123;" and "2003 Loco Maint AEPTEX.123."

[175] *See* n.94.

[176] *TMPA* at 58.

locomotives involved in { } would not be considered as "unavailable" under the contracts, but those units clearly are not available to the railroad for revenue service.[177]

Moreover, because BNSF and { } lacked sufficient data to measure "availability" as defined in the contracts, BNSF and {

}[178]

Thus, those guarantees are meaningless and cannot be used as a measure of locomotive availability. Also, AEP Texas inappropriately applied BNSF's recent agreement with { } to the entire year 2003, although the { } contract did not become effective until { }.[179]

Further, AEP Texas' use of the contract availability percentage as BNSF's locomotive spare margin is mathematically incorrect.[180] In its opening evidence, BNSF explained that the spare margin is expressed as a percentage of the actual *available* time, and not as a percentage of *total* locomotive hours, as AEP Texas calculates. BNSF Opening Nar. at II-15 to 16.

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[177] BNSF.RP.WP.II.A-0032 and 0039.

[178] The sixth covenant of the Sixth Amendment to BNSF's maintenance agreement with { } provides the following:

{

} AEP Texas workpapers 0481 to 0483, BNSF.RP.WP.II.A-0056 to 0058.

[179] BNSF.RP.WP.II.A-0043 and 0050.

[180] AEP Texas Opening electronic workpapers "2000 LOCO MAINT AEPTX.123," "2001 LOCO MAINT AEPTX.123," "2002 LOCO MAINT AEPTX.123," and "2003 LOCO MAINT AEPTX.123."

Finally, by failing to consider locomotive utilization, AEP Texas' approach further understates BNSF spare-margin needs.

BNSF's spare-margin evidence, which is based on data provided to AEP Texas in discovery that shows BNSF's actual availability and utilization, is far superior to AEP Texas' evidence, which is based on speculation and misapplication of BNSF's locomotive maintenance contracts.

(b) Development of BNSF Lease and Acquisition Expenses

AEP Texas used BNSF system-average locomotive ownership costs to calculate variable cost for the issue move. Since Oklaunion trains are predominantly powered by the most expensive locomotives in BNSF's fleet – SD70MACs – this approach understates actual lease and ownership costs for the units that power the Oklaunion rains. AEP Texas further understated lease and ownership costs by understating the number of units on the Oklaunion train. As the parties stipulated to the number of units that power the Oklaunion train, the difference attributable to AEP Texas' understatement of units on opening should disappear.

BNSF developed BNSF locomotive lease and ownership costs based on the specific costs of the actual units that powered the Oklaunion train. This approach has been repeatedly accepted by the Board.[181] AEP Texas claims that it did not follow this approach because BNSF's production of locomotive ownership data was somehow deficient. But BNSF produced detailed locomotive ownership and lease cost accounting data. BNSF also made its locomotive ownership and lease documents available to AEP Texas for inspection and copying when AEP Texas' consultants visited BNSF's Fort Worth, Texas headquarters.

[181] *WPL* at 58-59; *TMPA* at 61.

(15) Third-Party Loading And Unloading Expense

BNSF's operating witness, Mr. Deichert explains that BNSF pays a third party to load Oklaunion trains at each of the mines from which AEP Texas originated coal, except at the Black Thunder mine, where BNSF loading crews perform the loading function. BNSF produced in discovery its contracts with these third parties.[182] It also pays for a third party to unload coal at Oklaunion. AEP Texas ignores these costs in developing variable costs for the issue movement.

As Mr. Fisher and Ms. Newland use URCS system-average switching costs, which should account for costs incurred on the loop track at origin and destination, they do not include separately BNSF's payments to third parties for loading and unloading.

(16) Joint Facilities

As explained above, the parties agree on the joint facilities that are used by the Oklaunion train but disagree as to how joint facility payments should be treated in developing variable costs. AEP Texas improperly applies a 60 percent variability factor and excludes a portion of the joint facility payments that it incorrectly deems allocable to switching.[183]

Joint facilities are included in the URCS costing process. For running track maintenance joint facilities payments, URCS applies a variability factor of approximately 60 percent. The application of a variability factor reflects an assumption that many joint facility agreements are structured to provide a minimum payment by the railroad utilizing the joint facility whether it transports one ton or one million tons over the facility. Since the typical joint facility payment involves such fixed payments, URCS assumes that only a portion of the joint facility is variable.

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[182] BNSF/AEPTX 2842-2862, included as workpapers BNSF Reply electronic workpapers "Third Party Loaders.pdf."

[183] AEP Texas Opening Exh. II-A-3.

However, there are joint facility agreements which provide for payment purely on a usage basis, *i.e.*, payment is made on a per ton, per car, or per train basis. Such jointly facility payments that are based on usage are 100 percent variable to the tenant railroad.

In this case, the Oklaunion train traverses a section of track between Sterling and Union, Colorado, owned by UP. Because BNSF pays UP on a { }) to use this track,[184] its payments to UP are 100 percent variable to BNSF.

Second, AEP Texas arbitrarily reduces by 12 percent the joint facility payments that it identified for the Oklaunion trains.[185] AEP Texas' unexplained adjustment is apparently based on the theory that 12 percent of joint facility payments is allocable to switching and 88 percent to running based on BNSF's system-wide experience. As was true in *TMPA*, "BNSF's system-wide experience is not relevant here."[186] AEP Texas has not shown that any switching of bad order cars occurs on the joint facilities used by Oklaunion trains. Moreover, BNSF pays for the joint facilities traversed by the unit coal trains on either { }, and does not receive any switching services in exchange for its payments. BNSF operates the trains over each of the joint facilities, none of which involve the switching of cars or pick-up or delivery of the coal traffic. As it did with the reduction proffered by the complainant in *TMPA* (*see TMPA* at 63), the Board should reject AEP Texas' adjustment. Because of these errors, AEP Texas understated joint facility costs by nearly 50 percent.[187]

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[184] BNSF Reply electronic workpaper "Sterling-Union.pdf."

[185] AEP Texas Opening Exh. II.A-3.

[186] *TMPA* at 63.

[187] 0.60 x 0.88 = 0.53.

(17) Indexing

The parties stipulated to the appropriate index factors.[188]

2. Rate and Resulting R/VC Calculation

Mr. Fisher and Ms. Newland have updated the variable costs of the AEP Texas traffic for Third Quarter 2001 through Second Quarter 2003 to reflect where appropriate the stipulated traffic and operating characteristics, movement-specific crew-wage costs and BNSF's 2003 URCS. The following table shows the results. BNSF Reply Exhibit No. II.A-1 presents the cost summaries, and electronic workpaper "BNSF AEP REPLY PRG.123" contains the detailed calculations.

Table II.A-6
Summary of Variable Costs and Revenue To Variable Cost Ratios

Period	Rate/Ton	Variable Cost/Ton	Revenue to Variable Cost Ratio	
			Based on Rate Established by BNSF	Based on $13.68 Rate Paid by AEP Texas
Buckskin				
3rd Qtr 2001	$15.78	$9.42	168%	145%
4th Qtr 2001	$15.78	$9.32	169%	147%
Black Thunder				
3rd Qtr 2001	$15.78	$9.49	166%	144%
4th Qtr 2001	$15.78	$8.88	178%	154%
2nd Qtr 2002	$15.78	$9.77	161%	140%
3rd Qtr 2002	$16.36	$9.85	166%	139%
4th Qtr 2002	$17.25	$10.53	164%	130%
Caballo				
2nd Qtr 2002	$15.78	$10.56	149%	130%
3rd Qtr 2002	$16.36	$9.55	171%	143%
4th Qtr 2002	$17.25	$10.79	160%	127%
2nd Qtr 2003	$18.04	$10.52	171%	130%
Cordero				
2nd Qtr 2003	$18.04	$9.76	185%	140%
Caballo Rojo				
3rd Qtr 2001	$15.78	$9.32	169%	147%

[188] BNSF Reply electronic workpaper "Letter to the Board 5_3.pdf."

Period	Rate/Ton	Variable Cost/Ton	Revenue to Variable Cost Ratio	
			Based on Rate Established by BNSF	Based on $13.68 Rate Paid by AEP Texas
4th Qtr 2001	$15.78	$9.46	167%	145%
2nd Qtr 2002	18.04	$11.57	156%	118%
Jacobs Ranch				
3rd Qtr 2001	$15.78	$9.12	173%	150%
4th Qtr 2001	$15.78	$9.03	175%	151%
1st Qtr 2002	$15.78	$8.99	176%	152%
3rd Qtr 2002	$16.46	$9.76	169%	140%
4th Qtr 2002	$17.25	$10.31	167%	133%
Eagle Butte				
1st Qtr 2003	$17.25	$10.42	166%	131%
2nd Qtr 2003 117-Car Train	$17.53	$9.87	178%	139%
2nd Qtr 2003 128-Car Train	$18.04	$10.17	177%	134%
North Rochelle				
3rd Qtr 2002	$16.36	$10.77	152%	127%
Rawhide				
2nd Qtr 2003	$13.68	$10.60	129%	129%

II. MARKET DOMINANCE

B. QUALITATIVE MARKET DOMINANCE

AEP Texas argues that the Board should find that BNSF lacks intramodal and intermodal competition for the issue traffic based on its finding of market dominance in the 1996 Decision. As AEP Texas explains: "The facts relating to movements of coal from the Rawhide Mine to Oklaunion Station remain the same. Accordingly, the Board's 1996 market dominance findings with respect to that origin should apply in this proceeding. Further, the Board's conclusions regarding BNSF's market dominance are equally applicable to the non-Rawhide movements that are at isue in this proceeding." AEP Texas Opening Nar. at II-B-1.

BNSF does not contest AEP Texas' position that the Board's 1996 findings on market dominance should apply to this proceeding. In fact, BNSF believes that all of the Board's 1996 findings, including its SAC maximum rate findings, should apply in this proceeding. As BNSF explained in the Argument to this Reply Evidence, the Board's 1996 findings should apply here unless there is evidence of changed circumstances or legal error that would justify a departure from those findings since this proceeding involves the same parties and the same transportation service as the 1996 case. This conclusion should apply equally to the Board's market dominance and SAC calculations.

However, BNSF does contest AEP Texas' gratuitous allegation that BNSF's rate increases on its coal transportation since 1996 have constituted "retaliatory rate actions." *Id.* at II-B-6-7. Such an allegation is ludicrous on its face. As BNSF has demonstrated above, BNSF has never charged a rate for the traffic at issue here that exceeds the maximum reasonable rate that the Board calculated in 1996.

III. STAND-ALONE COST

A. TRAFFIC GROUP

In this rate case, AEP Texas is challenging the reasonableness of rates on coal traffic originating at Powder River Basin ("PRB") mines, including the Rawhide mine, and moving to AEP Texas' Oklaunion generating station. West Texas Utilities ("WTU"), a predecessor of AEP Texas,[1] challenged the reasonableness of the tariff rate for the very same movements, and the Board prescribed a rate for the movement from the Rawhide mine to the Oklaunion plant effective October 17, 1995, less than nine years ago. Now AEP Texas has persuaded the Board to vacate its original rate prescription for the Rawhide to Oklaunion movement and seeks to have the Board impose a new rate prescription for the movement that is some 30 percent lower than the rate previously prescribed by the Board, as of Second Quarter 2003.[2]

In this new rate case, AEP Texas has developed a hypothetical rail carrier called the Texas & Northern Railroad ("TNR") that transports primarily coal but also some general freight traffic from June 2000 through 2020. The TNR replicates existing BNSF lines within the PRB and extends from the PRB to Oklaunion, Texas.[3] Specifically, the TNR serves all Wyoming PRB mines, it exits the PRB to the north over Donkey Creek, runs through Edgemont, South Dakota; Alliance, Nebraska; Northport, Nebraska; Sterling, Colorado; Pueblo, Colorado;

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[1] AEP Texas and its predecessor, WTU, are both hereafter referred to as AEP Texas.

[2] AEP Texas now proposes a $12.51 rate per ton for the Rawhide movement whereas the Board's prescribed rate in Docket No. 41191 was $18.04 as of Second Quarter 2003. *Compare* AEP Texas Opening Nar. at I-35 with *West Texas Utilities Company v. The Burlington Northern and Santa Fe Railway Company*, STB Docket No. 41191 (decided May 28, 2003) at 5, Table 1 (hereafter "May 2003 WTU Decision")

[3] AEP Texas Opening Nar. at III-B-1.

Amarillo, Texas and down to the Oklaunion plant. AEP Texas provided a schematic of the TNR's route at its Opening Exhibit III-A-1.

The only significant difference between the traffic group in the original rate case brought by AEP Texas and the traffic group in this new rate case is the inclusion of substantial amounts of cross-over traffic in this rate case.[4] In the original rate case, AEP Texas developed a traffic group consisting of eleven plants, all of which were served by the stand-alone railroad ("SARR") either in single-line service or through a connection with a real world interline carrier at the real world interchange location.[5] There was no cross-over traffic in the original rate case. Based on this traffic group, the Board concluded that the SARR would transport 49.6 million tons in 2001.[6]

In contrast, in this new rate case, AEP Texas has selected a traffic group that includes coal movements destined to 107 different power plants, only seven of which are served by the TNR in either single-line service or through an existing interchange with a real world connecting carrier.[7] A substantial majority of the traffic handled by the TNR is cross-over traffic.[8] Indeed,

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[4] "Cross-over traffic" is traffic currently handled by the incumbent railroad (here BNSF) that the Complainant assumes would move in interline service between the stand-alone railroad ("SARR") and the incumbent railroad. The cross-over traffic is handed off from the SARR to the residual incumbent at fictional interchange points. *See PPL* at 7, n.13.

[5] *WTU*, 1 S.T.B. at 658.

[6] *Id.*, 1 S.T.B. at 711. 2001 is the first full year that the TNR operates in AEP Texas' new rate case.

[7] These seven plants include: Xcel's Arapahoe, Harrington, Comanche and Pawnee plants, Westar's Jeffrey plant, Nebraska Public Power District's ("NPPD") Gerald Gentleman Station and AEP Texas North's Oklaunion plant. *See* AEP Texas Opening Nar. at 36, 37-38.

[8] AEP Texas Opening Nar. at III-A-39.

according to AEP Texas' evidence, 173 of the 198.7 million tons transported by the TNR in 2001, its first full year of operation, are handled in cross-over service.[9]

In the current case, AEP Texas assumes that total volumes on the TNR increase by 19 percent from 198.7 million tons in 2001 to 236.9 million tons in 2020, the last year of the DCF period.[10] AEP Texas assumes that total revenues will increase by about 50 percent from $767 million in 2001 to almost $1.14 billion in 2020.[11]

As a threshold matter, BNSF challenges AEP Texas' use of cross-over traffic as the predominant source of revenue for the TNR. Reliance on cross-over traffic precludes a complete comparison of the revenues generated by the movements in the traffic group and the full costs of serving that traffic which is the essence of a properly conducted SAC test. The Board should reject AEP Texas' SAC evidence on this basis. The manipulation that may be achieved by a complainant through heavy reliance on cross-over traffic is particularly apparent in this case, given the existence of the earlier SAC case involving the Oklaunion plant. In that earlier rate case, which involved no cross-over traffic, the Board prescribed a rate of $18.04 per ton, effective 2003, for the Rawhide to Oklaunion movement.[12] In this rate case, which includes substantial cross-over traffic, AEP Texas is seeking a rate prescription of $12.51, effective 2Q03,

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[9] 173 million tons of cross-over traffic was calculated by subtracting 13.1 million tons (single-line tons in 2001), 12.5 million tons (coal handled at existing interchanges in 2001), and 0.1 million tons (Coleto Creek coal transported by UP in 2001) from 198.7 million tons (total traffic transported by TNR in 2001). *See* AEP Texas Opening Nar. at III-A-15, 36, 37, 41.

[10] *See* AEP Texas Opening Nar. at III-A-15 (total 2001 volume); AEP Texas Opening Exh. III-A-3 at 4, column 30 (2020 coal volumes) and Exh. III-A-15 at 5, column 23, row 19 (2020 non-coal volumes).

[11] AEP Texas Opening Exh. III-A-14 at 2, column 11 (2001 coal revenue); Exh. III-A-14 at 4, column 30 (2020 coal revenue); Exh. III-A-15 at 1, column 4, row 38 (2001 non-coal revenue); Exh. III-A-15 at 5, column 23, row 38 (2020 non-coal revenue).

[12] *May 2003 WTU Decision*, at 5.

for that Rawhide movement,[13] which is more than 30 percent lower than the rate previously prescribed by the Board following a full SAC analysis.

In addition to the distortions caused in the SAC results by this threshold problem with cross-over traffic, AEP Texas' volume and revenue evidence is flawed in numerous respects. These flaws result in a vast overstatement of both coal volumes to be transported by the TNR and revenues on those movements.

With respect to volumes, a very significant flaw in AEP Texas' evidence is the inclusion of certain rerouted cross-over traffic in the TNR traffic group. If the Board permits the use of cross-over traffic in this case – and it should not – it must nevertheless exclude certain rerouted cross-over movements. The vast majority of the cross-over traffic in AEP Texas' traffic group exits the TNR at Alliance, Nebraska.[14] In 2001, over 28 million tons of this rerouted coal traffic that exits at Alliance originated at the three southernmost PRB mines -- Antelope, North Antelope and North Rochelle. In the real world, this 28 million tons of coal was routed south via Guernsey out of the PRB. Rather than following this historical route, AEP Texas reroutes this traffic over a much longer route north out of the PRB via Donkey Creek and Edgemont. Under recent Board precedent, there is a presumption that traffic rerouted over a longer haul should not be included in the stand-alone traffic group. AEP Texas has not demonstrated that this longer route is as efficient as the real world BNSF route. To the contrary, as shown below, inclusion of this rerouted traffic would cause gridlock on the SARR as AEP Texas has configured it. Moreover, on its real world route over Guernsey, the coal traffic from the three southern mines

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[13] *See* AEP Texas Opening Nar. at I-35.

[14] 112 of the 173 million tons of cross-over traffic included by AEP Texas in its 2001 traffic group exits the TNR at Alliance. An additional 14.6 million tons are designated by AEP Texas as off the TNR at Alliance/Campbell interchanges. *See* BNSF Reply electronic workpaper "Cross Over v Local Traffic.xls."

would share only minimal facilities with the issue traffic on the TNR; namely, it would share no more than 15 miles of track in the PRB and 33.6 miles of track between Alliance and Northport. It is inconsistent with SAC principles to allow rerouted traffic to contribute substantial revenue to the coverage of the costs of facilities used by the issue traffic on the SARR when that traffic does not share those facilities in the real world or shares them only to a limited extent.

For the same reasons, the Board should exclude the coal traffic destined to Georgia Power's plant Scherer that is included in AEP Texas' traffic group as of 2004, the year BNSF first began to handle this traffic. Like the other coal movements originating at the southernmost PRB mines, the coal movement to Georgia Power's Scherer plant {

}

AEP Texas also improperly includes several other coal movements in its traffic group, including the movement to AEP Texas Central's Coleto Creek plant, which is transported by UP, not BNSF, in the real world and the movement to Tennessee Valley Authority's ("TVA") Shawnee plant, a plant that BNSF does not serve. Finally, as explained below, AEP Texas improperly includes coal that it claims will move to a new generating unit that may be constructed at Sunflower's Holcomb plant in the future, even though it is too uncertain at this point to assume that this unit will actually be built.

In addition to these problems with AEP Texas' starting coal tonnage, its volume projections also are substantially flawed, causing a vast overstatement of the volumes transported by the TNR over the DCF period. While AEP Texas claims to use BNSF'S Long Range Plan

("LRP") for coal to project coal volumes in 2003 through 2008,[15] it alters the BNSF LRP in so many ways that it succeeds in converting BNSF's ordinary course of business forecast, which the Board clearly prefers, into its own made-for-litigation forecast. The Board should not countenance this sleight-of-hand and should rely, instead, on BNSF's unmodified LRP, as BNSF has done in the reply evidence. The most egregious misuse of the BNSF LRP results from AEP Texas' completely unwarranted inflation of the volumes transported by the TNR between the years 2002 and 2003. While AEP Texas acknowledges in its workpapers that coal volumes transported by BNSF were projected to decline by { } between 2002 and 2003,[16] AEP Texas employs a circular, indefensible analysis of MMBTUs consumed at the plants in the TNR traffic group – an analysis that it does not even mention in its narrative -- to conclude that the volumes transported by the TNR actually *increase* by 2.6 percent between 2002 and 2003. Using the same flawed MMBTU sleight of hand, AEP Texas also assumes that the new plants added to the TNR traffic group in 2005 -- { }-- will receive substantially more coal than projected in BNSF's LRP.

Other volume projection errors result from AEP Texas' improper application of a cap on volumes that can be transported to a plant. While AEP Texas claims to cap volume growth when a plant reaches the 85 percent capacity factor,[17] it does not do so for plants that receive coal via a

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[15] *See* AEP Texas Opening Nar. at III-A-14.

[16] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth" row 3, cell K3; *see also* AEP Texas' Response to Second Request of The Burlington Northern and Santa Fe Railway Company for Workpapers, Response to Section III.A Request No. 3. A copy of this workpaper response is included in BNSF Reply electronic workpapers at "AEPTX Response to DR 2Q3.pdf."

[17] *See* AEP Texas Opening Nar. at III-A-14.

transloading facility. Further, AEP Texas does not accurately cap volume growth to plants whose coal deliveries exceeded the 85 percent capacity level in 2002. Rather than capping the volumes to these plants at the level of deliveries in 2002, AEP Texas allows deliveries to these plants to grow beyond the 2002 delivery level, which is inconsistent with the approach accepted by the Board in another recent rate case.[18] As explained below, AEP Texas also improperly inflates volumes to three other plants in the shipper group -- Texas Genco Holdings' Limestone plant, Tucson Electric Company's ("TEP") Springerville plant, and Texas Genco Holdings' Parish plant. Finally, AEP Texas' volume projections are also flawed because AEP Texas does not use the most recent Energy Information Administration ("EIA") forecast to project coal volumes beginning in 2009. BNSF corrects these flaws in its reply evidence.

AEP Texas' coal revenue assumptions are also fundamentally flawed. As stated above, cross-over traffic and its revenues should be excluded in their entirety. But if the Board permits the use of cross-over traffic, it should adopt BNSF's density adjusted revenue allocation ("DARA") procedure rather than the modified straight mileage prorate ("MSP") methodology utilized by AEP Texas. As explained in section III.A.3.c below, DARA is a superior methodology for allocating revenues on cross-over traffic than MSP for three reasons. First, DARA explicitly distinguishes between attributable and unattributable costs to implement the Board's instruction in *TMPA* that "[t]he revenue each carrier receives should cover the attributable costs of the service it provides and make some contribution to its unattributable costs."[19] In contrast, MSP does not explicitly ensure coverage of attributable costs. Second, DARA allocates revenues sufficient to cover directly attributable costs by calculating URCS-

[18] *WPL* at 20.

[19] *TMPA*, at 31, n. 73.

based variable costs, which is a more precise way of accounting for the costs of originating and terminating unit coal train traffic than the generic 100 mile origination and termination block credit used by MSP. Third, DARA takes account of economies of density (which MSP ignores) by allocating the revenue available to cover unattributable costs in inverse proportion to relative densities on the on-SARR and off-SARR segments.

Beyond the base year, AEP Texas' revenue forecast is inflated because it does not account for the fact that both competitive and sole-served destinations have routinely experienced { }. Other flaws in AEP Texas' revenue assumptions are discussed below in section III.A.3.d.

BNSF's evidence in this section III.A. is supported by eight witnesses. John C. Klick, a Senior Managing Director and Julie Murphy, a Director, in FTI's Economic Consulting Division, analyze AEP Texas' volume and revenue assumptions, explain the flaws in AEP Texas' approach, and sponsor evidence regarding BNSF's corrections to the volume and revenue assumptions. Mr. Klick also sponsors evidence regarding the conceptual flaws in AEP Texas' reliance on cross-over traffic. Mr. Klick and Benton V. Fisher, a Managing Director in FTI's Economic Consulting Division, sponsor evidence on the implementation of DARA and on the flaws in the MSP methodology used by AEP Texas. Ms. Murphy also sponsors the evidence regarding BNSF's rebased rates for both sole-served and competitive traffic on the TNR rail network at the expiration of existing contracts, and BNSF's revised revenue forecasts. Mr. Klick addresses the conceptual flaws in AEP Texas' reliance on cross-over traffic. David Wheeler, President of Rail Network Analytics, sponsors evidence regarding AEP Texas' transit times using the RTC Model. Thomas G. Kraemer, Group Vice President-Coal Marketing of BNSF, sponsors evidence regarding a study of BNSF coal rates under contracts that have expired since

January 1, 1998. Tony Deichert, General Superintendent, BNSF Coal Operations, sponsors evidence regarding BNSF coal operations. Randy Reyff, BNSF Director Coal Marketing, and Tom Epich, BNSF Director Coal Marketing, both sponsor evidence regarding BNSF's business arrangements with certain coal customers. The qualifications and verifications for these witnesses appear in Section IV.

1. Stand-Alone Railroad Traffic

This section identifies the traffic that AEP Texas improperly included in its SARR network. While the Complainant has the right to select its traffic base for the SARR network, there are limits to this right. As the ICC explained, "[t]he proponent of a particular stand-alone model must . . . be prepared to defend, the assumptions and selections it has made." *Coal Rate Guidelines*, 1 I.C.C. 2d at 544. In this case, AEP Texas has exceeded those limits by including several categories of traffic in its stand-alone shipper network that cannot be justified under governing SAC principles established by the Board.

As an initial matter, AEP Texas' heavy reliance on cross-over traffic is improper because it violates SAC principles. Moreover, AEP Texas' inclusion of vast quantities of rerouted coal traffic from the southernmost PRB mines results in a longer haul and less efficient service for that traffic and, thus, is inconsistent with SAC principles and Board precedent. For similar reasons, AEP Texas' inclusion of rerouted Georgia Power traffic is improper. Further, it is improper for AEP Texas to include the following movements in its traffic group: (1) the movement to Coleto Creek, a movement transported by UP, not BNSF, (2) the movement to TVA's Shawnee plant, a plant not served by BNSF, and (3) the movement to a purported new unit at Sunflower's Holcomb plant, a unit that is uncertain to be built. Each of these flaws is addressed in detail below.

a. AEP Texas North's Heavy Reliance On Cross-Over Traffic Is Inconsistent With The Fundamental Economics Of The SAC Test

There is only one material difference between the stand-alone rail network that was the basis of the Board's 1996 *WTU* decision and the stand-alone network that AEP Texas has posited here, and that difference is the inclusion in the current stand-alone network of very substantial volumes of cross-over traffic. Evidently AEP Texas concluded that it could not improve upon the results obtained in the 1996 decision if it adhered to the basic network configuration posited in that case. (Indeed, as discussed below, the likely outcome of an updated SAC analysis using the 1996 network configuration and traffic group would have been maximum reasonable rates higher than those found in the 1996 decision, because the actual revenues generated by the 1996 traffic group have been less than they were forecasted to be in the 1996 decision.) The only way that AEP could hope to show revenues substantially in excess of SAC was to posit the inclusion of large amounts of cross-over traffic in the stand-alone network. By claiming revenue – including contribution in excess of directly attributable costs – on cross-over movements and ignoring the off-SARR costs incurred to handle cross-over movements, AEP Texas has distorted the results that would have been realized under a legitimate stand-alone cost analysis that compares revenues on through movements with the full economic costs of providing the service.

The contrast between the results realized under the properly conceived stand-alone traffic group/network configuration that is the basis of the *1996 WTU Decision* and the outcome that AEP seeks with its current traffic group/network configuration shows conclusively how cross-over traffic distorts a SAC analysis and renders it invalid.

In this section III.A.1.a., BNSF recapitulates briefly the reasons why cross-over traffic is economically invalid, shows the potential for cross-over traffic to distort the results of a SAC analysis and identifies the distortion here by contrasting AEP's current evidence with the results

of the 1996 decision. BNSF's evidence in this section is sponsored by John C. Klick, Senior Managing Director of FTI consulting. Mr. Klick draws upon testimony by Professor Janusz Ordover addressing cross-over traffic that was submitted on behalf of BNSF in a prior SAC case and is part of the public record of that proceeding.[20]

(i) Cross-Over Traffic Is Inconsistent With The Purposes Of The SAC Test

According to the *Guidelines*, the stand-alone cost test "is used to compute the rate a competitor in the market-place would need to charge in serving a captive shipper or a group of shippers who benefit from sharing joint and common costs." *Guidelines*, 1 I.C.C.2d at 528. The sharing of costs by shippers in the stand-alone group entails the sharing of facilities. As the name implies, and as initially conceived, the *stand-alone* cost test was designed to compare the costs incurred to build and operate a *stand-alone railroad* serving the needs of an individual shipper (or a group of shippers) with the revenues generated by that shipper (or a group of shippers) at the existing rate levels charged by the defendant railroad.

The only way to know whether there are sufficient revenues available to cover all the costs (both attributable and unattributable) of the facilities needed to serve a traffic group is to posit the construction of all the necessary facilities and compare the costs of those facilities with the revenues generated by the traffic group. This is consistent with the basic principle of cost causality, which states that those who cause costs to be incurred should be responsible for their

[20] Specifically, Mr. Klick draws upon the first three sections of the Declaration of Janusz A. Ordover submitted on behalf of BNSF in BNSF's October 8, 2003 Reply filing in STB Docket No. 42071, *Otter Tail Power Co. v. The Burlington Northern and Santa Fe Railway Company*. Those sections of the declaration address general principles related to the use of cross-over traffic and not case specific issues. Mr. Klick does not draw upon the fourth and final section of the Ordover declaration in *Otter Tail* which addressed issues related to the revenue allocation procedure specific to that case. The first three sections of Professor Ordover's declaration in the *Otter Tail* case are included as BNSF Reply Exhibit III.A-1.

recovery. In the case of cross-over traffic, the basic principle of cost causality is violated. With cross-over traffic, not all of the facilities needed to handle the traffic in the group are built, and therefore the costs of serving the group cannot be calculated.

A stand-alone railroad that carries cross-over traffic is not in fact stand-alone. Such a SARR depends for its economic survival on the residual incumbent to carry the cross-over traffic for that portion of its movement that is not handled by the SARR.

With cross-over traffic, it is thus impossible to compare revenues generated on through movements with the costs of facilities used to handle the traffic. In lieu of full cost comparison, the inclusion of cross-over traffic requires that revenues on through movements be allocated between the on-SARR and off-SARR portions of cross-over movements. Because some of the costs that these revenues must cover are not attributable to a particular portion of the cross-over movement, the allocation is unavoidably arbitrary. The problems resulting from arbitrary allocations are precisely what CMP was supposed to cure. The ICC observed that "Ramsey pricing is a significant improvement over traditional methods of rate regulation which involved arbitrary allocations of 'unattributable costs' among various rail services. These methods have created serious economic distortions, causing harm to shippers and railroads as a result." *Guidelines* (Appendix C), 1 I.C.C.2d at 556.

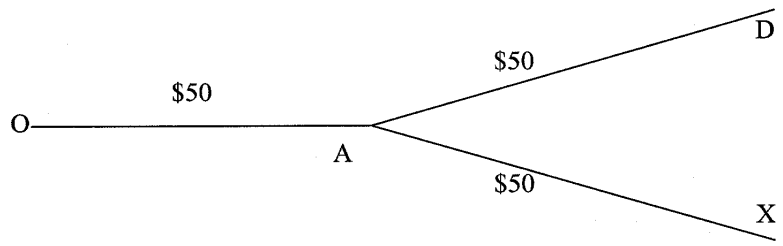
The distortions that flow from the use of cross-over traffic in a SAC analysis are illustrated below.

(ii) Distorting Effects Of Cross-Over Traffic Revenues On The Results Of The SAC Test: A Simple Example

This sub-section sets forth a simplified example which illustrates how use of cross-over traffic can lead to a finding that the issue rate is excessive, where, in fact such a finding is economically irrational and would undermine the viability of the residual incumbent. Assume

that the Board is assessing the reasonableness of a rate charged for traffic moving between origin O and destination D through point A. The fixed costs for that movement, standing alone, are $100 with $50 in costs for segment OA and $50 in costs for segment AD (operating costs are ignored for purposes of this example). Assume that the rates charged by the defendant for the issue traffic generate $90 of revenue. Therefore, when the issue traffic is analyzed on its own, without any grouping of other traffic, the costs of providing the issue traffic service ($100) exceed the issue traffic revenues ($90) by $10 ($100-$90).

Figure III.A-1
Hypothetical Railroad System



Now assume that the defendant railroad also moves traffic for a different shipper between origin O and destination X through point A. Assume the line segment OA has sufficient capacity to handle traffic for *both* shippers without additional investment. The additional cost of line segment AX is $50. Also assume that the second shipper has a more elastic demand for the rail service than the complainant. This limits the revenues the incumbent can charge for this movement to $60 rather than the $90 which the complainant pays on the issue traffic movement. The total cost for this traffic group is now $150 ($50 + $50 + $50) and the total revenues are $150 ($90 + $60). In other words, the revenues from the traffic group exactly match the costs of providing service. Recall that the issue traffic standing alone could not cover its full SAC. The grouped traffic can cover the SAC because of the economies of scope that exist in handling both

the issue and the non-issue traffic over the line segment OA. This simple example illustrates how shippers presenting SAC evidence can potentially benefit from grouping end-to-end non-issue traffic with issue traffic and realize cost savings from economies of scope. In the example, there is no finding of an excessive rate, however, since the pertinent revenues exactly match pertinent costs.

To this point, the example does not include cross-over traffic. In fact, it illustrates a circumstance in which the shipper can readily present evidence on the stand-alone costs of the entire system, as AEP Texas did in the prior case challenging the reasonableness of rates on movements to the Oklaunion generating station. Presenting the stand-alone costs of the complete SARR system required to provide the stand-alone traffic with the same service as the incumbent does today is the only accurate way to ensure that the full economic costs of all of the lines are covered on a stand-alone basis, and to ensure that there is no payment by the stand-alone traffic for facilities it does not use and from which it derives no benefit.

Now, assume that the complainant does not want to build the AX segment but, nevertheless, wants to claim some revenues for carrying traffic on the OA portion of the OAX movement. The complaining shipper thus chooses not to present evidence on the costs of segment AX. It therefore posits a stand-alone railroad that runs only between OA and AD. The OX traffic becomes "cross-over" traffic, *i.e.*, it moves over segment OA but interchanges with the residual incumbent at the fictional interchange point A. The costs of this reduced railroad are only $100 ($50 + $50). The issue traffic contributes $90 of revenue, as noted above. What then is the revenue contribution from the non-issue cross-over traffic for the OA portion of its OAX end-to-end movement? This question cannot be answered. The $60 worth of net revenue from the OAX traffic, *i.e.*, revenue in excess of variable cost, cannot be attributed to either segment,

be it OA or AX. The movement from O to X requires that both segments be in place and thus the costs of both segments need to be covered make the SARR and the residual incumbent sustainable over the long run.

It is the allocation of revenue on the through OX movement that introduces distortion into the SAC analysis. If the movement from O to A is the same distance as the movement from A to X, the MSP approach used by AEP Texas in this proceeding to allocate revenues on certain cross-over movements would generate equal division of revenue from the cross-over traffic to each carrier, or $30 contributed to the SARR and $30 to the residual incumbent. (Recall that in this example the incumbent receives $60 of revenue for the through OAX movement.) While having the air of objectivity and even-handedness, it is clear that this approach actually biases the SAC test in favor of the complaining shipper.

As was demonstrated above, when the SAC analysis is done correctly and the full costs and revenues are considered, the revenues from the two movements ($90 + $60) just equal the full economic costs of providing service to the two shippers ($50 + $50 + $50). In other words, the incumbent's costs are fully covered and the rates charged for the issue traffic do not exceed a reasonable maximum. But in the cross-over example, if the MSP is used to allocate the contribution from cross-over traffic to the SARR that does not include the AX segment (the "reduced" SARR), then the stand-alone "revenues" of $120 ($90 + $30) substantially exceed the costs of $100 ($50 + $50). The result of the revenue allocation is to lower the AX residual incumbent's share of revenues below its full economic costs of serving the cross-over traffic.

In the cross-over example, therefore, the rate charged for the issue traffic is determined to be unreasonably high, while in the full SAC analysis the rate would be deemed reasonable. Importantly, this finding would result in a lower rate for the shipper whose demand has been

deemed inelastic and a need to increase the rate for the shipper (the one moving on the OAX segment) whose demand has been deemed potentially more elastic. Such "rebalancing" of rates, assuming that the rate to the elastic shipper could even be raised, would harm economic efficiency and would be counter to the principles of Ramsey (differential) pricing. Of course, if the rate to the elastic shipper cannot be raised, because the shipper may not be willing to pay more than $60, the residual incumbent will become revenue inadequate and, over the long term, will have to withdraw service on the AX segment.

Note that in the example there is an allocation of revenue that would make the proponent of the SARR indifferent between performing the SAC test properly by building out the AX segment, on the one hand, and using the cross-over traffic assumption, on the other. This allocation would give only $10 to the O-A-D SARR and $50 to the AX residual incumbent, thereby ensuring that revenues on each of these two entities are just sufficient to cover costs (the same result achieved by properly constructing the SARR to include both the OAD and AX segments).

However, there is no formula or algorithm that, in the abstract, can calculate the "correct" allocation in an individual cross-over traffic situation – the only way to determine the allocation that leads to the postulated indifference is to determine what it would cost to construct and operate the lines of the residual incumbent required to move the cross-over traffic to its end-points on the defendant railroad.

(iii) AEP Texas' Claim That Revenues Exceed SAC Is Primarily Attributable To The Distorting Effects Of Cross-Over Traffic

AEP Texas has posited a stand-alone railroad network configuration that closely resembles the SARR in the 1996 *WTU* decision. The SARR extends from the Powder River Basin in Wyoming down the front range of the Rocky Mountains and into North Texas. The

route structure of AEP Texas' SARR is depicted the first page of the Schematic of Texas & Northern Railroad contained in AEP Texas' Opening Exhibit III-A-1. A comparison of this route structure with that depicted in the Schematic of WTRR Route set forth in the Board's 1996 Decision (1 S.T.B. at 659) reveals that the route structures of the two stand-alone networks are very similar.[21]

The stand-alone shipper group in the 1996 decision consisted of 11 coal movements that were local to the WTRR. *See 1996 WTU Decision*, 1 S.T.B. at 658. These were movements that were either handled by the real world Burlington Northern Railroad Company ("BN") from origin to destination or that traveled on BN to the point of interchange with real world connecting carriers. No cross-over traffic was included in the shipper group, and accordingly there was no need to allocate revenues on cross-over movements.

BNSF's witness Julie Murphy of FTI Consulting conducted an analysis of the revenues generated by the traffic group accepted by the Board in the *1996 WTU Decision* to determine whether the revenue projections adopted in that decision have proven to be accurate. In a second, related analysis, Ms. Murphy augmented the original WTRR traffic group by including movements that could have been handled by the WTRR in single-line service or for the majority

[21] The physical configuration of the WTRR is different from the physical configuration of the TNR in three substantive ways. First, the WTRR built the southern route out of the PRB, via Guernsey, while -- as discussed above -- the TNR has built the northern route out of the PRB via Edgemont. Second, the WTRR included trackage from Oklaunion to Fort Worth, Texas (where, in the real world, the BN then interchanged traffic with The Atchison, Topeka and Santa Fe Railway "ATSF"), while the TNR includes no trackage south of Oklaunion. As a result, movements to Texas Utilities' Big Brown, LCRA's Sam Seymour, TMPA's Gibbons Creek, Texas Genco's Parish and Donie, and Entergy's Nelson plant must be handled on the TNR as cross-over traffic. Third, the WTRR constructed branch lines to the Moba and Gerald Gentleman power plants, so that the WTRR could replicate BN's service to those locations, while the TNR does not build these lines and handles Moba as cross-over traffic. Since BNSF sold the line from Sterling to the Gerald Gentleman plant to the NKCR, the TNR replicates BNSF's portion of this movement.

of the movement but that were not included in the original WTRR traffic group because the real world BN did not begin handling them until after 1995, the base year of the original SAC analysis. The purpose of this second analysis was to determine how the revenues projected by the Board in the *1996 WTU Decision* compared to the actual revenues generated by the augmented traffic group.[22]

These analyses, summarized in Table III.A-1 show that revenues available to the stand-alone railroad turned out to be far lower than those projected by the Board in the *1996 WTU Decision*, both for the original WTRR traffic group and for the augmented traffic group. Table III.A-1 shows that the *1996 WTU Decision* projected revenues of $606.6 million for the 11 coal movements in the original WTRR traffic group in 2003. Instead, those 11 movements actually generated revenues on the real world BNSF of only { } in 2003, { } percent lower than the Board's projection.[23] For the augmented traffic group, revenues in 2003 are also substantially lower than originally forecast, *i.e.*, they are only { } percent lower than those projected by the Board in the *1996 WTU Decision*. Ms. Murphy's analysis suggests that the principal factor leading to lower real world revenues than those projected by the Board was the lower than expected rate per ton on BN (and subsequently BNSF) coal movements.

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[22] In undertaking these analyses, Ms. Murphy used the WTRR configuration. Where the WTRR (which built only BN track) interchanged traffic with ATSF -- locations that would become cross-over interchange locations on the merged BNSF system -- Ms. Murphy calculated revenue divisions in two ways, *i.e.*, she used the former BN/ATSF divisions, and she used the modified MSP procedure described below at section III.A.3.c and in BNSF Reply Exhibit III.A-9. On movements to the Tolk Station, she maintained the { } and then moved all traffic after 1998 through Amarillo. For movements not part of the original WTRR traffic configuration that could not be terminated by the WTRR, she used the modified MSP to calculate the revenue division for the WTRR configuration.

[23] This calculation assumes ATSF and BN revenue divisions consistent with those assumed in the *1996 WTU Decision.*

Average revenues per ton are dramatically lower than was anticipated in the *1996 WTU Decision*. The *1996 WTU Decision* projected an average revenue per ton of $11.97 in 2003 for the original WTRR traffic group, yet the 11 movements in that group actually generated only { } per ton in 2003, or { } percent less than predicted. For the augmented traffic group, average revenue per ton is only { } in 2003, { } percent lower than projected in the *1996 WTU Decision*.[24]

If these lower total revenues actually realized by BNSF had been reflected in the DCF analysis that underlies the *1996 WTU Decision*, the cumulative overage of revenues in excess of SAC would have been substantially lower and the common carrier rates prescribed by the Board would have been higher.

[24] *See* BNSF Reply electronic workpaper "AEP TX Original SARR.xls."

Table III.A-1

Comparison of BNSF Actual and STB Forecasted Traffic and Revenue for the Original And As More Comprehensive WTU SARR Group[25]

Year	STB Forecast	Update to Original SARR (a)		Original SARR Group with MSP Rev Div (b)		Original SARR plus New Traffic (MSP Rev Div) (b, c)	
	Rev ($million)	Rev ($million)	Percent Difference	Rev ($million)	Percent Difference	Rev ($million)	Percent Difference
1995	$433.4						
1996	$468.4	{ }	{ }	{ }	{ }	{ }	{ }
1997	$483.6	{ }	{ }	{ }	{ }	{ }	{ }
1998	$502.7	{ }	{ }	{ }	{ }	{ }	{ }
1999	$523.0	{ }	{ }	{ }	{ }	{ }	{ }
2000	$542.7	{ }	{ }	{ }	{ }	{ }	{ }
2001	$563.4	{ }	{ }	{ }	{ }	{ }	{ }
2002	$584.9	{ }	{ }	{ }	{ }	{ }	{ }
2003	$606.6	{ }	{ }	{ }	{ }	{ }	{ }

Note: All revenue estimates reflect the original SARR configuration from the *1996 WTU Decision*.

a. Assumes ATSF and BN revenue divisions consistent with those assumed in the *1996 WTU Decision*.

b. Assumes MSP revenue divisions based on 25/57 mile blocks for shipper and railroad cars, respectively.

c. Includes additional traffic local to original WTU SARR or that traverses significant portion of the SARR.

John Klick of FTI Consulting undertook an analysis to determine what effect changes in factors other than revenues would have had on the outcome of the *1996 WTU Decision*. Differences between forecast and actual values for inputs such as inflation assumptions, the cost of capital or the pattern of capital recovery might cause the results of the SAC analysis to depart from those that were developed in the earlier decision. To test the effect of these changes on the Board's prescribed rates, Mr. Klick started with the DCF underlying the Board's 1996 decision, and re-calculated the DCF results after making the following changes:

1. substituted actual AAR and RCAF inflation indexes, to the extent available, for the forecasts of those indexes used in the decision;

2. substituted the actual cost of equity, to the extent available, for the forecast cost of equity used in the decision; and

[25] *See* BNSF Reply electronic workpaper "AEP TX Original SARR.xls."

3. changed the pattern of cost recovery from the tonnage-based pattern used in the original decision to the annual pattern of capital recovery used in more recent Board decisions beginning with the *FMC* case.

The effect of making these changes to the Board's original DCF analysis is an increase in the level of the prescribed rates.[26] For example, the prescribed rate for 1995 under the Board's original decision was $13.06 per ton, while the prescribed rate in 2003 was $18.04. After making the above-described changes to the Board's original DCF, the 1995 prescribed rate increases to $16.77 (an increase of nearly 30 percent), and the 2003 rate increases to $19.11.

BNSF's analysis of revenues and its separate analysis of other DCF inputs both indicate that if the Board were to rerun its 1996 SAC analysis in light of information currently known, the maximum reasonable rates prescribed by the Board would be significantly higher than those actually prescribed.

AEP Texas undoubtedly assessed how a new SAC analysis would turn out if it maintained the original configuration and traffic group of its SARR. In its current case, AEP Texas has evidently concluded that the revenues available from traffic that is local to the SARR are not sufficient to support a finding that the challenged rates are unreasonably high. Nor do other intervening changes, for example in inflation indices and the pattern of capital recovery, contribute to such a finding. AEP Texas has therefore significantly altered the composition of its traffic group to include large volumes of cross-over traffic. The majority of these moves originate in the Powder River Basin, exiting to the north through Donkey Creek, travel through Edgemont, SD and exit the SARR at Alliance, NE. The only reason for AEP Texas to include this cross-over traffic was to augment revenues to the point that the SAC analysis would demonstrate revenues in excess of costs.

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[26] *See* BNSF Reply electronic workpaper "DCF Tons Update Inflation and Cost of Capital Recovery over time.wk4."

Unlike the WTRR stand-alone railroad from the *1996 WTU Decision*, the TNR postulated by AEP Texas does not stand on its own. Of the 198.7 million tons that the TNR carries in the first full year of SARR operations, only 25.6 million tons of traffic are local to the SARR.[27] The remaining 173 million tons, or 87 percent of the TNR's traffic by volume as calculated by AEP Texas, is cross-over traffic. The TNR does not handle this traffic in stand-alone service. The TNR depends on the residual incumbent, BNSF, to handle this traffic to destination.

The distorting effect of AEP Texas' reliance on cross-over traffic is apparent from a comparison of the capital cost and revenue figures adopted in the *1996 WTU Decision* versus those developed by AEP Texas in the current case. As mentioned before, the configuration of the stand-alone network in the *1996 WTU Decision* and the current case is very similar. The capital cost of the WTRR network as determined by the Board in the *1996 WTU Decision* was $1.907 billion in 1994/1995 dollars or $2.113 billion in 2000 dollars.[28] In AEP Texas' opening evidence in this case, the capital cost of the TNR network is $2.463 billion in 2000 dollars,[29] or 117 percent of the capital cost of the WTRR in year 2000.

On the revenue side, revenue in the first full year of SARR operations in the *1996 WTU Decision* was $433.3 million in 1995 dollars or $481.6 million in 2001 dollars.[30] In AEP Texas'

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[27] *See* AEP Texas Opening Nar. at III-A-15, 36, 37. The local traffic includes 13.1 million tons of single-line traffic and 12.5 million tons of coal handled to an existing interchange. *Id.*

[28] *See 1996 WTU Decision*, 1 S.T.B. at 701 (1994/1995 dollars); BNSF Reply electronic workpaper "WTRR v TNR Capital Costs and Revenues.xls." (2000 dollars).

[29] *See* AEP Texas Opening electronic workpaper "Exhibit III-H-1FP.xls."

[30] *See 1996 WTU Decision*, 1 S.T.B. at 711 (1995 dollars); BNSF Reply electronic workpapers "WTRR v TNR Capital Costs and Revenues.xls." (2001 dollars)

opening evidence in this case, first year (2001) revenues of the TNR are $767.3 million in 2001 dollars,[31] or 159 percent of the first year revenues on the WTRR.

The disparity between the increase in capital costs (117 percent) and the increase in revenues (159 percent) of the current SARR versus the one used in the prior case is striking. Particularly in light of the fact that both total revenues and revenue per ton for movements local to the SARR have actually declined far below the levels projected in the *1996 WTU Decision*,[32] the higher revenue claimed in the new SAC analysis must be attributed in its entirety to the large volumes of cross-over traffic that AEP Texas has claimed for its SARR. This substantial revenue growth has been claimed without a corresponding increase in the capital costs of constructing the SARR. The revenue allocation that AEP Texas has claimed on cross-over traffic far exceeds the attributable costs of handling that traffic. As in the simplified example depicted in Figure III.A-1, this revenue allocation distorts the outcome of the SAC analysis.

While AEP Texas might assert that the disproportionate increase in revenues versus capital costs merely reflect economies of density enjoyed by the SARR, these are economies of density that the SARR should not be entitled to claim. The so-called stand-alone railroad as configured by AEP Texas does not generate these densities. In the real world, the densities that BNSF realizes in the PRB exist only because there is a far flung network of lines that BNSF has built and paid for that allows coal traffic to make a complete movement from origin to destination. In the cross-over world, AEP Texas simply claims the densities that BNSF has paid for, but AEP Texas does not make the off-line capital investments needed to achieve those

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[31] *See* AEP Texas Opening Exh. III-A-14, column 11 (coal revenues); Exhibit III-A-15, column 4, row 38 (non-coal revenues)

[32] *See* BNSF Reply electronic workpaper "AEP TX Original SARR.xls."

densities. The stand-alone railroad does not stand-alone but relies on the residual incumbent to carry the PRB coal traffic on the less dense segments.

Thus, the only reason that AEP Texas is able even to contend that it is entitled to a rate reduction in this case is that it has obtained a massive infusion of revenue from cross-over traffic that was not included in the earlier case and that should not be included in a proper SAC analysis. The distortions that flow from cross-over traffic corrupt the SAC analysis and make it unreliable. The Board should reject AEP Texas' SAC evidence on that basis.

b. Exclusion Of Coal Traffic

AEP Texas has improperly included several coal movements in its stand-alone traffic group. These movements and the reasons they should be excluded from the shipper group are discussed below.

(i) Rerouted Traffic Originating At Southern PRB Mines

AEP Texas includes a substantial amount of rerouted coal traffic in its traffic group. Much of the rerouted coal traffic originates at the three southernmost PRB mines, *i.e.*, at Antelope, North Antelope, and North Rochelle, is routed north over Donkey Creek and exits the TNR at Alliance, NE. In the real world, this rerouted coal traffic exits the PRB to the south via Guernsey. AEP Texas' movements that are rerouted north on the SARR are substantially longer than the real world routings. Under recent Board precedent, there is a presumption that rerouted coal traffic that experiences a longer length of haul should be excluded from the traffic group. AEP Texas has not overcome this rebuttable presumption. Its evidence purporting to show that transit times for this rerouted traffic on the TNR will be shorter than real world transit times have been for this traffic in the real world is fatally flawed.

The rerouted traffic from the three southernmost mines should also be excluded because in the real world it makes only minimal use of the facilities that comprise the TNR. Non-issue

traffic should not contribute to the costs of facilities it does not use. The rerouted traffic in question should not be included in the SARR traffic group absent "a compelling justification that the defendant carrier should itself be routing the traffic in this manner and that it is inefficient for it not to do so."[33] AEP Texas has presented no such justification.

(a) Rerouted Coal Traffic From Southern PRB Mines Has Longer Haul And Is Not More Efficient

The Board recently explained that "[t]he starting point for the Board's analysis for rerouted traffic will be length of haul."[34] In *Duke/CSX*, the Board further clarified that "for reroutings that would result in a longer overall haul, the rebuttable presumption is that the longer route is less efficient; and the greater the disparity in distance, the stronger that presumption."[35]

There is no question that AEP Texas' rerouting of this cross-over coal traffic from these southernmost PRB mines results in a substantially longer haul. AEP Texas admits that its proposed rerouting adds the mileage shown in Table III.A-2 to the real world round-trip for coal trains originating at the three southernmost mines.

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[33] *Duke/CSX* at 15-16.

[34] *Duke/NS* at 18.

[35] *Duke/CSX* at 15; *see also CPL/NS* at 21. The Board did not limit the application of this rule to situations where the SARR interchanges the rerouted traffic with the residual railroad at a location that is not along the customary route for the traffic and, indeed, it should not do so. The rationale for the rule applies equally to a situation where, as here, the SARR interchanges the rerouted traffic with the residual railroad at a location on the real world route of movement.

Table III.A-2

Increased Mileage Resulting From AEP Texas' Rerouting Of Coal Trains From Southernmost PRB Mines

Mine	Additional Mileage Caused by Reroute[36]	Round-Trip Miles to Alliance Via Guernsey[37]	Percent Increase in Length of Haul
Antelope	114	458	25
North Antelope	102	464	22
North Rochelle	51	488	10

Given the great disparity in mileage between the real-world routing via Guernsey and AEP Texas' proposed reroute on the TNR, there is a strong presumption that the rerouting is inefficient. Under recent Board precedent, AEP Texas must present substantial evidence to overcome that presumption. AEP Texas' efforts to overcome this presumption fall short.

AEP Texas attempts to meet this burden by claiming that the transit times on the TNR for the much longer rerouted movements will be faster than the transit times for that traffic that the real world BNSF has achieved.[38] As a threshold matter, it is important to ask what changes AEP Texas has made to BNSF's real world operations in the PRB that would result in efficiencies significant enough that the TNR would be able to overcome these significantly longer hauls. The

[36] *See* AEP Texas Opening Exh. III-A-5, column 20, rows 94 to 108 (Antelope), 36 to 52 (North Antelope), 57 to 71 (North Rochelle). In this exhibit, NACJCT is the abbreviation for North Antelope Mine and CONJCT is the abbreviation for the Antelope mine.

[37] *See* AEP Texas Opening Exh. III-A-5, column 13 rows 94 to 108 (Antelope), 36 to 52 (North Antelope), 57 to 71 (North Rochelle). Column 13 of this exhibit lists the miles to the off-junction point, *i.e.*, Alliance, for coal traffic moving via Guernsey in the real world. BNSF has doubled the mileages in this column to obtain the round-trip mileage set forth above.

[38] *See* AEP Texas Opening Nar. at III-A-11 to III-A-12; AEP Texas Opening Exh. III-A-5, column 22. AEP Texas' evidence purports to show that the transit times in 2002 for this rerouted traffic from the three southernmost PRB mines are longer when moving over the real world route via Guernsey rather than when moving over the SARR route via Edgemont. *See* AEP Texas Opening Exh. III-A-5, column 21, rows 36 to 54, 57 to 71, 94 to 108.

most significant change made by AEP Texas, however, cuts the other way, *i.e.*, it has eliminated one of BNSF's main routes out of the PRB -- the southern route via Guernsey.

BNSF currently uses the northern route out of the PRB through Edgemont primarily to serve northern PRB mines, and it uses the southern route through Guernsey primarily to serve southern PRB mines. This is an efficient configuration for a railroad that serves mines extending from Eagle Butte in the north to Antelope in the south for at least two reasons. First, it minimizes the potential meets between empty returning trains and loaded trains. Empty trains generally must wait for loaded trains to pass. As a result, empty trains that must return to mines at the extreme end of the line (such as the TNR trains required to return to the southernmost mines) face the risk of delays as loaded trains enter the system from mines along the return route. Second, having two routes out of the PRB produces operating flexibility should unplanned track outages, equipment failures or derailments occur. AEP Texas' TNR configuration eliminates these efficiencies.

Therefore, there is no reason to believe that the TNR could make up for the longer distances traveled by the trains originating at the southern PRB mines, and, in fact, there are reasons to believe those trains would be at a great disadvantage on the TNR. AEP Texas relied on a transit time analysis to demonstrate that service would not deteriorate. AEP Texas' transit times calculations for the TNR route are an output of its RTC model. These calculations are flawed because they reflect unrealistic assumptions about the traffic being modeled.[39]

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[39] AEP Texas' comparison of TNR rerouted transit times to BNSF real world transit times via Guernsey are also flawed because AEP Texas does not include yard time in its TNR transit times but it does include yard time in its calculation of the BNSF real world transit times via Guernsey. *See* AEP Opening electronic workpapers "OD Reroutes 2003 121.xls" and "tnr coal transit 02.xls."

First and most importantly, AEP Texas failed to take into account the fact that many of the potential "mine slots" at these mines would be unavailable because they are required for trains that are originated by UP. Instead, AEP Texas assumes that there will be a mine slot available *whenever* a TNR train needs one. Second, AEP Texas ignored historical experience concerning when empty trains handling cross-over traffic actually would arrive back at Alliance from the residual BNSF to move via the TNR to these mines. Third, AEP Texas has assumed there will never be a random failure of a TNR train, and fourth, it has ignored the actual freight car consists that BNSF has handled and, instead, has assumed that all trains between a given origin and destination will be a "standardized" size.

BNSF's witness Dave Wheeler reran AEP Texas' RTC Model using more realistic assumptions about the operations of coal trains in the PRB. Specifically, Mr. Wheeler modified AEP Texas' RTC inputs as follows:

- He used the actual times UP trains were loaded at each mine, and did not let TNR trains load during these time periods.
- He added track outages into the RTC model at the same times and locations as BNSF experienced them historically during the peak week analyzed by AEP Texas.
- He assumed that empty trains would arrive at Alliance as they did historically, forcing the RTC model to realistically address the flows of trains returning to the TNR as it occurs in the real world.
- He used the freight car consists and net tons actually experienced by BNSF for each train in the peak week, rather than AEP Texas' standardized consist.

When Mr. Wheeler reran AEP Texas' RTC model using these more realistic assumptions, gridlock ensued, indicating that the trains in the TNR traffic group would not be able to operate given the operating assumptions and the capacity available.[40] The fact that the trains would not move at all under a realistic set of operating assumptions demonstrates that the transit times generated by AEP Texas are not reliable. AEP Texas has not submitted evidence sufficient to rebut the presumption that the shorter real world routing of the traffic is more efficient than the rerouting of traffic over the SARR.

(b) On Its Real World Route Via Guernsey, Coal Traffic From Southernmost PRB Mines Shares Minimal Facilities With The Issue Traffic

There is a second reason why the rerouted coal traffic from the three southernmost PRB mines should be excluded from TNR's traffic group -- the fact that it shares minimal facilities with the issue traffic on the TNR under its real world routing. Under its real world routing via Guernsey, this coal traffic travels a maximum of only 48.6 miles on the 1,192 mile SARR route, yet AEP Texas claims revenue from this traffic for the rerouted movements based on movements over the SARR ranging from 270 to 286 miles. *See* Table III.A-3.

[40] *See* BNSF Reply electronic workpaper "RTC case - AEP critique.zip."

Table III.A-3

Rerouted Traffic Off At Alliance: Comparison Of Shared Facilities In Real World To Shared Facilities On SARR Resulting From Rerouting

Mine	Shared Facilities Under Real World Route			Miles on SARR[41]
	PRB (Miles)[42]	Northport to Alliance (Miles)[43]	Total Miles	
Antelope	0	33.6	33.6	286
North Antelope	3	33.6	36.6	283
North Rochelle	15	33.6	48.6	270

The concept that non-issue traffic included in the SARR traffic group must "share facilities" with the issue traffic if it is to contribute to the cost of those facilities is an important SAC principle established in the *Coal Rate Guidelines*. As explained in the *Guidelines*, the SAC test is designed "to compute the rate a competitor in the market-place would need to charge in serving a captive shipper or a group of shippers who benefit from *sharing joint and common facilities*."[44] The Board reinforced this concept in a recent decision explaining that "[a] shipper should not seek to have its rate reduced by shifting *any part* of the costs of the lines or facilities that it needs onto traffic that does not use those lines or facilities."[45]

The issue of sharing of facilities is an important factor to consider in determining whether it is appropriate to reroute traffic to include it in the SARR shipper group. When addressing the issue of the route selected for the SARR, the *Coal Rate Guidelines* provide that "the stand-alone railroad may not represent the shortest route for the captive shipper, but the one with the highest

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[41] *See* AEP Texas Opening Exh. III-A-5, column 17, rows 94-108 (Antelope), 36-52 (North Antelope), 57-71 (North Rochelle).

[42] *See* AEP Texas Opening electronic workpaper "T&NRR Miles.xls."

[43] *See* AEP Texas Opening electronic workpaper "T&NRR Miles.xls."

[44] *Coal Rate Guidelines*, 1 I.C.C.2d at 528 (emphasis added).

[45] *PPL II* at 7 (emphasis added).

above. This rerouted coal traffic contributes { } million in base-year SARR revenues (nearly { } percent of the total) under AEP Texas' calculations.[48] While it might be appropriate for this southern PRB coal traffic to share the costs of the limited SARR facilities it does use in the real world, assuming it follows its real world route, that is not the revenue that AEP Texas has claimed. It has claimed revenue for the full rerouted movement between the PRB origins and Alliance, Nebraska, which is plainly excessive.

Given the nominal sharing of facilities, AEP Texas was required to present a "compelling justification that the defendant carrier should itself be routing the traffic in this manner [as AEP Texas has rerouted it] and that it is inefficient for it not to do so."[49] AEP Texas has not done so. Indeed, AEP Texas could not do so since the real-world routing of this southern PRB coal traffic via Guernsey is efficient. In the real world, BNSF has two rail lines that access the PRB -- a northern route that traverses Donkey Creek and a southern line that traverses Guernsey. These two routes were not the result of a merger but rather a plan to provide BNSF with operating flexibility given the heavy volumes of coal transported from the PRB. According to Tony Deichert, General Superintendent of BNSF Coal Operations, in the ordinary course of business, coal originating at Antelope, North Antelope or North Rochelle mines exits the PRB on BNSF following the southern route via Guernsey if it moves through Alliance and the Central Corridor. Indeed, the Antelope and North Rochelle mines have only southbound leads from the mines which means the coal trains move south from those mines and exit the PRB via Guernsey. While the North Antelope mine has both northbound and southbound leads, BNSF traditionally routes coal trains from that mine south via Guernsey if the trains move through the Central Corridor for

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[48] *See* BNSF Reply electronic workpaper "Rerouted SPRB Traffic.xls."

[49] *Duke/CSX* at 16.

operational efficiency.[50] Specifically, the routing via Guernsey provides a shorter route for PRB coal traffic originating at the southernmost mines and, consequently, substantially reduces the risk that an extra crew will be needed to move the train out of the PRB, which is likely to happen if the train is routed north via Donkey Creek. Since AEP Texas cannot demonstrate that the real-world routing of the southern PRB coal traffic is inefficient, the Board should exclude this traffic from the TNR traffic group.

(c) Summary Of Rerouted Coal Traffic From Southernmost PRB Mines Excluded By BNSF From Traffic Group

In 2002, AEP Texas improperly rerouted approximately 28 million tons of coal that originated at the Antelope, North Antelope and North Rochelle mines and exited the TNR at Alliance, as discussed in the foregoing section.[51] The amount of improperly rerouted coal traffic increases substantially in 2005 when AEP Texas adds three new movements to its traffic group; namely, {

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[50] {

} *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls."

[51] *See* BNSF Reply electronic workpaper "TNR Coal Traf and Rev 0100-0603_ BNSF Reply.xls" worksheet "02coalod."

[52] *See* AEP Texas Opening Exh. III-A-3, page 1, rows 4, 44, 51; *see also* BNSF Coal LRP, included in BNSF's Reply electronic workpapers at "BNSF Long Range Plan September 2003.xls." {

}

} BNSF accepts AEP Texas' assumption regarding the mines that will originate traffic for these three new movements. BNSF then excludes the rerouted tonnages associated with these new movements. BNSF estimates the volume of rerouted tonnages for these new movements based upon the percentage of rerouted traffic originating at each of the three southernmost PRB mines in 2002. Table III-A-4 below quantifies BNSF's exclusions of rerouted traffic, by mine origin, for certain milestone years in the DCF period.

Table III.A-4

Summary of Rerouted Coal Traffic Originating at Southernmost PRB Mines Excluded From Traffic Group (Millions)

Mine Origin	2002 Rerouted Tons	2005 Additional Rerouted Tons Associated With { Plants }
Antelope	4.8	1.33
North Antelope	16.1	2.33
North Rochelle	5.6	1.33
Total	**26.5**	**5.00**

Source: BNSF Reply electronic workpaper "Traffic Summaries from BNSF Reply.xls" worksheet "Reroute Summary."

(ii) Rerouted Georgia Power Traffic

Beginning in 2004, AEP Texas adds the movement to Georgia Power's Scherer plant to its traffic group. This traffic began moving on BNSF effective January 2004. AEP Texas assumes that the coal for the Georgia Power movement will originate at the Black Thunder mine and move north via Donkey Creek and Edgemont before exiting the TNR at Alliance.[54] As

[53] *See* AEP Texas Opening electronic workpaper "Simulation Trains - peak calc.xls" worksheet "New Movements." This data is summarized in BNSF Reply electronic workpaper "Simulation Trains - peak calc_BNSF Reply.xls" worksheet "New Movements."

[54] *See* AEP Texas Opening electronic workpaper "Simulation Trains_peak calc.xls."

Table III.A-5 demonstrates, in the real world, the coal destined for the Scherer plant has originated at several PRB mines, including the three southernmost PRB mines, through May 16, 2004.

Table III.A-5

2004 Georgia Power Traffic
By Mine Origin

Mine	Percent
{ }	{ }
{ }	{ }
{ }	{ }
{ }	{ }
{ }	{ }
Total	**100%**

Source: BNSF Reply electronic workpaper "Georgia Power.xls."

In the real world, all of the loaded Georgia Power trains {

}

BNSF is excluding the rerouted Georgia Power Scherer traffic from the traffic group for the reasons set forth above in section III.A.1.b.(i): (1) the reroute involves a longer haul than the real world movement and AEP Texas has not met its burden of establishing that the longer

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[55] {

}

reroute is as least as efficient as the real world route; and (2) along its real world route, the Georgia Power traffic would share only minimal facilities with the issue traffic on the TNR.

(a) Rerouted Georgia Power Traffic Has Longer Haul And Is Not More Efficient

Under recent Board precedent, if a reroute results in a longer haul, there is a rebuttable presumption that the longer haul is less efficient. There is no question that AEP Texas' reroute of the Georgia Power traffic results in a longer haul. As shown above in Table III.A-2, its proposed rerouting of Georgia Power traffic originating at Antelope, North Antelope and North Rochelle results in an increase in round-trip mileage to Alliance of 114, 102 and 51 miles, respectively. Moreover, AEP Texas acknowledges that its proposed reroute of coal traffic originating at either the Black Thunder or Jacobs Ranch mines would add 25 miles to the real world round-trip route to Alliance via Guernsey.[56]

Since BNSF did not begin transporting the Georgia Power traffic until 2004, the record does not contain real world transit times for the Georgia Power trains. Consequently, there is no basis on which AEP Texas could demonstrate that its calculated transit times for the Georgia Power trains are faster than the real world transit times for those trains. In any event, AEP Texas has provided no evidence of any inefficiency in BNSF's current operations that AEP Texas could correct that might enable the TNR to make-up for the longer distances and more congestion involved in the northern route out of the PRB. Moreover, as explained above in section III.A.1.b.(i).(a), all the transit times calculated by AEP Texas for the TNR are flawed because AEP Texas based its calculation on unreasonable assumptions. When realistic assumptions are

[56] *See* AEP Texas Opening Exh. III-A-5 at 1, column 20, rows 4 through 35. THUJCT is the abbreviation for Black Thunder mine. JACJCT is the abbreviation for Jacobs Ranch mine.

made to AEP Texas' transit time analysis, the system goes into gridlock. *Id.* AEP Texas' transit times for the Georgia Power coal trains are unreliable.

(b) On Its Real World Route, Georgia Power Traffic Shares Minimal Facilities With The Issue Traffic On The TNR

As explained above in section III.A.1.b.(i)(b), SAC principles require that the Board exclude rerouted traffic if it shares only minimal facilities with the issue traffic on the SARR under its real world routing, as is the case with the Georgia Power traffic. As shown in Table III.A-3, on its real world route via Guernsey, coal originating at the Antelope, North Rochelle or North Antelope mines would share at most 48.6 miles of facilities with the issue traffic on the TNR. Moreover, on its real world route via Guernsey, Georgia Power trains originating at the Black Thunder or Jacobs Ranch mines would share only 57.1 miles or 59.9 miles, respectively, of facilities with the issue traffic on the TNR. [57]

AEP Texas has not presented a "compelling justification that the defendant carrier itself should itself be routing the traffic in this manner [to exit the PRB north via Donkey Creek] and that it is inefficient not to do so."[58] It cannot do so since the real-world routing of this Georgia Power traffic south via Guernsey is efficient. As explained above, BNSF uses the routing via Guernsey {

}

[57] Specifically, under real world routing via Guernsey, trains originating at the Black Thunder or Jacobs Ranch mines would share 23.5 or 26.4 miles, respectively, of facilities in the PRB and 33.6 miles of facilities between Alliance and Northport with the issue traffic moving on the SARR. *See* BNSF Reply electronic workpaper "route miles and segments.xls."

[58] *Duke/CSX* at 16.

(c) It Would Be Inefficient To Allow Georgia Power Traffic To Be Routed Both North And South Out Of The PRB

As shown above, coal moving to the Georgia Power Scherer plant originates from several PRB coal mines, including the three southern most PRB mines -- Antelope, North Antelope and North Rochelle. As explained above, while the length of haul increases for all the rerouted Georgia Power traffic irrespective of mine origin, the greatest disparity in mileage occurs for coal originating at the three southernmost PRB mines.

Even though the mileage disparity is less for traffic originating at the Black Thunder or Jacobs Ranch mine routed north via Edgemont than it is for the rerouted traffic originating at the southernmost PRB mines, this would not justify splitting the Georgia Power movement between the TNR (for the northern origins) and the BNSF (for the southern origins). The northern route from the Black Thunder and Jacobs Ranch mines is still longer than the southern route. For the reasons explained above, AEP Texas cannot show that the TNR would be able to overcome the operational problems associated with its longer route over a single line into and out of the PRB. Moreover, there is still only a marginal sharing of facilities between the issue traffic moving on the TNR through Edgemont and the real world Georgia Power movement, {

}

In addition, it is impossible to know whether Georgia Power would have accepted an arrangement whereby part of its traffic is originated by one carrier (BNSF) and part of it is originated by another carrier (TNR) but interchanged back to the residual BNSF at a point outside of the PRB. In this case, Georgia Power historically received only part of its coal needs from the PRB, and it obtained that coal from UP. When Georgia Power planned to expand its PRB coal usage, there was strong competition between the UP to hold onto or expand its portion of the PRB shipments, and BNSF, which sought to become the sole source of Georgia Power's

PRB coal.[59] Georgia Power chose BNSF to replace UP altogether, thus indicating its clear preference for a single PRB coal supplier. Georgia Power's preference for a single supplier, when combined with the fact that the TNR's route would be longer, more circuitous and possibly more prone to delays from PRB congestion make it unreasonable to assume that Georgia Power would have accepted an arrangement where its PRB coal was originated both by the residual incumbent and the TNR. [60]

Moreover, routing northward only a portion of the Georgia Power traffic that originates at the Black Thunder and Jacobs Ranch mines is not an option because {

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[59] *See* BNSF Reply electronic workpaper "Georgia Power.pdf."

[60] Moreover, {

}

(d) Summary Of Georgia Power Coal Traffic Excluded By BNSF From Traffic Group

The amount of rerouted Georgia Power traffic excluded by BNSF from the TNR traffic group is summarized in Table III.A-6 below.

Table III.A-6

Georgia Power Coal Traffic
Excluded By BNSF From Traffic Group

Year	Georgia Power Tons Excluded
2004	{ }
2005	{ }
2006	{ }
2007	{ }
2008	{ }
2009	{ }
2010	{ }
2011	{ }
2012	{ }
2013	{ }
2014	{ }
2015	{ }
2016	{ }
2017	{ }
2018	{ }
2019	{ }
2020	{ }

Source: BNSF Reply electronic workpaper "Traffic Summaries from BNSF Reply.xls."

(iii) Exclusion Of Coleto Creek Traffic

AEP Texas has improperly included in the traffic group Colorado coal that is transported by UP, not BNSF, to AEP Texas Central's Coleto Creek plant. While this Coleto Creek movement was included in the WTRR traffic group in AEP Texas' earlier challenge to the reasonableness of rates to Oklaunion, the circumstances regarding this movement have changed in the intervening years. When the earlier case was decided, BN transported the Coleto Creek coal between Pueblo, Colorado and Fort Worth, Texas as part of a joint-line movement with the

Denver Rio Grande and Western Railroad ("DRGW") and Southern Pacific Railroad ("SP").[61] However, as of 1997, BNSF was no longer involved in the transportation of coal destined for the Coleto Creek plant.[62] Now UP carries this traffic for the entire movement, including the portion over BNSF's line from Pueblo, Colorado to Fort Worth, Texas, pursuant to two trackage rights agreements.[63] AEP Texas assumes that the TNR will replace BNSF as the landlord for the Coleto Creek movement from Pueblo, Colorado to Oklaunion, Texas (and implicitly that the residual BNSF will continue as landlord from Oklaunion, Texas to Forth Worth, Texas) and that it will receive a share of the trackage rights fees paid to BNSF by UP on the Coleto Creek movement.[64]

As an initial matter, AEP Texas has vastly overstated the amount of Coleto Creek traffic that would use the BNSF trackage rights beginning in 2004. Comparison of the FERC Form 423 data for the Coleto Creek traffic with the BNSF train movement data reveals that only { } percent of the coal destined for Coleto Creek traversed BNSF's line between 2001 and June 30, 2003.[65] UP handles the rest of the coal, much of which originates in the PRB, via its own rail system. Through 2003, AEP Texas assumes that the TNR will handle only the portion of the Coleto Creek tonnage that actually moved over BNSF lines under trackage rights agreements.[66] However, beginning 2004, AEP Texas improperly assumes that all tonnage destined to Coleto

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[61] *See WTU*, 1 S.T.B. at 658.

[62] *UP/SP Merger*, STB Finance Docket No. 32760 (December 11, 2002).

[63] *See* AEP Texas Opening Nar. at III-A-41.

[64] *See* AEP Texas Opening Nar. at III-A-3 n. 2, 41-42.

[65] *See* BNSF Reply Exh. III.A-2.

[66] AEP Texas erred in its calculation of net tonnage traversing BNSF's lines. *See* BNSF Reply electronic workpapers "bnsfortrn All CL Trains.xls" for a corrected calculation of net tons.

Creek will move over the TNR via BNSF's trackage rights agreements.[67] Consequently, even if the Coleto Creek traffic were properly included in the TNR traffic group -- which it is not, as explained below -- AEP Texas has vastly overstated the amount of Coleto Creek traffic that would move over BNSF's line.[68]

More importantly, it is improper to include *any* of this Coleto Creek traffic in the SARR traffic group for several reasons. Most significantly, the routing of the Coleto Creek traffic hypothesized by AEP Texas is prohibited under the two trackage rights agreements. Specifically, AEP Texas assumes that this traffic will move over the TNR from Pueblo, Colorado through Las Animas Junction, Colorado and Amarillo, Texas to Oklaunion. A schematic showing the TNR route for the Coleto Creek traffic assumed by AEP Texas appears at BNSF Reply Exhibit III.A-3. However, the original agreements do not allow such routing. Instead, those agreements break the trackage rights granted to UP, the successor to SP, into two separate, non-contiguous segments -- (1) overhead trackage rights between Pueblo, Colorado and Stratford, Texas, and (2) overhead trackage rights between Dalhart, Texas and Fort Worth, Texas.[69] These trackage rights were connected by the former SP's own line between Stratford,

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[67] *See* BNSF Reply electronic workpaper "Coleto Creek Tons.xls."

[68] *See* BNSF Reply electronic workpaper "Coleto Creek Tons.xls."

[69] *Burlington Northern Inc. and Burlington Northern Railroad Company -- Control and Merger -- Santa Fe Pacific Corporation and The Atchison, Topeka and Santa Fe Railway Company*, ICC Finance Docket No. 32549, Decision No. 38, at 121 (served Aug. 23, 1995) (hereafter referred to as "BN/SF Merger Decision"). *See also Pueblo, Colorado to Stratford, Texas and Stratford, Texas to Amarillo, Texas Trackage Rights Agreement* dated Aug. 1, 1995 (hereafter "Pueblo to Stratford Agreement") and *Dalhart, Texas to Fort Worth, Texas Trackage Rights Agreement* dated August 1, 1995 (hereafter "Dalhart to Fort Worth Agreement"). These trackage rights agreements are included in BNSF's Reply electronic workpapers at "BN-SF Merger Decision.pdf," "Pueblo to Stratford Agreement.pdf" and ""Dalhart to Fort Worth Agreement.pdf."

Texas and Dalhart, Texas.[70] A schematic showing the route authorized under the original trackage rights agreements and comparing it with the route used by the TNR appears at BNSF Reply Exhibit III.A-3.

In other words, the only route originally authorized by these two agreements on BNSF's line was from Pueblo, Colorado through Las Animas, Colorado to Stratford, Texas (under other trackage rights agreement) and then from Dalhart, Texas to Fort Worth, Texas (under other trackage rights agreement). {

} Consistent with this requirement, BNSF train movement data produced in this proceeding for time periods prior to September 2003 demonstrate that the Coleto Creek trains moved on BNSF lines from Pueblo, Colorado to Stratford, Texas and then again from Dalhart, Texas to Fort Worth, Texas.[72]

BNSF and UP modified the permissible routing of UP trains under these trackage rights agreements as of September 2003, three years after the TNR begins operations; however, this modification does not authorize AEP Texas to route the Coleto Creek trains as it proposes to do over the TNR in this rate case. Specifically, in September 2003, BNSF and UP modified the trackage rights agreements to allow directional running of trains on the two parallel BNSF lines

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[70] *See BN/SF Merger Decision* at 121.

[71] *Pueblo to Stratford Agreement*, § 3(a)(iv) (emphasis added) included in BNSF's electronic workpapers at ""Pueblo to Stratford Agreement.pdf."

[72] *See* BNSF Reply electronic workpapers "bnforte01 cx.xls, "bnforte02 cl.xls" and "bnforte03 cl.xls."

between Pueblo, Colorado and Amarillo, Texas. One of those lines runs from Pueblo, Colorado to Las Animas, Colorado to Stratford, Texas to Amarillo, Texas, the route built by AEP Texas. The parallel BNSF line runs from Pueblo, Colorado to Trinidad, Colorado to Dalhart, Texas to Amarillo, Texas -- a route not built by AEP Texas. A schematic showing these parallel BNSF lines appears at BNSF Reply Exhibit III.A-4.

As of September 2003, southbound loaded trains operate from Pueblo to Amarillo via the Las Animas/Stratford rail line and northbound trains operate from Amarillo to Pueblo via the Dalhart/Trinidad rail line.[73] {

}

Because AEP Texas did not build both BNSF routes between Pueblo and Amarillo, the TNR does not -- and cannot -- provide directional running on its route between Pueblo and Amarillo. Instead, AEP Texas runs both northbound and southbound trains over its single line between Pueblo and Amarillo. As a result, this modification to the trackage rights agreements

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[73] *See* BNSF response to AEP Texas' RFP No. 83, included in BNSF's Reply electronic workpapers at "Dalhart to Fort Worth Agreement.pdf."

[74] *See* Supplement to *Pueblo to Stratford Agreement* dated September 2003 (hereafter "Pueblo to Stratford Supp."), included in BNSF's Reply electronic workpapers at "Dalhart to Fort Worth Agreement.pdf."

[75] *Pueblo to Stratford Supp.*, § 1(b), included in BNSF's Reply electronic workpapers at "Dalhart to Fort Worth Agreement.pdf."

does not apply. In short, AEP Texas cannot include the Coleto Creek traffic in its traffic group via the BNSF trackage rights agreements, as it claims to, because the trackage rights agreements explicitly prohibit the routing that the TNR must employ.

For these reasons, BNSF has excluded the Coleto Creek movement from the TNR traffic group. As a result of this exclusion, BNSF has reduced AEP Texas' stand-alone traffic volumes by the following amounts annually:

Table III.A-7

Exclusion of Coleto Creek Coal Traffic

Year	Tons
2000	{ }
2001	{ }
2002	{ }
2003	{ }
2004	{ }
2005	{ }
2006	{ }
2007	{ }
2008-2020	{ }

Source: BNSF Reply electronic workpaper "Traffic Summaries from BNSF Reply.xls."

(iv) Exclusion Of Coal Movement To Tennessee Valley Authority's Shawnee Plant

AEP Texas includes a coal movement to Tennessee Valley Authority's ("TVA") Shawnee plant in its traffic group.[76] BNSF is excluding this movement from the SARR traffic group because, contrary to AEP Texas assumptions, BNSF has not transported coal to this plant since the start of the DCF period in June 2000. As further explained below, the traffic data produced by BNSF in this proceeding, which covers the period 2000 through June 2003, did not show any tonnage delivered to this plant,[77] and Tom Epich, the BNSF coal marketing director

[76] *See* AEP Texas Opening Exh. III-A-3, row 64.

[77] *See* BNSF Reply electronic workpaper "TVA Shawnee.xls."

responsible for TVA, confirms that BNSF has not transported volumes destined for delivery to this plant since the start of the DCF period in June 2000.

According to its workpaper responses, AEP Texas relied on information published in COALdat as the basis for its erroneous assumption that BNSF transported coal to the Shawnee plant during the DCF period.[78] Specifically, AEP Texas states that "[o]ver the 2000-2002 time period, the same COALdat data shows that PRB coal (*i.e.*, BNSF transported coal) averaged 13 % of all coal consumed at Shawnee. During the first nine (9) months of 2003, it was reported that BNSF moved 452,000 tons of PRB coal to Shawnee."[79] If there was any PRB coal transported to the Shawnee plant between 2000 and 2003, it must have been transported by UP because it was not transported by BNSF.

AEP Texas also erroneously claims that BNSF's traffic tapes show that BNSF delivered some coal trains to the Shawnee plant in 2001 and 2003. As shown in Table III.A-8, AEP Texas identified approximately 270,000 tons on the BNSF traffic tapes that it purports were delivered to TVA's Shawnee plant in 2001.[80] The Jessup, KY destination identified on the BNSF traffic

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[78] AEP Texas also relies on COALdat data, rather than any data produced by BNSF, to estimate volumes purportedly delivered to the Shawnee plant by BNSF and applies the rate per ton from the BNSF contract to TVA's Paradise plant to estimates revenues. *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls," worksheet "Heat Input Growth" and "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[79] Responses of Complainant AEP Texas North Company to Second Request of the Burlington Northern and Santa Fe Railway Company for Workpapers Related to Sections III.A, III.B, III.D.1-3, III.D.4, and III.F (hereafter "Section III.A Workpaper Request Responses"), Response to III.A Request No. 2. These responses are included in BNSF's Reply electronic workpapers at "AEP III-A WP 2 Responses.pdf."

[80] *See* AEP Texas electronic workpapers "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage."

tapes as the destination for this coal[81] is a transloading facility that receives coal destined for multiple plants via barge delivery. However, the approximately 270,000 tons identified by AEP Texas were not transported to TVA's Shawnee plant. As is clear from the contract identified on the traffic tapes, {

}[83]

The 86,496 tons that AEP Texas erroneously assumes were delivered to the Shawnee plant in 2003 were actually delivered to {

}

AEP Texas includes the { } power plants in its traffic group.[85] By erroneously assuming that volumes destined for { } are transported to the TVA Shawnee plant, AEP Texas is double-counting volumes already accounted for in the volumes assumed for the { } plants.

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[81] *See* BNSF electronic workpaper "Jessup.pdf."

[82] *See* BNSF Reply electronic workpaper "TVA Shawnee.xls."

[83] *See* BNSF Reply electronic workpaper "TVA Shawnee.xls." This fact was confirmed by BNSF Coal Marketing Director Tom Epich.

[84] *See* BNSF Reply electronic workpaper "TVA Shawnee.xls." This fact was confirmed by BNSF Coal Marketing Director Tom Epich.

[85] *See* AEP Texas Opening Exh. III-A-3, rows 7a, 6lb.

Table III.A-8

AEP Texas Purported Volume Forecast for TVA Shawnee

Year	Assumed TNR Tons to Shawnee
2000	0
2001	269,762
2002	0
2003 6 Months	86,496
AEP Texas Forecast	
2003	741,846
2020	771,218

Source: AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage."

Consequently, BNSF has excluded the volumes associated with the TVA's Shawnee plant movement from the TNR traffic group. Exclusion of this movement reduces the SARR volumes by 742,000 to 771,000 tons in each of the years 2003 through 2020.[86]

(v) Exclusion Of Volumes Associated With New Sunflower Electric Power Unit

AEP Texas assumes that Sunflower Electric Power will build a new unit at Holcomb and, as a result, assumes that an additional { } million tons will be transported to the plant beginning in 2008.[87] Specifically, AEP Texas assumes that coal deliveries to Holcomb will increase by { } million tons, between 2007 and 2008 reflecting the coal deliveries assumed for this new unit.[88]

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[86] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

[87] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Sand Sage;" AEP Texas Opening Exh. III-A-3, row 26.

[88] *See* AEP Texas Opening Exh. III-A-3, row 26, columns 17, 18.

BNSF excludes the tonnage associated with this new unit because it is too uncertain that this new unit will be built. While Sunflower has taken preliminary steps that might ultimately lead to the construction of a new unit, it has not yet received all of the appropriate permits or secured the necessary financing to build it.[89] In fact, Sunflower's own website states that, as of May 11 of this year, Sand Sage, the Sunflower subsidiary responsible for development of any new unit, has not been able to secure fully a customer base for this project.[90] According to Sunflower, the recent increased stringency of credit rating standards of national credit rating agencies has impacted Sunflower's development plan for the potential new unit because the credit agencies are "extremely leery of such speculative and risky merchant projects."[91] Effectively this means that Sunflower needs to demonstrate via long-term contractual commitments that it will have a revenue stream adequate to make its payments. This additional requirement has greatly impacted Sunflower's development plan for the potential new unit and has required Sunflower to request an extension for at least one of its environmental permits.[92] Over the last few years, only a small fraction of the new power plant projects proposed have been built—in large part because they were unable to secure the necessary financing.

Since it is too speculative to assume that this new Sunflower unit will be built, BNSF has excluded the tonnage that AEP Texas associates with this new unit from the stand-alone traffic

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[89] *See* BNSF Reply electronic workpapers "Sunflower 5-11-04 (Development).pdf" and "Sunflower 5-12-04 (Air Permit & Financing).pdf."

[90] http://www.sunflower.net/nr_development.htm which is included in BNSF's Reply electronic workpapers "Sunflower 5-11-04 (Development).pdf."

[91] http://www.sunflower.net/nr_development.htm which is included in BNSF's Reply electronic workpapers "Sunflower 5-11-04 (Development).pdf."

[92] *See* BNSF Reply electronic workpapers "Sunflower 5-11-04 (Development).pdf" and "Sunflower 5-12-04 (Air Permit & Financing).pdf."

group.[93] Exclusion of the tonnages destined for the Sunflower "new unit" reduces the TNR volumes by { } tons annually in each of the years 2008 through 2020.[94]

2. TNR Volumes (Historical and Projected)

Although the TNR predominantly transports coal, AEP Texas includes both coal and non-coal volumes in its traffic network. BNSF addresses coal and non-coal volumes separately below.

a. Coal Traffic

(i) Historical Coal Volumes (*i.e.*, 3Q00 through 4Q02)

AEP Texas assumes that the TNR would begin operations on June 16, 2000. AEP Texas develops coal volumes for the historical period June 16, 2000 through December 31, 2002 from the traffic tapes produced by BNSF which show the actual volumes transported to particular destinations by BNSF. *See* AEP Texas Opening Nar. at III-A-13 to 14. BNSF accepts use of the traffic tapes to establish the historical coal volumes but modifies those coal volumes to exclude the tonnages described in section III.A.1.b.

(ii) Projected Coal Volumes (2003 through 2008)

AEP Texas claims to use the BNSF Long Range Plan ("LRP"), a forecast that AEP Texas acknowledges was prepared by BNSF in the ordinary course of business, to develop coal

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[93] BNSF does not assume that the SARR will lose existing business to competition because it is too uncertain to predict those developments. *See WTU* at 1 S.T.B. at 662. But it is also too uncertain to predict the addition of a new plant where numerous obstacles still need to be overcome before a decision can even be made to construct the plant.

[94] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

volumes for the years 2003 through 2008.[95] However, AEP Texas often deviates from and misuses this LRP in developing future coal volumes for the years 2003 through 2008, and, thereby, transforms an ordinary course of business forecast into an AEP Texas made-for-litigation forecast that should be treated with skepticism. As explained below, BNSF makes several corrections to AEP Texas' evidence to make it consistent with its source, the BNSF LRP for coal.

(a) Calculation Of 2003 Coal Volumes

In its electronic workpapers, AEP Texas acknowledges that the BNSF LRP projected that BNSF coal volumes would decline by { } percent between 2002 and 2003.[96] Instead of reflecting this volume decline in its DCF analysis, however, AEP Texas calculates 2003 volumes using a convoluted approach, never explained in its narrative, to generate an overall 2.6 percent *increase* in coal volumes transported by the TNR between 2002 and 2003.[97] The flaws in AEP Texas' approached are discussed below.

As an initial matter, the BNSF LRP, AEP Texas' source for coal volumes in 2003 through 2008, forecast the total amount of coal that BNSF would transport in 2003; it did not forecast the change in BNSF's coal volumes between 2002 and 2003 and it did not project volumes by origin/destination pair.[98] Since the TNR does not include all BNSF coal shippers,

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[95] AEP Texas Opening Nar. at III-A-14, 20-21. This BNSF forecast projects coal volumes only for the years 2003 through 2008. *See* BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624.

[96] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth," row 3, cell K3.

[97] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnages."

[98] *See* BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624.

the stand-alone railroad would not transport the total coal volumes projected in the BNSF LRP for the year 2003. Consequently, as AEP Texas recognizes, a determination of the amount of coal the shippers in the TNR traffic group will transport in 2003 requires a calculation of the average growth or decline in BNSF's overall coal deliveries between 2002 and 2003, and an application of that rate of change to the 2002 volumes for the particular origin pairs included in the TNR traffic group. AEP Texas uses precisely this approach to calculate coal volumes for each of the years 2004 through 2008.[99] For example, AEP Texas calculates 2004 volumes using the { } percent projected growth shown in BNSF LRP's for overall BNSF coal deliveries between 2003 and 2004 and applies that overall growth rate to 2003 coal volumes.[100]

Buried in its electronic workpapers, AEP Texas actually calculates correctly the average change in BNSF's overall coal deliveries between 2002 and 2003.[101] As explained in its responses to BNSF's workpaper requests, AEP Texas calculated that there would be a { } percent decline in coal volumes transported by BNSF between 2002 and 2003 by taking the total carloads of coal that the BNSF LRP projected that BNSF would transport in 2003, *i.e.*, { }, and dividing by the total carloads of coal transported by BNSF in 2002, *i.e.*, 2,097,000.[102] Because this calculation compares BNSF coal deliveries in 2002 to BNSF

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[99] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "TNR Tonnages" and "Heat Input Growth."

[100] *See* Organic Growth for Year 2004 in BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624 (shows { } projected growth). AEP Texas Opening electronic workpaper "BNSF Long Range Plan September 2003.xls" (shows AEP Texas uses BNSF LRP projected growth).

[101] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth," row 3, cell K3.

[102] *See* Section III.A Workpaper Request Responses, Response to III.A Request No. 3. These responses are included in BNSF's Reply electronic workpapers at "AEP III-A WP2 Responses.pdf."

projected coal deliveries in 2003, it accurately estimates the average change in overall BNSF coal deliveries between 2002 and 2003.

However, rather than using this calculation, which makes an apples-to-apples comparison of BNSF coal deliveries in one year to those in another year, AEP Texas concocts a convoluted apples-to-oranges comparison of coal consumption to coal deliveries -- which is apparent only from a review of its workpapers -- to derive TNR coal volumes for the year 2003. Specifically, AEP Texas begins with the quantity of coal purportedly *consumed* in 2002 at each plant in its traffic group.[103] Then, applying the percentage decline in coal deliveries it developed from the BNSF LRP (a { } percent decline), AEP Texas assumes that the amount of coal *consumed* at the plant will be { } percent lower in 2003 than it was in 2002.[104] Finally, AEP Texas assumes that the tons of PRB coal it calculates will be consumed at the plant in 2003 equal the amount of tons that BNSF will deliver to the plant in 2003.[105]

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[103] AEP Texas develops what it refers to as a "Historic and Projected Coal Consumption (MMBtu)" for the TNR shipper group. It does so by taking the amount of MMBTUs that it purports were burned at the plant in 2002. *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "TNR Tonnages" and "Heat Input Growth." There are reasons that suggest AEP Texas' calculations of tons consumed at each plant are inaccurate. For example, as discussed below, BNSF has identified errors in the MMBTUs that AEP Texas relies upon by comparing them to publicly reported data. Those errors result in a significant overstatement in TNR volumes. As further explained below, after projecting MMBTUs consumed by each TNR plant for every year in the DCF period, AEP Texas uses a variety of assumptions about (1) the amount of coal that will be delivered by BNSF (as a percent of PRB coal deliveries), (2) the amount of PRB coal that will be consumed by the plant (as a percent of total coal consumption), and (3) the heat rate of the plant that could be wrong or inconsistent and produce anomalous results. *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "Heat Input Growth" and "TNR Tonnage" and BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 GG Error.xls" worksheet "BNSF SPRB Tonnage."

[104] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "Heat Input Growth" and "TNR Tonnage."

[105] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "Heat Input Growth" and "TNR Tonnage."

AEP's approach makes use of the { } percent decrease in BNSF coal deliveries between 2002 and 2003, but it does so in a devious and flawed manner that converts a decrease in BNSF coal deliveries into an increase.[106] The mechanism for this conversion is the assumption that tons consumed at a plant in 2002 will be the same as tons delivered to the plant in that year. But there can be substantial differences between the amount of coal delivered to a plant in a calendar year and the amount of coal burned in that calendar year. For example, tons burned will exceed tons delivered in a year that a coal plant reduces its inventory. AEP Texas has seized upon a disparity between coal consumption and coal deliveries at the plants in the TNR group in 2002 and used that as a device to convert a decrease in BNSF coal deliveries between 2002 and 2003 into an increase in BNSF coal deliveries between those two years. This sleight of hand should be rejected.

To illustrate what AEP Texas has done, consider the following hypothetical movement which assumes that 1 million tons were delivered by BNSF to a plant in 2002 and 1.05 million tons were consumed by that plant in 2002. Instead of applying the { } percent projected decline to the actual coal deliveries made in 2002 – which would yield 2003 deliveries of { } tons – AEP Texas makes the following calculation which, in the hypothetical, results in a 1.8 percent increase in coal deliveries in 2003:

[106] The effect of this error is significant. Specifically, correcting this error in 2003 reduces the volumes in AEP Texas' proposed traffic group by approximately 13.6 million tons, and reduces TNR revenues by approximately $53 million in 2003 (using AEP Texas's TNR rate per ton equal to $3.88/ton in 2003). *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model Correct 2003 LRF Error.xls."

Table III.A-9
Hypothetical Example of AEP Texas Misapplication of the BNSF LRF

	Eqn	Calculation
2002 Consumption	(1)	1,050,000
Reduction in Consumption 2002 to 2003	(2)	{ }
Estimated 2003 Deliveries	(3) = (L.1 x (1 - L.2))	{ }
2002 Actual Deliveries	(4)	{ }
Change in Coal Deliveries 2002 to 2003	(5) = (L.3 / L.4, minus 1)	1.80%

Note that AEP Texas does not take issue with the { } percent decline in coal deliveries – in fact, it employs this number in its calculations but applies it to 2002 consumption instead of 2002 deliveries. This converts a reduction in coal deliveries into an increase in rail deliveries.

BNSF rejects AEP Texas methodology for calculating coal volumes in 2003. Instead, BNSF correctly applies the average { } percent decline in coal deliveries calculated by AEP Texas to BNSF coal deliveries in 2002 and, thus, derives coal volumes delivered by the TNR in 2003.[107] BNSF's approach is confirmed by the actual decline in traffic (volumes and revenues) observed by the TNR shipper group, as proposed by AEP Texas, in 2003.[108]

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[107] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

[108] *See* BNSF Reply electronic workpaper "TNR Coal Traf and Rev 2003 Comparison.xls" worksheet "SARR traffic summary." {
}

(b) AEP Texas' Ad Hoc Adjustment to Texas Genco Holdings' Limestone Plant Volumes In 2004 Is Improper

Buried in its electronic workpapers, AEP Texas indicates that, in fact, it is not using the BNSF LRP to forecast volumes to Texas Genco Holdings' Limestone plant in 2004.[109] The BNSF LRP projects a { } percent growth in coal volume between 2003 and 2004.[110] However, AEP Texas projects almost a 100 percent increase in coal volumes for the Limestone plant between 2003 and 2004. It assumes that coal volumes for that plant will be {

}[111]

This ad hoc deviation from the BNSF LRP is not warranted for the following reasons. First, AEP Texas should not be allowed to make ad hoc exceptions to BNSF LRP, a macro coal forecast that reflects BNSF's overall perspective on how coal volumes delivered by BNSF will change from year to year. In all likelihood, some plants will receive more coal than projected by the macro coal forecast and others will receive less coal than projected by the macro coal forecast. However, if a claimant has elected to rely on the overall forecast, it should not be allowed to cherry pick and make exceptions to the coal forecast when it believes volumes to a particular plant will be greater than those projected by the forecast. Such exceptions will distort the overall forecast because they will not reflect the offsetting instances where a particular plant receives less coal than projected by the macro coal forecast. For example, use of the BNSF LRP

[109] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage."

[110] *See* Organic Growth for Year 2004 in BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624.

[111] *See* AEP Texas Opening Exh. III-A-3, row 39, columns 13, 14.

predicted that BNSF would transport { } million tons to Westar's Jeffrey plant in 2003,[112] but actual deliveries to Jeffrey were only { } million tons in that year.[113]

Second, the evidence that AEP Texas relies upon does not support its assumption regarding future coal volumes for the Limestone plant. AEP Texas relies on a press clipping which states that BNSF/Texas Genco Holdings have entered a contract under which 2.6 million tons of coal will be delivered to the Limestone plant in 2004.[114] Based upon this press clipping, AEP Texas assumes that coal volumes to the plant will equal 2.6 million tons in 2004, will grow in each subsequent year of the DCF period until they reach 2.9 million tons in 2010, and will then remain at 2.9 million tons for the remainder of the DCF period.[115] However, as apparent from the press clipping, the new contract is for only one year -- 2004. There is other evidence, ignored by AEP Texas, {

} Specifically, in February 2004 Texas Genco Holdings signed a seven-year deal to purchase a minimum of 7 million tons of lignite coal at the Limestone plant. Further, the agreement amends the 2001 – 2002 coal supply agreement to "assure NWR's (the owner of the Jewel lignite mine) right to supply all fuel requirements at the Limestone Station through 2015 with actual volumes determined on an annual basis."[116] {

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[112] *See* BNSF Reply electronic workpaper "Jeffrey tons.xls."

[113] *See* BNSF Reply electronic workpaper "Jeffrey tons.xls."

[114] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage."

[115] *See* AEP Texas Opening Exh. III-A-3, row 39.

[116] *See* BNSF Reply electronic workpaper "Limestone lignite agreement.pdf."

Consequently, BNSF rejects AEP Texas' ad hoc adjustment to the BNSF LRP in calculating future coal volumes to the Limestone plant. For the reasons set forth above, BNSF uses the BNSF LRP to project future coal volumes to that plant between 2003 and 2008. As a result, BNSF's assumed volumes to this plant,[117] but are likely overstated {

}

(c) AEP Texas' Calculation Of Coal Volumes For Three Plants Added To The Traffic Group In 2005 Is Improper

AEP Texas adds three new plants to the TNR traffic group in 2005 -- {

} AEP Texas apparently includes these plants in the TNR traffic group in 2005 because the BNSF LRP projects that BNSF will begin to transport coal to these plants as of 2005.[119]

BNSF disagrees with AEP Texas' assumptions regarding the volume of coal that will be transported to these plants in 2005 and subsequent years.[120] While AEP Texas claims that it uses the BNSF LRP to project coal volumes for the shippers in its traffic group in 2005,[121] it does not in fact do so. The BNSF LRP specifies how much coal BNSF assumes will be delivered to each

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[117] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

[118] *See* AEP Texas Opening Exh. III-A-3, rows 4, 44, 51.

[119] *See* Market Share Assumptions for Year 2005 in BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624.

[120] As explained in section III.A.1.b.(i)(c), BNSF excludes a portion of the { } movements from the traffic group because AEP Texas improperly rerouted this traffic.

[121] *See* AEP Texas Opening Nar. at III-A-20.

of these plants in 2005. Rather than using those volumes, AEP Texas assumes a substantially higher volume will be shipped to these plants in 2005. *See* Table III.A-10.

Table III.A-10

Comparison of 2005 Coal Volumes for New Plants in BNSF LRP to Those Assumed by AEP Texas

New Plant	2005 BNSF LRP Tons[122]	2005 Tons Assumed by AEP Texas[123]	Difference (tons)
{ }	{ }	{ }	{ }
{ }	{ }	{ }	{ }
{ }	{ }	{ }	{ }

Source: BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply" worksheet "New Moves."

BNSF develops volumes for these plants in 2005 using the tonnage estimates from the BNSF LRP for coal. BNSF then reduces the volumes for the plants to exclude the volumes forecast to originate at the southern three PRB mines which will exit the PRB via Guernsey as explained in section III.A.1.b.(i)(c).

Since the volumes assumed to be transported to these plants in the years subsequent to 2005 are calculated based upon the 2005 volumes, BNSF's modification to AEP Texas' 2005 volume assumptions also affects the volume assumptions for the plants in the remaining years of the DCF period.[124]

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[122] Market Share Assumptions for Year 2005 in BNSF Coal LRP, included in AEP Texas Opening workpapers at 07624.

[123] *See* AEP Texas Opening Exh. III-A-3, column 15, rows 4, 44, 51.

[124] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

(d) AEP Texas' Calculation of 2007 Volumes For The New TEP Springerville Unit Is Overstated

AEP Texas assumes that a new unit 3 will be constructed and become operational at Tucson Electric Power Company's ("TEP") Springerville plant effective 2007.[125] AEP Texas bases this assumption upon the report that this unit is expected to become operational in 2007 and the fact that a coal supply contract has been entered to supply coal to the new unit.[126] In addition, BNSF has entered a coal transportation agreement with TEP that governs the transportation of coal to this new Springerville unit. Given that there are coal supply and coal transportation contracts in place for this new unit, BNSF accepts AEP Texas' assumption that Springerville Unit 3 will be operational by 2007 and that PRB coal deliveries to the Springerville plant will begin in that year.

However, BNSF disagrees with AEP Texas' assumption about the amount of coal that will be delivered to that new unit. AEP Texas makes the unfounded assumption that the new unit will receive 1.7 million tons of coal in 2007, its first year of operation. This equals an 85 percent capacity factor for the plant in its first year of operation.[127]

BNSF uses a much more reasonable assumption based upon the best available evidence regarding the amount of coal that will be delivered to the Springerville plant in 2007. Specifically, BNSF relies on the statements made by Springerville Unit 3 Holding, LLC

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[125] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage," cell AH85.

[126] *See* Section III.A Workpaper Request Responses, Response to III.A Request No. 5. These responses are included in BNSF's Reply electronic workpapers at "AEP III-A WP 2 Response.pdf."

[127] *See* Section III.A Workpaper Request Responses, Response to III.A Request No. 5. These responses are included in BNSF's Reply electronic workpapers at "AEP III-A WP2 Responses.pdf."

representatives to Randall Reyff, the BNSF Coal Marketing Director responsible for the TEP and the Springerville Unit 3 Holding, LLC customer accounts, regarding the amount of Springerville Unit 3 coal expected to be shipped. Those representatives have told Mr. Reyff that Springerville Unit 3's annual coal demand is expected to be { } tons. Since Springerville Unit 3 Holding's volume estimates for the new unit incorporate the company's projections of regional demand and other operational factors, these estimates are clearly superior to AEP Texas' litigation-driven forecast for the new Springerville unit.

Consequently, BNSF assumes the new unit at Springerville will receive { } tons of coal in 2007, which is the mid-point of the range of coal shipments that representatives of Springerville Unit 3 Holding, LLC indicated to BNSF that the company expected to ship to the new Springerville unit.[128] BNSF then projects volumes for the Springerville plant in 2008 based upon the projected organic growth assumed in BNSF's LRP and in subsequent years of the DCF period based upon the most recent forecast published by EIA (*see* section III.A.2.a.(iii) below) until those volumes reach 1.7 million tons, the 85 percent capacity factor for the new unit.[129] As a result of this modification to AEP Texas' volume assumptions, BNSF reduces the TNR volumes by the following amounts:

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[128] *See* BNSF Reply electronic workpaper ""Traffic Summaries from BNSF Reply" worksheet "Tucson Electric.xls."

[129] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "Springerville."

Table III.A-11
Springerville Tonnage Reductions

Year	Springerville Tons Excluded by BNSF
2007	{ }
2008	{ }
2009	{ }
2010	{ }
2011	{ }
2012	{ }
2013	{ }
2014	{ }
2015	{ }
2016	{ }
2017	{ }
2018	{ }

Source: BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnage."

(iii) 2009 Through 2020 Projected Coal Volumes:

AEP Texas uses the EIA Annual Energy Outlook forecast published in 2003 to project volume changes from 2009 through 2020, erroneously claiming that this is the "most recent iteration of this analysis."[130] BNSF accepts the use of the EIA forecast to project volumes in those years but uses the most recent forecast which was published in January 2004, two months before AEP Texas filed its opening evidence.[131] The most recent forecast should be used because it reflects EIA's current best estimate of how coal volumes will change in the future. Indeed, AEP Texas appears to concede that the most recent forecast should be used since it intended to use the "most recent" EIA forecast in its evidence.[132]

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[130] *See* AEP Texas Opening Nar. at III-A-22, 23.

[131] *See* BNSF Reply electronic workpaper "AEO Assumptions (2004).pdf."

[132] *See* AEP Texas Opening Nar. at III-A- 23.

(iv) AEP Texas Errs in Applying The 85 Percent Capacity Factor

AEP Texas claims that it caps volume growth for the plants in the traffic group when the *consumption* level, not coal delivery level, at the plant reaches the 85 percent capacity factor.[133] However, AEP Texas' application of the 85 percent capacity factor is flawed in numerous respects and, as a result, BNSF modified AEP Texas methodology in the following ways:

(a) AEP Texas Improperly Fails To Apply The 85 Percent Capacity Factor To Shippers Whose Coal Moves Through A Transloading Facility

AEP Texas includes several plants in its shipper group that have their coal transported by BNSF from the PRB to a transloading facility. The plants in the traffic group falling into this category are identified, by transloading facility in Table III.A-12.

[133] *See* AEP Texas Opening Nar. at III-A- 21.

Table III.A-12

Plants in TNR Traffic Group
Whose Coal Moves Through Transloading Facility

Transloading Facility	Plant
North St. Louis Terminal[134]	{ }
North St. Louis Terminal	{ }
North St. Louis Terminal	{ }
Superior Dock[135]	{ }
Superior Dock	{ }
Superior Dock	{ }
Superior Dock	{ }
Cook Illinois[136]	{ }
Cook Illinois	{ }
Cook Illinois	{ }
Cook Illinois	{ }
Cook Illinois	{ }

Source: BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Transloading Docks."

However, AEP Texas fails to apply the 85 percent capacity factor cap to coal delivered to some of these plants.[137] As a result, AEP Texas assumes that the volumes of coal delivered to some of these plants, *i.e.*, { } will exceed the 85 percent capacity factor level at some point in the DCF period.[138] AEP Texas' failure to apply the 85 percent capacity factor cap to these plants is inconsistent with AEP Texas' own traffic

[134] The plants receiving coal through the North St. Louis Terminal are identified in AEP Texas Opening Exh. III-A-3, rows 7 through 7c.

[135] The plants receiving coal through the Superior Dock are identified in AEP Texas Opening Exh. III-A-3, rows 45 through 45c.

[136] The plants receiving coal through the Cook facility are identified in AEP Texas Opening Exh. III-A-3, rows 61 through 61e.

[137] AEP Texas does apply an 85 percent capacity cap to the { } plant. *See* AEP Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "TNR Tonnage."

[138] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Transloading Docks."

assumptions. BNSF rejects AEP Texas approach and applies the 85 percent capacity factor to cap the amount of coal delivered to each of these plants.[139]

(b) AEP Texas Improperly Overstates Volumes to Plants Whose Coal Deliveries Exceeded The 85 Percent Capacity Factor In 2002

AEP Texas makes an exception to its 85 percent capacity factor cap for plants that were operating at or above 85 percent capacity in 2002. For those plants, AEP Texas claims to "have their volumes held constant throughout the DCF period."[140] However, as explained below, AEP Texas does not hold the volumes delivered to these plants constant. Instead, relying upon an analysis of tons *consumed* at the plant, AEP Texas improperly increases the coal volumes delivered to these plants to an unrealistically high level.

As shown in Table III.A-13, AEP Texas assumes that the following plants in its traffic group operated at or above the 85 percent capacity factor level in 2002:

[139] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "Transloading Docks."

[140] *See* AEP Texas Opening Nar. at III-A- 22.

Table III.A-13

Plants That AEP Texas Assumes Operate Above 85 Percent Capacity in 2002

Shipper/Plant	Capacity Factor in 2002 as Calculated by AEP Texas[141]
Entergy Gulf States' Big Cajun 2 Plant	88%
Xcel's Comanche Plant	89%
NPPD's Gerald Gentleman Station	88%
Southwestern Public Service Company's Harrington Plant	101%
Kansas City Power & Lights' Hawthorne Plant	93%
Sunflower's Holcomb Plant	87%
PacifiCorp's Johnston Plant	87%
Basin Electric Power Corp's Laramie River Plant	92%
Westar's Lawrence Energy Center	88%
Texas Genco Holdings' Parish Plant	88%
Platte River Power Authority's Rawhide Plant	98%
Silkeston Board of Municipal Utilities' Sikeston Plant	93%
Springfield City Utilities Southwest Plant	97%
Xcel's Tolk Plant	86%
Arapahoe (PSCO)	102%

Source: BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "cap factor calc."

BNSF agrees that coal deliveries to many of these plants exceeded the 85 percent capacity factor in 2002.[142] However, BNSF does not agree with AEP Texas' methodology for capping the future volumes projected to be delivered to these plants.

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[141] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth."

[142] BNSF has another criticism of AEP Texas' volume assumptions for the Parish plant which is explained in section III.A.2.a.(iv)(c) below.

In applying a cap on future volume growth, SAC cases have focused on coal deliveries to the plants in the shipper group. If coal deliveries to a plant have been below 85 percent historically, the Board has allowed coal deliveries to increase throughout the DCF period until those deliveries reach the 85 percent capacity factor level.[143]

AEP Texas ignores the approach in existing Board precedent. Rather than focusing on the volume of coal *deliveries* to these plants, AEP Texas purports to use the number of MMBTUs *consumed* at the plant in 2002.[144] AEP Texas then attempts to convert the number of MMBTUs consumed into the volume of tons consumed in 2002.[145] Using its flawed input data and conversion analysis, AEP Texas allows coal deliveries to these plants to grow until they purportedly reach the level of MMBTUs consumed by the plant in 2002.

One significant flaw in AEP Texas' approach is that it overstates 2002 MMBTU consumption levels. As the following table demonstrates, AEP Texas' 2002 MMBTU consumption levels are higher than those developed from publicly available data reported to the EIA.[146] The overstatement in MMBTUs consumed allows AEP Texas to grow tonnages even beyond its historic consumption level for 2002.

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[143] *See, e.g. WTU*, 1 S.T.B. at 663-664. On limited occasions, the parties in SAC rate proceedings have made an exception to this 85 percent capacity factor cap in circumstances where a power plant has historically operated at a capacity factor greater than 85 percent. In those cases, the parties have capped coal deliveries to the plant at the historic coal delivery level.

[144] According to AEP Texas' workpapers, AEP is modeling "TNR Historic and Projected Coal Consumption (MMBtu)." *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth."

[145] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth."

[146] The EIA Form 906 contains net coal generation reported in MWHs. The net coal generation was converted to MMBTU's for this comparison using each plant's heat rate as assumed by AEP Texas.

Table III.A-14

Comparison of AEP Texas and EIA MMBTUs for 2002

PLANT	AEP TX[147] MMBTUS	Actual MMBTUS	AEP TEXAS Overstatement
Comanche	55,544,385	50,342,106	10.3%
Harrington	94,593,028	78,373,000	20.7%
Rawhide	24,285,022	21,440,365	13.3%
Southwest	16,712,126	12,866,618	29.9%

Source: BNSF Reply electronic workpaper "Capacity Factor Exs.xls."

Further, after overstating MMBTUs consumed by each TNR plant for every year in the DCF period, AEP Texas uses a variety of assumptions about (1) the volume of PRB coal delivered by BNSF (as a percent of PRB deliveries), (2) the volume of PRB coal consumed by the plant (as a percent of total coal consumption), and (3) the heat rate of the plant that may be wrong or inconsistent and produce anomalous results. For example, the data source upon which AEP Texas relies for its volume forecast assumptions erroneously identifies BNSF as the primary railroad that delivers coal to the TVA Shawnee plant. AEP Texas also erroneously assumes that BNSF delivered {

} that BNSF delivered in 2001 and 2002. These examples cast doubt on AEP Texas' assumptions regarding the percentage of coal delivered by BNSF.[148]

AEP Texas' flawed approach has the effect of allowing coal deliveries to grow to a point where certain plants would operate at unrealistically high levels throughout the DCF period. For

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[147] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Tonnage Model 12-31-2003 DELIVERED.xls" worksheet "Heat Input Growth."

[148] *See* AEP Texas Opening electronic workpaper "SARR Traffic Group Model 12-31-2003 DELIVERED.xls" worksheets "Heat Input Growth and "TNR Tonnage" and BNSF Reply electronic workpaper at "SARR Traffic Group Tonnage Model 12-31-2003 GG Error.xls" worksheet "BNSF SPRB Tonnage."

example, AEP Texas assumes that coal deliveries to the Harrington plant grow by almost { } between 2002 and 2003,[149] and, consequently, assumes that the Harrington plant would operate at a mathematically impossible 101 percent capacity factor level in 2003.[150] AEP Texas assumes that coal deliveries to the Harrington plant would continue at this 101 percent capacity factor level from 2004 through 2020. Similarly, AEP Texas assumes that deliveries to the Southwest plant grow by { } between 2002 and 2003,[151] and, consequently, assumes that the Southwest plant would operate at an unreasonably high 97 percent capacity factor level in 2003 through 2020.[152]

Consistent with Board precedent, BNSF has modified AEP Texas' methodology to link maximum volumes to delivered tons rather than consumed tons for plants whose coal deliveries exceeded the 85 percent capacity factor level in 2002. Under BNSF's modified approach, if the volume of coal delivered to a plant in 2002 exceeded the amount needed to operate the plant at an 85 percent capacity (*e.g.* was at the 87 percent capacity level), BNSF caps the volumes to that plant at the 2002 coal delivery level.[153]

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[149] *See* AEP Texas Opening Exh. III-A-3, row 23, columns 12, 13.

[150] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "TNR Tonnages."

[151] *See* AEP Texas Opening Exh. III-A-3, row 68, columns 12, 13.

[152] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model BNSF Reply.xls" worksheet "cap factor calc."

[153] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheets "TNR Tonnages" and "Heat Input Growth."

(c) AEP Texas Improperly Overstates Volumes To Texas Genco Holdings' Parish Plant

BNSF has made two modifications to AEP Texas' volume projections for the Parish plant. First, as explained above, AEP Texas incorrectly estimated that this plant operated at above 85 percent capacity in 2002 and, consequently, overstated volumes to this plant for the entire DCF period. Since coal deliveries to this plant were below the 85 percent capacity factor level in 2002, BNSF allows the volumes to this plant to increase to the 85 percent capacity factor level.[154]

Second, BNSF has modified volumes to this plant to correct AEP Texas' erroneous assumption regarding the amount of coal delivered to this plant by BNSF. Both BNSF and UP deliver coal to Parish.[155] AEP Texas incorrectly assumes that BNSF's percentage of the coal deliveries is { },[156] which is too high. The contract between BNSF and Texas Genco specifies that BNSF delivers {

}[157] BNSF has corrected the volume assumptions for the Parish

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[154] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheets "TNR Tonnages" and "Heat Input Growth."

[155] In fact, the Parish plant has long-term transportation contracts with both BNSF and Union Pacific. *See* BNSF Reply electronic workpaper "Centerpoint financial info.pdf."

[156] *See* AEP Texas Opening electronic workpapers "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheets "TNR Tonnages" and "Heat Input Growth."

[157] *See* { } included at BNSF Reply electronic workpaper "Parish contract.pdf."

plant to make the percentage of BNSF deliveries consistent with BNSF's contract with Texas Genco.[158]

b. Non-Coal Traffic

(i) Historical Non-Coal Volumes (*i.e.*, 3Q00 through 4Q02)

AEP Texas states that it develops non-coal volumes for the historic period from Third Quarter 2000 through Fourth Quarter 2002 using the volumes reported in BNSF's traffic tapes and train movement records. *See* AEP Texas Opening Nar. at III-A-14. BNSF accepts this methodology.

(ii) Projected Non-Coal Volumes (2003 through 2020)

AEP Texas caps future non-coal volumes at the 2002 volume level. *See* AEP Texas Opening Nar. at 15. BNSF accepts this assumption.

c. Volume Summary

The following Table III.A-15 compares total TNR volumes developed by BNSF with those developed by AEP Texas. The total volumes projected by BNSF are lower than those projected by AEP Texas due to BNSF's exclusion of certain coal traffic as described in section III.A.1 and BNSF's modifications to AEP Texas' volume assumptions as described in section III.A.2 above.

[158] *See* BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls" worksheet "Heat Input Growth."

Table III.A-15

TNR Volumes
Comparison of AEP Texas and BNSF Volume Assumptions

Year	AEP Texas Volumes	BNSF Volumes	Difference
2000 (part year)	102,043,625	87,146,340	14,897,285
2001	198,692,007	170,324,800	28,367,207
2002	195,424,814	167,527,129	27,897,684
2003	200,596,124	162,755,564	37,840,560
2004	212,794,713	161,448,170	51,346,543
2005	209,154,616	152,757,693	56,396,923
2006	211,168,052	154,592,632	56,575,420
2007	214,360,016	156,428,104	57,931,912
2008	216,910,847	156,734,119	60,176,727
2009	219,588,056	161,087,928	58,500,128
2010	224,602,496	162,164,161	62,438,335
2011	227,067,470	163,498,540	63,568,930
2012	228,572,459	166,184,094	62,388,366
2013	229,615,485	168,114,122	61,501,363
2014	230,608,448	168,991,795	61,616,654
2015	231,448,125	169,703,551	61,744,573
2016	232,587,641	171,261,655	61,325,986
2017	233,953,686	171,993,064	61,960,622
2018	234,757,608	171,480,116	63,277,492
2019	235,787,389	172,602,570	63,184,818
2020	236,909,400	173,464,073	63,445,327

Source: BNSF Reply electronic workpaper "SARR Traffic Group Tonnage Model_BNSF Reply.xls."

BNSF compares its modified coal traffic volumes with AEP Texas' coal traffic volumes by year in BNSF Reply Exhibit III.A-5. BNSF shows its revised volume forecast for all AEP Texas customers, by year, from 2000 through 2020 in BNSF Reply Exhibit III.A-6.

3. TNR Revenues (Historical and Projected)

TNR revenues are affected by (1) the shippers included in the stand-alone traffic network, (2) the tonnage assumed to be handled by the TNR, (3) the rates that TNR shippers are assumed to pay, and (4) the revenue divisions between the TNR and any interchange carriers (including the residual BNSF). As shown above in sections III.A.1 and III.A.2, there are fundamental flaws

in AEP Texas' traffic selection assumptions and volume projection assumptions, respectively, that result in the vast overstatement of volumes in the stand-alone network.

As shown below, there are also critical flaws in the revenue divisions calculated by AEP Texas and in the projected rates AEP Texas assumes the TNR shippers will pay. Since AEP Texas includes both coal and non-coal traffic in its stand-alone traffic group, BNSF addresses AEP Texas' assumptions for coal and non-coal traffic separately, below.

a. Historical Single-Line Revenues (*i.e.*, 3Q00 through 4Q02)

(i) Coal Traffic

Besides the issue traffic, the TNR serves other shippers in single-line service. *See* AEP Texas Opening Nar. at III-A-36. According to AEP Texas, the TNR is hypothesized to deliver approximately 13 million tons of coal in single-line service in 2001. *Id.* AEP Texas uses the common carrier rate to establish revenues for the issue traffic and BNSF's traffic tapes to establish revenues for the other single-line movements. *Id.* at III-A-36 to 37. BNSF accepts this methodology for developing historical single-line revenues for coal shippers.

(ii) Non-Coal Traffic

The TNR does not move any non-coal traffic in single-line service.

b. Division Of Revenues -- Existing Interchanges

(i) Coal Traffic

Two coal movements fall into this category where the TNR handles the movement along the actual route used by the BNSF in the real world and then interchanges the traffic to another rail carrier. Those two movements are: (1) the movement to Westar's Jeffrey Energy Center where TNR handles the traffic from the PRB to Northport, Nebraska and interchanges to UP at Northport, and (2) the movement to Nebraska Public Power District's ("NPPD") Gerald Gentleman Station where TNR transports the coal from the PRB to Sterling, Colorado and then

interchanges to the Nebraska, Kansas & Colorado Railnet ("NKCR") at Sterling. *See* AEP Texas Opening Nar. at III-A-37.

AEP Texas assumes that the TNR receives BNSF's revenue division associated with these two movements. *Id.* at III-A-38. BNSF accepts AEP Texas' methodology for determining the TNR's revenue divisions for these two movements.

(ii) Non-Coal Traffic

The TNR does not interchange any non-coal traffic at existing interchanges with another rail carrier.

c. Divisions Of Revenue -- Cross-Over Traffic

BNSF objects to the inclusion of cross-over traffic in AEP Texas' stand-alone traffic group. As discussed in section III.A.1.a, it is only through the inclusion of cross-over traffic that AEP is able to postulate revenues that exceed costs. Cross-over traffic distorts the SAC analysis, rendering its results unreliable.

(i) AEP Texas Has Not Met Its Burden Of Justifying Its Proposed Revenue Allocation Procedure

If inclusion of cross-over traffic in a stand-alone traffic group were appropriate, the complaining shipper would nonetheless have the burden of justifying the particular revenue allocation procedure that it proposes. An unsupported assumption of revenue contribution from cross-over traffic is not consistent with the *Coal Rate Guidelines*. *See OPPD*, 3 I.C.C.2d at 142-43.[159] In this case, the inclusion of revenue from cross-over traffic movements is a primary

[159] Specifically, in *OPPD*, the ICC stated:

> The Burlington Northern first challenged the absence of off-line costs and revenues in its evidence to the Administrative Law Judge. Omaha Power responded with exhibits that purported to show the total costs and revenues (including auxiliary costs and investments) under the "Appendix F" methodology for a group of

determinant of the outcome of the SAC analysis. AEP Texas had the burden of showing that the revenue it claims on cross-over traffic movements is in fact available to the SARR.

AEP has made no effort to meet its burden regarding cross-over traffic revenue. AEP observes that "[t]he issue of revenue divisions on cross-over traffic has been contentious in most coal rate proceedings conducted under the SAC methodology." AEP Texas Opening Nar. at III-A-40. It then states that in *Duke/NS* and *CP&L/NS* "the Board clarified the preferred methodology to be used in making these revenue allocations." *Id.* With no further discussion or analysis, AEP states that it "has calculated the TNR's division of interline revenues from cross-over traffic by application of the modified straight-mileage prorate formula." *Id.*

While the Board used the MSP revenue allocation approach in *Duke/NS*, *CP&L/NS*, and *Duke/CSX*, the Board has not adopted MSP as the "preferred" or standard approach to allocating revenue on cross-over traffic movements. The Board's statement in *TMPA* that "[w]e have not adopted a single, preferred procedure for developing revenue divisions on cross-over traffic" remains true today. *TMPA* at 31, n. 74. AEP Texas cannot simply rely on the Board's use of MSP in other cases (in which neither AEP Texas nor BNSF was a party) as a substitute for meeting its burden of showing that the claimed revenue is in fact available to the SARR and that the allocation procedure adopted "produce[s] the fairest division between the carriers." *Duke/NS*, at 22.

> unit train coal shippers constituting part, but not all, of the original CMV traffic. OPPD also filed an engineering cost workup for the same group of shippers. *Both of the rebuttal workups indicate a complete recovery of all stand-alone costs, including auxiliary costs and investments.*

Id. at 142 (footnotes omitted; emphasis added).

(ii) Shortcomings In The MSP Procedure

In its *Duke/NS* decision, the Board indicated that it would look to a cost-based approach as the proper means to allocate revenue on cross-over traffic.[160] BNSF believes that a cost-based approach is appropriate, particularly since the Board has ruled out the only economically rational paradigm for a market-based allocation of revenues on cross-over traffic.[161] In *Duke/NS*, the Board identified MSP as a cost-based approach that is preferable to MMP because it eliminates the lumpiness associated with the mileage blocks used in MMP and therefore reduces the incentives that parties would have "to design SARRs to take advantage of" the MMP revenue allocation procedure. *Duke/NS*, at 22.

BNSF agrees that MSP is superior to MMP for the reasons stated by the Board in *Duke/NS*. However, there are certain shortcomings with MSP as currently formulated that keep it from accurately reflecting costs and producing the fairest division of revenues between the carriers. First, the 100 mile block of credit for originating or terminating traffic is a system average number that is not a good proxy for the costs incurred in originating or terminating particular categories of traffic. The 100 mile block substantially overstates the costs of originating and terminating unit coal train traffic in the western United States where loop tracks and flood-loading are routinely employed, and coal field gathering operations are not required. It

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[160] *Duke/NS* at 20.

[161] The economically rational market-based approach to allocating revenues would focus on the hypothetical SARR's option to build the facilities need to handle movements from origin to destination or to buy a portion of the service from the residual incumbent. The entrant would buy the service from the incumbent if it could be obtained at a price less than the cost to build. The residual incumbent would set a price less than the cost of the entrant's build alternative, which could be as high as the incumbent's current contribution on the through movement. However, the Board has concluded that the incumbent cannot seek to retain its net contribution on the through movement, reasoning that such action would represent an impermissible, post-entry competitive response. *Nevada Power II*, 10 I.C.C.2d at 266-67. In fact, the "make or buy" scenario is a prescription for efficient pricing and does not entail an anticompetitive response.

substantially understates the costs of originating or terminating intermodal and other non-coal unit train traffic. Thus, on the relatively short cross-over coal movements on AEP Texas' SARR, the 100 mile block of credit unfairly overcompensates the SARR by implicitly attributing more costs to originate those short-haul movements than are actually incurred.

A second shortcoming with MSP is that it takes no account of how traffic density affects the recovery of costs. MSP assumes that costs are not affected by traffic density. As the Board and its predecessor have repeatedly recognized, that is not the case. In the railroad industry, average total costs per unit of traffic decline as traffic density increases.[162] If coverage of costs is a goal of a fair revenue allocation procedure, as the Board has suggested, the procedures used to allocate revenue on cross-over traffic should reflect the fact that total average costs decline as densities increase.

Finally, MSP does not distinguish between attributable and unattributable costs. The allocation of revenues according to the MSP procedure does not entail an explicit demonstration that the revenue allocated will cover the attributable costs of both on-SARR and off-SARR portions of cross-over movements.

BNSF's density adjusted revenue allocation procedure ("DARA") addresses the shortcomings of the MSP procedure. It takes account of length of haul, as does MSP, and it also takes account of density. It distinguishes between attributable and unattributable costs. It is the fairest procedure available for allocating revenue on cross-over traffic.

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[162] BNSF Reply Exhibits III.A-7 and III.A-8 are maps showing the average densities on the TNR and residual BNSF routes used by the cross-over coal and non-coal traffic, respectively, using BNSF's revised traffic group.

(a) The 100-Mile Credit For Originating And Terminating Traffic In MSP

As noted above, the 100 mile credit that MSP applies for the origination and termination of a coal unit train substantially overcompensates the originating and terminating carrier for the costs actually incurred to provide those services in the PRB where no gathering operations are required and where mine loop tracks and flood-loading are commonplace. The use of a 100-mile block in a SAC case involving PRB coal transportation therefore continues to provide a gaming incentive to the complainant to load the SARR with relatively short-haul movements. At the same time, use of a 100-mile origin/termination credit for merchandise and intermodal traffic substantially undercompensates the originating and terminating carrier for the costs that are incurred to originate and terminate those types of traffic. If the MSP methodology were to be used to allocate revenue on cross-over traffic, the gaming incentives associated with the use of cross-over traffic would need to be reduced by revising the 100-mile credit to reflect more accurately the costs to originate and terminate the different types of traffic included in a SARR. Although BNSF advocates DARA as the preferred revenue allocation procedure in this case, it has for illustrative purposes developed more appropriate mileage block credits for originating and terminating coal, merchandise and intermodal traffic. The development of those alternative mileage block credits is described in BNSF Reply Exhibit III.A-9.[163]

BNSF's DARA procedure obviates the need to use mileage block credits as a surrogate for origination and termination costs. As discussed further below, the first step of the DARA procedures allocates sufficient revenue to cover directly attributable costs as calculated

[163] A comparison of the revenues calculated under the 100-mile block credit and alternative mileage-block MSP approaches using BNSF's revised traffic group is shown in BNSF Reply Exh. III.A-10.

according to the Board's Ex Parte No. 399 URCS costing procedures. URCS costs include the costs associated with originating and terminating cross-over movements.

(b) The Need To Account For Traffic Density

The MSP approach used by the Board in *Duke/NS* and adopted by AEP Texas in its Opening Evidence does not take account of traffic density. It implicitly assumes that the need for and ability of cross-over traffic movements to cover costs is the same on relatively high-density and relatively low-density portions of cross-over movements. In fact, the railroad cost structure is affected by economies of density, which result in the widely observed phenomenon that average total costs per unit of traffic decrease as traffic densities increase. By ignoring economies of density, MSP over-allocates revenues to those portions of cross-over movements on high-density segments relative to movements over less dense segments of cross-over routes. This is contrary to the Board's objective that the revenue allocation for cross-over traffic "produce the fairest division between the carriers." *Duke/NS*, at 22.

It is beyond dispute that the railroad industry cost structure – and hence the ability of rail traffic to cover costs – is affected by economies of density. The existence of economies of density was a key feature of the railroad industry cost structure addressed by the ICC in its *Coal Rate Guidelines*:

> Railroads exhibit significant economies of scope and density. . . . Economy of *density* refers to the fact that greater use of the fixed plant results in declining average cost. Thus, the marginal cost of rail service is less than the average cost, because the fixed plant is used in a progressively more efficient manner.
>
> The differential between marginal costs and average costs cannot be assigned directly to specific movements by any conventional accounting methodology. Hence, we refer to it as the "unattributable costs."

Coal Rate Guidelines, 1 I.C.C.2d at 526. More recently, the Board took note of how economies of density affect cost recovery in its *PPL I* decision:

> [I]t is preferable to allocate the capital carrying charges on a level annual basis *to reflect the declining capital investment needed per unit of output as the rail system is used more intensively. This pattern of capital recovery reflects the production economies that characterize the economic structure of the rail industry.*

PPL I, at 12 n.21 (emphasis added).

The existence of different traffic densities on different portions of cross-over routes affects the ability of the SARR and the residual incumbent to cover costs on those segments because "[g]reater use of fixed plant results in a declining average cost." Thus, all else being equal, the more traffic that moves over a given line segment, the lower the cost that needs to be recovered on average from each individual ton-mile to recover the total costs of the segment.

(iii) BNSF's DARA Procedure

BNSF's DARA procedure is a method of allocating revenue that takes account of all relevant factors that affect the ability to cover costs on both the on-SARR and off-SARR segments of cross-over movements. DARA takes account of both length of haul and traffic density.

BNSF's DARA procedure addresses the Board's statement in its *TMPA* decision regarding the objective of revenue allocation on cross-over traffic: "The revenue each carrier receives should cover the attributable costs of the service it provides and make some contribution to its unattributable costs."[164] BNSF's DARA procedure separates the revenue on a cross-over movement into two components: (1) the component that would be available to cover attributable costs of the cross-over movements, and (2) the portion of the revenue representing contribution

[164] *TMPA* at 31 n.74.

in excess of attributable costs that would be available to cover unattributable costs on the SARR and the residual incumbent. Under DARA, BNSF witness John Klick first calculates the attributable cost component according to the Ex Parte 399 variable costing procedures, and allocates sufficient revenue to each of the two carriers to cover their respective attributable costs on cross-over movements. In the second step under DARA, the contribution component of each cross-over movement (*i.e.,* total end-to-end revenue minus the two carriers' attributable costs) is allocated to the SARR and the residual incumbent in direct proportion to relative length of haul and in inverse proportion to the traffic densities on each carrier.

To determine attributable costs for each portion of cross-over movements in the first step of DARA, Mr. Klick calculated URCS variable costs (based on a 2002 URCS for BNSF), using the Ex Parte No. 399 costing assumptions employed by the Board in preparing its costed waybill.[165] This approach captures the costs associated with originating and terminating the cross-over movements. The attributable costs also include those portions of road property ownership costs that URCS assumes to be variable.

There is no density adjustment made in calculating attributable costs in the first step of the DARA procedure. The on-SARR and off-SARR segments of all cross-over movements are costed. The more traffic that travels over a particular line segment, the more revenue (including revenue associated with the variable portion of "below-the-wheel" road property costs) will be allocated to the traffic using those line segments -- in direct proportion to the volume of traffic.

The density adjustment aspect of DARA comes into play in the second step of the DARA procedure, which involves the allocation of contribution net of attributable costs that is available

[165] *See* BNSF Reply electronic workpapers "AEP Coal Move.xls" (for coal traffic) and "non-coal inputs.xls" (for non-coal traffic).

to defray unattributable costs.[166] The revenue being allocated in the second stage of the DARA procedure is revenue that is available to defray costs that, by definition, are not caused by any particular movement of traffic. The logic of the inverse density adjustment is that because average total costs per unit of traffic are lower on dense lines than on less dense lines, the units of traffic on denser segments will need less revenue on average to cover unattributable costs than traffic on less dense segments.

In sum, DARA represents a refinement and an improvement over the MSP method used by the Board in *Duke/NS* and adopted by AEP Texas in its opening evidence. Through the Ex Parte No. 399 development of URCS variable costs, DARA is more precise in estimating costs of originating and terminating traffic than MSP, which incorporates a one-size-fits-all 100-mile credit as a proxy for those costs. DARA implements the Board's prescription in *TMPA* that "the revenue each carrier receives should cover the attributable costs of the service it provides and make some contribution to its unattributable costs."[167] And, unlike MSP, DARA addresses traffic density in allocating that portion of revenue that is available for coverage of unattributable costs, thereby taking account of the fact that "[g]reater use of fixed plant results in a declining average cost." *Guidelines*, 1 I.C.C.2d at 526.

(iv) DARA Does Not Assume That Road Property Investment Costs Are The Same For Light-Density Lines As For Heavy Density Lines

In its *Duke/NS* decision, the Board rejected the revenue allocation procedure proposed by NS which was functionally the same as DARA. The Board found that "NS's proposed formula contains the critical assumption that light-density lines have the same fixed costs per mile as

[166] *See* BNSF Reply electronic workpapers "AEP Coal Move.xls" (for coal traffic) and "non-coal inputs.xls" (for non-coal traffic).

[167] *TMPA* at 31 n.74.

heavy-density lines – an assumption that Duke challenges here. If the fixed costs per mile are not roughly the same, then NS's methodology could allocate too much revenue to the light density lines." *Duke/NS* at 21. It appears that the Board was using the term "fixed costs" in this discussion to refer to road property costs, *i.e.*, "investments in land, tunnels, track and bridges." *Id.* at 22.

The DARA procedure implemented by BNSF *does not* assume that the fixed costs (*i.e.*, costs of road property investment) are the same per mile for light-density lines as for heavy-density lines. The first step of the DARA procedure allocates revenues sufficient to cover directly attributable costs for movements over on-SARR and off-SARR segments by calculating URCS variable costs. The Board's own URCS costing procedure assumes that a certain portion of road property costs vary with density; accordingly, the variable portion of road property investment and depreciation are included in URCS-based variable costs for which revenue is allocated in the first step of the DARA procedure. On average, there is more cross-over traffic (and more traffic overall) moving over the relatively dense on-SARR segments than on less dense off-SARR segments; thus more variable costs per route mile are allocated for the recovery of road property investments to the denser on-SARR segments.

In the DARA calculations made for this Reply evidence, the variable road property costs per route mile allocated to the higher density SARR under the first stage of the DARA procedure is $67,000, which is more than three times the variable road property costs per route mile of $22,000 allocated to the lower-density off-SARR segments.[168]

Thus, DARA allocates more revenue per route mile for the recovery of road property costs on line segments that have a high density of cross-over movements than on segments that

[168] *See* BNSF Reply Exh. III.A-11.

have a low density of cross-over movements. The Board's discussion of NS's revenue allocation procedure in *Duke/NS* did not include any reference to or consideration of the URCS road property investment costs that are allocated through the first step of the DARA procedure. Instead, the Board's discussion focused upon the aspect of the allocation formula that allocates contribution in excess of attributable cost in inverse proportion to density. This is the aspect of the DARA procedure that involves the allocation of revenue available for the coverage of unattributable costs. In Mr. Klick's DARA calculations for this case, 78 percent of the total revenue that BNSF allocates through the DARA procedure is for coverage of the variable costs developed in step 1 of DARA.[169]

The Board is correct that the formula used in the second step of DARA can be characterized by the assumption that unattributable costs, as distinct from attributable costs, are the same per route mile on the less dense as well as more dense segments of cross-over movements. The assumption is valid in the second step of DARA precisely because the costs to be covered, being unattributable, do not vary with the volume of traffic. The logic of URCS is that unattributable costs – costs that are not variable as determined by the URCS variable costing procedure – are independent of the level of traffic on a particular line segment, and therefore would be the same per route mile on more dense and less dense segments of cross-over movements.

(v) Results Of BNSF's DARA Calculations

BNSF applied the DARA procedure in this case, and then compared the results of the cross-over revenue allocations derived using DARA with those derived by AEP Texas using the MSP approach. For coal traffic, the TNR interchanges cross-over traffic with the residual

[169] *See* BNSF Reply Exh. III.A-11.

incumbent at several locations, with most being forwarded to the residual BNSF at Alliance (more than 80 million net tons in 2002), and smaller volumes being interchanged at Oklaunion (16 million), South Logan (13 million), Campbell (more than 10 million), Amarillo (5 million), and Las Animas (1 million). The TNR also is hypothesized to transport several non-coal commodities in bridge service between Amarillo and Oklaunion, totaling 6 million net tons in 2002. Table III.A-16 compares the parties' cross-over revenue allocations for coal and non-coal traffic. Coal traffic is separated into three categories, *i.e.*, Alliance, TNR Short Haul (which includes traffic interchanged at Campbell, South Logan, and other short-haul traffic AEP labeled "Alliance/Campbell"), and TNR Long Haul (which includes traffic interchanged at Amarillo, Las Animas, and Oklaunion). Table III.A-16 summarizes the non-coal results in two categories, *i.e.*, Manifest and Intermodal.

Table III.A-16

Comparison of Cross-Over Traffic Revenue Allocations
To TNR and Residual BNSF Under AEP Texas's Generic MSP and DARA

	Net Ton-Miles (Billions)	Average Length of Haul	Revenue (Millions)		Mills per Ton-Mile	
			AEP (MSP)	BNSF (DARA)	AEP (MSP)	BNSF (DARA)
Coal						
Alliance Interchange						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
TNR Short Haul						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
TNR Long Haul						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
All Coal						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
Non-Coal						
Manifest						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
Intermodal						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }
All Non-Coal						
TNR	{ }	{ }	{ }	{ }	{ }	{ }
Residual BNSF	{ }	{ }	{ }	{ }	{ }	{ }

Source: BNSF Reply electronic work papers "AEP Coal Move.xls" and "noncoal revenue summary.xls"

Coal Traffic

Table III.A-16 shows the changes in coal revenues allocated to the TNR and the residual BNSF, on a mills per ton-mile basis, when DARA is substituted for AEP Texas's use of MSP. For cross-over coal traffic in the aggregate, AEP Texas' MSP revenue allocation approach yields

{ } mills per ton mile for movements on the SARR and { } mills per ton mile on the residual incumbent, which represents 22 percent more revenue for the SARR on a ton-mile basis. BNSF's DARA procedures yields overall coal revenues of { } mills per ton-mile on the SARR and { } mills per ton-mile on the residual incumbent, which still leaves the SARR with slightly higher average divisions on a ton-mile basis but reduces the discrepancy to 3 percent.

Turning to the divisions results produced for the various cross-over interchanges, the effect of switching from MSP to DARA is most significant for the "TNR Short Haul" category, where under MSP the TNR receives nearly three times more revenue per ton-mile than is allocated to the residual BNSF ({ }). This is caused by the overstated 100-mile credit for originations used by MSP. The TNR receives 18 percent of the through revenues for handling the "TNR Short Haul" traffic for only seven percent of its total miles under the MSP procedure. DARA reduces the TNR revenue per ton-mile by more than 40 percent, but still leaves the TNR with a significantly higher revenue per ton-mile on the "TNR Short Haul" traffic.

Even the "Alliance" interchange category of traffic, which averages more than 250 miles on the TNR, exhibits some distortion when the 100-miles origin credit associated with MSP is employed. The TNR's RTM is 25-percent higher than the residual BNSF's { }, and the TNR is allocated 28 percent of the revenue for 24 percent of the miles. Applications of DARA results in essentially identical revenues per ton-mile on the TNR and the residual BNSF for this traffic.

Application of DARA to the "TNR Long Haul" category increases the spread between the carriers' mills per ton-mile, with the residual BNSF receiving a higher division on a mills per ton-mile basis.

The varying impacts of substituting DARA for the MSP employed by AEP Texas reflect the interplay of a number of factors that affect the recovery of costs on the on-SARR and off-SARR portions of cross-over movements. As explained above, the first step of DARA ensures that the TNR and the residual BNSF are allocated revenue sufficient to cover their attributable (*i.e.*, variable) costs. The second step of DARA divides the remaining contribution in a way that is directly proportional to the average length of haul and inversely proportional to the average density. On the TNR's short-haul coal movements, its attributable costs are significantly lower than the 18 percent of through revenues assigned to them by application of MSP when the 100-mile credit is employed. Nevertheless, because the attributable costs that the TNR incurs to originate this traffic are recovered over substantially fewer ton-miles than are the costs the residual BNSF incurs to terminate this traffic, application of DARA still results in higher revenues per ton-mile for the TNR than for the residual BNSF.

The effect of substituting DARA for MSP is also influenced by the average densities on the TNR, and how those compare with the average densities on the residual BNSF routes used by the cross-over coal traffic (which are depicted in a map included as BNSF Reply Exhibit III-A-7). In total, the TNR segments have densities that are 50 percent higher than densities on the residual BNSF routes. However, the TNR and residual BNSF densities are closer for the "TNR Short Haul" and "Alliance" categories of traffic, because that cross-over traffic is delivered to the residual BNSF at locations that are on the incumbent's highest-density coal lines. In contrast, the average TNR densities are considerably higher than the average residual BNSF densities for the "TNR Long Haul" category of traffic interchanged at Amarillo, Las Animas, and Oklaunion. As a result, the residual BNSF portion of the "TNR Long Haul" category gets a much higher allocation of contribution above attributable costs, under DARA, than does the

TNR -- resulting in the 8.3 percent increase in the revenue per ton-mile for the residual BNSF's portion of this long-haul traffic.

In sum, application of DARA has the effect of reducing TNR coal revenues by { } million.

Non-Coal Traffic

Substitution of the DARA procedure for AEP Texas' MSP actually increases the average division for the TNR for manifest and intermodal traffic. In general, the fact that the TNR is providing overhead bridge service for all non-coal traffic means that the TNR division under MSP is not affected by the 100-mile credit used for originations on short haul movements. Although DARA makes a more accurate allocation of the specific attributable costs than MSP -- including costs to originate and terminate the traffic -- lengths of haul on the residual BNSF, { }, serve to dilute this effect.

In addition, the slight increase in the TNR's non-coal division produced by DARA reflects the fact that the densities on the residual BNSF routes traversed by this traffic in Eastern Texas and between Amarillo, on the one hand, and Colorado, Wyoming, and the Pacific Northwest are slightly higher than the average densities on the TNR's southernmost leg, which this traffic traverses. By contrast, the TNR's bridge division on intermodal traffic increases 12 percent, from { } mills per ton-mile, bringing it very close to the division DARA calculates for the residual BNSF. Virtually all of this traffic moves between Southern California and Texas via BNSF's transcontinental line that exhibits densities approaching three times that of the Amarillo-Oklaunion line of the TNR. As a result, application of DARA increases TNR non-coal revenues by { } million.

d. Other -- Projected Revenues

AEP Texas' methodology for projecting coal revenues differs from its methodology for projecting non-coal revenues. Consequently, BNSF addresses the revenue projections for coal and non-coal traffic separately below.

(i) Projected Revenues For Coal Traffic

This section describes the flaws in AEP Texas' methodology for calculating future coal revenues on the TNR. AEP Texas contends that the coal revenues of the hypothetical TNR will grow by approximately 53 percent from over $723 million in 2001, the first full year of the DCF, to over $1.1 billion in 2020.[170] Future TNR revenues reflect the combined effect of volume projections, cross-over traffic revenue divisions, and revenue projections. As discussed above in sections III.A.1, III.A.2, and III.A.3.c, BNSF has restated AEP Texas' tonnage projections and cross-over revenue divisions. As explained below, BNSF also modifies AEP Texas' revenue projections. Under BNSF's revised volumes and revenue projections, the TNR's coal revenues increase from $607.7 million in 2001 to $810.7 million in 2020.[171]

With respect to common carrier movements, BNSF accepts AEP Texas' methodology for projecting rates for movements with Board prescribed rates and for movements that have a rate adjustment mechanism in the common carrier pricing authority. However, as explained below, BNSF rejects AEP Texas' methodology for projecting rates for common carrier movements whose common carrier rates do not include a rate adjustment mechanism. These common carrier rate issues are discussed in subpart (a) of this section.

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[170] AEP Texas Opening Exh. III-A-14, row titled "Total", columns 11, 30.

[171] *See* BNSF Reply Exh. III-A-16.

With respect to contract movements, in the early part of the DCF period, AEP Texas bases its revenue projections on BNSF's LRP for coal, a forecast developed by BNSF in the ordinary course of business, and on the actual terms of existing contracts for coal shippers in the TNR traffic group until those contracts expire. While BNSF and AEP Texas are in general agreement on the methodology for this period, BNSF corrects some errors in AEP Texas' implementation of this methodology, such as its failure to use the correct terms in some existing coal transportation contracts. These implementation issues are discussed in subpart (b)(i) of this section.

The main divergence between the AEP Texas and BNSF revenue forecasts for the TNR occurs during the lengthy period between the expiration of each existing coal transportation contract and 2020, the last year of the DCF period. Significant revenue growth projected by AEP Texas occurs after the expiration of the existing contracts. Subpart (b)(ii) of this section explains the fundamental flaws of AEP Texas approach to forecasting revenues upon the expiration of current contracts. The most significant error is AEP Texas' assumption that rates and rate escalation methodologies for all coal shippers, both sole-served and competitively-served, will remain the same after their current contracts expire. This assumption is inconsistent with historic data and, with respect to competitively-served plants, is even inconsistent with the position taken by complainants in recent SAC cases brought against BNSF. As explained below, BNSF has rebased the rates for both competitively-served and sole-served coal plants upon contract expiration.

(a) Projected Revenues For Common Carrier Movements:

AEP Texas methodology for projecting rates for common carrier coal movements differs depending upon whether the Board has prescribed a rate for the common carrier movement, or, if

there is no Board prescription, whether the common carrier pricing authority established by BNSF for the movement contains a rate adjustment mechanism.

Common Carrier Movements with prescribed rates: AEP Texas includes one movement, the movement to TMPA's Gibbons Creek Station, that is subject to a Board rate prescription. AEP Texas projects revenues for this coal movement using the Board's prescribed rate. *See* AEP Texas Opening Nar. at III-A-43. BNSF accepts this approach for projecting future revenues to Gibbons Creek station.

Common Carrier Movements with rate adjustment mechanism: AEP Texas includes one common carrier movement -- the movement to Xcel's Pawnee plant -- that has a common carrier rate with a rate adjustment mechanism. AEP Texas uses the rate adjustment mechanism in the common carrier pricing authority to project future rates for this common carrier movement. *See* AEP Texas Opening Nar. at III-A-43. BNSF accepts this methodology for projecting rates to Xcel's Pawnee plant.

Common Carrier Movements with no rate adjustment mechanism: AEP Texas includes several common carrier movements, *i.e.,* the issue traffic movement, PPL's Corette movement, and Otter Tail's Big Stone movement, that have no rate adjustment mechanism in common carrier pricing authorities. For these movements, AEP Texas assumes the last common carrier rate for the movement will apply to that movement throughout the DCF period. *See* AEP Texas Opening Nar. at III-A-42 to 43.

BNSF disagrees with AEP Texas' approach because it fails to reflect the actual change in the common carrier rates for these movements over time. Even though the common carrier pricing authorities for these movements do not contain a rate adjustment mechanism, BNSF has changed the rates periodically for each of these movements by establishing a new common

carrier rate. In developing rates for these common carrier movements, BNSF uses the actual common carrier rate for the movements through 2004. BNSF develops the rates for 2005 and beyond as follows:

Issue Traffic: For the issue traffic originating at non-Rawhide mines, BNSF has historically established the common carrier rate at the level of the Board's prescribed rate for the Rawhide movement specified May 2003 WTU Decision. Specifically, BNSF established the following common carrier rates for the non-Rawhide issue traffic movements from 2000 through 2004:

Table III.A-17

BNSF Common Carrier Rate for Non-Rawhide Movements to Oklaunion

Year	Common Carrier Rate[172]
2000	$15.78
2001	$18.39
2002	$17.25
2003	$18.04
2004	$18.83

Source: BNSF Reply electronic workpaper "Oklaunion CCR.pdf."

Consequently, BNSF relies on its historic practice and assumes that the Board's prescribed rate for the Rawhide to Oklaunion movement, as set forth in the May 2003 WTU Decision, will apply to all the issue traffic movements from 2005 through 2014, the last year for which the Board prescribed a rate for the Oklaunion traffic.[173] From 2015 through 2020, BNSF adjusts the issue

[172] *See* BNSF Reply electronic workpaper "Oklaunion CCR.pdf."

[173] *See* BNSF Reply electronic workpaper "Oklaunion CCR.pdf" and "CCRs.xls."

traffic rate based upon 100 percent of the change in the RCAF-U index as projected in the 2003 Global Insights (formerly DRI-WEFA) forecast.[174]

Corette and Big Stone Movements: BNSF projects the rate for these movements in the years 2005 and beyond based upon the average annual historic change in the actual common carrier rate for each respective movement. For the Corette movement, this results in an average annual change of 1.60 percent.[175] For the Big Stone movement, this results in an annual average change of 2.21 percent.[176]

(b) Projected Revenues For Current Contract Movements

With respect to movements governed by coal transportation contracts, BNSF explains its modifications to AEP Texas' methodology for calculating future revenues through the term of the existing contract and its modifications to AEP Texas' methodology for calculating revenues subsequent to the expiration of an existing contract separately below.

i) Projected Revenues Through The Term Of Existing Coal Transportation Contract

AEP Texas' projection of revenues through the term of existing coal transportation contracts with shippers served by the hypothetical TNR is based on the actual rate adjustment

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[174] *See* BNSF Reply electronic workpaper "TNR Coal Revenue Forecast BNSF Reply.xls" worksheet "Rate Forecasts."

[175] *See* BNSF Reply electronic workpaper "CCRs.xls." The Corette common carrier rate has been in effect since July 2000. BNSF has modified this common carrier rate two times, increasing it from $7.74 per ton to $8.11 per ton. The common carrier rate, as amended, for the Corette movement appears in BNSF's Reply electronic workpapers at "CCRs.pdf."

[176] *See* BNSF Reply electronic workpaper "CCRs.xls." The Big Stone common carrier rate has been in effect since January 2002. BNSF has modified this common carrier rate two times, increasing it from $13.49 per ton to $14.17 per ton. The common carrier rate, as amended, for the Big Stone movement appears in BNSF's Reply electronic workpapers at "CCRs.pdf."

mechanism in these contracts until the contract expires. *See* AEP Texas Opening Nar. at III-A-43. Specifically, AEP Texas adjusts coal transportation contract rates annually from 2003 to the end of the contract by forecasting the change resulting from the application of the individual coal transportation contract adjustment mechanism, as a percentage of the RCAF-U. *Id.* BNSF accepts this general methodology but corrects some errors made by AEP Texas in implementing the methodology.

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[177] When preparing this reply evidence, BNSF discovered that it had inadvertently omitted page 19, which contained the base rate, from its produced copy of the { } contract. However, AEP Texas could have requested this missing page from BNSF as it was preparing its evidence. In the alternative, AEP Texas could have relied on the rate for the movement appearing in the traffic tapes produced by BNSF. BNSF is including page 19 of the contract in its workpapers at BNSF Reply electronic workpapers "limestone.pdf."

[178] *See* AEP Texas Opening electronic workpaper "TNR Coal Revenue Forecast.xls" worksheet "Base Revenue."

[179] *See* AEP Texas Opening electronic workpaper "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[180] *See* BNSF Reply electronic workpaper "TNR Coal Revenue Forecast-BNSF Reply.xls" worksheet "Rate Forecasts."

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[181] *See* {

} These contracts are included in AEP Texas Opening electronic workpapers in the folder titled "BNSF Contracts," except for {

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[182] *See* AEP Texas Opening electronic workpaper "TNR Coal Traf and Rev 0100-0603.xls" worksheet "MTsarrstat01."

[183] *See* BNSF Reply electronic workpaper "TNR Coal Traf and Rev 0100-0603_BNSF Reply.xls" worksheet "MTsarr stat01."

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ii) Projected Revenues After Expiration Of Existing Coal Transportation Contract

a) AEP Texas' Methodology

All the current coal transportation contracts between BNSF and shippers in the TNR traffic group expire well before 2020, the end of the DCF period.[185] AEP Texas includes both competitively-served and sole-served plants in its traffic group. However, unlike the complainants in other pending rate cases brought against BNSF, AEP Texas does not distinguish between competitively-served and sole-served plants when projecting revenues subsequent to the expiration of existing coal transportation contracts. While AEP Texas does not explain in its narrative how it sets the rate at the expiration of a contract, it is apparent from a review of AEP Texas' electronic workpapers that AEP Texas assumes the rate at the expiration of a contract to either a competitively-served plant or sole-served plant will equal the expired contract rate.[186] AEP Texas then purports to adjust the rate to both competitively-served and sole-served plants "using the forecast of changes in western coal transportation rates" in the EIA forecast published in 2003.[187] In fact, AEP Texas uses the national EIA transportation index published by EIA.

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[184] *See* BNSF Reply electronic workpaper "TNR Coal Traf and Rev 0100-0603_BNSF Reply.xls" worksheet "MTsarr stat01."

[185] *See* AEP Texas Opening electronic workpaper "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[186] *See* AEP Texas Opening electronic workpaper "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[187] *See* AEP Texas Opening Nar. at III-A-45.

Since transportation rates for PRB coal have fallen more precipitously than coal from other regions,[188] use of the EIA national forecast in this case will likely overstate future rate increases.

As explained below, BNSF does not accept AEP Texas methodology because it is flawed.

b) Rebased Rates For Competitively-Served Plants At Contract Expiration

For competitively-served plants, AEP Texas assumes that the rate at the expiration of a contract will equal the last contract rate. AEP Texas' assumption is inconsistent with the assumption made by the complainants in the last several rate cases brought against BNSF. In those cases, the complainant assumed that, at contract expiration, the rate to a competitively-served plant would equal *the lower of* the last contract rate or a competitive market rate calculated by the complainant.[189] These complainants recognized that historically the BNSF rate to a competitively-served plant often declined at the expiration of a contract.

As AEP Texas well knows based upon the discovery produced by BNSF in this rate case, AEP Texas' assumption is also inconsistent with BNSF's own experience with customers whose plants are competitively-served.[190] BNSF has prepared a study, hereafter referred to as the "BNSF Contract Rate Study," that analyzes the rate changes that resulted when BNSF entered

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[188] *See* BNSF Reply electronic workpaper "Transportation Rate Change.pdf."

[189] *See TMPA*, at 28, n. 66; Xcel Rebuttal Nar. at III-A-87; Otter Tail Opening Nar. at III-A-24 to 25.

[190] AEP Texas requested and received a copy of a contract study prepared by BNSF in another rate proceeding which showed the average change in BNSF rates upon contract expiration from 1998 through September, 2003. It was produced by BNSF at BNSF/AEPTX 38459-38467. The study analyzes the rate of change for competitively-served plants as well as sole-served plants.

new contracts from 1998 to the present.[191] This study shows that rates to competitively-served plants have { }[192] The study's methodology and results are explained in detail in BNSF Reply Exhibit III.A-12. Given BNSF's experience and the assumptions made by complainants in other recent rate cases, AEP Texas' assumption that the rates to competitively-served plants will remain the same upon contract expiration is not supported by the evidence.

Consequently, BNSF does not accept AEP Texas' assumption that, for competitively-served plants, the rate at the end of an existing contract will equal the expired contract rate.[193] Rather BNSF sets the rate at the termination of the contract based upon the lower of a "competitive marketplace" rate calculated by BNSF or the expired contract rate. BNSF develops a 2004 competitive marketplace rate from contracts signed in 2002 to 2004.[194] A separate competitive marketplace rate is calculated for movements in shipper-cars and movements in railroad-cars since the BNSF contracts will often specify a different rate depending upon whether

[191] The contract rate study includes circumstances where BNSF and the shipper did not enter into a new contract following the expiration of the old contract but rather BNSF issued a common carrier rate for the movement. The contract study lists the common carrier rate proposed by BNSF as the new rate. While BNSF believes it is inappropriate to include these common carrier rate in the contract rate study because they do not reflect actual rate changes resulting from arms-length negotiations, BNSF has included them to demonstrate that BNSF rates to sole-served plants have declined historically even when common carrier rates are considered.

[192] *See* BNSF Reply electronic workpaper "Kraemer CT Study_AEP.xls"

[193] The plants in the TNR shipper group that BNSF has designated competitively-served plants are set forth in BNSF Reply Exhibit III.A-14. BNSF categorizes a plant as being competitively-served if it can be serve by more than one rail carrier for the entire movement on the BNSF, *i.e.,* from the PRB origin to the BNSF interchange point with any other rail carrier.

[194] *See* BNSF Reply electronic workpaper "BNSF Competitive Mill Table_AEP.xls."

the traffic moves in shipper or railroad cars.[195] To develop a competitive marketplace rate in each year subsequent to 2004, BNSF uses the average rate of change in the BNSF LRP to develop such rates from 2004 through 2008 and the average rate of change in the 2004 EIA forecast to develop such rates from 2009 through 2020. BNSF Reply Exhibit III.A-13 summarizes BNSF's development of the competitive marketplace rate for competitively-served destinations.

c) Rebased Rates For Sole-Served Plants At Contract Expiration

With respect to sole-served plants, AEP Texas also assumes that the rate at the expiration of a contract will equal the last contract rate. However, as AEP Texas knows from the contract study produced by BNSF in this rate case, AEP Texas' assumption is inconsistent with BNSF's experience with customers whose plants are sole-served. The BNSF Contract Rate Study shows that rates to sole-served plants have {

}[196]

Given BNSF's recent experience with sole-served plants, AEP Texas' assumption that the rates to sole-served plants will remain the same upon contract expiration is not supported by the evidence.

Consequently, BNSF does not accept AEP Texas' assumption that the rate for a sole-served plant at the end of an existing contract will equal the expired contract rate.[197] Rather BNSF assumes that those contract rates will {

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[195] *See* BNSF Reply electronic workpaper "BNSF Competitive Mill Table_AEP.xls."

[196] *See* BNSF Reply electronic workpaper "Kraemer CT Study_AEP.xls."

[197] The plants in the TNR shipper group that BNSF has designated sole-served plants are set forth in BNSF Reply Exhibit III.A-14.

} BNSF Reply Exhibit III.A-14 summarizes the rate reductions for contracts that BNSF renegotiated from 2002 to 2004 for sole-served destinations.

AEP Texas may argue that this analysis should include newly established common carrier rates that are under dispute before the STB. The only such rate that BNSF has established since 2002 is the rate to the Otter Tail Big Stone power plant. Since Otter Tail has challenged this rate and is seeking a lower rate in a rate reasonableness proceeding at the Board, the common carrier rate does not reflect an agreed upon rate and has been excluded from this analysis.

d) Rate Escalation Subsequent To Expiration Of Existing Coal Transportation Contracts

After an existing coal transportation contract to either a competitively-served or sole-served plant expires, AEP Texas escalates the new rate for the coal movement through the DCF period based upon "the forecast of changes in western coal traffic rates" as published in the January, 2003 EIA forecast. *See* AEP Texas Opening Nar. at III-A-45.[199] BNSF makes two modifications to AEP Texas' methodology.

First, BNSF uses the BNSF LRP, rather than the EIA forecast, to project revenues for the 2003 through 2008 time period. This is the same source that AEP Texas used to develop volumes for that time period and, consequently, is consistent with AEP Texas' methodology for projecting volumes. Since AEP Texas has calculated the average change in revenues projected

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[198] *See* BNSF electronic workpaper "Renewal Rate Reduction for Sole Served Destinations.xls."

[199] As discussed above, the EIA forecast used by AEP Texas is a national forecast, not a forecast of western rates.

by the BNSF LRP as being equal to { },[200] BNSF uses AEP Texas' calculation.[201]

Second, BNSF uses the EIA forecast to project revenues for the 2009 through 2020 time period but uses the more recent EIA forecast published in January, 2004.[202] This is the same EIA forecast used by BNSF to project TNR volumes for the years 2009 through 2020 and, consequently, is consistent with BNSF's volume projections.

(c) Projected Revenues For Future Contract Movements

The TNR traffic group developed by AEP Texas also includes several movements that began subsequent to the close of discovery in this case and for which AEP Texas did not request production of a rail transportation contract. This future business consists of movements that are included on BNSF's LRP as well as movements that are not included on BNSF's LRP. Since AEP Texas' methodology for projecting revenues for future business differs depending upon whether the movement appears on BNSF's LRP or not, BNSF addresses these two types of future movements separately below.

i) Revenues For Future Coal Transportation Movements Listed On BNSF LRP

AEP Texas includes four movements in its traffic group that commence subsequent to 2003 and appear on BNSF's LRP as future movements. They are {

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[200] *See* AEP Texas Opening electronic workpaper "BNSF Long Range Plan September 2003 (final).xls."

[201] *See* BNSF Reply electronic workpaper "TNR Coal Revenue Forecast_BNSF Reply.xls" worksheet "Rate Forecasts."

[202] *See* BNSF Reply electronic workpaper "TNR Coal Revenue Forecast_BNSF Reply.xls" worksheet "Rate Forecasts."

}[203] The BNSF LRP specifies the revenues that BNSF estimates it will receive for these movements during the first year of transportation. For these four movements, AEP Texas projects revenues using the first year revenues listed in the LRP for each respective movement, adjusts these revenues through 2008 based upon the projected growth rate in the LRP and adjusts these revenues from 2009 through 2020 based upon the projected growth rate in the January, 2004 EIA forecast.[204]

BNSF has excluded one of these movements -- the Georgia Power movement -- in its entirety from the traffic group because it is improperly rerouted by AEP Texas as explained in section III.A.1.b.(ii). BNSF also excludes a portion of the { } movements for the same reasons. *See* section III.A.1.b.(i). With respect to the traffic that remains, BNSF accepts AEP Texas' methodology for projecting revenues with one exception. BNSF uses a more current EIA forecast published in January, 2004 to project revenues from 2009 through 2020.[205]

ii) Revenues For Future Coal Transportation Movements Not Listed On BNSF LRP

AEP Texas also includes three movements in its traffic group that AEP Texas assumes will commence subsequent to 2002 that do not appear on BNSF's LRP as future movements.

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[203] *See* AEP Texas Opening Exh. III-A-3, rows 4, 44, 51, 63; *see also* BNSF Coal LRP, included in BNSF's Reply electronic workpapers at "BNSF Long Range September 2003 (final).xls."

[204] *See* AEP Texas Opening electronic workpaper "TNR Coal Revenue Forecast.xls" worksheet "EIA Transportation Forecast."

[205] *See* BNSF Reply electronic workpaper "TNR Coal Revenue Forecast_BNSF Reply.xls" worksheet "EIA Transportation Forecast."

They are (1) TVA's movement to Shawnee assumed to commence in 2003, (2) Sunflower's movement to a new unit at Holcomb assumed to begin as of 2008, and (3) TEP's movement to a new unit 3 at Springerville assumed to commence as of 2007.[206]

TVA movement to Shawnee plant: AEP Texas uses the rate for transportation to TVA's Paradise plant as a proxy for the Shawnee rate and then escalates that rate purportedly using the BNSF LRP from 2003 through 2008 and the EIA forecast from 2009 through 2020.[207] As explained above in section III.A.1.b.(iv), BNSF does not transport coal destined for this plant and, consequently, excluded this plant from the TNR traffic group.

Sunflower's Purported New Unit at Holcomb: AEP Texas uses the rate from BNSF's existing contract with Sunflower governing the Holcomb plant through 2012, the contract expiration date, and then adjusts the rate based upon the EIA forecast.[208] As explained above in section III.A.1.b.(v), it is uncertain that this new unit will be built and, consequently, BNSF has excluded the coal volumes associated with this "new Holcomb unit" from the traffic group.

TEP's New Unit at Springerville: AEP Texas uses the 2002 rate for APS' Cholla plant as a proxy for the TEP Springerville rate and then escalates that rate purportedly using the BNSF LRP from 2003 through 2008 and the EIA forecast from 2009 through 2020.[209] As explained above in section III.A.2.a.(ii)(d), BNSF excludes some of the volumes assumed by AEP Texas

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[206] *See* AEP Texas Opening electronic workpapers "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[207] *See* AEP Texas Opening electronic workpapers "TNR Coal Revenue Forecast.xls" worksheet "Rate Forecasts."

[208] *See* AEP Texas Opening electronic workpapers "TNR Coal Revenue Forecast.xls" worksheet "SAC Rev Forecast."

[209] *See* AEP Texas Opening electronic workpapers "TNR Coal Revenue Forecast.xls" worksheets "SAC Rev Forecast" and "Rate Forecasts."

for this new Springerville unit. With respect to the volumes remaining in the traffic group, BNSF accepts AEP Texas' methodology for developing revenues for this new unit.

(ii) Revenues For Non-Coal Traffic

(a) Historical Non-Coal Traffic Revenues (3Q00 through 4Q02)

AEP Texas develops historical revenues for non-coal traffic from the traffic tapes produced by BNSF. *See* AEP Texas Opening Nar. at III-A-45. BNSF accepts this methodology for developing historical non-coal revenues.

(b) Projected Non-Coal Traffic Revenues (2003 through 2020)

AEP Texas projects revenues for non-coal traffic from 2003 through 2020 using the following methodology: If the non-coal traffic is subject to a contract with a rate adjustment mechanism, AEP Texas uses the rate adjustment mechanism to adjust the rate until the contract expires. *Id.* Upon expiration of the contract, it uses the long range plan produced by BNSF for that type of non-coal traffic ("BNSF Non-Coal LRP") to project the rate through 2008 and then uses the 2003 through 2008 compound annual growth rate from the BNSF Non-Coal LRP to project non-coal revenues from 2009 through the end of the DCF period. *Id.* at III-A-45 to 46.

If there is no rate adjustment mechanism for the non-coal traffic, AEP Texas applies the BNSF Non-Coal LRP for the particular commodity to determine non-coal revenues for 2003 through 2008 and the compounded annual growth rate for such traffic for the 2003 through 2008 time period to calculate revenues from 2009 through end of DCF period. *Id.*

BNSF accepts AEP Texas methodology for projecting revenues for non-coal traffic.

(iii) Total Traffic Summary

The following table presents a summary of the differences in the TNR railroad total revenues assumed by AEP Texas and the total revenues assumed by BNSF.

Table III.A-18

TNR Total Traffic Revenues
Comparison of AEP Texas and BNSF Estimates

	AEP Texas Estimate	BNSF Estimate	Difference
2000	$407,442,589	$346,185,564	$61,257,024
2001	$767,312,777	$654,566,246	$112,746,532
2002	$772,201,509	$656,963,303	$115,238,205
2003	$784,096,775	$629,771,545	$154,325,230
2004	$840,836,834	$636,601,324	$204,235,511
2005	$830,676,319	$615,885,500	$214,790,819
2006	$851,032,481	$634,054,013	$216,978,468
2007	$878,617,948	$649,930,889	$228,687,059
2008	$916,126,519	$668,085,101	$248,041,418
2009	$939,186,877	$687,168,895	$252,017,982
2010	$969,910,072	$673,829,760	$296,080,313
2011	$990,533,397	$690,879,693	$299,653,704
2012	$1,009,361,539	$710,435,856	$298,925,683
2013	$1,028,014,935	$726,347,261	$301,667,674
2014	$1,045,780,210	$744,754,658	$301,025,552
2015	$1,063,831,547	$761,552,679	$302,278,868
2016	$1,078,664,596	$782,883,558	$295,781,039
2017	$1,094,969,172	$800,203,037	$294,766,136
2018	$1,109,927,275	$812,125,283	$297,801,991
2019	$1,125,232,165	$833,765,516	$291,466,649
2020	$1,142,232,930	$851,691,610	$290,541,320

Source: BNSF Reply electronic workpaper "TNR Coal Revenue Forecast BNSF Reply.xls" and "BNSFgrft_BNSF Reply.xls."

The differences shown in the table result from three basic factors: First, BNSF's adjustments to the coal volumes transported by the TNR railroad as described in sections III.A.1 and III.A.2; second, BNSF's modification of the method for allocating cross-over traffic revenues between the TNR and the residual BNSF, as explained in section III.A.3.c above; and third, BNSF's use of a rebased rate subsequent to the expiration of a coal transportation contract and a more realistic and current forecast to project rates for expired coal transportation contracts from 2003 to 2020, as explained in section III.A.3.d above. BNSF compares its modified coal revenues with AEP Texas' coal revenues by year in Exhibit III.A-16.

With respect to total volumes and revenues for the TNR, BNSF Reply Exhibit III.A-17 compares BNSF's modified tonnages and revenues for the TNR with those presented by AEP Texas. BNSF Reply Exhibit III.A-18 shows BNSF's revised revenue forecast for all AEP Texas customers by year from 2000 through 2020.

B. STAND-ALONE RAILROAD SYSTEM

1. Route And Mileage

The TNR network configuration posited by AEP Texas consists of 1,192.25 route miles traversing parts of Wyoming, South Dakota, Nebraska, Colorado, New Mexico and Texas.[1] AEP Texas proposes to construct 1,168.54 route miles and to use BNSF trackage rights on the UP line between Sterling and Union, CO, to operate over the remaining 23.71 miles. BNSF accepts AEP Texas' assumption that the TNR will use these trackage rights. BNSF's witness Mr. Plum reviewed AEP Texas' mileage calculations and identified instances in which AEP Texas miscalculated the TNR's constructed route miles. The net difference of these errors results in AEP Texas overstating the route miles by 0.16 miles.

BNSF corrected AEP Texas' mileage calculations in six areas. First, AEP Texas' mileage calculations account for only two of the three legs of the wye track at Alliance, NE. All three legs appear on AEP Texas' Opening Exhibit III-B-1 and are necessary to serve the TNR's traffic group. Second, AEP Texas understated the length of the connector track at Amarillo, TX.[2] Third, AEP Texas omitted the railroad's ownership of a section of the Oklaunion plant spur track. AEP Texas assumed that its ownership begins at the mainline turnout, but the TEAM Schematics produced in discovery show that BNSF owns the first 0.62 miles of the spur track.[3] Fourth, BNSF reduced the size of the TNR yard at Alliance, NE, which allowed BNSF to reduce the TNR's route miles at this location. BNSF's modifications to the Alliance Yard are discussed in more detail in Section III.B.3. Fifth, AEP Texas overstated the route miles near Crawford Hill

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[1] AEP Texas Second Errata electronic workpaper "Track Miles Total.xls."

[2] BNSF Reply workpaper BNSF.RP.WP.III.B-0001 to 0003.

[3] BNSF Reply electronic workpaper "Oklaunion team.pdf."

because of its failure to account for an equalization attributable to a right-of-way realignment in the early 1980s.[4] Finally, AEP Texas misidentified the connection point of the Boise City Subdivision and the Amarillo subway track at Amarillo, resulting in an overstatement of route miles at this location.[5]

Table III.B-1 summarizes the corrections Mr. Plum made to the route miles developed by AEP Texas, which are incorporated into BNSF's construction and operating cost calculations.

Table III.B-1
Reconciliation Of Constructed Route Miles

AEP Texas Opening Route Miles[6]	1,168.54
Route Mile Additions:	
Alliance - South to East Leg of Wye Track	0.19
Amarillo - Connector Track Correction	0.06
Oklaunion - BNSF Ownership of Plant Spur	0.62
Route Mile Reductions:	
Alliance - Yard Length Reduction	0.29
Crawford Hill - Equation Point	0.69
Amarillo - Subway Start MP Correction	0.04
BNSF Reply Route Miles[7]	1,168.38

After making the above corrections, the TNR network consists of 1,168.38 constructed route miles and 23.71 trackage rights miles, for a total of 1,192.09 route miles.

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[4] BNSF Reply workpaper BNSF.RP.WP.III.B-0004.

[5] BNSF Reply workpaper BNSF.RP.WP.III.B-0003.

[6] AEP Texas Second Errata electronic workpaper "Track Miles Total.xls."

[7] BNSF Reply electronic workpaper "III F TNR Construction.xls" at worksheet "Segmentation."

a. AEP Texas Development Of TNR System Configuration

The route selected by AEP Texas is similar to the route in the 1996 SAC analysis of movements to the Oklaunion plant. There are three principal differences. First, the TNR route exits the PRB via Edgemont and Alliance, NE, instead of using BNSF's southern route out of the PRB through Guernsey, WY. Second, the TNR traverses the Las Animas Jct. route between Pueblo, CO and Amarillo, TX, instead of the Trinidad route. Third, the TNR terminates at the Oklaunion plant, instead of continuing on to Fort Worth, TX. BNSF accepts AEP Texas' basic configuration for the TNR.

AEP Texas used the Rail Traffic Controller Model ("RTC Model") to develop the TNR's capacity requirements. A number of preliminary steps were involved in preparing the RTC Model to test the TNR's capacity requirements. First, AEP Texas' consultants developed a preliminary capacity plan to be tested by simulation. Second, based on BNSF's 2002 traffic data and AEP Texas' projected traffic volumes, AEP Texas' consultants selected a peak traffic week in the year 2020. Third, the consultants developed train counts and other traffic characteristics (*e.g.*, train length, weight, locomotive and helper needs, dwell times) for the traffic moving during that peak week, as well as during an initial four-day warm-up period and four-day cool-down period. Fourth, AEP Texas' consultants identified a starting point for each train's movement on the TNR. AEP Texas Nar. at III-B-8 to 11. Finally, the consultants coded all of these inputs into the RTC Model and ran successive iterations until they developed the configuration, transit times and other operating statistics presented in AEP Texas' opening evidence.[8]

[8] AEP Texas only provided the TNR's final configuration, so BNSF is unable to review or comment on the various iterations tested by AEP Texas' consultants.

BNSF agrees that the RTC Model is an appropriate and effective simulation model to develop capacity requirements for the TNR, assuming that the inputs to the model reflect real world operating conditions. In this case, AEP Texas' consultants made certain assumptions about TNR operations that do not reflect real world operations and ignored other operational realities altogether. The effect of these assumptions and omissions is an idealized simulation that cannot reliably predict the TNR's capacity requirements or transit times under real world conditions.

The principal problems with AEP Texas' simulation can be summarized as follows:

- AEP Texas' simulation assumes that loading slots at PRB mines jointly served by BNSF and UP are always available despite the fact that the TNR would be required to coordinate and share access to certain mine slots with UP and, to a letter extent, the residual BNSF;
- AEP Texas did not provide for any track outages during the entire 15-day simulation period;
- AEP Texas understated certain time requirements for TNR trains, including loading time at the Campbell Subdivision mines, unloading time at plants served directly by TNR, and fueling and inspection times;
- AEP Texas' use of standardized trains between TNR origin/destination pairs produces unrealistic and invalid modeling results; and
- AEP Texas' selection of arrival times for empty coal trains interchanged to the TNR as the beginning of each train's on-SARR cycle results in scheduled train arrivals which are inconsistent with the actual movement of coal trains.

Each of these problems is discussed in more detail in the sections below.

(1) AEP Texas Failed To Account For Limited Availability of Mine Loading Slots At Mines Served By UP

AEP Texas claims that the TNR track configuration has sufficient capacity for train staging outside the PRB mines. AEP Texas also claims that transit times generated from its RTC Model simulation account for all necessary TNR train operations, including staging. However, AEP Texas' has not attempted to reflect in its model one of the leading causes of mine

congestion in the PRB – shared access with UP to nine of the fifteen Wyoming PRB mines. Instead, AEP Texas assumes that TNR trains can enter the mines for loading whenever a mine slot is not being used by another TNR train. This assumption artificially reduces the capacity that the TNR would need to hold trains while waiting for a loading slot to become available. It also results in unrealistic transit times by failing to account for any necessary staging time.

To account for the impact that UP train loading would have on TNR train operations, BNSF identified the actual UP train loadings at jointly served mines during the 15-day study period modeled by AEP Texas. Mr. Wheeler added the UP mine loadings to BNSF's simulation to account for the unavailability of mine slots during this time. BNSF's simulation is discussed in Section III.B.1.b below.

(2) AEP Texas Failed To Account For Track Outages During The 15-Day Study Period

AEP Texas' simulation did not account for any planned or unexpected track outages. This is unrealistic. No railroad can assume perfect operations. Unexpected events occur all the time, and any attempt to depict realistic operating conditions must take those events into account. These unexpected events can have an enormous impact on the operation of trains over a line segment.

Mr. Albin, BNSF's witness responsible for MOW costs, explains in Section III.D.4.a.(1) that random failures regularly occur on a high-density railroad. As Mr. Albin explains, there are three types of essential railroad maintenance activities that require extended periods of track time: (1) programmed replacement by seasonal work gangs, *i.e.,* rail, tie, surfacing, planned contract work, and the like; (2) regular inspections and planned repairs; and (3) maintenance work required to address unplanned events like the repair of broken rail and signal system failures. Programmed MOW work can be planned and to some extent can be performed in a way

that avoids interference with peak traffic periods.[9] To a lesser extent, the more regular inspections and planned day-to-day maintenance can also be worked around peak traffic periods, although they cannot be altogether ignored just because traffic volumes are heavy. Safety would be compromised if a railroad totally avoided routine inspections just because traffic levels were high during a particular time. But the third category of unplanned events and corrective actions cannot be avoided or planned around peak traffic periods.

In addition to track-related random failures, operating-related random failures are also a regular occurrence on a high-density railroad. These unplanned events include locomotive failures, train stalls on grades, and broken couplers and knuckles. Like track-related random failures, these problems and follow-up corrective action cannot be avoided.

Mr. Albin and BNSF's operating witness Mr. Mueller collected information from BNSF showing both track-related and operating-related random failures experienced by BNSF on the lines replicated by TNR during the 15-day study period. Messrs. Albin and Mueller identified all of the failures that would either cause a complete stoppage or a slowdown of traffic and provided this information to Mr. Wheeler for use in the TNR network simulation.[10] BNSF's simulation is discussed in more detail in Section III.B.1.b.

(3) AEP Texas Understated TNR Time Requirements

AEP Texas understated three significant time requirements. The first is loading time for mines located on the Campbell Subdivision. AEP Texas provided only four hours of loading

[9] It is worth noting that the TNR's peak period is in the middle of the summer when much of a railroad's programmed maintenance is carried out. BNSF nevertheless made the conservative assumption that no programmed maintenance would interfere with TNR operations during the modeled period.

[10] Track-related failures are shown in electronic workpaper "June to July Engineering Data.xls." Operating-related failures are shown in BNSF's Daily Train Performance Reports. BNSF.RP.WP.III.B-0005 to 0116.

time for these mines, in contrast to AEP Texas' 5.5 hours of loading time at mines located on the Orin and Reno Subdivisions. AEP Texas' consultants reasoned that the Campbell Subdivision mines are served exclusively by BNSF and therefore TNR trains would not experience congestion caused by UP trains loading at these mines. They further reasoned that all of these mines are capable of loading a train in less than 2.25 hours. AEP Texas Nar. at III-C-29 to 30.

This reasoning ignores the reality that trains at each of the Campbell Subdivision mines are loaded by third-party contractors. BNSF's experience at these mines in the year 2002 indicates that the third-party loaders required, on average, six hours of time from the arrival of the train at the mine to the release of the train to BNSF.[11] It is unrealistic to expect that third-party contractors will load TNR trains any faster than they currently load BNSF's trains. Therefore, Mr. Wheeler assumed that each TNR train required six hours of loading time at the Campbell Subdivision mines.

The second set of times understated by AEP Texas are unloading times for five power plants served by TNR. AEP Texas assumed that the destination dwell time would be equal to the maximum free time for unloading allowed under each applicable transportation contract or common carrier pricing authority. AEP Texas Nar. at III-C-30. This assumption ignores historical evidence as to the actual unloading time at these plants. The TNR could not reasonably expect to achieve more favorable times than BNSF because the amount of time required to spot the train and complete the unloading process is largely dependent on the utility's readiness and availability to unload the train. Mr. Wheeler therefore assumed that BNSF's actual 2002 unloading times would apply to local TNR plants. These times are discussed in more detail in Section III.B.1.b.(1)(c) below.

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[11] BNSF Reply electronic workpaper "Campbell Load Times 2002.xls."

The third dwell time involves fueling and inspection. AEP Texas provided two primary fueling and inspection locations for TNR trains: the Alliance Yard for fueling and inspection of empty coal trains and the Las Animas Yard for fueling and inspection of loaded coal trains. AEP Texas' proposed fueling and inspection operations at Las Animas are infeasible and must be modified to ensure that the TNR coal trains destined for Arizona, Louisiana and parts of Texas do not run out of fuel or violate FRA-mandated inspection requirements. In summary, BNSF relocated AEP Texas' Las Animas fueling and inspection services to Amarillo and required that the TNR fuel and inspect all trains at Amarillo in both the loaded and empty directions, with the exception of empty Oklaunion trains. These changes are discussed in detail in Section III.B.3 below. The net effect of these revisions is some additional dwell time to allow the TNR to provide necessary fueling and inspection services.

Finally, Mr. Wheeler also discovered instances in which the dwell times in the RTC Model did not match the dwell times described in AEP Texas' Narrative. For example, AEP Texas' Narrative calls for 30 minutes of dwell time for all trains interchanged to or from the residual BNSF at Oklaunion, but AEP Texas provided only 15 minutes for this activity in its simulation. AEP Texas Nar. at III-C-33. AEP Texas' Narrative also calls for 20 minutes of dwell time to attach a helper and 15 minutes to remove one, but AEP Texas reversed these times for certain trains.[12] *Id.* at III-C-37. In these instances, Mr. Wheeler assumed that the time stated in the Narrative was accurate and corrected the RTC Model accordingly. AEP Texas' dwell time assumptions are discussed in more detail in Section III.C.2.

[12] The affected train sections include 12A, 12B, 12C, 13A, 13C, 20A, 20B, 20C, 24A, 24B, 24C, 32A, 32B, 32C, 39A, 47B and 47C.

(4) AEP Texas' Use Of Standardized Trains In The RTC Model Produces Unrealistic And Invalid Modeling Results

As discussed in Section III.A above, AEP Texas' stand-alone railroad is predominantly a coal railroad that also provides overhead service for general freight traffic between Amarillo and Oklaunion, TX. To carry out the modeling exercise, AEP Texas had to identify the coal and general freight trains that would be included in its simulation of the TNR's operations and it had to specify the characteristics of each modeled train. For coal traffic, AEP Texas developed 52 distinct and standardized "seed" trains, one for each TNR origin/destination pair. Each "seed" train has identical characteristics. Each of these 52 trains is duplicated as needed so that the entire TNR system is populated with identical coal trains moving between each TNR origin/destination pair. For general freight traffic, AEP Texas used 14 trains with distinct characteristics to develop the 138 general freight trains that populate the simulation period. The problems with AEP Texas' coal and general freight trains are described in detail below.

(a) Coal Trains

The RTC simulation performed by AEP Texas' consultants involved a 15-day study period, which includes a peak week, a four-day warm-up period, and a four-day cool-down period, during the TNR's peak year 2020. AEP Texas determined the number of coal trains that would move in the peak year using 2002 train data provided in discovery adjusted to account for peak year volumes by projecting the increase in TNR traffic from 2002 to 2020.[13] AEP Texas then selected one standardized train for each coal train's origin and on-SARR destination or interchange location. Regardless of their ultimate destination, all simulated coal trains moving

[13] AEP Texas Opening electronic workpaper "Simulation Trains - Peak Calc.xls."

on the TNR between a particular mine (*e.g.*, Caballo Mine) and a particular interchange location (*e.g.*, Alliance) are identical in length and weight.[14]

AEP Texas claims that it selected the "largest train size" for each origin/destination pair and that such an assumption leads to a conservative modeling result. AEP Texas Nar. at III-B-16. AEP Texas' workpapers show that its consultants selected the longest train (*i.e.*, the train with the most number of cars) in most instances.[15] However, the most important characteristic of a train for purposes of the modeling exercise is the weight of the train, not its length, and the longest train selected by AEP Texas was frequently not the heaviest train for a particular origin/destination pair. Nearly 30% of real world BNSF trains were heavier than the relevant seed trains selected by AEP Texas.[16] A few examples are provided in Table III.B-2 below.

Table III.B-2
Examples Of AEP Texas Standardized Trains Lighter Than BNSF Trains
(In Gross Tons)

Origin/Destination Pair	AEP Texas Seed Train Weight	BNSF's Heaviest Train Weight	Difference
Black Thunder/Amarillo	15,676	16,874	1,198
Cordero/Alliance	17,758	19,124	1,366
Caballo Rojo/Alliance	15,806	17,630	1,824
Eagle Butte/Oklaunion	16,889	18,444	1,555

Source: BNSF Reply electronic workpaper "TNR TrainSummaries - Light Tons.xls," worksheet "2020 WY Coal" at rows 331, 409, 441, and 589

[14] AEP Texas Nar. at III-B-16 and electronic workpaper "TNR TrainSummaries.xls."

[15] AEP Texas Opening electronic workpaper "TNR TrainSummaries.xls." For coal traffic originating at the North Rochelle mine and interchanged to BNSF at Alliance (37 trains during the modeled period), AEP Texas determined that the longest train was 135 cars, but selected a seed train for modeling with only 120 cars. BNSF Reply electronic workpaper "TNR TrainSummaries - Light Tons.xls," worksheet "2020 WY Coal," at rows 120 and 151.

[16] BNSF Reply electronic workpaper "TNR TrainSummaries - Light Tons.xls," worksheet "2020 WY Coal" at columns M-O. For empty coal traffic, nearly 90% of the coal trains originated by the TNR were modeled with fewer tons than BNSF's actual trains. *Id.* at worksheet "Empty Tare Tons."

AEP Texas' failure to account for the operations of such a large number of heavy trains distorts the modeling results in AEP Texas' favor. Heavy trains require more time to accelerate than lighter trains and require significantly more time to ascend steep grades. To illustrate this fact, BNSF's witness Mr. Wheeler compared the transit times of two trains which he generated using the Train Performance Calculator ("TPC") module of the RTC Model.[17] The transit time for AEP Texas' standardized train between Caballo Rojo Mine and Alliance (15,806 gross tons) was 5.8% faster than the transit time for a heavier BNSF train traveling the same route (17,868 gross tons).[18] The fact that some of BNSF's actual trains are lighter than AEP Texas' standardized trains does not make up for the distorting effect that the use of standardized trains has on the simulation results. Heavier trains act as a bottleneck on the railroad and they constrain the movement of lighter trains traveling behind them. Over single-track segments, heavy trains also impede the progress of opposing traffic because they may take longer to clear a single-track segment than lighter trains.

In addition, the use of standardized trains allowed AEP Texas to ignore the helper requirements of heavier trains. Because it used lighter standardized trains, AEP Texas concluded that the TNR did not require helpers for loaded trains between Campbell Subdivision mines and West Campbell or Donkey Creek, as BNSF requires today. AEP Texas Nar. at III-C-18 n.7. Mr. Wheeler's TPC run using a BNSF train that is heavier than the standardized train used by AEP Texas confirms that the TNR does require helpers for certain trains on the Campbell

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[17] The TPC simulates the movement of a train over a specified route without any interference from other trains. The transit time generated by the TPC is therefore an idealized time.

[18] BNSF Reply electronic workpapers "AEP train size selection examples_v1.xls" and "AEP TPC Analysis.zip."

Subdivision.[19] Mr. Wheeler also confirmed that additional loaded TNR trains on the Orin Subdivision require helper assistance when actual train weights are used in the RTC simulation.[20]

Far from being a conservative approach, AEP Texas' use of standardized trains biases the result of the RTC simulation in AEP Texas' favor by producing unrealistic results that understate TNR capacity requirements and transit times. Moreover, there was no need to use standardized trains since real world data were readily available. It has been Mr. Wheeler's experience that the RTC Model will produce more accurate simulation results if the inputs to the simulation reflect real world operations. Mr. Wheeler therefore rejected AEP Texas' use of standardized trains and inputted actual 2002 train characteristics (*i.e.*, weight and number of cars) into BNSF's RTC simulation, which is described in more detail in Section III.B.1.b.

(b) General Freight Trains

As with coal traffic, AEP Texas' consultants developed a distinct train for each general freight train type and symbol and then replicated that train so that all general freight trains of a particular type and symbol are identical. Unlike their approach to coal traffic, AEP Texas' consultants did not attempt to use the largest train size. Instead, they claim to have developed an "average" train for each train type and symbol.[21]

The general freight traffic included in the TNR traffic group varies greatly in length and weight. As an overhead carrier between Amarillo and Oklaunion, TX, the TNR will have no

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[19] *Id.*

[20] The use of actual train sizes required Mr. Wheeler to add helper locomotives to loaded trains originating on the Orin Subdivision in AEP Texas routing categories 10 (Jacobs Ranch/Alliance), 12 (Jacobs Ranch/Oklaunion), 22 (Caballo Rojo/Alliance), and 29 (Caballo/Alliance). BNSF Reply electronic workpaper "BNSF Reply RTC Case.zip."

[21] AEP Texas Nar. at III-B-20 and electronic workpaper "TNR TrainSummaries.xls" at worksheet "Mdse."

control over each train's characteristics and, therefore, it is unrealistic to model identical average trains. Moreover, by using average train statistics, AEP Texas understates the actual length and weight of many of the simulated trains. For example, the longest BNSF train moving from Fort Worth to Amarillo, TX, was 6,614 feet long and the heaviest BNSF train weighed 9,623 tons.[22] The corresponding standard train modeled by AEP Texas was 4,740 feet in length and weighed 5,972 tons.[23] BNSF found numerous examples of train lengths understated by thousands of feet and train weights understated by thousands of gross tons.

In addition, AEP Texas misclassified many general freight trains and failed to model entire train types. AEP Texas modeled many high priority trains (*e.g.*, H, P, Q, and Z trains) as normal priority merchandise trains (M trains). AEP Texas completely eliminated B, S and U trains and modeled each of these train types as M trains.[24] This allowed the RTC Model to ignore the effect that train prioritization will have on TNR operations between Amarillo and Oklaunion, TX.

As with coal traffic, Mr. Wheeler used actual train characteristics in BNSF's RTC simulation to produce a more realistic simulation of TNR operations, as described in more detail in Section III.B.1.b.

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[22] BNSF Reply electronic workpaper "RTC GF Trains.xls," worksheet "RTC GF Train Stats," at cells D13 and H13.

[23] AEP Texas Opening electronic workpaper "TNR TrainSummaries.xls," worksheet "Mdse" at cells F18 and H18.

[24] BNSF Reply electronic workpaper "RTC GF Trains.xls" at worksheet "AEP RTC v. Real World."

(5) AEP Texas' Arrival Times For Empty Coal Trains Interchanged To TNR Are Unrealistic

The appropriate starting point for each on-SARR cycle of the trains included in a model has been a contested issue in previous rate cases. Complainants in past cases typically selected the mine departure time as a starting point for a train cycle, which resulted in the modeling of a train cycle beginning as a loaded train at the mine origin and moving to a destination or interchange point. When the train reached this point, the complainant would assume an off-line time, return the empty train to the destination or interchange point, and then move the empty train back to the mine origin. When empty trains returned to the mines, they were never linked up with loaded trains departing the mines. In many cases, days would pass between the return of an empty train to a mine and the departure of the next loaded train to the same destination. The complainants never considered the capacity at the mine needed to hold an empty train for this time, and therefore they totally ignored the capacity needs of a SARR that would have to accommodate empty trains waiting to be loaded in the PRB. BNSF has consistently argued that a proper model for capacity purposes must examine the entire on-SARR train cycle, beginning with the empty train's arrival on the SARR at an interchange point or destination, traveling to the mine for loading, and then returning to the appropriate interchange point or destination as a loaded train. By modeling a full on-SARR cycle in this way, the model can more realistically account for any capacity or transit time effects that result from staging requirements.

In this case, AEP Texas abandoned the approach of past complainants and assumed, consistent with BNSF's approach, that the appropriate simulation starting point for interchanged coal traffic is the time that the TNR receives the empty train from its interchange partner. This allows the model to simulate operation of SARR trains for a full on-SARR cycle. AEP Texas' Narrative contains a brief description of the methodology used by its consultants to determine the

simulation starting time for each train. AEP Texas Nar. at III-B-17. As discussed below, the starting times generated by that methodology are unrealistic and produce unreliable modeling results.

The empty return date and time (that is, the time each train is assumed to begin a cycle on the TNR) for each train during the simulation period was developed by first taking each train's 2002 mine loading date and time and subtracting an arbitrary amount of time AEP Texas assumed that the TNR would need for transit, dwell and loading between the time it arrived on the TNR and the time it departed from the mine loaded.[25] In other words, AEP Texas attempted to back into an on-SARR starting point using the real world loading time. At this point, AEP Texas had developed a unique on-SARR date and time for each of the 2002 modeled trains. Without explanation, however, AEP Texas then chose to ignore these times. AEP Texas chose only to use the on-SARR date that it generated through this process to determine the day on which particular trains were assumed to return to the SARR, and therefore how many trains were assumed to come onto the SARR at a particular interchange point on a particular day.

AEP Texas then used a random number generator to develop scheduled starting times for each of the TNR's 52 standardized coal trains.[26] As an example, all empty trains interchanged to the TNR at Amarillo and traveling empty on the TNR to Caballo Mine are scheduled to return to the TNR system at 3:26 AM on the empty return date assigned to each train.[27] For on-SARR

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[25] AEP Texas Opening electronic workpaper "TNRTrainSummaries.xls," worksheet "2020 WY Mty Day" at columns BI-BN.

[26] Each standardized train is assigned a route number. For example, trains with an origin/interchange pair of Caballo Mine/Amarillo are assigned to route number 30. These trains start their cycle on the TNR as empty trains received in interchange from the residual BNSF at Amarillo.

[27] AEP Texas Opening electronic workpaper "Random Times w Adjustments.xls," worksheet "Random Departure Times" at row 89.

locations where several trains are assumed to begin their on-SARR cycle on a single day, AEP Texas generated a schedule time for each train, and that schedule was assumed to apply throughout the model period.[28]

The problem with this approach, in a nutshell, is that coal trains are not scheduled in the real world, and they could not be operated according to a schedule. AEP Texas' assumption that empty coal trains will be received in interchange at the same time every day defies real world traffic fluctuations, the need to coordinate multiple train activities, and the need to deal with mine constraints that impact real world unit coal train operations.

AEP Texas further distorts real world coal operations by adjusting the schedule it developed. In fact, AEP Texas manipulates 14% of the empty return times developed by the random number generator.[29] The apparent effect of these adjustments is to smooth out the flow of trains during the day and eliminate train bunching at particular yards.[30]

These departures from real world operating conditions have a substantial impact on the RTC Model. Mr. Wheeler found that the RTC Model is very sensitive to changes in train starting times. To test the model's sensitivity, Mr. Wheeler ran a new simulation in which he instructed the model to randomly select a new starting time for each empty coal train within four hours of the train's scheduled starting time. This simulation ended in gridlock during the warm-up period prior to the TNR's peak week.[31] In another simulation, Mr. Wheeler added a fifth

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[28] *Id.*

[29] *Id.* at columns B and G.

[30] *Id.*

[31] BNSF Reply electronic workpaper "RTC case - AEP randomized.zip."

warm-up day to AEP Texas' simulation period.[32] The additional traffic on this day changed the progress of the trains and also caused the simulation to end in gridlock during the warm-up period.[33] Both of these tests confirm the sensitivity of the model to changes in train times and suggest that AEP Texas' modeling results could not be duplicated under less idealized operating conditions.

Given the obvious potential for manipulated starting times to generate idealized modeling results, BNSF's witness Mr. Wheeler determined that using actual train arrival times would produce the most realistic and reliable modeling results. The development of BNSF's times is discussed in the next section.

b. BNSF Development Of TNR System Configuration

As discussed above, BNSF agrees with AEP Texas that the RTC Model is an appropriate tool to test the capacity requirements of the TNR, assuming that the simulation reflects realistic operating conditions. AEP Texas' approach to assessing the capacity requirements of the TNR was based on erroneous methodologies and factual assumptions. BNSF therefore corrected the problems with AEP Texas' assumptions. These corrections are summarized below and described in more detail in Section III.B.1.b.(1).

- Loading slots for jointly served mines are taken out of service based on UP's 2002 loadings to simulate realistic mine access by TNR trains;

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[32] When AEP Texas' consultants replicated the TNR's seed trains to run on specified days during the 15-day simulation period (Saturday, June 27 to Saturday, July 11), they scheduled 42 empty coal trains to arrive on the TNR on Friday, June 26. A list of these train is provided in BNSF's Reply electronic workpaper "Week 1 Friday.xls." The trains scheduled to run on that day were not dispatched in the simulation submitted in AEP Texas' Opening Evidence. Mr. Wheeler instructed the simulation period to begin on June 26, instead of June 27, to determine the effect that these trains would have on the rest of the simulation period.

[33] BNSF Reply electronic workpaper "TNR 2-25B-expandedtime.zip."

- Portions of TNR track are taken out of service or put under a speed restriction based on BNSF's 2002 outages to simulate TNR random failures;
- Time requirements for TNR trains reflect actual loading time at the Campbell Subdivision mines, actual unloading time at plants served directly by TNR, and fueling and inspection services at appropriate TNR locations;
- The lengths and weights of TNR's peak period coal and non-coal trains are based on actual BNSF train lengths and weights; and
- TNR's 2020 empty arrival times are based on actual BNSF empty arrival times at on-SARR locations.

Once these problems were corrected, BNSF's capacity expert, Mr. Wheeler, was able to perform independent simulations to test the TNR's track configuration. Two observations are worth noting here. First, the incorporation of these realistic operating conditions has the greatest effect on the TNR's operations north of Alliance, NE, where the TNR's traffic volume is heaviest and where train staging occurs en route to the PRB mines. BNSF's reduction of traffic volumes described in Section III.A also has its greatest impact in this geographic area as the majority of the traffic reductions are due to the improper routing of coal traffic from the southernmost PRB mines to Alliance via the TNR's Edgemont route. The use of more realistic operating conditions tends to increase capacity requirements, but BNSF's reduction of traffic has an offsetting effect of reducing capacity requirements. BNSF made only slight changes to operating conditions on the line segments south of Alliance, and BNSF made only slight adjustments to the traffic on these segments. As a result, the TNR's capacity requirements and transit times south of Alliance can be expected to experience only minor changes.

Before testing BNSF's revised traffic volumes, Mr. Wheeler first tested the ability of AEP Texas' proposed track configuration to accommodate AEP Texas' proposed traffic group, assuming BNSF's more realistic operating assumptions. Mr. Wheeler found that the simulation

ended in gridlock during the four-day warm-up period assumed by AEP Texas.[34] If the TNR system proposed by AEP Texas is unable to accommodate AEP Texas' assumed traffic group during a non-peak period (the warm-up period before the TNR's peak week), the system clearly has insufficient capacity to accommodate the peak period traffic projected by AEP Texas.

In his second simulation, Mr. Wheeler tested the ability of the TNR's track configuration to accommodate the properly grouped traffic described in Section III.A, assuming BNSF's realistic operating conditions.[35] Mr. Wheeler found that the track configuration required minor modifications to accommodate the revised traffic group. The results of this simulation are discussed in detail in Section III.B.1.b.(2) below.

(1) Correction Of Improper Modeling Assumptions

In this section, BNSF describes the various corrections it made to AEP Texas' modeling inputs to ensure that the RTC simulations accounted for significant operating realities.

(a) Simulated Mine Congestion

In Section III.B.1.a.(1) above, BNSF explained that AEP Texas' simulation ignored the most important cause of congestion and delay in the PRB region -- shared access with UP to nine of the PRB mines. Regardless of the efficiency of the TNR, it must accommodate the operations of other real world railroads, and it cannot assume away constraints imposed by those other railroads' operations. To account for the impact that UP train loading would have on TNR train operations, BNSF identified the actual UP train loadings at jointly served mines during the 15-

[34] BNSF Reply electronic workpaper "RTC Case- AEP critique.zip." This simulation included all of the corrections described in Section III.B.1.b.(1) below, as well as the relocation of AEP Texas' two fueling and inspection tracks from Las Animas Yard to Amarillo Yard.

[35] BNSF's revisions to the traffic volumes in the simulation are contained in BNSF Reply electronic workpaper "copkstat BNSF Affirmative.xls."

day study period modeled by AEP Texas.[36] Mr. Wheeler added the UP mine loadings to BNSF's simulation to account for the unavailability of mine slots during this time. The use of UP's mine loadings at jointly served mines is conservative since the TNR will also compete with the residual BNSF for access to all of the PRB mines, but those loading constraints are not included in Mr. Wheeler's simulation.

(b) Simulated Random Failures

BNSF explained above that AEP Texas' simulation did not account for any planned or unexpected track outages. To be conservative, BNSF did not include any programmed maintenance windows during the 15-day modeling period. However, it is completely unrealistic for AEP Texas to assume that no unexpected failures will occur during the TNR's peak operating period. BNSF's witnesses Messrs. Albin and Mueller collected data showing track-related and operating-related random failures experienced by BNSF on the lines replicated by the TNR during the 15-day study period. It is reasonable to assume that the TNR in the year 2020 will experience at least as many random failures as BNSF experienced in 2002. The TNR is expected to carry greater traffic volumes on most segments and, by the year 2020, the TNR's equipment and infrastructure will be aging.

Messrs. Albin and Mueller identified all of the failures that would either cause a complete stoppage or a slowdown of traffic and provided this information to Mr. Wheeler for use in the TNR network simulation.[37] Messrs. Albin and Mueller also identified those track outages that would require a track maintenance crew to correct the problem. Mr. Wheeler assumed that a

[36] BNSF Reply electronic workpaper "UP Track outage data.xls."

[37] BNSF Reply electronic workpaper "June to July Engineering Data.xls" and BNSF.RP.WP.III.B-0005 to 0116.

track outage on a double-track section with 15-foot track centers would also require a speed restriction on the adjacent track.[38]

(c) Corrected Time Requirements For TNR Trains

As described above, AEP Texas relied on several unrealistic time assumptions for TNR train activities. To correct the understated four-hour loading time assumed by AEP Texas at the Campbell Subdivision mines, BNSF used the 2002 average mine loading time of six hours at these mines. BNSF explained above that the TNR could not expect to improve on these times because trains at these mines are loaded by a third-party loading crew that cannot be controlled by the TNR.

To correct the understated unloading time assumed by AEP Texas at the TNR-served plants, BNSF used the 2002 average unloading time at these plants, which includes the time from the arrival of the train at the plant to the release of the train to BNSF. The TNR cannot expect to improve on these times because the TNR, like BNSF, will be dependent on the availability and readiness of each plant's personnel to receive and unload the train. These times are shown in Table III.B-3.

Table III.B-3
Dwell Times At TNR-Served Destinations

Destination	Dwell Time (Hours)
Pawnee	{ }
Minnequa	{ }
Arapahoe	{ }
Harrington	{ }
Oklaunion	{ }

Source: BNSF Reply electronic workpaper "Linesegment2002.pdf"

[38] A summary of the track outages and speed restrictions used in the simulation is provided in BNSF's Reply electronic workpaper "RTC Track failure-maintenance summary.xls."

The Arapahoe time is listed as { } hours because the plant has unique unloading requirements. {

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Mr. Wheeler was unable to account for these unique circumstances in the RTC simulation. Therefore, he assumed that the Arapahoe trains in the simulation experience only a

[39] BNSF witnesses Messrs. Mueller and Plum obtained information about Arapahoe unloading requirements from Tim Godsil, BNSF's General Director of Transportation in Denver.

{ } dwell time at the destination. However, Mr. Plum has accounted for the extra time required at this plant in his calculation of locomotive requirements.[40]

BNSF also corrected certain fueling and inspection assumptions made by AEP Texas, as described in detail in Section III.B.3 below. In summary, AEP Texas proposed to fuel and inspect empty TNR coal trains at Alliance, NE, and loaded TNR coal trains at Las Animas Jct., CO. BNSF shows in Section III.B.3 that AEP Texas' proposed fueling and inspection plan would cause certain TNR trains to either run out of fuel or to exceed FRA-mandated inspections. To avoid these significant problems, BNSF relocated the TNR's fueling and inspection services from Las Animas Jct., CO, to Amarillo, TX, where fueling and inspection is performed in both the loaded and empty direction on all coal trains except empty trains returning from the Oklaunion plant. BNSF also proposes to fuel and inspect the Holcomb trains at Alliance in both the loaded and empty directions to prevent similar problems for these trains due to the elimination of mechanical inspectors and DTL fueling at Las Animas. The result is a slight increase in overall yard time for the affected trains.

Mr. Wheeler also corrected the interchange time at Oklaunion and the helper times for certain trains, as discussed in Section III.B.1.a.(3) above. AEP Texas' dwell time assumptions are discussed in more detail in Section III.C.2.

(d) Corrected Train Characteristics For Coal And General Freight Trains In The RTC Simulation

In Section III.B.1.a.(4) above, BNSF described AEP Texas' development of standardized trains for each origin/interchange pair and showed that AEP Texas' approach ignored the significant effect that heavy coal trains would have on the simulation. Since BNSF produced

[40] BNSF Reply electronic workpaper "LUMs and Carmiles – (AEPTX-BNSF).xls" at worksheet "Crew Districts."

data in discovery showing the actual train characteristics of each 2002 train, BNSF corrected this problem by using the discovery data to determine the appropriate car count and gross tons for each train in the simulation. Where traffic projections require the movement of new trains in the year 2020, BNSF replicated the characteristics of an existing train to develop new trains. The development of these trains is shown in BNSF's Reply electronic workpaper "Simulation Trains - BNSF Affirmative.xls."

(e) Corrected Starting Times For Empty Trains In The RTC Simulation

BNSF also described the development of AEP Texas' starting dates and times for empty coal trains entering the TNR system in Section III.B.1.a.(5) above. AEP Texas adopted a schedule for the TNR's coal traffic and then manipulated that schedule in an apparent attempt to even out the flow of coal traffic through interchange locations. To correct this problem, BNSF used the actual starting date and time for empty coal trains whenever that time could be determined from the data produced in discovery (75% of trains in the revised traffic group).[41] For trains that could not be located in the discovery data or that followed a different route of movement as a result of AEP Texas' decision to reroute TNR movements from their real world routes, BNSF estimated the starting date and time at the TNR's hypothetical interchange location

[41] AEP Texas' workpapers identify BNSF train symbols for the loaded coal trains that it intended to include in the simulation. The preceding empty train has a different train symbol which BNSF had to identify in order to determine the appropriate starting time for the corresponding empty train at the TNR's hypothetical interchange point. BNSF performed an analysis using car identification numbers to locate the appropriate empty trains. If an empty train followed the TNR's route, BNSF used the actual time that the train arrived at the hypothetical TNR interchange location as the starting time in the simulation. BNSF Reply electronic workpaper "copkstat BNSF Affirmative.xls" at worksheet "2020 Trains - All.xls."

(7% of trains).[42] For new trains moving in the year 2020, BNSF used a random number generator to develop a starting time (18% of trains).[43]

For trains local to the TNR, AEP Texas used the mine loading time as the starting point for a train cycle. To address the Board's criticism in previous cases that this approach leads to the "disappearance" of empty trains at the mine, AEP Texas decided to link loaded and empty trains serving each destination to create continuously cycling trains. AEP Texas Nar. at III-B-16 to 17. To ensure it had the right number of trains for each plant, AEP Texas performed an analysis using estimated cycle times to calculate the number of train sets each plant required during the modeling period.[44] BNSF determined that AEP Texas underestimated the cycle time for the Harrington plant and therefore understated the number of train sets needed to serve that plant during the simulation period. BNSF calculated the appropriate number of train sets based on the expected volume to be delivered during the modeled period and Mr. Wheeler used this number in BNSF's simulation.[45]

(f) Other Corrections

Mr. Wheeler corrected some additional problems with AEP Texas' RTC files that do not fall into any of the categories described above. These corrections include:

- Changed mine origin to Buckskin for train sections 45D, 46B, 47A, 47B and 48A, which were incorrectly routed to Dry Fork or Fort Union;

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[42] *Id.*

[43] *Id.*

[44] AEP Texas Opening electronic workpaper "TNR TrainSummaries.xls" at worksheet "LOC Coal."

[45] BNSF Reply electronic workpaper "copkstat BNSF Affirmative.xls" at worksheet "2020 Trains - All.xls."

- Changed traffic control specifications for UP line between Sterling and Union, CO from centralized traffic control ("CTC") to dark territory (non-signaled);
- Modified directional coding of trains interchanged at Campbell and traveling between Campbell and Donkey Creek (northbound trains were coded as southbound and vice versa);
- Modified crew count function at Oklaunion interchange for trains in train section 12A (crew count decreased); and
- Utilized all three locomotives for trains in route 40 on the empty return from Pawnee to Eagle Butte (third unit was isolated/in idle which is inconsistent with other trains in the simulation).

Some of these corrections had a noticeable effect on the simulation results. Correcting the Buckskin mine origin, for example, led to increased congestion at the mine. Other corrections were technical in nature and did not appear to impact the simulation.

(2) Results Of Simulation Using Realistic Assumptions And Properly Grouped Traffic

Mr. Wheeler simulated the performance of the TNR traffic group as revised by BNSF using the corrections described above.[46] As noted previously, Mr. Wheeler's simulation using AEP Texas' traffic assumptions resulted in gridlock. Mr. Wheeler determined that the track configuration proposed by AEP Texas, with BNSF's modifications at Las Animas and Amarillo, was not sufficient for the revised traffic group and required several modest adjustments.

The simulation showed that the TNR experienced congestion in several locations, including the Campbell Subdivision, Amarillo Yard, and the Oklaunion interchange. On the Campbell Subdivision, Mr. Wheeler determined that an additional staging track/passing siding was required to allow empty coal trains to queue near the mines. At Amarillo Yard, Mr. Wheeler determined that the two fueling and inspection tracks initially proposed by AEP Texas for its Las Animas Yard and relocated to Amarillo by BNSF were not sufficient to accommodate the needs

[46] BNSF Reply electronic workpaper "BNSF Reply RTC Case.zip."

of empty and loaded coal trains at the yard. Mr. Wheeler found it necessary to add a third fueling and inspection track at Amarillo. At the Oklaunion interchange, Mr. Wheeler noticed congestion resulting from AEP Texas' track configuration which prevented empty Oklaunion coal trains from departing the plant whenever another train occupied the interchange track. Mr. Wheeler added a crossover track at this location to facilitate the efficient movement of trains into and out of the Oklaunion plant.

Mr. Wheeler also identified locations in which capacity reductions were possible without sacrificing service levels. Mr. Wheeler removed six tracks from the eastern portion of the Alliance Yard (used for receiving empty trains from the residual BNSF), two tracks from the southern portion of the Alliance Yard (used for inspections and crew changes for TNR through trains), and a passing siding located at MP 303.87-305.47 between Amarillo and Oklaunion on the Red River Valley Subdivision.

BNSF's revised track configuration for the TNR is shown in Exhibit III.B-1. This Exhibit also shows the TNR track configuration posited by AEP Texas to facilitate a side-by-side comparison of the parties' proposed configurations.

Mr. Wheeler provided summary data from BNSF's simulation to Mr. Plum to use in calculating the TNR's equipment and crew requirements.[47] These requirements are discussed in Sections III.C and III.D.

2. Track Miles And Weight Of Track

In its opening evidence, AEP Texas stated that the TNR required 1,567.23 miles of track for mainlines, passing sidings and branch lines and an additional 110.69 miles of yard,

[47] Mr. Wheeler used a report generator to develop data summaries for Mr. Plum. The report generator is included in BNSF's workpapers along with a tutorial program. BNSF Reply electronic workpapers "Reportgenerator.zip" and "Reportgenerator_tutorial.zip."

interchange and setout/storage tracks.[48] BNSF's critique of AEP Texas' approach to determining TNR capacity is described in Section III.B.1.a above. BNSF's methodology is described in Section III.B.1.b above. Table III.B-4 below contains a summary comparison of the miles of track recommended by AEP Texas with the miles recommended by BNSF's witnesses.

Table III.B-4
Comparison Of AEP Texas' Calculation Of Miles
With BNSF's Calculation Of Miles Of TNR Track

Type of Track	AEP Texas[49]	BNSF[50]	Difference
Mainline Track	1,147.39	1,146.61	-0.78
Other Main, Sidings	398.69	397.88	-0.81
Branches, Mine Spurs	21.15	21.77	0.62
Interchange, Set-Out	41.28	63.16	21.88
Yards	69.41	61.34	-8.07
Total	**1677.92**	**1690.76**	**12.84**

Table III.B-5 contains a comparison of the total track miles by weight of rail recommended by AEP Texas with the total track miles by weight of rail recommended by BNSF witnesses.

[48] AEP Texas Second Errata electronic workpaper "Track Miles Total.xls" at worksheet "TOTAL TRACK MILES."

[49] *Id.*

[50] BNSF Reply electronic workpaper "III F TNR Construction.xls" at worksheet "Track Data."

Table III.B-5
Comparison Of Total Track Miles By Weight Of Rail

Type of Rail	AEP Texas[51]	BNSF[52]	Difference
136# Premium	626.04	631.03	4.99
136# New	947.56	933.30	-14.26
115# CWR	97.13	118.96	21.83
Total[53]	**1670.73**	**1683.28**	**12.56**

a. Main Line

BNSF accepts AEP Texas' proposed use of 136-pound standard CWR on most of the TNR main line. As discussed in Section III.F.3.d.(1), BNSF Engineering Consultants accept AEP Texas' placement of 136-pound premium rail on track between Donkey Creek and South Logan, Donkey Creek and Alliance and on curves of three degrees or greater. BNSF also accepts AEP Texas' assumed maximum GWR of 286,000 pounds per car and maximum train speeds of 60 mph for all trains except loaded coal trains which are limited to 50 mph.

BNSF made one change to the main line track configuration posited by AEP Texas. BNSF removed a 1.6-mile passing siding on the TNR main line segment between Amarillo and Oklaunion, as discussed above.

b. Branch Lines And Destination Spurs

BNSF accepts AEP Texas' proposed use of 136-pound standard CWR and premium rail on curves of three degrees or greater on the TNR's branch lines and destination spurs. AEP Texas Nar. at III-B-22 and III-F-61. However, AEP Texas used 115-pound relay rail in

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[51] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls" at worksheet "Track Quantities." BNSF used the rail quantities shown in the worksheet "Track Quantities" because AEP Texas' calculation of rail quantities in the worksheet "TOTALS" appears to be wrong.

[52] BNSF Reply electronic workpaper "III F TNR Construction.xls" at worksheet "Rail."

[53] Total rail miles constructed and total miles constructed differ due to the removal of rail in turnouts discussed in Section III.F.3.

determining the costs for these line segments. As described in Section III.F.3.d.(2), BNSF Engineering Consultants have corrected this error.

BNSF modified AEP Texas' proposed track configuration for the Campbell Subdivision branch line and for the lead track to the Arapahoe plant, as discussed in more detail above. In summary, BNSF added a 1.55-mile staging track/passing siding to the Campbell Subdivision branch line to alleviate congestion. BNSF also added an auxiliary track to the lead track to the Arapahoe plant. {

} BNSF owns this auxiliary track and AEP Texas failed to provide a similar track for the TNR.[54] {

} BNSF therefore added this auxiliary track on the lead to the Arapahoe plant and included the track miles and costs associated with it.

c. Sidings

The TNR's passing sidings are considered part of its main line or branch line track and are discussed above.

d. Other

(1) Yards And Related Trackage

BNSF accepts AEP Texas' specifications for yard trackage. AEP Texas used 115-pound relay rail in TNR yards except for the running tracks passing through the yard where it used the same weight of rail as the surrounding main line track.

[54] BNSF Reply electronic workpaper "arapahoe runaround.pdf."

The TNR's yards and related trackage are discussed in Section III.B.3 below. In summary, BNSF reduced AEP Texas' proposed yard track miles for the Alliance and Las Animas Yards by eliminating certain receiving and departure tracks that BNSF determined were no longer necessary for the traffic group discussed in Section III.A and the operating changes discussed above. BNSF increased AEP Texas' proposed yard track miles for the Amarillo Yard by relocating certain functions that AEP Texas proposed the TNR would perform at Las Animas.

(2) Interchange And Set-Out Tracks

BNSF accepts AEP Texas' proposed 115-pound relay CWR for all interchange tracks. As explained above, BNSF provided for an additional crossover at the Oklaunion interchange to facilitate the movement of trains to and from the plant.

BNSF also extended the set-out tracks proposed by AEP Texas. As discussed in Section III.F.3, BNSF extended the first set-out track at each FED to 2,000 feet to allow for storage of maintenance-of-way equipment. Consistent with AEP Texas' opening evidence, BNSF extended the second track at each FED to 951 feet to allow for 600 feet of clearance. AEP Texas Nar. at III-F-78.

(3) Helper Tracks

BNSF accepts the location of AEP Texas' helper tracks but determined that the tracks located at Crawford Hill and at MP 15.4 on the Orin Subdivision were not long enough to accommodate the number of locomotives assigned to those locations and the DTL fueling service described in Section III.D.1. BNSF extended the length of the helper track at Crawford Hill and double ended the helper track at MP 15.4 on the Orin Subdivision.

3. Yards

a. Location And Purpose

AEP Texas designed the TNR with two major yards located at Alliance, NE, and Las Animas Jct., CO. AEP Texas determined that the TNR did not require major yards at six interchange locations: West Campbell and South Logan, WY; Northport, NE; Sterling, CO; and Amarillo and Oklaunion, TX. Instead, AEP Texas provided two interchange tracks at each location.

BNSF accepts AEP Texas' proposed interchange configuration at four of these locations: West Campbell and South Logan, WY; Northport, NE; and Sterling, CO. However, BNSF determined that the proposed configuration of the remaining yards and interchange locations (Alliance, NE; Las Animas Jct., CO; and Amarillo and Oklaunion, TX) required certain modifications. These changes are discussed below.

(1) Alliance Yard

AEP Texas' largest yard is located at Alliance, NE. AEP Texas intends to perform the following activities at the Alliance Yard: empty coal train staging; locomotive fueling, servicing and maintenance; exchange of power; FRA-mandated car inspections; bad-order car removal and repair; insertion of spare cars; crew changes; and interchanges. The TNR's headquarters is also located at Alliance.

The Alliance Yard is divided into two sections, one for interchange trains (Alliance East) and one for the TNR's through trains (Alliance South). As discussed in Section III.A.1 above, AEP Texas's traffic group improperly included coal traffic originated from the three southernmost PRB mines and rerouted over the TNR's Edgemont line to Alliance for interchange with the residual BNSF. The elimination of this traffic allowed BNSF's witness Mr. Wheeler to eliminate six of the sixteen receiving tracks proposed by AEP Texas at Alliance East.

As a result, BNSF's engineering witnesses were able to reduce the length of the yard, which now ends at MP 363.54.

Mr. Wheeler also determined that BNSF's revised traffic group did not require all eight receiving and departure tracks proposed by AEP Texas for Alliance South. Mr. Wheeler's simulation confirmed that he could eliminate two of these tracks.

BNSF's witnesses Messrs. Mueller and Primm reviewed AEP Texas' proposed configuration for the locomotive shop, locomotive servicing facility, car shop and related trackage serving both of these facilities. They determined the appropriate facilities required for the TNR to serve the traffic group discussed in Section III.A. Mr. Primm developed a four-platform, eight-track fueling facility for the TNR. He also redesigned the TNR's locomotive maintenance shop within the same shop area provided by AEP Texas and designed a two-track enclosed car maintenance facility. In order to accommodate the spare cars required by the TNR's traffic group at Alliance, Mr. Mueller added four tracks at both Alliance East and Alliance South. BNSF's proposed configuration of the revised Alliance Yard is shown in Exhibit III.B-1 at pages 6-8.

(2) Las Animas Yard

AEP Texas proposes to perform the following activities at its Las Animas Yard: loaded coal train 1,500-mile inspections and DTL fueling; crew changes; and interchange. BNSF's witnesses Messrs. Bues and Mueller reviewed AEP Texas' operating plan and determined that the TNR's proposed fueling and inspection operations should not be performed at Las Animas for the simple reason that certain TNR trains moving beyond Las Animas on the TNR will run out of fuel and exceed FRA-mandated 1,500-mile inspection requirements before they would return to a fueling or inspection facility on the TNR. These conclusions and BNSF's modification to the TNR yards and operating plan are discussed below.

AEP Texas provides limited fueling and inspection service for coal trains in the TNR's proposed traffic group traveling south of Amarillo to destinations in Arizona, Louisiana and Texas. Empty coal trains are fueled at Alliance, NE, and loaded coal trains are fueled at Las Animas Jct., CO. There is no dispute that empty coal trains fueled at Alliance have sufficient fuel to travel to PRB mine origins for loading, return to Alliance, and continue along the TNR route to Las Animas before needing additional fuel. However, loaded coal trains fueled at Las Animas could not travel to their destination plants in parts of Arizona, Louisiana and Texas and then return to Alliance without being refueled. Indeed, in many cases, those trains would not have enough fuel even to return to Las Animas.

Using AEP Texas' fuel consumption assumptions, BNSF calculated the amount of fuel expected to be consumed per locomotive unit for certain TNR coal trains during the Las Animas-Destination-Alliance portion of the cycle.[55] BNSF's calculations are shown in Table III.B-6 below.

Table III.B-6
AEP Texas' Assumed Fuel Consumption Per Locomotive Unit For TNR Trains Serving Arizona, Louisiana, And Texas Destinations

	Cumulative Gallons Consumed From Las Animas Via TNR Route				
Destination Plant	**Amarillo**	**Destination**	**Amarillo**	**Las Animas**	**Alliance**
Big Brown (TX)	767.4	2,228.2	3,689.0	**4,456.4**	**5,874.5**
Cholla (AZ)	767.4	2,693.7	4,620.1	**5,387.5**	**6,805.6**
Fayette (TX)	767.4	2,663.7	4,560.1	**5,327.5**	**6,745.6**
Gibbons Creek (TX)	767.4	2,492.3	4,217.1	**4,984.5**	**6,402.6**
Limestone (TX)	767.4	2,323.4	3,879.4	**4,646.8**	**6,064.9**
Nelson (LA)	767.4	3,255.8	5,744.1	**6,511.5**	**7,929.6**
Parish (TX)	767.4	2,861.6	4,955.9	**5,723.3**	**7,141.4**
Springerville (AZ)	767.4	2,768.1	4,768.7	**5,536.1**	**6,954.2**

Source: BNSF Reply electronic workpaper "RUNOUTOF FUEL.xls" at worksheet "A"

[55] BNSF's witnesses determined that AEP Texas understated the fuel consumption requirements of the locomotives on TNR trains. BNSF's development of fuel consumption requirements is discussed in Section III.D.1.

The capacity of an SD70MAC fuel tank is 4,800 gallons, according to the manufacturer's specifications. Table III.B-6 shows that the locomotives on these eight TNR trains will run out of fuel before returning to Alliance for refueling. Indeed, this Table also shows that most of these trains will run out of fuel before returning from their destinations to Las Animas.

AEP Texas faces a similar problem with FRA-mandated inspections. BNSF calculated the mileage traveled by the same coal trains from Las Animas-Destination-Alliance and determined that all of the trains exceed the FRA designated long-haul requirements for inspections within 1,500 miles. Most of these trains would also exceed 1,500 miles before returning to Las Animas in the empty direction. BNSF's calculations are shown in Table III.B-7.

Table III.B-7
Distance Traveled By TNR Trains With Arizona, Louisiana, And Texas Destinations

Destination Plant	Cumulative Miles From Las Animas Via TNR Route				
	Amarillo	Destination	Amarillo	Las Animas	Alliance
Big Brown (TX)	235.4	683.5	1,131.6	**1,367.0**	**1,802.0**
Cholla (AZ)	235.4	826.3	1,417.2	**1,652.6**	**2,087.6**
Fayette (TX)	235.4	817.1	1,398.8	**1,634.2**	**2,069.2**
Gibbons Creek (TX)	235.4	764.5	1,293.6	**1,529.0**	**1,964.0**
Limestone (TX)	235.4	712.7	1,190.0	**1,425.4**	**1,860.4**
Nelson (LA)	235.4	998.7	1,762.0	**1,997.4**	**2,432.4**
Parish (TX)	235.4	877.8	1,520.2	**1,755.6**	**2,190.6**
Springerville (AZ)	235.4	849.1	1,462.8	**1,698.2**	**2,133.2**

Source: BNSF Reply electronic workpaper "RUNOUTOF FUEL.xls" at worksheet "A"

Therefore, it is clear that the TNR fueling and inspection locations proposed by AEP Texas are not feasible. AEP Texas failed to explain in its opening evidence how it arrived at these recommendations.[56] In the real world, BNSF fuels and inspects most of these trains in both the loaded and empty direction at Amarillo, TX. Indeed, even with a fueling facility at Amarillo,

[56] AEP Texas stated that inspections would occur off-line at Fort Worth, TX, but none of these trains receive inspections at Fort Worth today. AEP Texas Nar. at III-C-43.

BNSF needs to provide off-line fueling service for empty Nelson trains to ensure they do not run out of fuel before returning to Amarillo.[57] BNSF therefore relocated AEP Texas' proposed Las Animas fueling and inspection tracks to Amarillo, where TNR could perform fueling and inspections in both the loaded and empty directions without forcing the residual BNSF to change its operations or incur additional off-line costs.

BNSF also modified the fueling and inspection requirements for the Holcomb and Harrington trains, which AEP Texas had proposed to fuel at Las Animas in the loaded direction. The Holcomb trains are interchanged at Las Animas and do not travel to Amarillo. Messrs. Bues and Mueller determined that the Holcomb trains are unable to complete a round-trip cycle if they are fueled and inspected at Alliance in the empty direction only.[58] Mr. Mueller determined that it would be more efficient to fuel and inspect these trains in both the loaded and empty directions at Alliance in order to avoid the costs associated with mechanical inspectors and DTL fueling at Las Animas to serve only the Holcomb trains.[59]

The Harrington trains depart the TNR main line for the plant spur track at MP 3.1 on the Boise City Subdivision, approximately three miles north of the TNR's Amarillo fueling facility. BNSF currently fuels the locomotives on Harrington trains at the plant via DTL service and a third party provides inspection services at { }. BNSF proposes the same fueling and inspection arrangements for the TNR to avoid the inefficiency of moving these trains out of route

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[57] Fueling is provided for these trains via direct-to-locomotive ("DTL") service at Temple, TX, and inspections are performed by a third party at { }. Most TNR trains could not be fueled at this location because they travel a different route of movement.

[58] BNSF Reply electronic workpaper "RUNOUTOF FUEL.xls" at worksheet "B."

[59] In the real world, BNSF fuels and inspects the Holcomb trains in both the loaded and empty direction at Guernsey, WY.

to fuel at the Amarillo facility. These changes also avoid the need to maintain DTL fueling and inspection service at Las Animas.

Since fueling and inspection services are no longer performed at Las Animas, BNSF's witness Mr. Wheeler removed two of the receiving and departure tracks from that location, leaving it with two interchange/crew change tracks. BNSF's proposed configuration of the revised Las Animas Yard is shown in Exhibit III.B.1 at pages 15-16.

(3) Amarillo Yard

AEP Texas' proposed configuration for Amarillo included only two interchange tracks As discussed above, BNSF's witnesses determined that the TNR's fueling and inspection services must be relocated from Las Animas to Amarillo in order to serve the needs of the TNR's traffic group. Messrs. Mueller and Wheeler initially proposed two fueling and inspection tracks for this location. However, Mr. Wheeler's modeling confirmed that the yard required three tracks in order to service the TNR's traffic group.

Since trains will be fueled in both the empty and loaded directions at this location, which pumps in excess of one million gallons per month, Mr. Mueller determined that a least-cost efficient railroad would provide fueling platforms, instead of DTL, to pump this volume of fuel.[60] The yard is configured with fuel platforms at both ends of the receiving and departure tracks so that trains moving in either direction can use any of the three fueling and inspection tracks. When a train arrives, it will stop and fuel the rear DP locomotive, then pull up and fuel the two locomotives at the head end of the train while the train is being inspected. These improvements will reduce the time required for train fueling and servicing. AEP Texas proposed a five-hour dwell time requirement for loaded trains at Las Animas, which were to be inspected

[60] As explained in Section III.D.1 below, the price of fuel is also significantly higher with DTL service, so the use of fixed fueling locations is the more efficient approach to take here.

and fueled via DTL service. With the configuration provided by BNSF at Amarillo, Mr. Mueller proposes a three-hour dwell time requirement for both loaded and empty trains.

Mr. Mueller also determined that the TNR's Amarillo Yard required an additional crossover to allow Tolk and Springerville trains interchanged from the residual BNSF to access the fueling facilities in the Amarillo Yard. This crossover is located at approximately MP 757.5 and allows for the straight away move from the interchange yard to the fueling and inspection tracks.

Mr. Mueller also proposes to relocate other supporting track and facilities from Las Animas to Amarillo. These include a small repair facility for bad order cars, four yard tracks to support the switching of bad order cars, the movement of such cars to the repair facility, and storage of repaired cars waiting to be placed back in the appropriate trains. BNSF's proposed configuration of the revised Amarillo Yard is shown in Exhibit III.B.1 at page 20, sheet 4.

(4) Oklaunion Interchange

As explained in Section III.B.1.b above, Mr. Wheeler's simulation of the TNR track configuration proposed by AEP Texas revealed significant congestion which prevented empty Oklaunion coal trains from departing the plant whenever another train occupied the interchange track leading to the plant. Mr. Wheeler added a crossover track at this location to facilitate the efficient movement of trains into and out of the Oklaunion plant. BNSF's proposed configuration of the revised Oklaunion interchange tracks is shown in Exhibit III.B.1 at page 20, sheet 3.

b. Miles And Weight Of Track

Table III.B-8 contains a comparison of the yard miles recommended by AEP Texas with the yard miles recommended by BNSF witnesses.

Table III.B-8
Comparison Of Yard Miles

Yard Location	AEP Texas[61]	BNSF[62]	Difference
Alliance	64.24	53.45	-10.79
Las Animas	5.17	0.00	-5.17
Amarillo	0.00	7.89	7.89
Total	**69.41**	**61.34**	**-8.07**

4. Other

a. Joint Facilities

AEP Texas elected to use BNSF's trackage rights on the UP line between Sterling and Union, CO. BNSF accepts the TNR's use of those trackage rights. The terms of compensation are discussed in Section III.D.5.

BNSF explained in Section III.A.1 that the inclusion of UP traffic under a purported trackage rights arrangement is improper and therefore BNSF excluded the UP traffic from the TNR's shipper group.

b. Track Parameters

Track parameters are discussed in Section III.F.3.

c. Signal/Communication System

BNSF accepts AEP Texas' assumption of a CTC traffic control system on the TNR's mainline and two branch lines. BNSF also accepts the use of a microwave system for TNR

[61] AEP Texas Opening electronic workpaper "Yardcomputations.xls." AEP Texas updated the quantity of yard track at Las Animas in its Second Errata electronic workpaper "Yardcomputations.xls." However, AEP Texas failed to update the yard quantities in its Second Errata workpaper "Track Miles Total.xls" at worksheet "TOTAL TRACK MILES." For this Table, BNSF uses the 5.17 miles contained in AEP Texas' Opening Evidence and costed in its workpapers.

[62] BNSF Reply electronic workpaper "III F TNR Construction.xls" at worksheet "Rail."

communications. The TNR's signal and communications systems are discussed in more detail in Section III.F.6.

d. Turnouts, FEDs And AEI Scanners

The use of turnouts, failed equipment detectors ("FEDs") and automatic equipment identification ("AEI") scanners on the TNR are discussed in Section III.F.6.

C. OPERATING PLAN

BNSF's primary rail operations expert, Loren Mueller, reviewed the TNR operating plan designed by AEP Texas' witnesses. Mr. Mueller accepts many of AEP Texas' operating assumptions and provides corrected assumptions whenever he determined that AEP Texas' witnesses failed to take account of certain operating realities. Mr. Mueller provided these corrected assumptions to BNSF's modeling expert, David Wheeler, for use in the RTC Model simulations. The changes to the operating plan and TNR modeling assumptions are discussed in detail below.

1. General Parameters

a. Traffic Flow And Interchange Points

BNSF generally accepts the traffic flow and interchange points assumed by AEP Texas, with the exception of certain coal traffic discussed below.

AEP Texas assumes that the annual traffic to be transported by the TNR in the peak year 2020 is 227.2 million net tons of coal traffic and 7.3 million net tons of other freight traffic. AEP Texas Nar. at III-C-3. As discussed in Section III.A.1 of this Narrative, AEP Texas overstated the amount of coal traffic that would be available to the TNR. For purposes of creating an operating plan for the TNR, BNSF has modified the TNR's peak year coal traffic volume to be 166.2 million net tons. The reasons for BNSF's modifications to the TNR traffic are explained in detail in Section III.A.1 and are not repeated here. As explained in that Section, the largest difference between the parties on traffic volumes involves TNR movements in the PRB, where BNSF has excluded numerous rerouted cross-over movements that exit the TNR at Alliance.

Table III.C-1 is a comparison of AEP Texas' and BNSF's traffic assumptions for the line segments comprising the TNR.

Table III.C-1
Comparison Of TNR 2020 Traffic Density By Segment
(In Millions Of Net Tons)[1]

Line Segment	AEP Texas	BNSF	Difference
Campbell Branch	{ }	{ }	-1.13
Reno Branch	{ }	{ }	-22.16
E. Campbell-Donkey Creek[2]	{ }	{ }	11.96
Donkey Creek-Converse Jct.	{ }	{ }	-70.23
Converse Jct.-South Logan	{ }	{ }	-0.63
Donkey Creek-Alliance	{ }	{ }	-58.33
Alliance-Northport	{ }	{ }	-6.56
Northport-Sterling	{ }	{ }	-6.44
Sterling-Pawnee Jct.	{ }	{ }	-6.39
Pawnee Jct.-Denver[3]	{ }	{ }	-6.37
Denver-Pueblo	{ }	{ }	-6.47
Pueblo-Las Animas Jct.	{ }	{ }	-7.19
Las Animas Jct.-Amarillo	{ }	{ }	-5.47
Amarillo-Oklaunion[4]	{ }	{ }	-4.87

Source: AEP Texas Opening Table III-C-2 and BNSF Reply electronic workpaper "LUMS and Carmiles (AEPTX-BNSF).xls"

b. Trains And Equipment

(1) Train Characteristics

BNSF generally accepts the parameters established by AEP Texas in its Narrative concerning trains and equipment. BNSF accepts that the TNR will have only two types of trains: (1) unit coal trains; and (2) run-through trains for non-coal overhead traffic between Amarillo and Oklaunion. BNSF also accepts that train sizes would be the same as those used by BNSF in

[1] Tonnages shown for a line segment are the maximum tonnages moving over any part of the segment; volumes are not uniform for the entire segment in some cases.

[2] The net tons contained in AEP Texas' Table III-C-2 for this segment appear to be understated. However, BNSF was unable to locate workpapers showing AEP Texas' calculations.

[3] This segment includes traffic to Arapahoe.

[4] This segment includes TNR non-coal traffic moving in overhead service in both directions between Amarillo and Oklaunion.

2002, that non-coal trains would remain at the same number throughout the DCF period, and that growth in coal traffic would be accounted for by adding additional coal trains.[5]

(2) Locomotive Requirements

(a) Road Locomotives

BNSF accepts AEP Texas' use of SD70MACs to power both unit coal trains and non-coal traffic. With respect to locomotive consists, BNSF accepts that each coal train would have three SD70MACs in a distributed power ("DP") configuration.[6] For non-coal trains, BNSF's Reply evidence calculates the number of SD70MAC locomotives that would be required for each train by dividing the real-world train's horsepower by 4,000 (the horsepower per unit for an SD70MAC).

AEP Texas asserts that the TNR would require 321 of these locomotives to meet its requirements in the peak year, 2020. AEP Texas Opening Nar. at III-C-13. AEP Texas provides no support for this number other than a vague assertion that the number was developed from its RTC model analysis and includes a { } spare margin. *See* AEP Texas Opening Nar. at III-C-17. AEP Texas also does not provide any workpapers that show the calculation of this number.

Nor does AEP Texas state precisely how many SD70MACs the TNR would require in the base year, although it does calculate a total lease cost.[7] The total lease cost specified for the base year consists of two components. The first is 229 locomotives multiplied by an annual

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[5] As described in Section III.B.1.(a).(4) above, AEP Texas used standardized train sizes for each origin/destination pair, which, in most cases, consisted of the longest but not always the heaviest train. In its own modeling, BNSF used the real-world characteristics of the trains in terms of length, type, number of locomotives, and weight.

[6] This is generally what AEP Texas modeled, although in a few instances it inexplicably dropped a locomotive from empty coal trains. BNSF corrected these discrepancies in its own modeling.

[7] *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.xls."

lease cost of { }. The second component is a number of locomotive days – calculated by multiplying the 229 locomotives by a "peaking factor" of 5.6 percent times 366 days in the year – multiplied by a "Daily Rate." It is unclear why AEP Texas chose to apply a "daily lease expense," which it mischaracterizes as a "daily rate," to a calculated number of locomotive days. The 14 SD70MACs for which a "daily lease expense" is reported in AEP Texas' workpapers[8] are all covered by a long-term lease similar to the one AEP Texas used as the source for its annual lease payments. AEP Texas does not explain or justify its calculation of base-year locomotive lease costs. As demonstrated in Section III.D, however, it is clear that whatever number of locomotives the TNR is starting with does not result in the TNR having sufficient locomotives, by its own count, in the peak year.

BNSF has not attempted to recalculate the TNR's locomotive requirements based on the AEP Texas traffic group because BNSF assumes a smaller traffic group. Instead, BNSF calculated peak-year locomotive requirements for the BNSF-sponsored traffic group in the same manner employed (and accepted by the Board) in the *TMPA* case. Under the *TMPA* methodology, the number of locomotives required is calculated using the following formula:

> TNR Locomotive Requirement = Total TNR Annual Locomotive Unit Hours/Number of Hours in a Year * Locomotive Spare Margin * Peaking Factor

TNR locomotive-hours were calculated for each train in 2020 that traversed the TNR using average transit times generated by Mr. Wheeler's RTC model and multiplying those average times by the number of locomotives on the train. The total number of locomotive-hours was divided by the number of hours in the year to calculate a base number of locomotives, which was in turn modified to account for spare-margin and peaking requirements.[9]

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[8] *See* AEP Texas Opening workpaper 08796.

[9] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls."

A spare margin is necessary because locomotives are not available for use at all times to haul freight. AEP Texas acknowledges that a spare margin is required, but uses a spare margin of only { } that it claims is based on a BNSF locomotive maintenance agreement.[10] AEP Texas appears to be misrepresenting {

}

It is abundantly clear from the maintenance agreement that AEP Texas refers to that {

} AEP Texas' reliance on { } to support a { } spare margin is clearly insupportable because {

[10] AEP Texas appears to rely upon the { } specified at AEP Texas Opening workpaper 08811.

[11] *See* AEP Texas Opening workpaper 08805.

[12] *Id.* at 08806.

}[13]

BNSF developed a spare margin for the TNR SD70MAC fleet based on real-world BNSF utilization data for the Alliance locomotive pool, which provides the power for the vast majority of trains traversing the TNR segments. To be conservative, BNSF used the average amount of time that SD70MACs were unavailable in 2002, { }, although the unavailable time was somewhat higher in both 2001 and 2003.[14] AEP Texas has submitted no evidence suggesting that it would be able to reduce the "unavailable" time for its locomotives.

BNSF did not include in its spare margin time during which BNSF SD70MACs were available but unused. BNSF excluded this component in order to avoid any concern that application of both a spare margin and a peaking factor would result in double-counting. As a result, BNSF's approach conservatively assumed that any "available" locomotive could be used on peak days.

The final component of the formula for calculating locomotive requirements is the peaking factor. As the Board explained in *TMPA*, the need for a peaking factor is the "inescapable consequence of the seasonality of the traffic and a carrier's obligation to have sufficient locomotives to serve its customers during peak periods." *TMPA* at 81. Indeed, a peaking factor is the only way to ensure that the SARR will bear the appropriate cost of having sufficient locomotives to satisfy customer requirements on its busiest days. These peak days occur at unpredictable intervals throughout the year, and generally there are numerous days

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[13] It is worth noting that AEP Texas' math is wrong in any case since the spare margin is applied as an additive and not as the percentage of total time. {

}

[14] *See* BNSF Opening electronic workpaper "Spare Margin.xls."

during the year when traffic levels approach those of the busiest day.[15] It would violate SAC principles to allow the SAC to shift the costs of meeting peak requirements to interchange partners of the SARR instead of requiring the SARR to have sufficient locomotives on hand to meet demand.

AEP Texas appears to admit that some peaking factor is necessary, *see* AEP Texas Opening Nar. at III-D-131. As explained at the beginning of Section III.D below, however, the supposed peaking factor applied by Mr. Crowley does not result in the TNR having the number of locomotives it says it would require in the peak year and is, therefore, clearly incorrect. The proper method for calculating the peaking factor, and the approach accepted by the Board in *TMPA*, at 81, is to divide the number of train-starts on the peak day by the number of train-starts on an average day.

Application of the *TMPA* formula indicates that the TNR would require 249 locomotives to transport the BNSF-sponsored traffic group in the peak year, compared to the 321 AEP Texas says would be required for its traffic group.[16]

(b) Helper Locomotives

BNSF accepts the helper districts, helper assignments, and number of helper consists specified by AEP Texas in its opening evidence. *See* AEP Texas Opening Nar. at III-C-17 to 20. As a result, the TNR will require 42 SD40-2s for helper service. In Mr. Wheeler's RTC model, BNSF provides helper assistance to loaded trains with 112 or more cars on the Campbell

[15] Hence, it is inappropriate to claim that application of a peaking factor requires the SARR to have locomotives on hand simply to meet the requirements of a single busy day. In fact, there are numerous busy days throughout the year on which the locomotives required by the peaking factor would be used.

[16] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls."

subdivision. Helper needs for these trains can be met by the helper consists already specified by AEP Texas.

(c) Switch Locomotives

BNSF accepts AEP Texas' determination that the TNR will require five switch locomotives. *See* AEP Texas Opening Nar. at III-C-20. As described in Section III.B above, BNSF's Reply Evidence relocates the operations that AEP Texas had specified to occur at Las Animas to Amarillo. As a result, the switch locomotive AEP Texas had stationed at Las Animas would be stationed at Amarillo under BNSF's operating plan.

(d) Work Train Locomotives

BNSF witness Albin concludes in section III.D.4 below that the TNR would require four work trains. Each work train would require two SD40-2 locomotives for a total of eight SD40-2 work-train locomotives.

(e) Summary Of Locomotive Requirements

Table III.C-2
Comparison of Base Year Locomotive Requirements

Locomotives	AEP Texas	BNSF	Difference
Road – SD70MAC	229	232	3
Helper – SD40-2	42	42	0
Switch – SD40-2	5	5	0
Work Train –SD40-2	0	8	8
Total	276	287	11

(3) Railcar Requirements

(a) Non-Coal Cars

BNSF accepts AEP Texas' leasing and maintenance cost of { } for non-coal railcars and does not, therefore, separately calculate statistics related to these cars.[17]

[17] *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.XLS."

(b) Coal Cars

With respect to coal cars, BNSF generally agrees that it is appropriate to distinguish between shipper-supplied cars, for which the railroad incurs no costs, and railroad-provided cars, for which the railroad does incur maintenance and lease costs. BNSF has not attempted to calculate the number of coal cars that would be required to transport the AEP Texas traffic group in the peak year, but notes that AEP Texas has likely understated its requirements by failing to include in its calculations all of the railcars the BNSF actually supplies for each customer. BNSF agrees that the shippers listed in AEP Texas Opening Nar. Table III-C-5, at III-C-23, use BNSF-supplied cars, but, as explained below, disagrees that these shippers represent the limit of coal cars actually provided by BNSF.

To calculate coal car requirements for the BNSF-sponsored traffic group, BNSF first identified the percentage of cars for each destination plant for which BNSF was responsible in 2002. In some cases, such as for those shippers listed in AEP Texas Opening Nar. Table III-C-5, 100 percent of the cars are the responsibility of BNSF. In other cases, even where the movement is in cars that do not have BNSF markings, the materials produced by BNSF in discovery show that BNSF actually provided some proportion of the cars.[18] In some cases this was likely because BNSF was providing "fill" cars to replace bad-ordered cars. In other cases, where the percentage was higher, it was likely due to an arrangement between BNSF and the shipper that BNSF would supply some portion of the cars for the shipper.

Total TNR coal car hours were calculated for each train in the BNSF-sponsored traffic group in 2020 using average transit times generated by Mr. Wheeler's RTC analysis. The total

[18] *See* BNSF discovery document "Freight Car Operating Lease Info.xls," included with this filing as an electronic workpaper of the same name, and samples of car lease agreements included with this filing as electronic workpaper "Car Lease Agreements sample (Bates 09289-09351).PDF."

car hours for each train were then modified by the 2002 percentage applicable to that train's destination to derive the number of car hours for which the TNR would be responsible. Car counts were determined from car hours by dividing total car hours by the number of hours in a year and then including a { } percent spare margin. In addition, the peaking factor for coal traffic described in the locomotive calculation in Section III.C.1.b.(2) was applied.[19] The table below compares the coal-car requirements for the TNR:

Table III.C-3
Comparison of Coal Car Requirements – 2000

Type of Car	AEP Texas	BNSF	Difference
Gondolas (J & G)	535	509	(26)
Hoppers (H & K)	247	128	(119)
Total	782	637	(145)

2. Cycle Time

AEP Texas primarily used cycle time calculations to establish TNR's equipment requirements. Cycle times are made up of two components: (1) transit times and (2) times spent to perform specific activities such as fueling, inspections and crew changes.[20] AEP Texas uses the RTC Model to calculate transit times. The times to perform specific activities (*e.g.*, times at mines, yards and interchange locations) were estimated by AEP Texas' operating witnesses and then input into the RTC Model. The RTC Model was then used to develop a cycle time for each train, consisting of the train's transit time over the TNR route and the time assumed for the train to perform specific activities.

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[19] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls."

[20] Where cross-over traffic is used in a SAC analysis, the parties do not generally include the off-line time in the cycle time calculations, and AEP Texas has not done so here. Both parties consider only the on-SARR times in their cycle time calculations.

As discussed in Section III.B.1.a.(3), several of the activity times assumed by AEP Texas witnesses are understated. In addition, BNSF's witnesses have also determined that the transit times produced by AEP Texas' simulation are unrealistic because they ignore significant real world operating constraints, including random failures and the effects of PRB congestion. These findings are discussed in more detail below.

a. Operating Inputs To The RTC Model

(1) Maximum Train Speeds

BNSF accepts AEP Texas' assumptions that the TNR's traffic will be limited to a maximum train speed of 60 mph, except that loaded coal trains will be limited to a maximum speed of 50 mph. These maximum train speeds are further restricted on certain TNR segments due to particular operating conditions such as curves, turnouts and other restrictions contained in BNSF's timetables. These restrictions are reflected in the track speed limits in the RTC Model.

(2) Loading/Unloading Dwell Times

As discussed in Section III.B.1.a.(3) above, BNSF accepts AEP Texas' assumption that TNR trains will require 5.5 hours of loading time at mines located on the Orin Subdivision. However, BNSF's witness Mr. Mueller determined that AEP Texas' four-hour assumption of loading time at mines on the Campbell Subdivision is unrealistic. In the real world, trains at each of the Campbell Subdivision mines are loaded by third-party contractors. BNSF's experience at these mines in the year 2002 indicates that the third-party loaders required, on average, six hours of loading time at the Campbell Sub mines.[21] It is unrealistic to expect that third-party contractors will load TNR trains any faster than they currently load BNSF's trains.

[21] BNSF Reply electronic workpaper "Campbell load times 2002.xls."

Mr. Mueller therefore corrected AEP Texas' loading time at the Campbell Subdivision mines. Mr. Wheeler used the corrected loading time of six hours in his RTC simulations.

Mr. Mueller also determined that AEP Texas' assumptions regarding unloading times for on-SARR destinations were unrealistic. AEP Texas assumed that the dwell times at these locations were equal to the maximum free time for unloading allowed under each applicable contract or common carrier pricing authority. Although AEP Texas acknowledges that coal trains dwell longer than the allowable free time, AEP Texas ignores the actual experience and assumed the hypothetical times that have not been achieved in the real world. AEP Texas Nar. at III-C-30.

Since the TNR's crews will be performing the exact same functions at these destinations as BNSF's crews (*e.g.*, spotting the first few cars until the train can be handled by the indexer, removing the DP locomotive from the rear of the train, and, { }), there is no reason to believe that the TNR would experience different dwell times at on-SARR plants than BNSF currently experiences. AEP Texas has identified no inefficiency in BNSF's activities and nothing that the TNR crews would do differently. Plant-specific data are available to calculate the amount of time required from the time a train arrives at the plant (arrive), to the time it is spotted to begin unloading (spot), to the time it is released from the loading process (release). BNSF used the average 2002 time for these activities (arrive to spot and spot to release) to determine unloading time for TNR-served plants.[22] This time does not include the release-to-depart portion of time, when a train finished unloading but had not yet departed from the plant. By excluding this time, BNSF accepts AEP Texas' assumption that a TNR crew is immediately available to move the empty coal train as

[22] BNSF Reply electronic workpaper "Linesegment2002.pdf."

soon as it has been released by the utility, even though such a practice is rarely, if ever, realized in the real world.

Exhibit III.C-1 contains a summary comparison of the parties' dwell time assumptions for the TNR trains. This Exhibit includes loading and unloading time, as well as time for fueling and inspections, crew changes, interchanges, and addition and removal of helpers at various locations on the TNR.

(3) Starting Point Of Train Cycle

BNSF agrees with AEP Texas that the time of receipt of empty coal trains at the interchange point is the appropriate starting point for the TNR simulation. However, as explained in Section III.B.1.a.(5) above, AEP Texas' approach to determining this starting point for the cycle was flawed and produced an unrealistic flow of trains onto the SARR. BNSF's witnesses, Messrs. Mueller and Wheeler, determined that the proper approach would be to start the train's cycle at the actual time of receipt of BNSF's empty coal trains at the TNR's hypothetical interchange point.

(4) Crew-Change Locations And Times

AEP Texas allotted 15 minutes for crew changes at seven locations (Donkey Creek/West Campbell and South Logan, WY; Alliance, NE; Denver (Englewood) and Las Animas Jct., CO; and Amarillo and Oklaunion, TX).[23] Mr. Mueller accepts AEP Texas' assumption at these locations, with the exception of Oklaunion where trains are unloaded at the Oklaunion plant or interchanged with the residual BNSF and therefore TNR crew changes are not required.

[23] As explained in Section III.D.3.a.(1)(b), BNSF assumes that the home terminal for crews serving origin mines on the Orin Subdivision should be Donkey Creek instead of South Logan. Although AEP Texas stated in its Narrative that the home terminal for such crews is South Logan, AEP Texas' workpapers show that it calculated taxis for the crews as if their home terminal was Donkey Creek.

(5) Interchange Times

AEP Texas allotted 30 minutes for interchanges, with the exception of empty coal trains delivered in interchange to the TNR at South Logan and Alliance. At South Logan, AEP Texas allotted three hours for empty trains that require 1,000-mile inspections and fueling. (Alliance interchange requirements are discussed in the next section.) Mr. Mueller accepts AEP Texas' assumptions regarding interchange times.

Mr. Wheeler reviewed the interchange times actually used by AEP Texas in the RTC Model and determined that trains interchanged at Oklaunion were allotted less than 30 minutes of interchange. Mr. Wheeler corrected these errors to conform to the description in AEP Texas' Narrative.

(6) Dwell Time And Functions To Be Performed At Alliance Yard

AEP Texas allotted six hours of dwell time at Alliance Yard for empty coal trains, 30 minutes of dwell time for loaded coal trains interchanged to BNSF, and 15 minutes for loaded coal trains moving beyond Alliance on the TNR. Mr. Mueller accepts these assumptions with one exception. As explained in Section III.B.3.a.(2) above, Mr. Mueller determined that coal trains traveling to the Holcomb plant should be fueled and inspected at Alliance Yard in the loaded direction, as well as in the empty direction, due to the relocation of the TNR's fueling and inspection services from Las Animas to Amarillo. The 15-minute crew change time provided by AEP Texas is not sufficient to perform these activities. Mr. Mueller conservatively allotted three hours for loaded Holcomb trains to be fueled and inspected at Alliance Yard, and Mr. Wheeler incorporated this assumption in the RTC simulation.

(7) Dwell Time And Functions To Be Performed At Las Animas Yard And At South Logan

AEP Texas allotted five hours of dwell time for fueling and inspection of loaded trains at Las Animas Yard, 30 minutes of dwell time for empty Holcomb trains interchanged from BNSF, and 15 minutes of dwell time for crew change for empty coal trains continuing on the TNR.[24] Mr. Mueller accepts AEP Texas' assumptions for empty Holcomb trains and for TNR trains requiring crew changes. However, as explained in Section III.B.3.a.(2) above, BNSF determined that certain TNR trains would run out of fuel and violate FRA-mandated inspection requirements if fueling and inspections occurred at Las Animas in the loaded direction. Therefore, BNSF relocated the TNR fueling and inspection services from Las Animas to Amarillo, where such services will be performed on all coal trains moving in both the loaded and empty directions with the exception of empty Oklaunion trains. The amount of fuel dispensed at this location makes it economical and more efficient to install a fixed fueling facility, instead of using DTL fueling as proposed by AEP Texas at Las Animas. The presence of a fixed fueling facility allows Mr. Mueller to provide a shorter dwell time to accomplish the same functions that AEP Texas proposed to perform at Las Animas. Instead of requiring five hours to fuel and inspect trains, the TNR trains at the Amarillo facility would require only three hours in both directions.

AEP Texas allotted three hours for the TNR to fuel and perform inspections and remove bad-order cars from empty trains at South Logan and 30 minutes for interchange for loaded trains and empty trains that do not require inspection. Mr. Mueller accepts these assumptions.

[24] AEP Texas Nar. at III-C-36. However, in the RTC Model, AEP Texas provided six hours of dwell time for fueling and inspection of loaded trains at Las Animas.

(8) Time To Add/Remove Helpers

AEP Texas allotted 20 minutes for TNR trains to add helper locomotives at the beginning of each helper district and 15 minutes to remove helper locomotives at the end of each district.[25] When the beginning of a helper district is one of the PRB mines, AEP Texas assumed that the helper could be added during the time allotted for loading, 5.5 hours on the Orin Subdivision and 6.0 hours on the Campbell Subdivision, as corrected by BNSF. Mr. Mueller accepts AEP Texas' assumptions regarding the times needed to add and remove helpers.

(9) Track Inspections, Maintenance Windows And Random Failures

AEP Texas makes no provision for track inspections, maintenance windows or random failures during the 15-day period modeled in its RTC simulation. This is unrealistic. As explained in Section III.B.1.a.(2) above, track maintenance and unexpected events can have an enormous impact on the operation of trains over a line segment.

To be conservative, Mr. Wheeler did not account for the time required to conduct track inspections or any time for planned maintenance windows during the TNR's 15-day model period. However, random failures will occur on every railroad, and it is therefore necessary to take tracks out of service during the modeling period to simulate such failures. AEP Texas argues that it is inappropriate to include random failures in a model because it is impossible to predict when the random failures will occur. AEP Texas Nar. at III-C-38. But the difficulty to predict when a random failure will occur does not justify ignoring altogether the effect of random failures. Instead, it is necessary to develop an appropriate proxy for those failures, which BNSF has done. By ignoring random failures altogether, the TNR track capacity as

[25] AEP Texas Nar. at III-C-37. However, AEP Texas reversed these times at certain locations in its RTC simulation. Mr. Wheeler corrected these errors in the model.

designed by AEP Texas would not be sufficient to accommodate failures that will undoubtedly occur under normal operating conditions.

BNSF's witnesses Messrs. Mueller and Albin reviewed BNSF's records for actual operating and track failures that occurred during the 15-day period modeled by AEP Texas.[26] They determined which failures required that track be taken out of service and which failures required movements at a restricted speed. They also determined the appropriate amount of time for each outage or restriction. They provided this information to Mr. Wheeler who added track outages and restricted train speeds to the TNR simulation.[27]

b. Results Of RTC Model

As discussed in Section III.B.1.b above, Mr. Wheeler ran simulations using the RTC Model. Both simulations were based on AEP Texas' track configuration and incorporated BNSF's real world operating assumptions, such as actual train sizes and empty start times, corrected dwell time assumptions, random failures, and mine congestion caused by UP trains. The first simulation included AEP Texas' traffic group. That simulation ended in gridlock and BNSF was unable to develop revised transit times for the TNR based on AEP Texas' traffic assumptions.

Mr. Wheeler ran a second simulation using AEP Texas' track configuration and BNSF's traffic group and realistic operating assumptions. As discussed in Section III.B.1.b.(2) above, Mr. Wheeler determined that certain track capacity changes were required to allow the simulation to run to completion. Those changes include: (1) one additional passing

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[26] BNSF Reply electronic workpaper "June to July Engineering Data.xls" and BNSF.RP.WP.III.B-0005 to 0116.

[27] The outages used in the RTC simulation are summarized in BNSF's Reply electronic workpaper "RTC Track failure-maintenance summary.xls."

siding/staging track on the Campbell Sub; (2) three fueling and inspection tracks at the Amarillo Yard; and (3) one additional crossover at the Oklaunion Yard. Mr. Wheeler also confirmed that he could remove certain unnecessary capacity initially provided by AEP Texas. The reductions in capacity include: (1) six receiving/departure tracks at Alliance Yard East; (2) two receiving/departure tracks at Alliance Yard South; (3) two receiving/departure tracks at Las Animas Yard; and (4) one passing siding at MP 303.87-305.47 between Amarillo and Oklaunion.

Table III.C-4 contains a comparison of the transit times posited by AEP Texas in its opening evidence with the transit times from Mr. Wheeler's final simulation.

Table III.C-4
Comparison Of Average Transit Time In Hours[28]

TNR Segment	Loaded Direction		Empty Direction	
	AEP Texas	BNSF	AEP Texas	BNSF
Donkey Creek-Alliance	09:17	08:48	05:35	05:41
Alliance-Northport	01:20	01:25	00:48	00:54
Northport-Sterling	03:53	04:00	02:33	02:42
Sterling-Denver	06:12	06:16	04:21	04:43
Denver-Pueblo	06:31	06:31	04:29	04:58
Pueblo-Amarillo	13:26	13:56	11:04	10:17
Amarillo-Oklaunion	04:32	04:44	04:39	05:07
Total (Donkey Creek-Oklaunion)	45:11	45:40	33:29	34:22

Source: BNSF Reply electronic workpaper
"Coal_Transit_Times_Summary_w RTC_Final.xls"

The transit times presented in AEP Texas' opening evidence are the best guide for BNSF to determine the level of service that AEP Texas intended for the TNR to provide. The comparison

[28] The transit times shown in Table III.C-4 exclude dwell times at the end of each TNR segment but include intermediate dwell times, such as crew changes and time to add and remove helper locomotives. To facilitate an apples-to-apples comparison, BNSF subtracted a total of five hours and forty-five minutes of Las Animas dwell time from AEP Texas' average transit time for loaded trains on the Pueblo-Amarillo section (calculated by subtracting AEP Texas' assumed dwell time of six hours and adding back 15 minutes for crew change). Since BNSF relocated the TNR's fueling and inspection services from Las Animas to Amarillo, loaded through trains in BNSF's simulation require only a 15-minute dwell at Las Animas for crew change.

in Table III.C-4 shows that the track configuration and traffic group sponsored by BNSF in its reply evidence generates comparable transit times as the times that AEP Texas proposed in its opening evidence.

3. Other

a. Inspections

BNSF generally accepts the inspection procedures established by AEP Texas, but has relocated the inspections that would occur at Las Animas to Amarillo for the reasons explained in Section III.B above.

b. Train Control And Communications

BNSF accepts AEP Texas' determination that the TNR network will have a Centralized Traffic Control system. The only exception to this rule is the UP segment over which the TNR operates via trackage rights between Sterling and Union, which is ABS in the real world. Mr. Wheeler corrected AEP Texas' misdesignation of the signaling on the UP trackage-rights segment in his modeling.

BNSF also accepts the dispatching districts identified by AEP Texas.

D. OPERATING EXPENSES

AEP Texas generally purports to have calculated its operating costs by first determining what the requirements would be for peak-year 2020 operations and then applying a ratio to the 2020 number to derive costs for base-year (2000) operations. While AEP Texas witness Mr. Crowley explains what ratio was applied, he does not explain why application of that particular ratio makes sense. *See* AEP Opening Nar. at III-D-130. Mr Crowley effectively concedes that application of his ratio would understate base-year requirements unless he added back in a peaking factor. *Id.* As explained in detail below, Mr. Crowley does not manage to correct this understatement by applying an improperly calculated year-2000 peaking factor to locomotive and car requirements. As a result of his errors, there is a pervasive understatement of operating statistics that AEP Texas calculates based on the 2020 peak week and a consequent understatement of the base-year operating statistics that are fed into AEP Texas' DCF. The base-year understatement is then carried through for the entire 20-year period since costs for subsequent years are based on the base-year cost.

To calculate most base-year operating statistics, Mr. Crowley multiplied the statistic as calculated for the peak year (2020) by a fraction consisting of the TNR 2000 net tons divided by a supposed TNR peak-year tonnage figure. Rather than use the net tons that AEP Texas forecast the TNR would transport in 2020, however, he used an inflated tonnage figure that was annualized from the peak-week traffic in 2020.[1] Using a larger number in the denominator decreases the size of the ratio and consequently reduces base-year requirements below what they would be if Mr. Crowley had simply used the projected 2020 volume. Mr. Crowley does not and cannot explain why use of the inflated annualized peak volume instead of "actual" 2020 volume

[1] *See* AEP Texas Opening Nar. at III-D-130 and AEP Texas Second Errata electronic workpaper "TNR Operating Statistics.xls," worksheet "Base Year Operating Statistics."

is the correct number to use. Indeed, his approach clearly understates 2000 operating statistics, as well as operating statistics in each succeeding year throughout the DCF analysis.

The following figures illustrate the impact of Mr. Crowley's flawed approach:

AEP Texas Tonnage Ratio:

$$\frac{\text{TNR Base-Year Tons}}{\text{TNR Peak-Year Tons, Annualized from Peak-Week}} = \frac{187,678,225}{263,571,292} = 0.712 \text{ (29\% reduction)}$$

Proper Ratio:

$$\frac{\text{TNR Base-Year Tons}}{\text{TNR Peak-Year Tons}} = \frac{187,678,225}{236,909,400} = 0.792 \text{ (21\% reduction)}$$

Application of an inconsistent ratio of 0.712 that compares full-year 2000 tonnages to an annualized peak-week 2020 figure, and not the comparable full-year 2020 tonnages, understates operating statistics in the base-year by 10 percent.[2]

The understatement of operating statistics can be demonstrated both in the abstract and by specific reference to cost items in this case. In the abstract, it is obvious that the base-year operating costs that Mr. Crowley has devised will not reach the levels that he has specified as his peak-year requirements at any point in the analysis. For example, applying Mr. Crowley's ratio to a cost item of $1,000,000 in 2020 would produce a cost in the base year of $712,059.[3] This base-year cost would be fed into the DCF analysis and would increase over time in proportion to the increase in net tonnage transported by the TNR. As a result, by 2020 this cost item would have increased to only $898,844, more than ten percent shy of the $1,000,000 that was determined for the peak year.[4]

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[2] 0.712 / 0.792 -1 = -10.1 percent

[3] $1,000,000 x (187,678,225/263,571,292).

[4] $712,059 x (236,909,400/187,678,225).

The DCF analysis submitted by AEP Texas itself demonstrates that in 2020 the TNR is not incurring operating costs for the full number of road locomotives and road crew personnel that AEP Texas has said would be required in 2020. AEP Texas asserts that the TNR would require 321 SD70MACs in 2020.[5] The 2020 locomotive lease cost shown in its DCF analysis, however, is sufficient to pay for only 312 SD70MACs.[6] Similarly, AEP Texas represents that the TNR would require 579 road crew personnel in 2020.[7] Again, AEP Texas' DCF analysis reveals that the TNR falls short of the mark; the TNR incurs T&E expenses sufficient to cover only 548 road crew personnel in 2020.[8]

Mr. Crowley claims that he has safeguarded against this type of understatement in operating costs by applying a peaking factor to locomotives and cars. It is puzzling why one would undertake an analysis based on a peak period in 2020, apply a ratio that clearly removes the impact of that peak period to derive base-year costs, and then try to correct the error by calculating a different peaking factor for the base year. Nor is it clear why it would be appropriate to apply a peaking factor to locomotives and railcars, but not to other cost items such as crew personnel who also must be employed in sufficient numbers to cover the railroad's busiest periods. Indeed, the overall approach appears intentionally calculated to understate base-

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[5] AEP Texas Opening Nar. at III-C-13.

[6] *See* BNSF Reply electronic workpaper "Missing Locos and Crew.xls," worksheet "Missing Locomotives." This calculation is based on the unadjusted dollar amounts specified in AEP Texas First Errata electronic workpaper "Exhibit III-H-1SP.xls," worksheet "Operating SAC." It makes no difference whether the calculation is performed in unadjusted dollars or in inflated dollars since AEP Texas simply multiplies the unadjusted dollar figure by an inflation index to derive the cost in 2020 dollars of paying for the same number of locomotives.

[7] *See* AEP Texas Second Errata electronic workpaper "TNR Operating Statistics.xls," worksheet "Summary."

[8] BNSF Reply electronic workpaper "Missing Locos and Crew.xls," worksheet "Missing Crew."

year costs and thereby significantly improve the apparent performance of the SARR. The short answer to Mr. Crowley's claim, however, is that his application of a year-2000 peaking factor did not, in fact, fix the understatement of base-year operating costs. As demonstrated in the prior paragraph, the TNR does not pay for the locomotives and crew that AEP Texas says it would require in 2020.

Another defect in Mr. Crowley's ratio approach is that it fails to recognize that the amount of non-coal traffic and the resources devoted to transporting that traffic remain the same for the last 18 years of the DCF period. Because the non-coal traffic does not change from 2002 through 2020, the locomotives, cars, and crews required for that traffic do not change.[9] Mr. Crowley's approach, due to the application of his ratio, improperly assumes that year-2000 operating costs for non-coal traffic (as well as those for intervening years) are significantly less than year-2020 operating costs for the same traffic. Simply stated, in 2002 the non-coal locomotive, car, and crew requirements are the same as they will be in 2020, and the associated operating costs should account for this.[10]

The net impact of the errors described above is that many of the operating costs AEP Texas inputs into the DCF analysis are too low. The understated starting point propagates throughout the entire DCF period. As a result, the TNR appears to have much lower costs

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[9] AEP Texas assumes "no growth in non-coal traffic over the 2003-2020 time period from levels shown for 2002." AEP Texas Opening Nar. at III-A-15. Although AEP Texas reports fluctuating net tonnages due to its revenue manipulations, *see* AEP Texas Opening Exh. III-A-15, there is no basis for modifying operating statistics based on fabricated variations in net tonnages. AEP Texas explicitly indicates that its train sizes, locomotive consists, volume, and number of trains do not change after 2002. *See* AEP Opening Nar. at III-C-13.

[10] BNSF has corrected the volume figures used in the escalation of operating expenses in the DCF model to avoid the understatement of costs for the TNR's non-coal trains.

throughout the DCF period than would be the case if AEP Texas had started with cost inputs consistent with its stated 2020 requirements.

1. Locomotives

a. Leasing

AEP Texas assumed that the TNR would lease its locomotives, and BNSF has adopted that approach. AEP Texas assumed an annual lease cost of { } for each SD70MAC and { } for each SD40-2. BNSF accepts this annual lease cost for SD40-2s, but adopts a different approach for SD70MACs because AEP Texas' approach does not accurately reflect the actual lease costs that would be incurred over the DCF period.

To determine the annual lease cost for SD70MACs, AEP Texas relied upon a BNSF lease agreement produced in discovery.[11] That lease agreement spreads payments across a { }-year period, beginning January 15, 2001. AEP Texas derived the supposed annual lease cost by summing only the first two payments required under the lease.[12] This approach was clearly incorrect because AEP Texas chose unrepresentatively low annual payments. The scheduled payments contained in the lease agreement upon which AEP Texas relied vary considerably from year to year. In all but two of the other 21 years, payments are higher than in 2001, and in one year { } annual lease payments rise to { } per locomotive.[13] In fact, the average annual payment that BNSF actually will make over the life of the lease is { }, nearly 25 percent higher than the anomalous annual payment level proffered by AEP Texas. Exhibit III.D-1 shows the level of annual lease payments over time and the low level of payments in the first

[11] *See* AEP Texas Opening workpaper 08751.

[12] *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.xls," worksheet "Summary."

[13] *See* BNSF Reply electronic workpaper "Loco Lease.xls".

year. AEP Texas, like BNSF, must expect to bear the full cost of the lease rather than an intentionally understated cost derived by selecting an unrepresentative, low annual payment.

In order to incorporate the full cost of the SD70MAC locomotive lease in the TNR's operating expenses, BNSF derived a representative annual lease figure in base-year dollars for use in the DCF. Specifically, BNSF calculated the present value of the stream of lease payments and then divided by the number of years in the lease.[14] The resulting annual lease payment of { }, in base-year dollars, is what BNSF would have to pay each year in level payments to equal the present value of the varying annual payments BNSF actually makes under the lease. This approach appropriately accounts for the fact that payments in later years are lower in real terms. At the same time, calculating the base-year lease payment on a present-value basis means that it is not necessary to modify the mechanics of the DCF to treat inflation differently for locomotive lease costs. Applying inflation indices within the DCF merely converts the lease costs in later years to nominal dollars, which is the same way that other cost items are treated within the DCF.[15] Because the purpose of the DCF stand-alone analysis is to capture representative annual costs, the approach adopted by BNSF is clearly more appropriate than that adopted by AEP Texas, which falls short of capturing the total lease payments that will be made.

Table III.D.1-1 compares the parties' respective 2000 locomotive lease costs:[16]

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[14] BNSF used the appropriate AAR Equipment Rents index to discount the future locomotive lease payments to current dollars. *See* BNSF Reply electronic workpaper "Loco Lease.xls".

[15] *See, e.g.*, AEP Texas First Errata electronic workpaper "Exhibit III-H-1SP.xls," worksheet "Operating SAC," columns AJ through AX.

[16] In this section, year-2000 cost totals reflect full-year figures based on Second Quarter cost levels that are subsequently prorated for the period included in the analysis (June 16 through December 31) and escalated quarterly to account for cost inflation. See BNSF Reply electronic workpaper "Exhibit III-H-1.xls," worksheet "Operating SAC."

Table III.D.1-1
Comparison of TNR Locomotive Costs

	AEP Texas	BNSF	Difference
Number of Locomotives			
1. SD70MAC locomotives	229	232	3
2. SD40-2 locomotives	47	55	8
Annual Locomotive Lease Payment			
Annual SD70MAC Unit Lease Cost	{ }	{ }	$10,502
Annual SD40-2 Unit Lease Cost	{ }	{ }	$0
Total Locomotive Lease Cost (*Millions*)	{ }	{ }	{ }

b. Maintenance

Locomotive maintenance expenses consist of two components, a cost based on the annual number of locomotive unit miles ("LUMs") and a cost based on periodic overhauls of each locomotive. BNSF accepts AEP Texas' use of the maintenance contract to identify the per-LUM costs as calculated in AEP Texas' electronic workpapers,[17] but applies the correct mileage-tier rate based on the average number of LUMs per month for each locomotive.[18]

With respect to overhauls, BNSF accepts the annual overhaul cost specified by AEP Texas for SD40-2s. AEP Texas' annual overhaul cost for SD70MACs, however, is well-below the actual overhaul costs incurred by BNSF. AEP Texas relies upon a { } BNSF maintenance agreement as support for an overhaul charge of { }, but that agreement clearly states {

} BNSF invoice data produced in discovery demonstrates that BNSF actually paid { } for each of

[17] *See* AEP Texas Opening electronic workpaper "TNR Loco Maint.xls."

[18] See BNSF Reply electronic workpaper "Revised Locomaint_AEPTX.xls," worksheet "Summary."

[19] AEP Texas Opening workpaper 8803.

the { } SD70MACs overhauled during 2001.[20] BNSF uses this real-world cost in its Reply evidence.

The total locomotive maintenance costs used in BNSF's DCF analysis are calculated for the somewhat smaller traffic group sponsored by BNSF. Overhaul costs are based on the number of locomotives the TNR would require for this traffic group. *See* Section III.C.1.b.(2) above. Mileage-based maintenance costs for road locomotives were determined by counting the actual number of LUMs for the BNSF-sponsored traffic group in 2020 and then adjusting that number of LUMs to reflect the annualized traffic volume for the partial base year 2000.[21] For the SD40-2s, BNSF developed the total number of LUMs by applying the standard 6-mile-per-hour factor to the hours that the switch and work-train units were in service, and calculating the actual LUMs generated by the units in helper service.[22] The following table compares locomotive maintenance costs:

Table III.D.1-2
Comparison of Locomotive Maintenance

	AEP Texas	**BNSF**	**Difference**
SD70MACs			
1. Locomotive Unit-Miles	32.00 million	27.73 million	-4.27 million
2. Cost/LUM	{ }	{ }	$0.0696
3. Annual Maintenance	{ }	{ }	-$0.27 million
4. Annual Overhaul Charge/Unit	{ }	{ }	$154,078
5. Total Number of Units	229	232	3
6. Total Overhauls	{ }	{ }	$3.03 million

[20] BNSF.RP.WP.III.D-0023.

[21] BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls," worksheet "Summary." LUMs were calculated by identifying the number of route miles traveled by each train over the TNR, counting the appropriate number of LUMs for each locomotive on each train, and summing the LUMs for all locomotives on all trains.

[22] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls," worksheet "Summary" for helper LUMs and BNSF Reply electronic workpaper "Total TNR Fuel.xls" for switch and work train LUMs.

SD40-2s			
7. Locomotive Unit-Miles	2.02 million	2.14 million	0.12 million
8. Cost/LUM	${ }	${ }	$0.0000
9. Annual Maintenance	{ }	{ }	$0.52 million
10. Annual Overhaul Charge/Unit	{ }	{ }	$0
11. Total Number of Units	47	55	8
12. Total Overhauls	{ }	{ }	$0.09 million
13. Total Annual Maintenance	*{ }*	*{ }*	*$3.37 million*

c. Servicing

AEP Texas derives a locomotive servicing cost per LUM that includes sanding and lubrication from BNSF's 2000 R-1.[23] BNSF accepts the R-1 as an appropriate source for this unit cost but takes issue with AEP Texas exclusion of costs reported to a yard operations account. To account fully for all of its locomotive servicing expense, BNSF includes the total reported costs in its calculation, which results in a per-LUM servicing cost of { } instead of { }.[24]

d. Fuel

(1) Fuel Locations

AEP Texas assumes that the TNR will have two primary fueling locations. Its main fueling facility would be at its yard in Alliance, NE, and a second facility would be at its Las Animas, CO yard. AEP Texas assumes that all locomotives on TNR trains will be fueled in the empty direction at Alliance where permanent fuel racks are to be installed. All locomotives are assumed to be fueled in the loaded direction at Las Animas, where fuel is to be dispensed by tanker truck. AEP Texas Nar. at III-D-4. BNSF explained above that it is not feasible for the TNR to establish a fueling facility at Las Animas. Instead, for the reasons discussed above, the

[23] *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.xls," worksheet "Summary."

[24] BNSF Reply electronic workpaper "OPR_EXP.xls," worksheet "Summary."

TNR would need to have a large scale fixed fuel facility at Amarillo, where BNSF currently has a fuel facility. Accordingly, BNSF relocated the Las Animas yard tracks to Amarillo and identified the fueling facilities that would be required at that yard. Also as explained above, the TNR would have to dispense fuel to TNR trains at Amarillo in both the loaded and empty directions. BNSF has sized the Amarillo facility to accommodate the higher volume of fuel that would have to be dispensed there.

AEP Texas also assumes that the TNR will provide fuel, as needed, for trains exiting the TNR at South Logan and Campbell by direct-to-locomotive ("DTL") service located at the TNR's South Logan and Campbell interchange locations. These DTL fueling facilities are needed because trains exiting the TNR at South Logan and Campbell never pass through Alliance or Las Animas where larger scale fueling operations are assumed to be carried out. *Id.* The TNR will also provide helper service at several locations, but AEP Texas did not specify how the TNR will fuel its helper locomotives. Since AEP Texas proposed DTL service at Campbell, WY for interchange trains, BNSF assumes that helper locomotives on the Orin Line and Campbell subdivisions will be fueled by the same DTL service at Campbell. The TNR provides helper service at two other locations (Crawford, NE, for helpers at the Crawford Hill and Big Lift, CO, for helpers operating between Big Lift and Palmer Lake, CO), but neither of these helper locations is near AEP Texas' primary fueling facilities at Alliance or Las Animas. BNSF therefore assumes that the TNR will fuel these locomotives via DTL service as well.

Finally, the need to move the Las Animas fueling service to Amarillo will require the TNR to adjust its fueling operations for trains destined to two plants, Holcomb and Harrington. Holcomb trains are interchanged to the residual BNSF at Las Animas before reaching the Amarillo fueling facility. Since these trains cannot complete a round-trip journey without

refueling, they will be fueled in both the loaded and empty directions at Alliance. The Harrington plant is located approximately three miles north of the TNR's Amarillo fueling facility. {

} BNSF proposes the same fueling arrangement for the TNR to avoid the inefficiency of moving these trains out of route to fuel at the Amarillo facility. These changes also avoid the need to maintain DTL fueling service at Las Animas for these two trains.

(2) Fuel Price

In calculating the cost of fuel for TNR trains, which is included in the SAC locomotive operating costs, AEP Texas assumed that fuel would be available to the TNR at BNSF's system-average fuel price as reflected in the R-1. AEP Texas Opening Nar. at III-D-4. AEP Texas provides no evidence to support this assumption. In fact, Lonnie Jarrell, BNSF's Director Fuel Logistics, testifies that such an assumption is not justified. As he testifies, BNSF's cost for fuel at each of the locations where the TNR plans to dispense fuel is significantly greater than its system average R-1 price. There is no reason to believe that the TNR could obtain fuel for its trains at a cost that is less than the cost that BNSF incurs to obtain fuel at those same locations.

Mr. Jarrell explains that BNSF's Fuel Management Group maintains a database in the ordinary course of business that tracks BNSF's cost of fuel at the various locations where fuel is dispensed and the volume of fuel dispensed. This database draws from system accounting databases that record payments to third party vendors and transportation suppliers such as pipelines. It also includes an estimate of the cost for BNSF to transport fuel from particular refineries or pipeline terminals to fueling locations on BNSF's system. The database is used by BNSF's Fuel Management Group among other things to monitor inventory levels and relevant costs and to make business decisions about how much fuel to purchase for particular locations and where to source the fuel.

Exhibit III.D-2 presents the data from the Fuel Management Group database showing BNSF's cost of fuel at Alliance and Amarillo for each month of the year 2000.[25] The TNR is assumed to begin operations in Second Quarter 2000 and BNSF has calculated a Second Quarter 2000 price to be used in the SAC analysis.[26] Mr. Jarrell explains below the components for these fuel prices for each location.

As to Alliance, BNSF obtains the vast majority of its fuel from a fuel supplier in Tulsa, OK. BNSF purchases the fuel in bulk at Tulsa and arranges for transportation of the fuel by pipeline from Tulsa to Des Moines, IA. At Des Moines, the fuel is taken by BNSF from the pipeline and loaded into rail tank cars and moved to Alliance on BNSF trains over BNSF's lines. The fuel price identified in Exhibit III.D-2 includes the cost of the fuel at Tulsa, the out-of-pocket payments to the pipeline for movement of the fuel to Des Moines and an estimate of BNSF's costs to move the fuel from Des Moines to Alliance over BNSF's lines. That fuel price also includes an environmental fee paid to the state of Nebraska which is required for fuel used or dispensed in Nebraska. Finally, the fuel price includes the federal excise taxes due on all diesel fuel.

As to Amarillo, BNSF obtains its fuel at that location from a refinery and distribution terminal located near Amarillo. There is an existing pipeline that connects the distribution terminal with BNSF's fuel tanks at the Amarillo yard. The price of fuel reflected in Exhibit III.D-2 for Amarillo includes the purchase price of the fuel at the refinery, out-of-pocket payments by BNSF to the pipeline for movement of the fuel to BNSF's yard, and federal excise taxes.

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[25] This Exhibit is included in BNSF's electronic workpapers as "AEP TX Fuel Cost Alliance Amarillo.xls."

[26] BNSF Reply electronic workpaper "Total TNR Fuel.xls."

BNSF assumes that the TNR will obtain fuel at Alliance and Amarillo at the prices reflected in Exhibit III.D-2, the same costs incurred by BNSF to obtain fuel at those locations. There is no reason to believe that the TNR would obtain fuel at a lower price. Indeed, BNSF uses internal resources to move fuel to Alliance and the cost to BNSF reflected in Exhibit III.D-2 contains only an estimate of BNSF's costs for that service. The TNR would have to pay a third party to provide the transportation of the fuel from Des Moines to Alliance and would clearly pay a price for that service that is higher than the direct cost. It is therefore conservative to assume that the TNR would be no worse off than the incumbent in obtaining the large volumes of fuel that are needed at Alliance.

The TNR will require much smaller volumes of fuel at locations using DTL service. However, AEP Texas assumed that the TNR would obtain fuel for these locations at BNSF's system-average fuel cost as reflected in the R-1. AEP Texas ignores both the cost to obtain fuel at the locations where DTL service will be provided and the payments to DTL providers to dispense the fuel by truck. Mr. Jarrell explains that BNSF today uses DTL service at a variety of locations. Most of the fuel used in DTL service is purchased by BNSF and then provided to the DTL supplier to dispense. BNSF's cost of fuel in those instances consists of the cost to obtain the fuel and an out-of-pocket payment to the DTL provider. That payment is usually based on a per-day, per-truck fee but it is occasionally based on a contracted price per gallon. At some locations BNSF purchases both the fuel and the DTL service from the DTL provider.

BNSF's Fuel Management Group also maintains data on the average amounts paid to DTL providers per year. These data are derived from BNSF's system-wide accounting data and are based on the actual payments to DTL vendors. BNSF maintains these data to monitor inventory and costs and to make purchasing decision. The data are maintained on the basis of

annual averages. In the year 2000, BNSF dispensed { } gallons of fuel using DTL providers and paid an average of { } for the DTL service on top of the cost to obtain the fuel itself.

In estimating the TNR cost of fuel for DTL service, BNSF assumed that the TNR could obtain fuel for its South Logan, Campbell, Crawford and Big Lift fuel services at the same cost that it obtains fuel at Alliance. This is a conservative assumption since it ignores the internal costs to transport the fuel to those locations, assuming that the TNR would provide that transportation itself rather than pay a third party to move the fuel to the various DTL sites. BNSF adds the { } DTL premium to that price for the volume of fuel dispensed at those locations to account for the payments to a DTL provider. BNSF assumes that the TNR will obtain fuel at the Harrington location at the Amarillo price and adds the DTL premium to that amount. BNSF's calculations are set out in supporting workpapers.[27]

(3) Fuel Consumption

AEP Texas also erred by assuming that TNR trains would consume fuel at a rate that reflects "BNSF's system average fuel consumption rates per gross ton-mile and diesel unit-mile from its 2000 STB URCS." AEP Texas Opening Nar. at III-D-4. TNR trains are predominantly large, heavy unit coal trains. In the loaded direction, these trains are among the longest and heaviest trains that BNSF handles on its rail network. The terrain over which these trains move is difficult. On their return from the shippers' electricity generating facilities, these long trains trail over one hundred empty, open-top cars that generate substantial wind resistance. There is no reason to believe that a railroad handling unit coal trains in the west would consume fuel at the average fuel consumption rate for the incumbent's entire fleet of trains. In fact, BNSF has

[27] BNSF Reply electronic workpaper "Total TNR Fuel.xls."

demonstrated in past SAC litigation that unit coal trains operating in this area consume fuel at a rate that significantly exceeds BNSF's system average fuel consumption rate.

In *TMPA*, BNSF presented evidence of above-average fuel consumption on TMPA's trains based on a fuel consumption study that analyzed event recorder data obtained from several TMPA trains. As BNSF explained in that case, locomotives used to power unit coal trains are equipped with event recorders that keep track of a variety of operating characteristics, such as speed and distance traveled. Event recorders also keep track of a locomotive's throttle position by time. The amount of fuel consumed by modern diesel locomotives is a function of the locomotive's throttle positions. Because the locomotive diesel engine simply creates electricity for traction motors, the amount of fuel consumed by the diesel engine at each throttle position is constant and does not vary with operating conditions. The manufacturers of the locomotives used by BNSF perform extensive tests to develop highly precise fuel consumption figures for each throttle position on each locomotive model. It is therefore possible to calculate fuel consumption with a high degree of accuracy using the manufacturer fuel consumption specifications and data from event recorders on the amount of time a locomotive spends in various throttle positions.

BNSF also carried out a field test for purposes of its fuel consumption study in the *TMPA* case to determine whether the event recorders could reliably be used to estimate fuel consumption on unit coal trains and whether the fuel consumption rates provided by the manufacturers were reliable. BNSF carried out this field test with TMPA and with Xcel Energy, a complainant in another pending SAC case. The field test used a BNSF test car equipped with flow meters that measured the amount of fuel actually injected into two locomotives during a movement in the PRB. The locomotives pulled empty coal cars from Guernsey, WY to a mine

in the PRB for loading and then returned to Guernsey with loaded cars. The data generated by the test car were then compared to calculations of fuel consumption made using the event recorder data downloaded from those same two locomotives for the same movement segment and the locomotive manufacturer's fuel consumption rates. The event recorder calculations for the combined fuel consumption of the two locomotives monitored were within one percent of the test car measurements, thus confirming both the reliability of the event recorder approach to estimating fuel consumption and the locomotive manufacturer tables of fuel consumption.[28]

The Board in *TMPA* accepted BNSF's fuel consumption calculations for purposes of the variable cost analysis with minor adjustments to the fuel consumption rates.[29] BNSF also used its fuel consumption calculations to prepare SAC evidence on fuel consumed by SARR trains, and the Board accepted those calculations as well.[30] In the pending *Xcel* case, BNSF carried out an identical fuel study, which also showed significantly above-average fuel consumption on Xcel's trains. BNSF based its variable cost and SAC fuel evidence in that case on its fuel study.

In this case, BNSF applies the results of the fuel studies it carried out in *TMPA* and *Xcel* to TNR trains. Those fuel studies provide a highly reliable basis for estimating fuel consumption on TNR trains. The size of the study trains in both the *TMPA* and *Xcel* studies is similar to the size of TNR trains.[31] Moreover, the route covered by those trains is very similar to the route that

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[28] BNSF.RP.WP.III.D-0036 to 0058.

[29] *TMPA*, slip op. at 58.

[30] *Id.* at 82.

[31] The TMPA fuel study trains used three-locomotive consists and averaged { } cars per train, while the Xcel fuel study trains used three-locomotive consists and averaged { } cars. TNR coal trains also use three-locomotive consists and, with the exception of a handful of smaller trains, range in size from 111 to 136 cars with an average of 121 cars per train. AEP Texas Opening electronic workpaper "TNR Fuel Consumption.xls," worksheet "2020 WY Coal Train List" at column I. As BNSF explains in its opening evidence in this case, BNSF carried

TNR trains are assumed to follow. In order to make the most reliable comparison, BNSF applied the results of the *TMPA* fuel study to TNR trains that moved beyond Denver, since TMPA's trains likewise moved along the front range of the Rocky Mountains into Texas.[32] BNSF applied the results of the *Xcel* fuel study to TNR trains that exited the TNR before Denver.[33] BNSF's workpapers show how these results were applied to TNR trains.[34]

e. Other

This section intentionally left blank.

2. Railcars

BNSF accepts AEP Texas' leasing and maintenance cost of { } for non-coal railcars.[35] With respect to coal cars, BNSF accepts the lease and maintenance unit costs specified in AEP Texas' workpapers, but applies those unit costs to the fleet of coal cars required

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out a fuel consumption study on AEP Texas trains moving in the third and fourth quarters of 2003. However, AEP Texas' trains moving in those quarters were not representative of TNR trains, so the results of that study could not be used to estimate fuel consumption on TNR trains.

[32] The TMPA study produced a fuel consumption rate of 3.40 gallons per locomotive unit mile, as shown in BNSF's opening and rebuttal workpapers supporting the TMPA study. BNSF Reply electronic workpaper "TMPA Fuel Study - Adjusted.123" and BNSF.RP.WP.III.D-0059 to 0338.

[33] The Xcel study produced a fuel consumption rate of 3.78 gallons per locomotive unit mile, as shown in BNSF's opening and rebuttal workpapers supporting the Xcel study. BNSF Reply electronic workpapers "XCEL FUEL_STUDY_SUMMARIZED_OPEN.123" and BNSF.RP.WP.III.D-0339 to 1207. In response to Xcel's reply evidence, BNSF submitted several sensitivity analyses which are also reproduced in this case. BNSF Reply electronic workpapers "XCEL FUEL_STUDY_SUMMARY less EST.123," "XCEL FUEL_STUDY_SUMMARY LESS GE.123" and "Xcel Rebuttal Fuel Sensitivities.123."

[34] BNSF Reply electronic workpaper "Total TNR Fuel.xls" and BNSF.RP.WP.III.D-1208 to 1216.

[35] *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.xls," worksheet "Summary."

to transport the revised BNSF-sponsored traffic group.[36] BNSF notes that there is an apparent linking error in the AEP Texas workpapers that results in an understatement of the coal car leasing and maintenance costs that AEP Texas inputs into its DCF analysis. AEP Texas erroneously included only the { } in gondola maintenance costs rather than the total lease and maintenance cost for gondolas and hoppers, which it determined to be { }.[37] BNSF corrected that error.

a. Leasing

This section intentionally left blank.

b. Maintenance

This section intentionally left blank.

c. Foreign Cars and Private Car Allowance

BNSF accepts AEP Texas' treatment of foreign cars and private car allowances.

d. Other

This section intentionally left blank.

3. Personnel

a. Operating

(1) Staffing Requirements

The table below compares the operating personnel proposed by AEP Texas and the minimum number determined to be required by BNSF for the BNSF-sponsored traffic group. The staffing requirements are discussed in more detail below.

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[36] *See* BNSF Reply electronic workpaper "TNR Car Costs BNSF.xls," worksheet "Coal Cars."

[37] *See* AEP Texas First Errata electronic workpapers "TNR_OP_EXP.xls," worksheet "Summary," cell D124, and "TNR Car Costs.xls," worksheet "Coal Cars," cells C29, C31, and D31.

TABLE III.D.3-1
Operating Personnel - 2000

Position	AEP Texas	BNSF	Difference
Director of Operations Control*	1	1	0
Manager of Operations Control	5	5	0
Crew Callers	5	5	0
Dispatchers	18	18	0
Director of Customer Service*	1	1	0
Customer Service Managers*	8	8	0
Director of Train and Locomotive Operations*	1	1	0
Manager of Train Operations	9	9	0
Assistant Manager of Train Operations[38]	21	22	1
Train & Helper Crew Members	487	473	(14)
Switch & Work Train Crew Members	27	42	15
Crew Hauler/Utility Clerk	0	5	5
Manager of Locomotive Operations	9	8	(1)
Hostlers	0	24	24
Manager of Operating Rules and Safety*	1	1	0
Total	593	623	30

* AEP Texas included these positions in its G&A Staff.

[38] Although Table III-D-2 of AEP Texas' Opening Nar. at III-D-13 specifies 23 assistant managers for Alliance and Las Animas, AEP Texas's workpapers include costs for only 21 employees. *See* AEP Texas First Errata electronic workpaper "TNR_OP_EXP.xls," worksheet "Summary," cell E201.

(a) Operating Personnel (Except Train Crews)

BNSF witness Loren Mueller has reviewed AEP Texas' operating personnel designations for non-crew positions and generally agrees that the staffing levels are adequate. Under the BNSF operating plan for the TNR, all crews serving mines will be based at Donkey Creek. In light of this adjustment, Mr. Mueller eliminated the Assistant Manager of Train Operations position at South Logan. In addition, Mr. Mueller has eliminated the Manager of Locomotive Operations at South Logan as there are no locomotive engineers based at that location under the BNSF operating plan.

Mr. Mueller added three, two-man hostler positions working 24/7 in eight-hour shifts at Alliance to handle locomotives. These hostlers are required to move locomotives from both the front of the train and the DP position to and from the service tracks. AEP Texas' operating plan provides that all locomotives arriving at Alliance on empty trains, both through on the TNR and received in interchange from the BNSF, will go to the locomotive service facility to be fully fueled and serviced. Each of these trains will arrive with a locomotive on the rear in DP configuration and will require a hostler to move them to the service facility. BNSF crews delivering empty trains to the TNR in interchange cannot be required to detach their locomotives and move them to the service area, therefore, the hostlers will be required to perform that task on each empty received in interchange. Each empty train departing Alliance will also have a locomotive on the rear in DP configuration and will require a hostler to move the locomotive from the service area to the rear of the train.

In addition, Mr. Mueller added a 24/7 crew hauler/utility clerk position (for a total of 5 employees) at Alliance. The main duties assigned to this position involve transporting train crews and hostlers within the Alliance yard. The position will require a four-wheel-drive Suburban in order to access the railroad right-of-way and the yard tracks. When the utility clerks

are not being utilized to transport train crews and hostlers they will be available to perform administrative duties such as posting bulletins and general orders as necessary, maintaining printers and computers in the crew facility, maintaining the vehicle they are driving, janitorial duties at the crew on/off duty facility, and any other duties as may be required by the supervisors in the Alliance Yard.

(b) Train Crews

i) Crew Districts

Mr. Mueller has reviewed and accepts the crew assignments specified by AEP Texas with a single exception. AEP Texas appears to have specified in its narrative that all Orin Subdivision mines would be served by turn crews based at South Logan. *See* AEP Texas Opening Nar. at III-C-32. Basing these crews at South Logan makes little sense since the frequency of trains moving through South Logan is low. Mr. Mueller has assumed that all crews serving mines on the Orin, Reno, and Campbell subdivisions would be based in Donkey Creek. Indeed, this appears to be the assumption that AEP Texas actually made in its underlying workpapers.[39]

ii) Staffing Requirements

AEP Texas developed its peak-year crew requirements by counting the number of road-crew personnel that would be required to work the trains that traverse the TNR during the July 1 to July 7 peak week in 2020. BNSF accepts that this method of counting is an appropriate way to determine peak year road crew requirements and believes that the 579 road-crew personnel specified by AEP Texas would be adequate to meet the peak-year needs for the AEP Texas

[39] *See* AEP Texas Second Errata electronic workpaper "TNR Operating Statistics.xls," worksheet "Crew Starts," cells U7 and U8. AEP Texas assumed that taxis would only be required for crews passing through South Logan, which is consistent with crews having a home base of Donkey Creek. If crews were based in South Logan, then nearly all crews serving Orin Subdivision mines would need taxis both to the mines and back to South Logan at the end of their shifts.

traffic group, if one accepts the assumption that each crew-person can perform 270 shifts per year.[40] As explained in the introduction to Section III.D, however, AEP Texas did not properly translate these peak-year requirements to the base-year. The TNR does not actually pay for (and thus presumably does not employ) the full 579 road-crew personnel AEP Texas says would be needed in the peak year, and the TNR's T&E expenses are understated throughout the DCF analysis.

To calculate road-crew personnel for the BNSF-sponsored traffic group, BNSF accepted AEP Texas' general approach for calculating peak-year requirements. BNSF counted the number of crew starts that would occur in each crew district during the peak week identified by AEP Texas. In those instances where the RTC model analysis indicated that a crew would not be able to complete its shift within the 12 hours permitted by federal hours-of-service rules, a recrew was added.[41] As AEP Texas did, BNSF annualized this number of starts to determine the number of starts in the peak year. This produced a peak-year road-crew requirement of 441.[42]

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[40] BNSF has accepted the 270-shift assumption for road crew personnel given the Board's reluctance to recognize that such a level of work-effort is unknown in the real world and almost certainly could not be achieved by a SARR. As shown in Section III.D.3.a.(2) below, only { }% of the sampled BNSF employees who worked on trains that traversed the SARR achieved 270 crew starts or more per year; those few that averaged 270 annual starts received compensation well above that paid to an "average" crew member. Although it appears patently unreasonable to assume that employees of the TNR could *average* 270 starts per year – more than one start every weekday of the year – BNSF has elected not to contest this assumption so long as the TNR's T&E personnel receive the high compensation that would be commensurate with the exceptionally heavy workload assumed.

[41] A recrew was added where the transit time between stations exceeded 11.5 hours. BNSF witness Mueller concluded that this was the maximum time a crew would have available after allowing for on-duty tasks in the yards. Although AEP Texas' own RTC analysis showed that the TNR's crews do not always complete their shifts within 12 hours, AEP Texas did not make any adjustment to its calculations to correct for crews that outlaw.

[42] *See* BNSF Reply electronic workpaper "BNSF Crew Count.xls," worksheet "Summary."

Calculating peak requirements is necessary to ensure that the TNR will have sufficient crew personnel to handle the railroad's requirements on its busiest days. These days occur frequently throughout the year at unpredictable intervals and are not simply isolated spikes in traffic. Because the SAC analysis does not provide any contingency funds for operating costs, the only way to ensure that a SARR will incur the costs required to satisfy its peak requirements is to build to those peak requirements. Indeed, the Board has explicitly recognized that requiring a SARR to maintain sufficient resources to meet peak demand is an "inescapable consequence" of the carrier's obligation to serve customer needs during those periods. *TMPA* at 81.

To derive base-year requirements from this peak-year number, BNSF simply multiplied by the ratio of 2000 net tons divided by 2020 net tons.[43] The TNR would require 410 road crew personnel in 2000 to transport the BNSF-sponsored traffic.

With respect to helper and switch crews, BNSF accepts AEP Texas' assumption that helpers would have one-person crews and switch engines would have two-person crews. BNSF does not accept AEP Texas' assumption that helper and switch personnel could work 270 twelve-hour shifts a year.[44] Under AEP Texas' assumption, these crew personnel would be required to work an unrealistic 3240 hours a year. Mr. Mueller has determined that helper and switch personnel could work only eight-hour shifts, at most, if they were expected to perform 270 shifts a year. BNSF has accepted the number of switch and helper assignments. With the

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[43] *See* BNSF Reply electronic workpaper "OPR_EXP.xls," worksheet "Summary," cell F7. The net tonnage figures applied are the same as those used in the DCF analysis. As a result, under BNSF's approach, the TNR would actually pay for the number of road crew personnel that it requires in each year of its operations.

[44] *See* AEP Texas Second Errata electronic workpaper "TNR Operating Statistics.xls," worksheet "Crew Starts."

change to three shifts per day, the TNR would require 34 switch personnel[45] and 63 helper personnel.[46] Although the number of helper and switch crew personnel increases because three shifts are performed a day instead of two, the number of helper crew personnel actually goes down under the BNSF operating plan because AEP Texas made an error that overstated the number of helper personnel it would need (even at two shifts per day) for the Crawford and Big Lift Helpers.[47] Similarly, the number of switch crew personnel increases only slightly under the BNSF operating plan because AEP Texas calculated its crew requirements based on five switch assignments, which includes the spare, instead of on four switch assignments.[48]

AEP Texas did not provide for any work trains. BNSF witness Albin has specified that the TNR would require four work trains that operate five days per week year-round. Each work train will require a two-person crew, resulting in an additional 8 crew persons.

iii) Mine Loading Costs

AEP Texas assumed that mine loading would be carried out by contractors at the mines. *See* AEP Texas Opening Nar. at III-B-25. AEP Texas did not, however, include any cost for the mine loading operations in its DCF analysis, notwithstanding the fact that BNSF provided to AEP Texas in discovery copies of the contracts BNSF maintains with the third-party loaders at the mines. BNSF accepts AEP Texas' apparent assumption that loading would be handled by

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[45] At Alliance, 3 switch engines x 3 shifts per day x 2 crews x 365 days/270 = 25. At Amarillo, 1 switch engines x 3 shifts per day x 2 crews x 365 days/270 = 9.

[46] At Donkey Creek, 3 helper assignments x 3 shifts per day x 1 crew x 365 days/270 shifts = 13. At Crawford, 7 helper assignments x 3 shifts per day x 1 crew x 365 days/270 shifts = 29. At Big Lift, 5 helper assignments x 3 shifts per day x 1 crew x 365 days/270 shifts = 21.

[47] *See* AEP Texas Second Errata electronic workpaper "TNR Operating Statistics.xls," worksheet "Crew Starts."

[48] *Id.*

contractors at the mines since as of {

} use contractors. BNSF has included an appropriate cost based on the actual payments made to the mine loaders.[49]

iv) Taxi & Overnight Expenses

BNSF accepts AEP Texas' per trip and per night taxi and overnight costs. BNSF has generally made the same assumptions concerning when taxis and overnights would be required as did AEP Texas in its electronic workpapers. BNSF has added intermine taxis for mines where train frequency is too low to permit a turn crew arriving with an empty train to depart from the same mine with a loaded train. In addition, BNSF has assumed that crews on overnight stays would not be required to share a hotel room.[50]

(2) Compensation

AEP Texas uses BNSF 2000 Wage Form A and B data as the source for its salary information. AEP Texas manipulates that data inappropriately to produce understated personnel costs. First, AEP Texas continues failed properly to index wages to the fiscal quarter in which operations on the SARR commence. When de-escalating wages to the 2Q 2000 levels, AEP Texas used the ratio of the AAR second quarter wage rates index in the Western Region "Quarterly Indexes of Chargeout Prices and Wage Rates" (293.6) to the AAR Western Region annual wage rates index (304.6).[51] This approach was simply wrong. As the Board and its predecessor the ICC have long recognized, it is not possible to use the AAR annual wage indexes

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[49] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls;" BNSF.RP.WP.III.D-1217-1277.

[50] *See* BNSF Reply electronic workpaper "LUMs and Carmiles (AEPTX-BNSF).xls."

[51] *See* AEP Texas Opening electronic workpaper "TNR Salaries.XLS." AEP Texas does not identify the source of the indexes it uses, but they correspond to the indexes identified by BNSF above. *See* BNSF.RP.WP.III.D-1283-1285.

and the AAR quarterly wage indexes in the same calculation. Indeed, the AAR publication containing the indexes itself notes that the quarterly and annual indices are derived from different data sets and are not, therefore, directly comparable.[52] It is true that the quarterly indexes are estimates,[53] while the annual index is derived from annual survey data, but that in no way justifies mixing the two in a single ratio. The quarterly estimates and the annual figure are prepared on different bases. If the quarterly index is to be used, as it must be, it can only be used in conjunction with the other quarterly indexes. The proper method for de-escalating to second quarter levels is to divide the second quarter wage index by the average of the four quarterly wage indexes. This provides an apples-to-apples comparison.

Second, AEP Texas used an artificially low fringe benefit ratio. AEP Texas based its estimate of fringe benefits on AAR data used in calculating the RCAF during the second quarter of 2000 to develop an additive of 33.9% to salaries and wages. This figure is well below both the levels paid by Class I railroads[54] and the fringe benefit additive of 40 percent accepted by the Board in *TMPA*.[55] Indeed, the actual fringe benefits paid by railroads as reported in their R-1s over the full year 2000 and in subsequent years were considerably higher.[56]

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[52] *See* BNSF.RP.WP.III.D-1285, at 8, Note to Table A.

[53] According to the Association of American Railroads' Railroad Cost Recovery Index background information (updated November 2001), "[d]ata are collected from the railroads in quarterly surveys, with the exception of wage and wage supplements data, which are available only annually. Quarterly estimates of the wage and wage supplements components are based on provisions in labor contracts and on payroll tax changes and health and welfare contribution changes that occur on fixed dates." BNSF.RP.WP.III.D-1286.

[54] *See* BNSF Reply electronic workpaper "fringe benefits.xls."

[55] *See TMPA* at 103.

[56] *See* BNSF Reply electronic workpaper "fringe benefits.xls."

In its reply evidence, BNSF uses fringe benefits ratios derived from what railroads report in their R-1s. This method is superior due to the reliability of the data and the ability to specify fringe benefits separately for transportation, G&A, and MOW employees. For transportation employees, BNSF uses a three-year average of transportation-specific fringe benefits reported in R-1s for Class I railroads in the same peer group as the TNR, namely with less than $1 billion in freight expenses per year. The average 2000-2002 transportation department ratio for those carriers was 43.4 percent.

(a) Transportation Department Personnel (Except Train Crews)

Compensation for transportation department employees other than train crews was determined by calculating BNSF 2000 Wage Form A and B average annual salaries and indexing to second quarter 2000 levels. BNSF accepts the Wage Form A and B data as an appropriate source for salaries, but corrects the indexing and fringe benefit issues described immediately above.

(b) Train Crews

AEP Texas asserts that crew wages, as well as wages for other TNR employees, are "at or close to the same levels as those presently paid by BNSF for comparable positions, and include[] constructive allowances." AEP Texas Opening Nar. at III-D-19. With respect to crew salaries, this statement is simply false.

i) Exclusion of Compensation Actually Paid to BNSF T&E Personnel

AEP Texas admits that it has selectively chosen to pay its crew personnel some constructive allowances while declining to pay them others. This exclusion appears to be based on the notion that some constructive allowances are irrelevant and that others the TNR could

simply elect not to pay because AEP Texas believes the TNR would be a non-union railroad. There are a number of problems with this analysis.

First, constructive allowances are merely an accounting mechanism used to categorize the total compensation received by T&E employees. TNR employees, like employees at other railroads, will be concerned with the total compensation they receive, not by any labels attached to separate components of that compensation. AEP Texas does not and cannot explain why TNR employees would be willing to forego compensation they could and would earn at another railroad simply because AEP Texas believes that such compensation is unnecessary.

Second, many of the constructive allowances excluded by AEP Texas are for clearly legitimate activities such as ongoing training, personal and annual leave, military service, and safety meetings for which engineers and conductors would expect to be compensated.[57] In fact, AEP Texas's work papers show that its development of TNR salaries excludes more than one million dollars in wages for the above activities that BNSF paid to crew persons working Oklaunion trains in 2002.[58] There is no reason to believe the TNR could avoid compensating its employees for these activities.

Third, AEP Texas has failed to provide any basis for the proposition that the TNR would be non-union. As described in Section III.D.3.c below, the TNR would be a Class I railroad and would be larger than the four smallest real-world Class I railroads. All of the Class I railroads are unionized, as are many of the regional and shortline railroads.

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[57] BNSF does not assert that T&E compensation should include payments made to train and engine crew persons from the separate productivity fund.

[58] *See* AEP Texas Opening electronic workpaper "TNR Constructive Allowances.xls" and BNSF Reply electronic workpaper "Constructive Allowance Exclusions.xls."

Finally, any attempt to compare constructive allowances that would need to be paid by the TNR to those allegedly paid by the Wisconsin Central prior to its acquisition by the Canadian National is beside the point. AEP Texas has provided no basis for believing that a valid comparison could be made. In particular, it has made no effort to demonstrate that the work effort expected of Wisconsin Central employees bears any resemblance to the very heavy workload that will be demanded from the TNR's 270-start a year employees. According to BNSF witness Reilly McCarren, who became President of the Wisconsin Central in mid-1999, and who had previously served as Executive Vice President and Chief Operating Officer, road crews on the Wisconsin Central did not approach 270 starts per year on average during his time with the railroad. Here, as in the Board's recent *CP & L* decision, there is no basis to believe that the TNR would be able to avoid paying the constructive allowances it has excluded. *See CP & L*, slip op. at 63.

ii) More Work for Less Pay

Even if AEP Texas had properly included constructive allowances in T&E compensation, its compensation levels would be too low because of the extraordinarily high work level it expects from TNR T&E employees. TNR T&E personnel will be expected to average 270 shifts a year. This is far more shifts than the "average" BNSF T&E employee whose compensation is reflected in Wage Form B performs in a year.[59] Compensation data for { } full-year BNSF employees who served as engineers or conductors on trains included in the TNR traffic group reveal that the average number of crew starts in 2002 for these BNSF engineers and conductors was { }, nearly { } fewer shifts than the 270 starts AEP Texas says its crew

[59] The Wage Form B figures on which AEP Texas relies contains aggregate data for all BNSF engineers and conductors. Dividing aggregate wages by the number of employees necessarily produces an average wage.

personnel will perform.[60] Only { } of the { } employees performed 270 crew starts or more in 2002. This demonstrates that TNR T&E personnel will be required to perform much more work each year than the average BNSF T&E employee on whom AEP Texas based its wages.

Given the small proportion of BNSF employees in the sample who performed 270 crew starts per year, it appears unreasonable for AEP Texas to assume that its entire work force would be able to average 270 starts per year. Indeed, recent press accounts of service problems on the UP have reported that those problems stem in part from trying to force too few T&E employees to perform too much work. A representative of conductors for UP is quoted as stating that "we're overworked to the point of exhaustion, and it's getting to the point where our members are actually looking forward to being disciplined because it's the only way that they can get some rest." *See* Exhibit III.D-3, "UP in a Jam," *traffic WORLD*, at 30 (Mar. 8, 2004). Similarly, another union representative is quoted as stating that "Railroads in general are trying to get too much work done with not enough people and our members are suffering because of it." *Id.* Employees of Class I railroads are already balking at their current workload. The evidence submitted by BNSF demonstrates that the existing workload is far below the 270 starts per year

[60] *See* BNSF Reply electronic workpaper "All Wages.xls," worksheet "Eng_Cond Combo." The wage data used for this analysis are contained in the same workpaper at worksheet "SMSSOC02." To develop these data, BNSF consultants FTI used the 2002 payroll records for train and engine crews from BNSF's full wage data provided to AEP in discovery. *See* BNSF/AEPTX/TAPE 127 and BNSF/AEPTX/TAPE 128, used to create BNSF Reply electronic workpaper "SMSSOC02.dbf." AEP Texas used these records to develop crew wage costs used in its variable cost analysis for the Oklaunion trains. *See* "Open-Wages Summary-2002.xls." In BNSF's analysis, an employee was counted as "full-year" if that employee had at least one crew start in each month. Only individual payment records that showed an employee actually worked a train on a shift (because the record contained a positive amount in the straight pay (STAmnt column) were used.

the TNR would demand. Clearly, the TNR will need to pay premium wages if it expects to generate that level of work effort.

Despite the unreality of the assumption, AEP Texas has specified that the TNR's T&E work force will be composed only of employees who are willing to work as hard as the hardest-working { } percent of BNSF crew personnel. In the remote event that such a work force could be developed, AEP Texas would unquestionably need to pay more than an "average" wage. In the railroad world as elsewhere, employees who work more shifts and more hours in a year are better compensated than those who work fewer shifts and fewer hours. Indeed, the small proportion of BNSF T&E personnel who performed at this level was much more highly compensated than the "average" employee who performed only { } crew starts per year.

iii) BNSF Wages are the Best Evidence of Market Wages

Absent compelling evidence to the contrary, there is no basis for AEP Texas to arbitrarily reduce crew compensation below what is being paid in the marketplace today for work of similar type and quantity. Allowing proponents of stand-alone railroads to ignore fundamental economic principles would violate the stand-alone concept. Simply put, the stand-alone railroad must pay the market rate for its T&E employees. If AEP Texas expects TNR T&E employees to average 270 crew starts per year, it must expect to pay the higher compensation such employees currently earn in the market.

The best evidence of what the TNR would need to pay its 270-shift-per-year crew personnel is actual data that demonstrates what employees who performed the required amount and type of work earned at BNSF. From data for { } BNSF engineers and conductors who worked on trains included in the TNR traffic group, BNSF calculated separately what an engineer or conductor in the hardest working group of engineers or conductors would have been

paid.[61] Defendants then averaged the engineer and conductor salaries, just as AEP Texas did, to derive an overall average wage for T&E employees (de-escalated to a 2Q2000 level) of ${ }.

(c) Summary Comparison

The table below compares the compensation for operating personnel proposed by AEP Texas and BNSF:

TABLE III.D.3-2
Operations Personnel Compensation[62]

	AEP Texas			BNSF			
Position	**Count**	**Annual Salary**	**Total Salary**	**Count**	**Annual Salary**	**Total Salary**	**Total Difference**
Director of Operations Control*	1	$89,255	$89,255	1	$91,942	$91,942	$2,687
Manager of Operations Control	5	$73,313	$366,565	5	$75,520	$377,600	$11,035
Crew Callers	5	$40,793	$203,965	5	$42,021	$210,104	$6,139
Dispatchers	18	$59,593	$1,072,674	18	$61,386	$1,104,952	$32,278
Director of Customer Service*	1	$89,255	$89,255	1	$91,942	$91,942	$2,687
Customer Service Managers*	8	$76,190	$609,520	8	$78,483	$627,865	$18,345
Director of Train and Locomotive Operations*	1	$89,255	$89,255	1	$91,942	$91,942	$2,687
Manager of Train Operations	9	$73,313	$659,817	9	$75,520	$679,680	$19,863
Assistant Manager of Train Operations	21	$67,467	$1,416,807	22	$71,505	$1,573,116	$156,309

[61] For this calculation, BNSF used the group of engineers and conductors with annual starts in the range between { } and { }. Calculation of the engineer and conductor average salaries are contained, respectively, in BNSF Reply electronic workpaper "Engineers.xls," worksheet "Summary," and "Conductors.xls," worksheet "Summary." When de-escalated to the 2Q2000 level, an average engineer salary for this group was ${ } and an average conductor salary was ${ }. BNSF Reply electronic workpaper "Salary Summary.xls."

[62] Source: TNR information - TNR Opening Nar., Tables III-D-3 and III-D-5. BNSF information – BNSF Reply electronic workpaper "OPR_EXP.xls," at worksheet "Summary."

Train & Helper Crew Members	487	$58,673	$28,573,751	473	$68,234	$32,274,682	$3,700,931
Switch & Work Train Crew Members	27	$58,673	$1,584,171	42	$68,234	$2,865,828	$1,281,657
Crew Hauler/Utility Cler	0	$0	$0	5	$35,709	$178,546	$178,546
Manager of Locomotive Operations	9	$73,313	$659,817	8	$75,520	$604,160	($55,657)
Hostlers	0	0	0	24	$74,012	$1,776,277	$1,776,277
Manager of Operating Rules and Safety*	1	$73,313	$73,313	1	$75,520	$75,520	$2,207
Total	593		$35,488,165	623		$42,624,156	$7,135,991

* AEP Texas included these positions in its G&A Staff.

(3) Materials, Supplies and Equipment

In general, BNSF accepts the individual item unit costs that make up the overall material and equipment expense costs and basic cost per employee. However, AEP Texas' safety equipment costs are unacceptably low. BNSF calculates more appropriate safety gear costs for trainmen and equipment inspectors.[63] BNSF also adds a travel expense equal to 5% of non-train operating personnel salaries.[64]

b. Non-operating

(1) Staffing Requirements

(a) Mechanical

BNSF generally accepts AEP Texas' proposed mechanical staffing, but corrects an apparent computational error. AEP Texas specified six four-person inspection crews on a 24/7, 365-day-a-year, basis. *See* AEP Texas Opening Nar. at III-D-17 to 18. The standard conversion factor for determining how many personnel would be required to staff the 24 inspector positions

[63] *See* BNSF Reply electronic workpaper "OPR_EXP.xls," worksheet "Safety Gear."

[64] *See* BNSF Reply electronic workpaper "OPR_EXP.xls," worksheet "Summary."

full time is 4.5. Multiplying 4.5 by 24 produces 108, not 106. The table below compares the mechanical staffing for the TNR proposed by AEP Texas and BNSF:

TABLE III.D.3-3
Mechanical Staffing[65]

Position	TNR	BNSF	Difference
Director of Mechanical Services	1	1	0
Manager of Mechanical Operations	2	2	0
Equipment Inspectors	106	108	2
Total	109	111	2

(b) Engineering

Engineering staffing is addressed in Section III.D.4.b below.

(2) Compensation

(a) Mechanical

The table below compares the compensation for Mechanical Department personnel for the TNR proposed by AEP Texas and BNSF:

[65] Source: TNR information - TNR Opening Nar., Tables III-D-1 and III-D-4.

TABLE III.D.3-4
Mechanical Personnel Compensation[66]

Position	TNR			BNSF			
	Count	**Salary**	**Total**	**Count**	**Salary**	**Total**	**Total Difference**
Director of Mechanical Services	1	$89,255	$89,255	1	$91,942	$91,942	$2,687
Manager of Mechanical Operations	2	$73,313	$146,626	2	$75,520	$151,040	$4,414
Equipment Inspectors	106	$41,467	$4,395,502	108	$42,715	$4,613,173	$217,671
Total	109		$4,631,383	111		$4,856,154	$224,772

(b) Engineering

Compensation for engineering personnel is addressed in Section III.D.4.b below.

(3) Materials, supplies and equipment

(a) Mechanical

Materials, supplies and equipment for non-operating mechanical personnel are included in the consideration of materials, supplies and equipment for operating personnel in Section III.D.3.a.(3) above.

(b) Engineering

Materials, supplies and equipment for engineering functions are addressed in Sections III.D.4.b and c below.

[66] Source: TNR information - TNR Opening Nar., Tables III-D-3 and III-D-5. BNSF information – BNSF Reply electronic workpaper "OPR_EXP.xls," worksheet "Summary."

c. General and Administrative Expense

TNR as envisioned by AEP Texas will be a multi-commodity, Class I railroad of substantial scope. In its first year of full operations, 2001, it will:

- Handle 1.97 million carloads;
- Earn $767.3 million in revenue;[67]
- Operate and maintain 1,192 route miles;
- Operate in six states; and
- Employ 895 people.

TNR comfortably exceeds the size of the four smallest Class I carriers, Illinois Central ("IC") (with 2001 revenues of $650.2 million), Kansas City Southern ("KCS") (with 2001 revenues of $577.3 million), the Soo line (with 2001 revenues of $561.6 million) and the Grand Trunk Western Railroad, Inc. ("GTW") (with 2001 revenues of $359.2 million). It is also vastly larger than any regional carrier. In fact, TNR has more than twice the revenue of Wisconsin Central System ("WCS" – the North American operations of Wisconsin Central Transportation Company ("WCTC")), the nation's largest regional carrier prior to its merger into Canadian National ("CN") in 2001. While BNSF believes that AEP Texas has overstated TNR revenue, even with BNSF's revisions TNR still earns almost $654.6 million in revenue in 2001 and grows to $851.7 million by 2020.

Despite its size, AEP Texas proposes that TNR will require a general and administrative ("G&A") staff of only 56 employees (including several employees usually designated as operating and non-operating personnel) and a G&A budget of a mere $12.9

[67] TNR will earn $407.4 million in revenue during a partial year of operations in 2000.

million annually, excluding insurance, depreciation and property taxes. This figure is astoundingly low, and implies that TNR can operate at a level of administrative efficiency never approached by any other North American rail carrier of similar scope. AEP Texas supplies scant justification for such an aggressive assertion. AEP Texas' foundation for its unprecedentedly low cost level rests primarily on two factors: (1) TNR will perform "only one, repetitive kind of operation (the movement of unit and through trains)"; and (2) TNR will outsource "a number of functions normally performed in-house by a Class I railroad."[68]

AEP Texas proposes to operate a far more complex rail undertaking in the TNR than it would have the Board believe. Not only does TNR anticipate handling between 1.6 and 2.0 million carloads of coal annually, it also plans to handle over 300 thousand units of non-coal traffic (approximately 1.4 million and in excess of 300 thousand, respectively, with BNSF's revisions). Although much of this traffic has competitive transportation alternatives to service using the TNR, AEP Texas makes no provision for marketing TNR's services in a competitive environment and assumes that TNR's connecting railroads will undertake almost the entire customer billing and marketing functions for the benefit of TNR.

Also, AEP Texas' claims of expense reductions through outsourcing go far beyond the benefits realized by railroads actually using these strategies. The railroad industry already makes substantial use of outsourcing non-critical functions, and has increased its use in the past decade. While some Class I railroads are restrained by labor

[68] TNR Opening Nar. at III-D-24. AEP Texas also mentions the Board's G&A conclusions in *WTU* as a basis for its low staffing and costs here. *Id.* at III-D-25. The WTRR in *WTU* was substantially smaller than TNR, carrying only 25% of the tonnage proposed for TNR, with only 11 customers, and a single commodity — coal.

contracts from outsourcing all possible functions, the regional carriers formed since deregulation have suffered from no such constraint. Those carriers outsource many of their G&A functions, but none has achieved the extraordinary levels of efficiency claimed by AEP Texas. A complainant is permitted to base stand-alone cost assessments on an assumption that it will operate efficiently, but it must demonstrate how it will achieve those efficiencies and prove that they are achievable. AEP Texas has not done that here.

In prior SAC cases, the Board has accepted the complainant's G&A costs on the basis that the defendant did not adequately address the complainant's outsourcing plan.[69] In this case, however, BNSF addresses AEP Texas' outsourcing assumptions directly and shows that its proposed G&A staffing and cost levels are clearly inadequate. As is discussed in more detail below, BNSF demonstrates that AEP Texas claims to reduce TNR's G&A expense to 25% of the expense level of the average Class I while spending only 2% of what the average Class I incurs for outsourcing.[70] This result is clearly anomalous.

For the most part, AEP Texas fails to offer any independent real-world support for its G&A plans. The only real-world railroad example it mentions, in defense of TNR's outsourcing of its marketing function, is the Monongahela Railway ("MGA").[71] That railroad was jointly owned by Consolidated Rail Corporation, CSX Transportation and

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[69] *Duke v. CSX*, slip opin. at 59; *CP&L v. NS*, slip opin. at 61.

[70] In response to workpaper requests, AEP Texas refused to provide more specifics about how its witnesses arrived at their G&A outsourcing costs. *See* BNSF Reply electronic workpaper "AEP Texas G&A.pdf"

[71] *Id.* at III-D-45; *see also* TNR.OP.WP.08741-44.

the Pittsburgh and Lake Erie Railroad Company. Those three railroads were the only railroads served by MGA. That example does not come close in size, scope or complexity to the proposed TNR. MGA was a private entity so its revenues are not known, but they would most certainly have been substantially less than those of TNR. MGA was significantly shorter than TNR and the joint ownership of the line by its connecting railroads puts it in a much different situation than TNR. These are glaring disparities and AEP Texas offers no data about MGA that would support any comparison of it to the proposed TNR, especially not from a marketing perspective. This example does not provide a credible model for the more than three quarters of a billion dollars in revenues that AEP Texas proposes TNR will generate.

BNSF's witness J. Reilly McCarren offers testimony on TNR's G&A requirements. Mr. McCarren is the Chairman and principal owner of the Arkansas and Missouri Railroad ("A&M"), a Class III railroad operating in its namesake states. Previously, Mr. McCarren was President and CEO of WCS and directed those operations from 1996 to 2001. In 2000, its last full year of operations, WCS enjoyed $380 million in railway operating revenues, operated approximately 2,800 route miles, employed over 2,200 people and handled 562,000 of its own carloads, as well as 150,000 carloads of haulage traffic for CN. From 1998 to 2001, Mr. McCarren served as a board member of WCS' parent WCTC and in that role became familiar with railway operations overseas, where WCTC was an active player on the railway privatization front.

Mr. McCarren was President and CEO of Gateway Western Railway ("GWWR") a $40 million, 400 mile Class II carrier operating in Missouri and Illinois from 1990 to 1996. During 1991, Mr. McCarren also served as interim President and CEO of the

Wheeling and Lake Erie Railway, a 900 mile Class II carrier operating in Ohio and Pennsylvania. Altogether Mr. McCarren has spent 26 years in the railroad industry.

Mr. McCarren has been active in railroad industry affairs since founding GWWR in 1990. He has served as vice-chairman of the Legislative Policy Council of the American Short Line and Regional Railroad Association and currently serves as co-chairman of the Industry Working Group. He is vice-chairman of Operation Lifesaver, Inc., a non-profit group concerned with safety at rail highway crossings and along rail rights of way. He is also a member of the Transportation Research Council, which directs the Transportation Research Forum. With a wealth of Class I, Class II and Class III railroad experience, Mr. McCarren is well-qualified to testify on the G&A requirements of the proposed TNR.

TNR Qualifies As A Class I Railroad

In order to evaluate TNR's operations as compared to real-world railroads, it must first be placed in the proper context. AEP Texas' hypothetical TNR substantially exceeds the STB threshold for Class I status. The STB classifies railroads by revenue. Pursuant to STB regulations, 49 C.F.R. Part 1201, Section 1-1 of the General Instructions, the 2001 revenue threshold for Class I railroads was $266.7 million, which AEP Texas' TNR substantially exceeds. Similarly, TNR substantially exceeds the scale of the commonly referred to "local" or "regional" railroad. The Association of American Railroads ("AAR") defines a "regional" railroad as a non-Class I carrier with $40 million in revenue and at least 350 route miles, and a "local" railroad as one with revenue and miles less than a "regional" railroad. *Railroad Ten Year Trends,* AAR at 184, 185 (2001).

By most measures, Mr. McCarren notes that TNR is substantially larger than all the publicly-traded regional railroads and short-line holding companies. In fact, based on TNR's assumed 2001 operating revenues it is larger than Class I carriers such as the former IC ($650.2 million) and GTW ($359.2 million), the KCS ($566.4 million) and the Soo Line ($561.6 million). *See Railroad Ten Year Trends at* 34 (2001).

TNR's Peer Railroad Group

Annual gross revenues are the most commonly used basis for standardizing size in the railroad industry. AEP Texas estimates 2001 revenues of $767.3 million (BNSF has revised that downward to $654.6 million) for TNR, which would place it as the fifth largest U.S. railroad of those operating independently in 2001. Figure III.D.3-1 shows TNR revenue in relation to various other carriers.[72]

[72] The data in the figures that follow are derived from the companies most currently available data in their SEC 10-Ks, 14As or AAR publications. *See* BNSF Reply electronic workpaper "RR_Comparisons.xls."

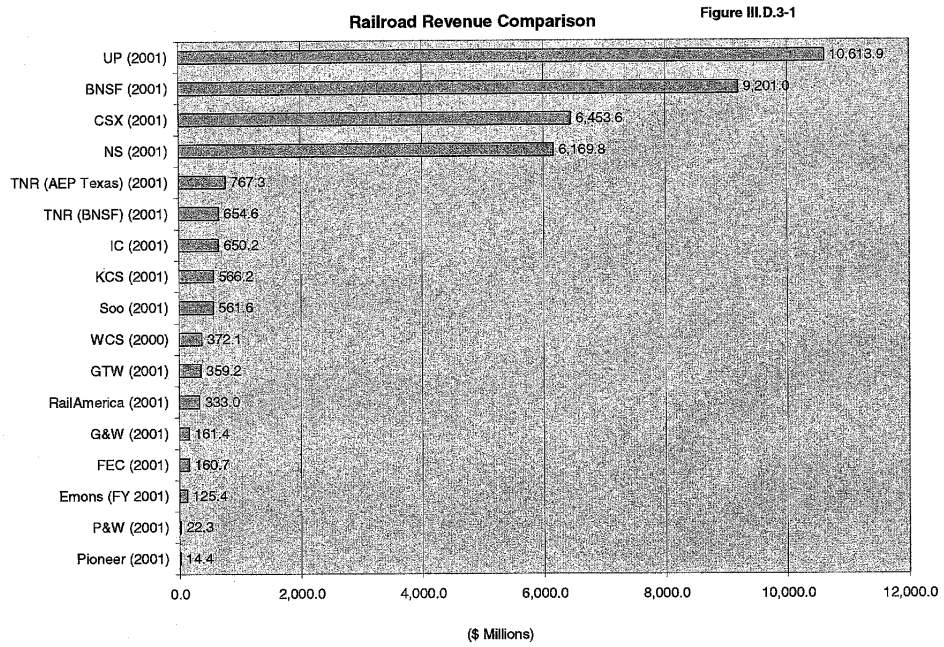
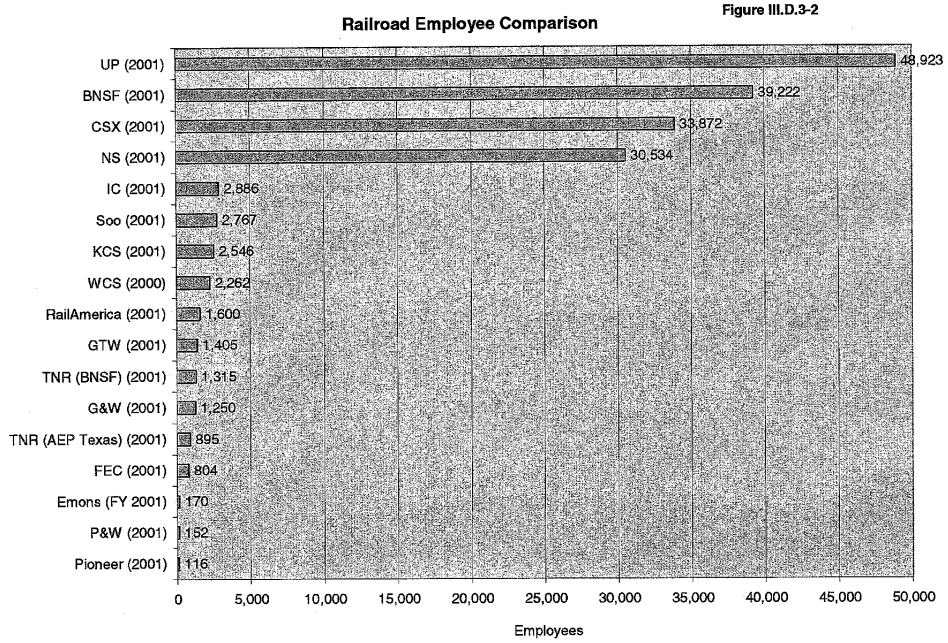


Figure III.D.3-1

TNR, while fifth in rank, is well behind the first four carriers in revenue. A better basis of comparison to TNR are five carriers: IC, KCS, Soo, WCS and GTW.[73] CNW, which had slightly more revenue than TNR in 1994 ($1.1 billion), would have been a reasonably good match, but it has been gone from the scene for too long to make a meaningful comparison.

[73] RailAmerica does not provide a good comparison because it is a railroad holding conglomerate.

Figure III.D.3-2

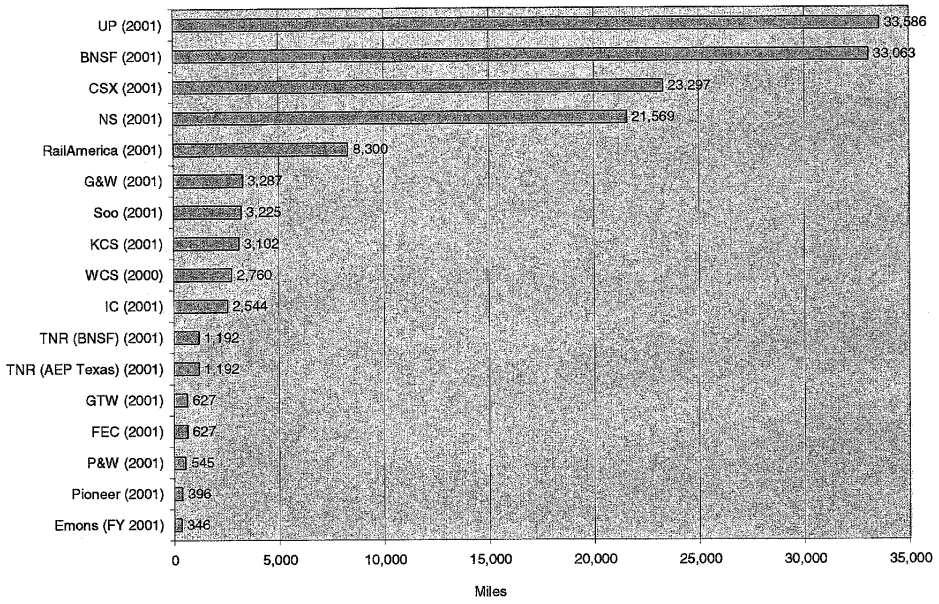


Employment levels are also usually a good indication of the size and scope of a rail operation. Comparison of overall employment levels with other carriers of similar scale can indicate which real-world carriers constitute the best models for the proposed TNR. Comparative railroad employment levels are shown in Figure III.D.3-2.

With a proposed 895 employees, TNR employee levels fall well below its revenue peer group. Excluding multi-railroad holding companies (RailAmerica and G&W), reasonable comparison carriers appear to be the Florida East Coast ("FEC") railroad and GTW.

Operating mileage is another measure of comparability. TNR plans to operate 1,192 miles of railroad, again placing it in a middle class of carriers as shown in Figure III.D.3-3.

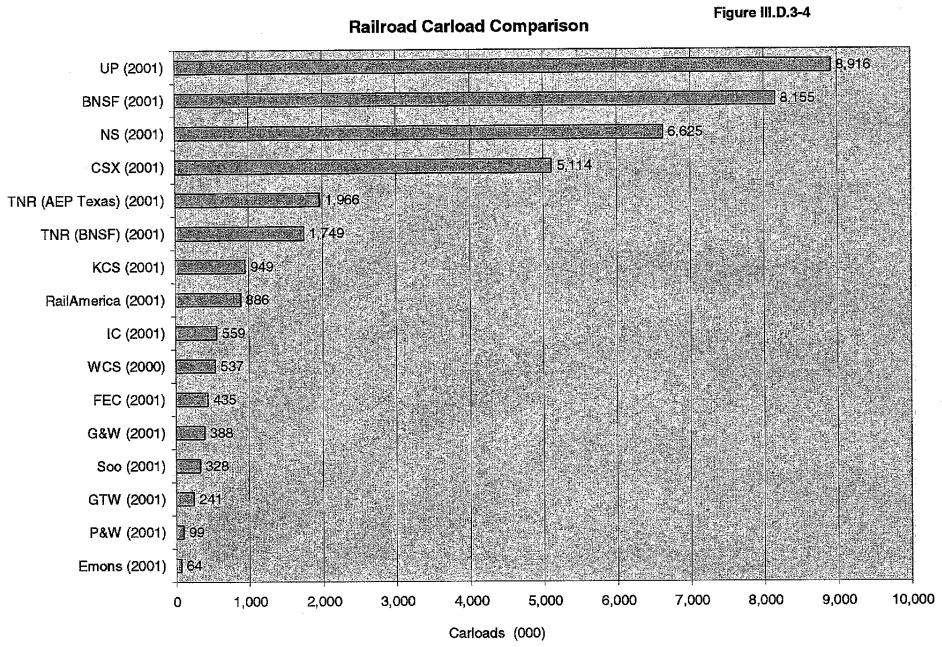
Figure III.D.3-3



Good comparison carriers to TNR, again excluding non-contiguous multi-carrier holding companies, include the six carriers identified above.

Finally, the number of total carloads is another statistic commonly used to compare railroad companies. Figure III.D.3-4 shows how TNR's 2001 projection of 1.97 million carloads (BNSF revised to 1.75 million) compares with other carriers.

Figure III.D.3-4



Again we see that TNR is best measured against four of those mid-level carriers (KCS, IC, WCS and FEC), all of which have been previously identified as comparable carriers under the comparative factors mentioned above.[74]

Overall we can see that based on these four measures IC, KCS, Soo, GTW, FEC and WCS are the best real-world carriers with which to compare TNR. Of those, KCS, WCS and IC have the most comparable operations.

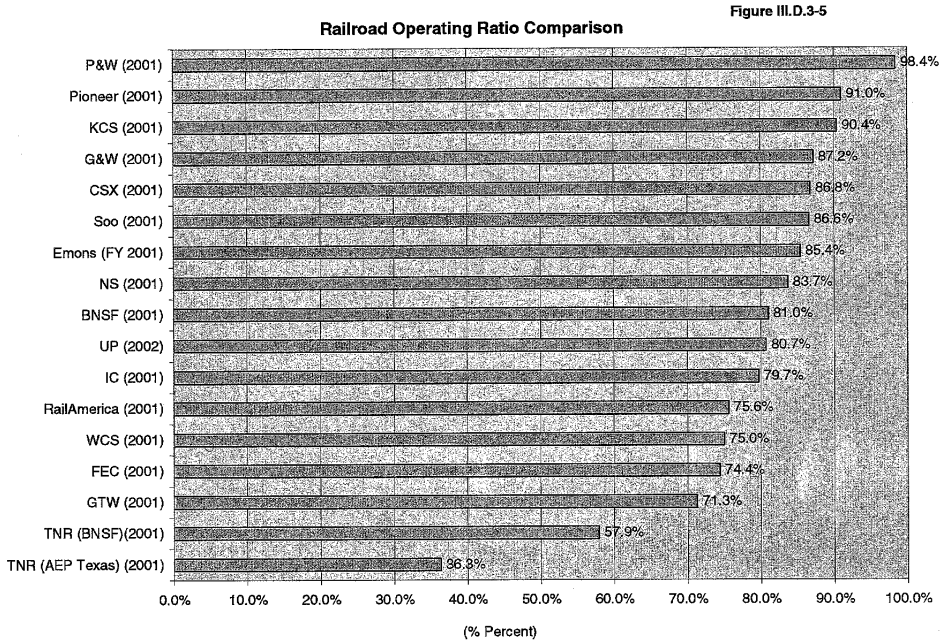
Comparison Of TNR's Performance To Peer Group

Having identified TNR's relevant real world peer group, Mr. McCarren considers how it measures up to that group. He determines that TNR claims a level of efficiency not achieved by any operating railroad of its class. Operating efficiency in the railroad

[74] As mentioned above, RailAmerica is excluded because of the nature of its operations.

business is judged primarily by operating ratios. The operating ratio represents a carrier's ratio of operating expenses to operating revenues. The railroad industry has long recognized that the lower the operating ratio, the more efficient the carrier. AAR statistics show that the average Class I operating ratio for 2001 was 84.4%.[75] The Class I railroad with the lowest operating ratio for the past several years has been CN, posting a 69.8% mark in 2003 and 69.4% in 2002 (after adjustments).

Figure III.D.3-5



AEP Texas proposes that TNR will operate with an operating ratio of 36.3% in 2001, well outside the range of reported operating ratios as shown in Figure III.D.3-5. This is far better than its comparison group of IC (79.7 % in 2001), KCS (90.4% in 2001), and WCS (75% in 2000). Figure III.D.3-5 shows that TNR's proposed operations will yield an operating ratio *just above half the best mark* posted by an independent U.S.

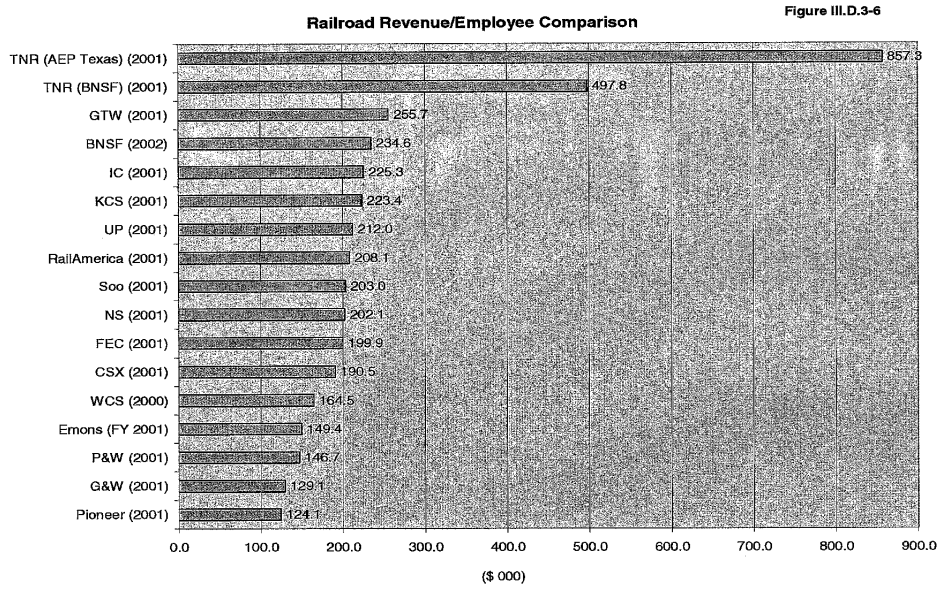
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[75] *Railroad Ten-Year Trends* at 83.

Class I railroad in modern times – IC in 1998 at 64%. From a historical perspective, the AAR has reported that Class I's as a group enjoyed an operating ratio of 80.28% in their best year over the past decade. The operating ratio for TNR with BNSF's revisions is 57.9% — still unprecedentedly efficient for a railroad of this size, but markedly more realistic. Mr. McCarren acknowledges there may be some shortlines that operate in the 50-60% range, but none near the size of TNR.

Another key measure of efficiency is labor productivity. While measured in many ways, the most common standard is revenue per employee. TNR anticipates earning $857,000 in revenue per employee. This measure is also "out of sync" with recent railroad experience as shown in Figure III.D.3-6.

Figure III.D.3-6

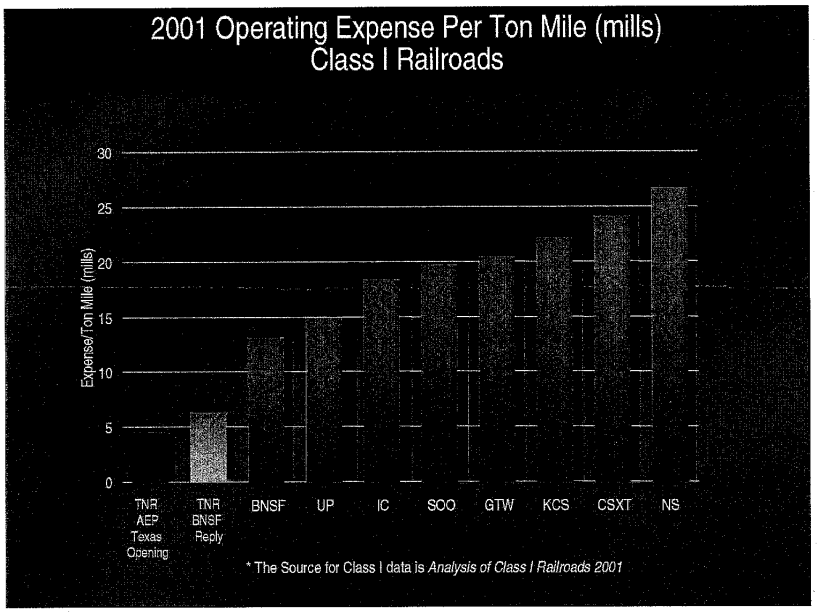


Not only does TNR operate completely outside the normal range by a factor of more than 3:1 for this measure, it also defies the prevailing trend. As can be seen in Figure III.D.3-

6, larger railroads generally outperform smaller ones in this measure, because of returns on scale. When compared to the group of its peer railroads, with revenue per employee in the $164.5-255.7 thousand range, the results predicted for TNR stand out in even greater contrast. Indeed, even as revised by BNSF, TNR produces far more revenue per employee ($497,769) than its peer group.

Finally, Mr. McCarren examines TNR based on operating expenses per revenue ton mile for 2001 compared to the Class I's. This comparison in Figure III.D.3-7 vividly illustrates how truly unrealistic AEP Texas' operating expenses are and how defensible BNSF's alternative case is.

Figure III.D.3.7



Taken together, these three measures of operating performance strongly indicate that the structure and economics proposed for TNR are unrealistic. This overall result undermines the credibility and reliability of AEP Texas' G&A projections (indeed all its operating expense projections) for TNR, which fail to comport with the experience of existing players in the industry.

G&A Comparison

AEP Texas projects 2001 operating expenses (less depreciation) of $271.2 million;[76] this is comparable to the $244.1 million in operating expenses spent by WCS in 2000. In addition, BNSF's witness McCarren notes that in 2000, WCS enjoyed the second-lowest operating ratio of all major, independently-operated North American railroads and was widely regarded as particularly strong with respect to administrative cost containment. Therefore, he uses the experience of WCS as one basis on which to evaluate AEP Texas' G&A evidence. WCS is not a perfect analogy for TNR; indeed there is no railroad that matches TNR in all respects. TNR's markets are more limited than WCS, which handled significant quantities of merchandise traffic in addition to unit trains of coal, iron ore, stone and double stack containers. TNR therefore requires less effort in marketing and revenue accounting. On the other hand, its operations are more concentrated, requiring more attention to operations and engineering. Overall, however, WCS operated with a similar level of operating expenses and had a corporate size in the same range as TNR. Real world comparisons provide a useful benchmark for evaluating

[76] *Id.*

the feasibility of stand-alone railroads and the STB should reject the argument that no comparisons can be made between the SARR and documented operating railroads.

AEP Texas points to no specific railroad to support its unrealistic staffing levels, except in marketing. Instead it relies upon the unsupported opinion of its expert without specifying what in its expert's experience is the basis for its evidence. That approach is comparable to the complainant's G&A evidence in *FMC Wyoming* that the Board refused to accept because it consisted of nothing more than a list of G&A positions.[77] In this case, AEP Texas merely added a sentence or two-long description about the responsibilities of each position, but offered no real substantive support for the amount of work to be performed or how the G&A staff it identified can in reality fulfill those responsibilities with employment levels substantially below industry norms.

AEP Texas proffers a TNR than employs 56 G&A personnel with G&A expense (excluding depreciation, property/ad valorem taxes and insurance costs) that totals $12.9 million in 2001.[78] AEP Texas confuses the issue by including a number of people normally considered operating in G&A. AEP Texas thus makes TNR's G&A staffing appear much more reasonable than it is, but this change does not remedy the critical deficiencies in TNR's staffing.

In order to compare TNR's G&A numbers appropriately to WCS, adjustment must be made to ensure comparability. Eliminating transportation and engineering personnel, TNR's G&A staff count drops to 39. By comparison, Mr. McCarren's former employer, WCS employed 152 people in comparable areas in 2000, its last full year of

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[77] *FMC*, slip opin. at 165.

[78] *See* AEP Texas Opening Exh. III-H-1 at 24.

independent operation, and its G&A expense totaled almost $31 million, excluding depreciation, insurance and property taxes. Thus, WCS employed over four times as many people in "true" G&A areas as TNR, while handling less than half the revenue proposed for TNR. This expense accounted for 8.3% of WCS' revenue. AEP Texas' TNR G&A expense amounts to a miniscule 1.7% of revenue and drops even further when transportation and engineering expenses are reclassified. Such a result is infeasible. By comparison, BNSF's G&A expense for TNR of 4% (including ongoing training and IT expense) is quite reasonable.

Another useful alternative comparison measure for G&A expenses is the ratio of such expenses to overall operating expenses, less depreciation. Depreciation varies considerably based on the timing of investments and accounting policies and is best excluded for these purposes. WCS' G&A expenses represented over 12.6% of operating expenses (less depreciation). TNR's projected G&A expenses amount to only 5% of TNR's total operating expenses (and even less if reallocations and understatements in other expense categories are corrected).

Another railroad worth examining by way of comparison is the Montana Rail Link ("MRL"), which operates 600 miles of mainline rail from Huntley, Montana to Spokane, Washington. While considerably smaller than the proposed TNR (MRL has revenues in the range of { } million in projected operating revenues for 2002), MRL's operations bear some similarity to TNR's in that it serves as a bridge carrier for BNSF and those unit-train like movements account for approximately 2/3 of its revenues. MRL employs about { } employees full-time, supplemented by about { } seasonal

workers, { }.[79] Of those, there are approximately { } non-operating employees of which at least { } would be classified G&A positions comparable to TNR. The MRL figures do not include IT, which is handled by their corporate parent. MRL's overall operating expenses are well below the amount projected for TNR and revenues are { } of TNR's.

Another comparison with a regional railroad is G&W, although it is also considerably smaller than TNR. In 2001, G&W, with North American revenues of only $140 million, employed a G&A staff of { }. Since 2001, another large regional has been created through the common ownership of the Dakota Minnesota and Eastern and the Iowa, Chicago and Eastern by Cedar American Rail Holdings. The combined DME/ICE system has revenues of { } million, { } annual carloads, { } employees and { } route miles. That system employs { } people in comparable G&A areas, not including transportation, mechanical and engineering personnel.

The smallest independent Class I railroad today is KCS, which had $566 million in 2001 revenues and most recently $581 million in 2003. KCS employs { } people in the Finance Department alone, not including marketing and sales { } or information technology { }.

AEP Texas implies that it will operate far more efficiently than the (presumed) inefficient Class I railroads, through its outsourcing of G&A functions. Yet, as these examples demonstrate, it projects a dramatically lower level of G&A staffing than that experienced by regional carriers substantially smaller in size and scope of operations than TNR. These carriers also make extensive use of outsourcing where it provides financial

[79] *See* BNSF Reply electronic workpaper "MRL_Info.doc."

benefits just as AEP Texas proposes. For example, WCS outsourced all of its revenue accounting and operations support information technology to UP Technologies.

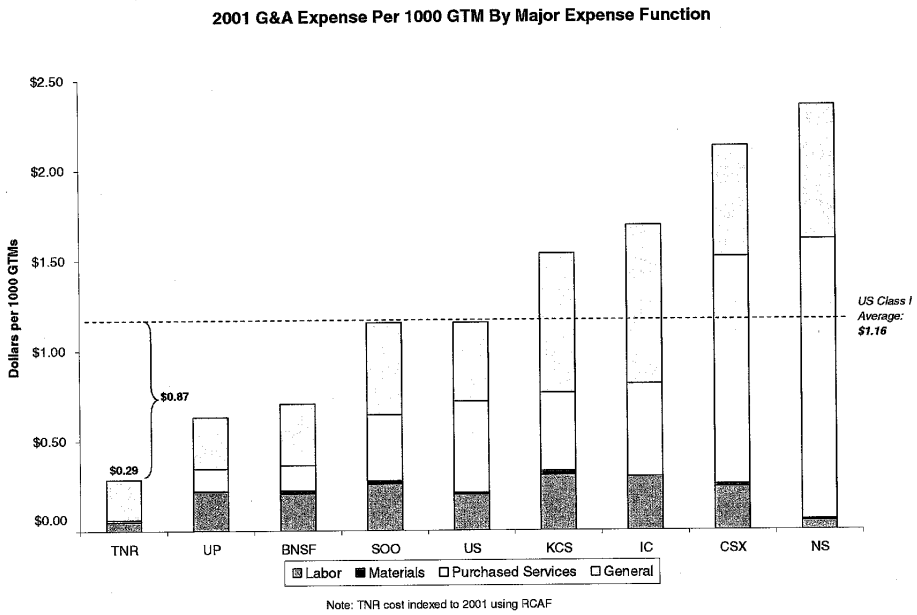
Using WCS as a basis of comparison, AEP Texas estimates that TNR can operate with 25 percent of the staff, while handling almost three times the number of carloads and enjoying more than twice the revenue. AEP Texas makes no credible argument for the dramatic difference between its projections and the results achieved by those that actually operate railroads.

In order to achieve the vast improvement in operating efficiency that AEP Texas proposes, Mr. McCarren testifies that TNR would have to benefit from unique strategic advantages, new technologies or ways of doing business. However, AEP Texas proposes to utilize standard North American railroad operating methods, with just a few changes at the margins. For example, track construction and maintenance will be done with standard AREMA specification materials and using standard methods used by virtually all railroads. Trains will be manned by industry-standard two person crews. Standard issue locomotives will be used, exactly the same type of locomotives currently purchased by the incumbent BNSF. AEP Texas proposes to utilize a third party information system for railroad operations already used by over two hundred Class II and III North American railroads. Yet the service provided by TNR to its customers is basically the same as that provided by BNSF today. In Mr. McCarren's opinion, nowhere in the AEP Texas proposal is there a unique idea, plan or proposal that could give rise to a fundamental change in railroad economics. Yet the results contemplated by AEP Texas could only happen if railroad economics were changed in such a manner.

AEP Texas provides scant rationale for why it would be able to operate such a complex rail system with less than half of the G&A expense incurred by one of the industry's most efficient operators. Its filing ignores the anomalous results of its cost calculations, preferring to make vague generalizations about a simplified traffic base, modest route structure and extensive outsourcing. Nothing, however, is simple, modest or unassuming about a railroad that has revenues approaching $1 billion. And, as shown later, TNR actually budgets less money for outsourced services than the current operators in the real world do. Absent a convincing explanation for results far outside industry experience, AEP Texas' assumptions are unsupportable.

With the assistance of Mercer Consulting, witness McCarren evaluates TNR's G&A expenses per gross ton-mile ("GTM") by major expense function in comparison to Class I carriers in 2001. To perform this analysis he adds AEP Texas' estimates of G&A, insurance and property taxes of $27.3 million to represent G&A expense as is customary in the industry. He then distributes those dollars per 1,000 GTMs.[80] For 2001, the average Class I spent $1.16 per 1,000 GTMs on G&A. By comparison, AEP Texas proposes to spend only $0.29 for TNR. The lowest 2001 G&A expense by a Class I was by UP, which spent $0.64. Figure III.D.3-8 shows this comparison.

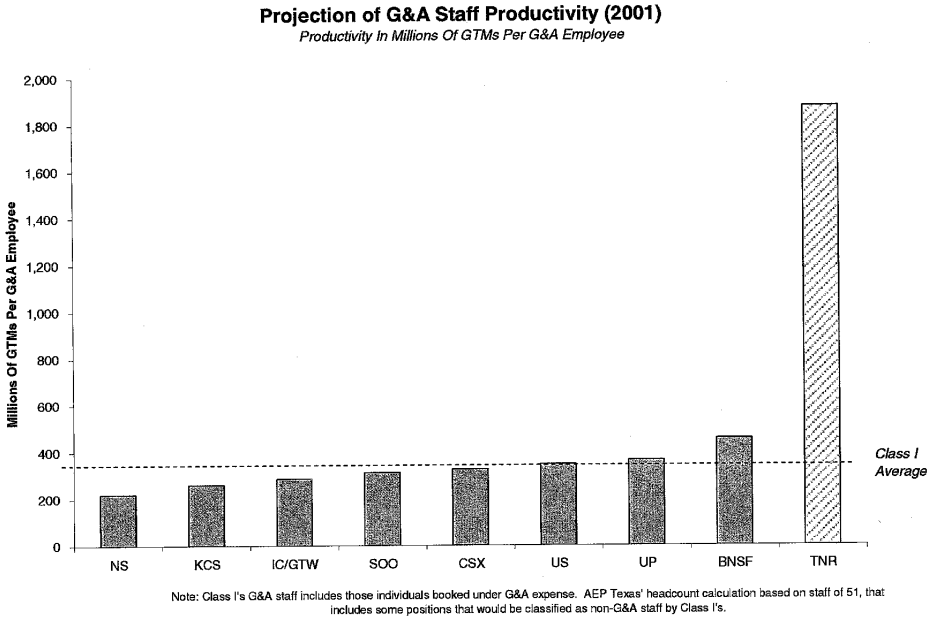
[80] *See* BNSF Reply electronic workpaper "G&A Charts.xls," spreadsheet "Per GTM by Function."



Witness McCarren also compared the productivity of AEP Texas' proposed G&A staff of 51 (which excludes some employees that Mr. McCarren and the industry do not consider G&A staff) to the G&A staff of other Class I's based on the millions of GTMs handled per employee. As previously shown in chart III.D.6 of revenue per employee and demonstrated in Figure III.D.3-9 below, AEP Texas employees were "off the charts" in terms of productivity exceeding the Class I average by a factor of five.[81]

[81] *See* BNSF Reply electronic workpaper "G&A Charts.xls," spreadsheet "G&A Productivity."

Figure III.D.3-9

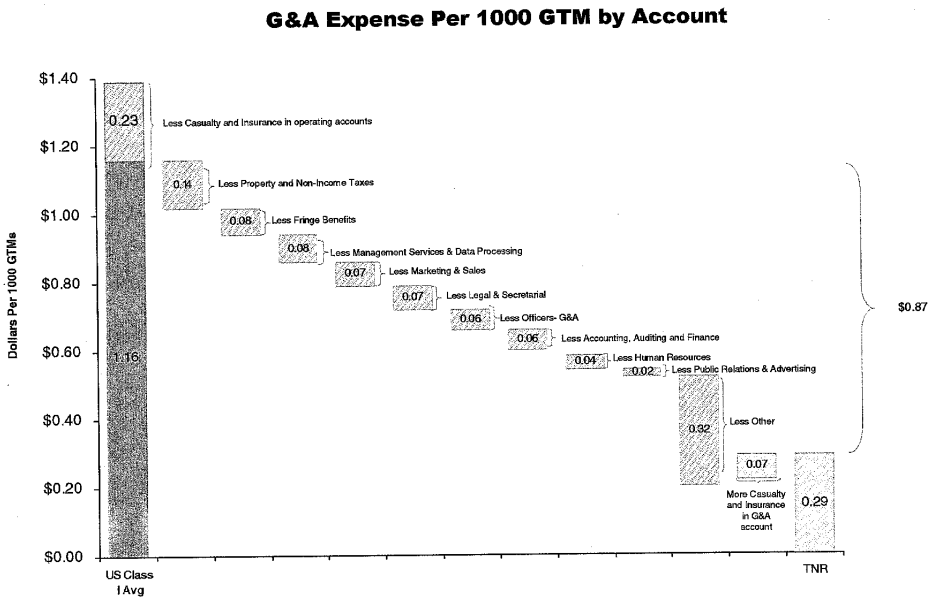


Finally, witness McCarren reallocated AEP Texas' G&A personnel and costs to those reported by Class I carriers on the R-1. Based on those reallocations, AEP Texas' G&A estimate of $0.29 was compared to the industry average of $1.16 per 1,000 GTMs. Figure III.D.3-10 shows the level of savings AEP Texas contends TNR will achieve in each category of costs reported on the R-1's.[82] Of those categories, AEP Texas alleges that TNR achieves unprecedented savings in marketing and sales and accounting, auditing and finance because of the purported simplicity of its operations. However, even if the entire average cost for those expenses ($0.08 for marketing and $0.07 for

[82] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "G&A by Acct."

finance and accounting) is excluded, the industry's average G&A expenses would be reduced by a mere $0.15 to $1.01, which is still 3.5 times greater than AEP Texas' projections.

Figure III.D.3-10



Mr. McCarren concludes such bizarre results stem from erroneous assumptions and the failure to acknowledge important areas of expense. AEP Texas has the burden to show that all its operating costs are verifiable. *Coal Guidelines*, 1 I.C.C. 2d at 543. It has not done so here.

Since AEP Texas' assumptions are infeasible, Mr. McCarren undertook an independent analysis of the TNR's G&A costs. Mr. McCarren examines the individual areas that make up G&A expense and identifies where the proposed TNR operation diverges from normal practice and industry experience.

(1) Staffing Requirements

TNR proposes a staffing level of 56 G&A employees broken down in departments as follows:

Table III.D.3-5

AEP Texas' G&A Proposal	**Employees**
President's Office	3
Finance and Accounting Department (including IT)	21
Law and Administration Department (including claims, training and secretarial)	12
Marketing	2
Materials & Purchasing	1
Engineering/Mechanical	4
Transportation	13
Total	56
Total Traditional G&A (no Operating)	39

As Mr. McCarren demonstrated earlier, WCS provides a good basis for comparison to TNR in several respects. WCS employed 152 people in comparable areas, as detailed below:[83]

[83] *See* BNSF Reply electronic workpaper "WCS & IMRL.xls."

Table III.D.3-6

Category	AEP Texas' TNR Staffing	WCS 2000 Staffing	Difference
President's Office	3	2[84]	1
Finance and Accounting	11	64[85]	(53)
Information Technology	10	17	(7)
Materials & Purchasing	1	3[86]	(2)
Legal Affairs (including claims, training and secretarial)	6	4	(1)
Human Resources	6	21	(15)
Marketing	2	37	(35)
Real Estate	0	4[87]	(4)
Subtotal G&A	**39**	**152**	**(113)**
Engineering/Mechanical	4	NA	NA
Transportation	13	NA	NA
Total	56	NA	NA

Mr. McCarren concludes that it would be necessary to increase TNR's staffing substantially to operate the proposed rail system in a responsible manner. To determine a credible G&A staff, Mr. McCarren presents a detailed, bottom up review of TNR functions and identifies staff and compensation costs that TNR would experience in order to operate. As Mr. McCarren explains, the operations of TNR are comparable to those of

[84] WCS was a subsidiary of WCTC; additional executive department personnel were part of the holding company payroll and are excluded here.

[85] Includes Treasury Department personnel organized under WCTC but performing duties principally for WCS.

[86] WCS employed 25 people in materials and purchasing; however, all but 3 are considered to be more appropriately assigned to operating departments and are therefore excluded here.

[87] WCS organized real estate functions in its Engineering Department. TNR makes no provision for this function.

small Class I carriers and large regionals such as WCS. He assumes that TNR, although officially a Class I carrier as defined by the STB, could feasibly operate at the levels of a mid-sized regional carrier. In other words, he makes the *very conservative* assumption that TNR can operate more efficiently than all its Class I peers currently do and one of the most efficient regionals, WCS. This assumption results in a redesigned TNR that is the least cost, most efficient SARR that is possible rather than the infeasible TNR that AEP Texas posits.

Mr. McCarren makes several staffing and costing recommendations that he states will bring TNR to the minimum G&A staffing levels necessary to make its operations feasible. First, he examines the specific G&A staffing requirements and expenses for each Department of the TNR and compares AEP Texas' assumptions with the minimum requirements for a railroad of the size and complexity of TNR. Second, Mr. McCarren examines the compensation levels for TNR's executives. Finally, he identifies certain necessary start-up costs for the new railroad, which are addressed below and in Section III.D.3.c.(4).

AEP Texas proposes a G&A staff of 56 for the TNR headquartered in Alliance, Nebraska. The TNR staff will either perform G&A functions themselves or oversee the functions that are contracted out to third parties. The proposed staff and costs are insufficient to accomplish the mission with which it is charged. Mr. McCarren has redesigned the organization to accomplish the tasks required. That redesigned organization is set forth in Table III.D.3-7 and contrasted with the proposed TNR organization. The individual positions are then described in the narrative that follows.

Table III.D.3-7

General & Administrative Department/Position	AEP Texas' Employee Count	BNSF's Employee Count	Difference
1. President's Office			
a. President and CEO	1	1	0
b. Administrative Assistant	1	1	0
c. Director Corporate Relations	1	1	0
Subtotal – President's Office	3	3	0
2. Finance and Administration			
a. Vice President – Finance	1	1	0
b. Secretary	0	1	1
c. Assistant Vice President – Treasurer	0	1	1
d. Assistant Treasurer	0	1	1
e. Cash Manager	0	2	2
f. Controller	1	1	0
g. Assistant Controller - Revenue	1	1	0
h. Manager - Revenue	0	1	1
i. Director - Taxes	1	1	0
j. Director – Financial Reporting	0	1	1
k. Manger Financial Reporting	1	1	0
l. Property Accounting Analyst	0	1	1
m. Sr. Financial Analyst	0	3	3
n. Manager – Accounting	0	1	1
o. Revenue Accounting Clerk	1	6	5
p. Assistant Controller – Disbursements	1	1	0
q. Manager – Accounts Payable	0	1	1
r. Manager - Payroll	0	1	1
s. Manager Revenue Analysis	0	1	1
t. Revenue Analysts	0	1	1
u. Manager Car Equipment Accounting	0	1	1
v. Disbursement Clerks	1	2	1
w. Payroll Coordinator	0	1	1
x. Manager Misc. Billing	0	1	1
y: Director – Internal Audit	0	1	1
z. Manager of Administration	1	1	0
aa. Director Budgeting and Analysis	1	1	0
bb. AVP – Information Technology	0	1	1
cc. Director – Information Technology	1	1	0
dd. IT Specialists	10	10	0
ee. Director of Real Estate	0	1	1
ff. Manager of Real Estate	0	1	1

General & Administrative Department/Position	AEP Texas' Employee Count	BNSF's Employee Count	Difference
gg. Director of Purchasing	0	1	1
hh. Manager of Purchasing	0	2	2
Subtotal – Finance and Accounting	21	53	32
3. Law and Administration Department			
a. General Counsel	1	1	0
b. Staff Attorney	2	2	0
c. Secretary/Paralegal	4	1	(3)
d. AVP – HR	0	1	1
e. AVP – Safety & Claims	0	1	1
f. Director – Safety & Loss Control	1	1	0
g. Manager - Safety	2	2	0
h. Director – Recruitment	0	1	1
i. Director – Personnel	0	1	1
j. Human Resources Coordinator	1	4	3
k. Director – Compensation & Benefits	0	1	1
l. Claims Manager	0	1	1
m. Analyst	0	1	1
n. Secretary/Administrative Assistant	0	1	1
o. Manager of Training	1	1	0
p. Asst. Manager of Training	0	2	2
Subtotal – Law and Administration Department	12	22	10
4. Marketing Department			
a. Vice President - Marketing	0	1	1
b. Secretary	0	1	1
c. AVP – Coal Marketing	0	1	1
d. Manager – Coal Marketing	1	2	1
e. Market Mgr – Other	1	4	3
Subtotal – Marketing	2	9	7
5. Transportation Department			
a. VP - Transportation	1	1	0
b. Administrative Assistant	0	1	1
c. Secretary	0	1	1
d. Director Operations Control	1	In Operating	(1)
e. Director of Train and Locomotive Operations	1	In Operating	(1)

General & Administrative Department/Position	AEP Texas' Employee Count	BNSF's Employee Count	Difference
f. Director Customer Service	1	In Operating	(1)
g. Service Managers	8	In Operating	(8)
h. Manager of Operating Rules and Safety	1	In Operating	(1)
Subtotal – Transportation	13	3	(10)
6. Engineering and Mechanical a. Vice President	1	1	0
b. Administrative Assistant	0	1	1
b. Director of Mechanical Services	1	In Operating	(1)
c. Manager of Budgets and Purchasing	1	0	(1)
d. Manger of Testing/Environmental	1	In Operating	(1)
e. Clerks	1	1	0
Subtotal	5	3	(2)
Total – G&A	56	93	37
Total – G&A, less positions shifted to ops	42	93	51

(a) President's Office

AEP Texas proposes that the TNR President's office contain a President, an administrative assistant and a Director of Corporate Relations. Under its proposal, each TNR Vice President will report to the President. That person will also chair a five person board consisting of the President, Vice President-Transportation and three outside Directors. The outside Directors would include a member of TNR's customer group, a representative of its investor group and a single independent Director. The three outside Directors would each serve without compensation.

Mr. McCarren agrees with the functions set forth by AEP Texas for the President and the composition of the President's office. However, Mr. McCarren disagrees with AEP Texas regarding the appropriate size, composition and compensation of TNR's

Board of Directors. As several recent corporate scandals have proven, protecting stakeholders' interests has become increasingly more complex and important. While not a public company, TNR will be of a substantial size and require significant financing. Its investors will require a board that accurately reflects their interests and stake in the company. Since TNR plans to incur a significant amount of debt, lenders will likewise insist that it employ corporate governance requirements commensurate with an enterprise of its size. Moreover, they will insist that the board have sufficient competence and experience to oversee the activities of management properly. The board proposed by AEP Texas does not meet these requirements.

Mr. McCarren has reviewed information on publicly-traded Class I, regional and short-line railroads from 2001. The boards of the 15 railroads whose information he reviewed ranged from 5 to 15 Directors (or on average 9.3 Directors), including from 2 to 13 outside Directors (or on average 7.7 outside Directors). A summary of those Boards appears below:

Table III.D.3-8

Board of Directors
Railroads

Railroad	Total No.	Outside No.	Compensation
BNSF	14	11	$40,000/yr; add'l $5,000 for Comm Chair
			$1,000/mtg (Board or Comm)
			Awards and options
			(Only outside directors receive compensation)
CN	15	13 (12 unrelated)	In CAD: $29, 900 (retainer & stock)
			$1,300 per day for each board mtg, add'l $1,000
			if travel 2 time zones or more; $5,000 for being
			comm. member; $1,100/comm. Mtg; $5,000 for
			comm. Chair
			The above applies to 12 unrelated directors
			Chairman of board rec'd $239,460 (retain & stock)
			2 Officers rec'd no comp for board membership
CSX	12	10	$40,000/yr to non-employees; $5,000/yr for
			Comm Chair; $1,000/mtg (Board & Comm) to
			non-employees
			Stock grants and options
Illinois Central	9	8	$170,000 Chairman
(1996-1998 Data)			$20,000 Other Directors
			$3,000/Comm. Chair
			$2,000/mtg Attendance
			2250 Stock Options
			Retirement Plan
KCS	5	4	$4k/Bd mtg in person
			$2k/Bd mtg via phone
			$2k/Comm mtg in person
			$1k/Comm mtg via phone
			Addl $500/Comm Chair
			Awards and options
			(Only outside directors receive compensation)

Norfolk Southern	10	9	$32,000/non-employee Director
			$4,500/qtr/comm served on for non-employees
			3,000 restricted stock shares for non-employees
			4,000 stock units to non-employees
UP	11	9	$60,000/yr; add'l $6,000 for Comm Chair
			Awards, options, pension after 5 yrs
			(Only outside directors receive compensation)
Wisconsin Central	9	6	6,000 share stock option
			and either (1) $30,000
			in phantom stock; or (2)
			$15,000 cash and
			$15,000 phantom stock.
			Chairman also receives
			$120,000.00
Florida East Coast	10	9	$20,000 Each Director; $3,000 for Comm. Chair
			$1,000/mtg Attendance (Board & Comm.)
			Directors receive options for 2000 shares upon
			election and for 3000 upon re-election
			(Only outside directors receive compensation)
Emons	7	5	$10,000 each Director;
			$500/Bd or Comm. mtg in person;
			$250/Bd of Comm. mtg by phone
			(Only non-employee directors receive compensation)
Genesee & Wyoming	9	8	$15,000 each Director;
			$1,500/Bd mtg; $500/Comm. mtg; $250/
			Bd or comm. mtg by phone or 125% in
			stock options; plus stock options
			(Only outside directors receive compensation)
Pioneer Railcorp	5	2	$3,000/Director
Providence & Worcester	9	7	$500/Bd + $50 per mtg for each
			year as Director
			$300/Comm. Mtg, $350 for Comm. Chair
			100 shares stock option
			(Only outside directors receive compensation)

RailAmerica	9	6	$36,000/yr; $1,000 per Brd mtg; $500/add'l day
			on company business;
			$750 per comm. Mtg, $1,000 for Comm. Chair;
			50,000 shares stock option upon initial election
			(Only outside directors receive compensation)
CNW	7	6	$50,000/non-employee Director
(1994 Data)			

BNSF Sources: Year 2001 Schedule 14-A
CSX Sources: Year 2001 Schedule 14-A
IC Sources: Year 1996 Schedule 14-A; Year 1997 Form 10-K; Year 1998 R1
KCS Sources: Year 2001 Schedule 14-A
Norfolk Southern Sources: Year 2001 Schedule 14-A
UP Sources: Year 2001 Schedule 14-A
WC Sources: Year 2000 Schedule 14-A and Form 10-K
FECR Sources: Florida East Coast Industries Year 2001 Schedule 14-A
Emons Source: Fiscal Year 2001 Schedule 14-A
Genesee Source: Year 2001 Schedule 14-A
Pioneer Source: Year 2001 Schedule 14-A
P&W Source: Year 2001 Schedule 14-A
RailAmerica Source: Year 2001 Schedule 14-A
CNW Source: Year 1994 Schedule 14-A

Based on this information and his experience with non-public small railroads and the public WCTC, Mr. McCarren concludes that a company of TNR's size should have a minimum of 7 Directors with at least 5 outside Directors, 4 of whom should be independent of any dealings with the company exclusive of ownership interest. The inside Directors should include the President/CEO and the Vice President of Finance/CFO rather than the Vice President of Transportation as AEP Texas proposes. Given the prominence of outside equity capital and the private nature of the firm, Mr. McCarren believes the board should have a non-executive Chairman drawn from the ranks of outside Directors. At least one of the other outside Directors should have sufficient financial expertise to serve as Chairman of the Audit Committee.

The only railroads in the table above with fewer than 7 Directors are Pioneer Railcorp, a small railroad holding company with approximately $15 million in revenue and a market capitalization of $10 million, and KCS, which increased its board to 8 Directors in 2002. All of the railroads above have only 1-3 inside Directors, with most (11 of the 15 railroads) having 2 or fewer inside Directors.

While inside board members will serve without compensation beyond their normal salary, outside board members will demand compensation commensurate with their service. That is true for even those outside Directors with some financial stake in the venture. For example, WCTC Directors were always compensated, even in the early days of WCTC as a private company. Similarly, Mr. McCarren compensated those Directors at Gateway Western representing the equity interests backing the railroad. Even A&M compensates its Directors, all of whom are significant investors in the company. In Mr. McCarren's experience, compensation is related more to the size of the company (and hence the workload of the director) than its public/private status or Director independence. As Table III.D.3-8 shows, outside railroad board members regardless of independence received as much as $60,000 in 2001.

For a company of this size, an annual fee of $40,000, including travel and expenses, is reasonable. That compensation with expenses is comparable to what a Board member of WCS or FEC would have received. Since TNR is a private company, with no public market for its securities, such compensation should be in cash. With no opportunity to profit from increasing share prices, such a compensation scheme is conservative in today's world, especially given the risk that Directors incur. The non-executive Chairman should receive a higher level if compensation, at least $70,000,

including travel and expenses. Additionally, Mr. McCarren notes that based on information from Mercer Consulting, whose affiliate Marsh Inc. insures most of the railroad industry, TNR would pay approximately $750,000 for Directors' and Officers' Insurance.[88]

(b) Finance and Accounting Department

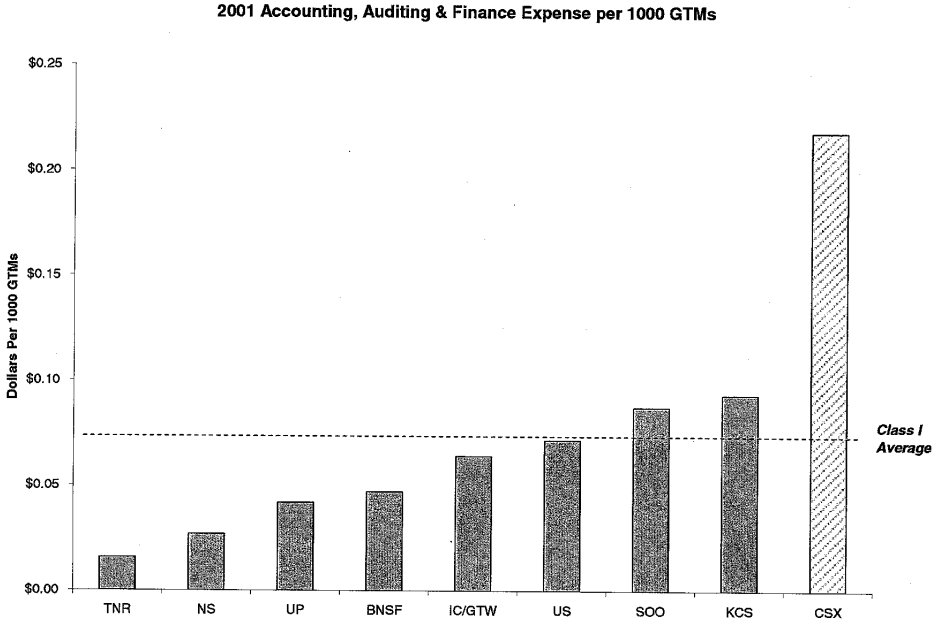
AEP Texas proposes that TNR can handle its Finance and Accounting functions with a mere 10 people. The budget for this staff including $439,000 of outsourced services is $1.5 million. Mr. McCarren believes that TNR could not perform its necessary functions with such a small staff and that it would be negligent to do so from a financial control standpoint. As Figure III.D.3-11 below shows, Class I railroads spent on average $0.072 per 1,000 GTMs in 2001.[89] By comparison, AEP Texas intends to spend only $0.02. Regardless of the relative homogeneity of TNR's traffic, witness McCarren testifies that the vast majority of a railroad's basic finance and accounting requirements will remain constant. Only the revenue accounting and analysis and certain billing functions will be decreased due to the lack of traffic diversity compared with the incumbent BNSF's traffic base. To illustrate, $50 million dollars worth of track material purchases will create exactly the same accounting workload regardless of whether only coal or a diverse mix of commodities will be hauled across them once installed.

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[88] *See* BNSF Reply electronic workpaper "G&A Charts.xls," spreadsheet "Mercer Cost of Risk Estimate."

[89] *See* BNSF Reply electronic workpaper "G&A Charts.xls," spreadsheet "Finance per GTM."

Figure III.D.3-11



AEP Texas' justification for such a small finance office is not only the limited number of local customers and the repetitive operation of TNR, but also the TNR's proposed use of computerized programs and outsourcing of functions.[90] However, AEP Texas itself acknowledges that such computerized programs are increasingly being used in the industry.[91] Indeed, witness McCarren notes that the computerized programs TNR plans to employ or similar computerized programs are already widely used by railroads. In addition, most of the functions AEP Texas plans to outsource are already widely

[90] AEP Texas Opening Nar. at III-D-35.

[91] *Id.*

outsourced by regional and some Class I carriers. AEP Texas ignores the fact that it plans to handle over 349,000 units of general freight traffic in 2001, the large majority of which needs to be billed, if not to customers then settled with other rail carriers. Moreover, AEP Texas does not provide sufficient staff to track expenses properly, pay invoices and conduct the other functions expected of the Finance Department of such a large company.

In comparison to TNR, WCS had 64 people in its Finance and Accounting Department, excluding Information Technology and Materials and Purchasing. The much smaller IMRL, with revenues of approximately $130 million in its last year of operations, had 34 non-information systems employees in its Finance and Accounting Department.[92] MRL, with revenues of { } million of 2003 revenues, has { } employees in its Accounting Department.[93] DM&E/ICE has { } non-information systems Finance and Accounting employees and { } million in revenue. Great Lakes Transportation, parent company of the Duluth Missabe & Iron Range and the Bessemenr and Lake Erie railroads, just acquired by CN, employed { } managers and clerks in its Finance and Accounting Department, with approximately $217 million in revenue. All these companies operate computer-based general accounting systems, some internally developed, some commercially acquired. For example, WCS used an enhanced version of MAS90, sister program to the MAS200 specified by AEP for TNR, A&M also uses MAS90, DM&E/ICE uses similar software from J.D. Edwards, as does Genesee and Wyoming.

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[92] BNSF Reply electronic workpaper "IMRL_Admin_org.xls."

[93] BNSF Reply electronic workpaper "MRL_Info.doc."

Mr. McCarren estimates that TNR will require a minimum of 36 Finance and Accounting employees, three and one half times that projected by AEP Texas but still little more than half that of WCS. This number takes into account the computerization planned and the functions outsourced by AEP Texas and does not reflect returning any of those functions to the company, but simply insuring that the outsourced functions have appropriate oversight.

Both AEP Texas and witness McCarren provide for a Vice President – Finance. Mr. McCarren adds an administrative assistant/secretary. He adds such an assistant for each Vice President, which is common practice in the industry. In the Treasury area, AEP Texas provides for no Treasurer or other staff. It merely asserts that the Vice President will be able to attend to the Treasury function with the part time assistance of the Manager of Administration. Based on his experience at WCS and other regional companies, Mr. McCarren provides for an Assistant Vice President-Treasurer and an Assistant Treasurer and two Cash Managers. This staff is considerably smaller than the seven person Treasury office at WCS; however, it does take into account the fact that TNR is not a public company. Nevertheless, it is a company that claims to average close to $1 billion in revenues over the study period ($711 million under BNSF's revision). With operations that substantial, and with the complexities inherent in running a modern railway network, more resources in this area are required. TNR will be required to manage substantial cash flows and balances, and will have significant amounts of debt that need to be serviced.

AEP Texas provides for a Controller, two Assistant Controllers and two clerks in the accounting area. AEP Texas provides a long laundry list of items these employees

will be required to attend to without offering any explanation for how they will actually accomplish those tasks or evidence of other railroads that have effectively utilized so few resources so productively.

TNR is not a simple, one-commodity railroad. With a diverse traffic mix, significant effort will be required to settle interline revenues with other railroads, even if other carriers handle the customer billing. Settlement in the railroad industry is far from straightforward, and a substantial number of interline bills require adjustment between carriers. Mr. McCarren provides for a Controller, one Revenue Accounting Managers and six clerks, for a total of eight in this important area. In the revenue accounting area, WCS employed 19 people to process substantially less revenue. TNR's lower level of traffic diversity, compared to WCS,' allows TNR to operate with a much smaller and more productive staff.

In the disbursements area, Mr. McCarren finds this staffing level insufficient compared with his experience at WCS and elsewhere. WCS employed an Assistant Controller, Manager of Accounts Payable and 3 analysts (clerks) in this area. Given the probable reduced level of capital expenditures for TNR, because the plant and equipment are new, two clerks will likely be sufficient; however, a Manager will be required. Mr. McCarren notes that WCS and TNR operating expenses are almost identical, so their accounts payable requirements should be quite similar as well. Regarding payroll, although paycheck preparation is outsourced, which Mr. McCarren embraces, Mr. McCarren thinks that two positions will be necessary, one Manager and one coordinator to supervise this important area properly. After all, TNR employs over 895 people as proposed by AEP Texas, 1,315 (1,519 if capitalized MOW employees are counted) as

revised by BNSF, even with paycheck preparation itself outsourced, considerable oversight and correction activity will be required. In checking with TNR's proposed vendor, Paychex, Mr. McCarren learned that Paychex would require all payroll inputs to be submitted to them in electronic format, which will need to be done by TNR.

Both AEP Texas and Mr. McCarren agree that a single tax expert will suffice for a railroad the size of TNR. The increased staffing Mr. McCarren proposes in other areas can also be used to support the tax effort where specialized subject matter knowledge is not required.

In the financial reporting area, AEP Texas provides a single Manager. This is insufficient to generate the quantity and quality of financial information required by such a large company. Mr. McCarren employed seven people in this function at WCS. He believes that seven would also be required to staff the area at TNR adequately. This level of staffing is necessary because TNR has virtually the same level of operating expense as WCS, and its overall spending exceeds that of WCS. TNR should provide the same level of financial information to its management, board and investors as WCS did. In addition, as a Class I railroad TNR will have substantial reporting requirements to the STB.

WCS employed a sub-group in Finance and Accounting responsible for analyzing revenue issues and trends and resolving substantive disputes that could not be quickly settled by revenue accountants. AEP Texas fails to provide for such a function at TNR. While in an ideal world, most of this work would not be required, the real world of railroading includes overcharges and undercharges, systems issues, miscoding of bills and a host of problems that need to be resolved. Even if TNR's employees perform flawlessly and its systems work to perfection, it has positioned itself as an interline

carrier in an imperfect world. Given the large amount of revenue the TNR is expected to generate, Mr. McCarren finds that TNR has too much at stake to leave this area unprotected. He has provided a staff consisting of a Manager and one analyst. TNR still benefits from the relative lack of traffic diversity; WCS employed five to handle these issues, with less than half the total revenue.

Witness McCarren also adds a Manager of Equipment Accounting to manage the car hire payable and receivable issues and to oversee the outsourced routine transactions. This Manager will also handle any financial transactions regarding foreign locomotives on the TNR or TNR's locomotives when off-line. In the interest of efficiency, TNR will continue to pool power as BNSF does today (with KCS) but also with BNSF on crossover traffic. Mr. McCarren has also added a Manager of Miscellaneous Billing in this area, to handle billing of non-freight items such as joint facilities, real estate leases and easements, locomotive and freight car repairs, *etc.* AEP Texas has not provided for a Manager of Car Repair Billing in the Engineering/Mechanical department so Finance will need to provide this function. Car Repair Billing is a specialty area that normally requires specific training and experience, even with the use of modern software such as RMI's *E-Repair*. More recently, railroads have been adopting information systems using hand-held devices. In order to operate with such a lean staff in Finance, Mr. McCarren has specified such a system for car repair activities as part of TNR's operating systems. Without such a system at least one additional person would be required in this area. Depending on the quantity of foreign car repairs performed, a second person may well be required. AEP Texas has provided no information on projected car repair activity, but with 106 equipment inspectors, a significant repair volume would normally be expected.

Mr. McCarren has also provided a Director of Internal Audit. While AEP Texas provides for "internal systems review" as part of their projected auditing expense, a company this size should not operate without an internal auditor. There is a frequent misperception that internal auditors are only required to investigate possible improprieties or perform forensic accounting. Most companies, including WCS, use their internal auditors primarily to ensure that their system of controls remains appropriate and that the relationship between operating organizations and the finance group enhances overall effectiveness. No matter how well structured an organization may be at startup, it needs to evolve over time and a good internal auditor helps ensure that this evolution does not compromise the essential system of checks and balances in a large organization.

i) Information Technology

Witness McCarren believes information technology ("IT") is the cornerstone for modern, efficient railroad service. IT affects railroad companies principally in two ways:

- Providing a strong, paperless, interface for routine customer transactions and information requirements; and
- Allowing increased rail productivity in all operating areas through real time information and advanced planning capabilities.

Advances in information technology have allowed railroads, especially over the past decade, to eliminate thousands of clerical positions and improve asset utilization, all while providing their customers with enhanced communication, shipment location and planning capability.

Operating a unit coal train is conceptually simple. With respect to low volumes of traffic, it can, in fact, be operationally simple. However, operating a large network with high train volumes at high levels of productivity as AEP Texas contemplates for TNR is extremely challenging. Contrary to AEP Texas' assertions, unit train sets do not

simply cycle uneventfully between mine and power plant. Variations in coal supply and demand and other uncontrollable factors require short-term forecasting and planning. Those uncontrollable factors include unusual requirements such as disruptions at the mine, at the plant or in the rail network, and maintenance outages. All these factors require real time changes to even the short term plan. Strong IT capabilities support a carrier's ability to accomplish its tasks effectively and productively despite unplanned disruptions.

The railroad envisioned by AEP Texas is a complex undertaking. In 2020, AEP Texas plans to operate 16,435 unit coal trains with an equal number of empty train and 2,898 non-coal trains.[94] This equates to 65 loaded and empty coal train originations *daily*. In addition, because some of the trains' journeys will consume more than 24 hours to traverse the TNR, the total number of coal trains on the railroad will be even larger. In addition, eight daily non-coal trains will operate between Amarillo and Oklaunion, for a total of 73 daily trains operating over a network of 1,192 route miles of high-density mainline. AEP Texas proposes that TNR will operate this Class I-equivalent railroad at unprecedented levels of efficiency and productivity. That demands robust IT support for operations, marketing and finance.

AEP Texas proposes staffing the Finance and Accounting Department with one information technology ("IT") Director and ten specialists. Total IT annual costs would be approximately $5.27 million or less than 0.07% of total revenues. The highest level employee for the group, the Director would be paid a paltry $69,416. Based on his experience with WCS and consultations with other operators of medium-sized railroads,

[94] *See* AEP Texas Opening electronic workpaper "Simulation Trains-peak calc.xls," spreadsheet "2002 to 2020 Train Counts," Column R.

witness McCarren believes TNR's IT annual operating cost is insufficient. Given the importance of IT to the success of the overall enterprise, Mr. McCarren has added an Assistant Vice President – Information Technology to the staffing proposed by AEP Texas. This would allow IT to function as a separate sub-department within the overall Finance and Administration Department. Railroads and railroad holding companies smaller than the proposed TNR typically have such positions (*e.g.*, WCS – AVP, Information Services, KCS – Chief Information Officer, G&W – VP, Information Technology, MRL – VP, Management Information Systems). Mr. McCarren adds an Assistant Vice President to run the Department, as was the practice at WCS. IT is simply too important a function to be headed by a Director. The Director's position will still be very much required, given the number of staff varied responsibilities and the oversight of outsourcing involved. With this addition, the total IT staff numbers only 12, less than the WCS IT organization of 17 and communications staff of 4.

Based on his experience at WCS, Mr. McCarren finds that the proposed staffing levels, with the addition of an Assistant Vice President, could handle the IT requirements of the workforce and information systems specified by AEP Texas. However, these staffing levels have been demonstrated to be insufficient for a company of the size and scale of TNR. WCS' 2001 organization plan called for an IT staff of 17 in a similarly outsourced environment. WCS also employed outside consultants (often as many as six) on a continuing basis to augment its work force. AEP Texas does not make clear in their filing who will be responsible for the voice communication network – there appears to be one communications supervisor but no communication technicians provided in the Engineering Department, yet no one in the IT department is specifically assigned these

duties (the network engineers are merely tasked to handle "any telecommunications issues which may occur"). The management of the voice communication network will be a considerable task, given the number of communication devices required and the pace of technological change in this area. Mr. McCarren has placed this responsibility in the Engineering Department, which will be addressed by Ms. Gouger in Section III.F.6.

ii) Materials And Purchasing

BNSF's reply includes material handling personnel in the Engineering Department, as proposed by AEP Texas. However, AEP Texas does not provide for a centralized purchasing authority, which would be required for an enterprise of this size. TNR will have substantial purchasing requirements, well in excess of $40 million annually. Although some items can be purchased directly by the operating departments, larger purchases will invariably need review and approval at headquarters. Therefore, Mr. McCarren proposes a Director of Purchasing reporting to the Vice President - Finance. Under the Director would be two Purchasing Managers working directly with vendors and the operating departments.

iii) Real Estate

AEP Texas does not provide any personnel to handle the real estate function. With more than 1,100 route miles, TNR will have a number of real estate issues. Most of these will take the form of crossings, licenses and easements for utility lines, cable TV and the like. Dealings with state departments of transportation on highway crossings and replacement of existing crossings will take considerable time. Municipal authorities seek new road crossings from time-to-time as well. While TNR is custom-designed for the traffic at hand, over time operations and facilities will change and some land will no longer be required while TNR will need to acquire additional property for new facilities.

Mr. McCarren proposes a real estate department of two individuals; a Director and a Manager. This staff will handle issues with companies seeking cable and pipeline crossings, state DOT's and county highway departments doing new or expanded roads, and similar projects. This is half the force employed at WCS, which had about twice the road mileage proposed for TNR. While WCS organized these individuals in the Engineering Department, they can be equally well situated in the Finance Department, and here report to the VP – Finance and Accounting.

iv) Outsourced Expenses

AEP Texas includes a cost of $250,000 for its annual audit, without offering any support for that cost estimate. WCTC's audit fees in 2000 and 1999 were $264,000 and $240,000 in 1998. Given the increased scrutiny of corporate auditing in recent years, auditing fees have increased since 2000. Another comparable railroad, KCS, had audit fees of $563,289 in 2001.[95] While TNR would not have the auditing fees associated with a public company, it would have fees associated with preparing R-1 financials for the STB. WCS, which was divided into Class II and III railroads for classification purposes, did not prepare an R-1. As a result, Mr. McCarren estimates that an appropriate annual audit fee for TNR in 2001 would be $275,000.

The $150,000 that TNR plans to pay for outside federal, state, local and property tax services appears to be adequate for the services specified, based on consultation with WCS' auditors, KPMG. In addition, start-up tax consultation would likely total an additional $15,000.

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[95] *See* KCS Proxy Statement and Fiscal Year 2002 Form 10-K; *see also* BNSF Reply electronic workpaper "RR_Comparisons.xls."

The principal shortcoming of the IT structure proposed by AEP Texas lies not in the staffing of the IT department but the absence of system support in key areas. AEP Texas has configured a system typical of that employed by Class II and Class III railroads without the extensive, high density traffic envisioned for TNR. Indeed, the financial and operating systems proposed for TNR, with over $750 million in revenues, are basically the same as those used by the Arkansas and Missouri, a Class III carrier with less than $15 million in revenues. It would be possible to operate the TNR with the rudimentary IT systems environment envisioned, but it would not be feasible to operate it at the productivity and efficiency levels claimed. TNR would most certainly not attain the level of customer service currently provided by BNSF as required by the STB.

From an overall cost standpoint, AEP Texas proposes to operate on a far lower cost basis than WCS did, even though WCS also outsourced its principal operating system (using Transcentric, then UP Technologies' TCS system). AEP Texas proposes that TNR will spend approximately 0.7% of its revenues or 1.9% of its operating expenses for IT staffing and systems. By contrast, in 2000, WCS spent 2.1% of revenue or 2.8% of its operating expenses on IT and maintenance capital projects. In 1999, WCS expended 2.3% of revenue or 3.2% of its operating expenses and budgeted to spend 2.8% of revenue of 3.7% of its operating expenses in 2001 (WCS was acquired by CN in October, 2001) on IT. Even these figures are conservative, however, because they omit major system development projects.

WCS' IT expenses were unusual in the industry only because through outsourcing and cost control it was able to keep its costs so low. Witness McCarren spoke with Paul Pascutti, VP-Marketing for RMI, the principal provider of operating systems software to

the regional and short line industry about the typical costs of IT for smaller railroads and the provider chosen by AEP Texas for TNR. He estimates that annual expenditures on IT of 2 ½ % to 4% of revenues are typical by small railroads. BNSF witness McCarren also discussed IT spending with Gene Goode, Assistant Vice President — Finance at KCS, the railroad closest in size to the proposed TNR. KCS plans to spend a whopping 6% of revenue on IT in 2004, including maintenance capital items but excluding major system development.

The great disparity between the expenditures of real railroad peers of TNR and those proposed by AEP Texas is because of the omission of systems commonly relied upon by railroads and maintenance capital items.

AEP Texas proposes to use the RMI *RailConnect* System as its base information system to support rail operations on the TNR. BNSF's witness McCarren has direct experience with *RailConnect,* because it is used by the Arkansas & Missouri Railroad ("A&M"), of which he is Chairman and principal owner. A&M relies on *RailConnect* to support its rail operations. *RailConnect*, actually a suite of systems, encompasses basic transportation functions, revenue accounting, cash application, car hire payables and receivables, car repair billing, e-commerce and tracing, and internal reporting. RMI also offers associated systems for customer freight monitoring and bulk material handling facilities.

RailConnect is an internet-enabled operating system well suited for short line railroads and small regional carriers operating carload networks, although it can handle unit and intermodal trains as well. Its Transportation Management System ("TMS") module offers all the basic car and train movement functions expected in the

contemporary railroad environment. It integrates the TMS and the Revenue Management System ("RMS") modules. *RailConnect* also offers very basic e-commerce functions such as car tracing, electronic bill of lading ("e-bol") and switching instructions through another module, *ShipperConnect*, which has not been included by AEP Texas for TNR.

RailConnect does not, however, offer the breadth of functionality offered by major railroad operating systems such as BNSF's TSS, UP's TCS or CN's SRS. It also is not a system configured for a unit train environment. In 1999-2000, WCS explored moving to the *RailConnect* system to reduce its IT operating expenses. The company determined that it would remain with TCS due to the extra functionality that TCS provided. This included areas such as locomotive utilization and maintenance planning; car fleet management and advanced customer service support. Such systems allow for improved performance in their respective areas. BNSF witness McCarren notes that WCS operated fewer road trains than proposed for TNR with a substantially smaller fleet of locomotives.

Even after adding the e-bol capabilities of *ShipperConnect* the *RailConnect* suite does not match the e-commerce capabilities of BNSF (widely acknowledged as the leader in railroad e-commerce) or UP with respect to the specific needs of unit coal train customers. BNSF, for example, provides customers with forecasting tools for production and loading; train tracing tools that provide estimated time of arrival, updates on maintenance activities that may affect train movement and statistics on current train performance. In today's world, e-commerce capabilities are every bit as much a service criteria as delivery times and equipment availability. Since BNSF currently provides a

high level of e-commerce service today, the TNR must provide an equivalent level of service; TNR cannot do so with the systems specified.

In order to properly handle the high volume of unit train business and provide efficient interaction with customers, TNR will need to augment *RailConnect* with additional systems. At a minimum, they should include a unit train planning and reporting module and a coal train forecasting module. RMI has provided Mr. McCarren with a very rough quote of $300,000 to $500,000 to develop the former and, based on discussions with BNSF, Mr. McCarren estimates that the latter system could be built for $150,000. Mr. McCarren allocates another $200,000 in initial cost for web site development and integration with the various tools mentioned here. Such system additions and modifications will be required by TNR on an ongoing basis. Customer requirements will increase, rail industry requirements will change and management will always need new information. For example, DM&E/ICE plans to spend $500,000 on custom programming to supplement their use of *RailConnect* with additional management reporting capabilities this year alone.

Mr. McCarren believes that TNR should budget $300,000 annually in outsourced expenses for systems development and replacement connected with its use of *RailConnect.* A company as large as TNR will need to take generic *RailConnect* outputs and use them in management information systems specific to TNR. TNR plans an initial capital expenditure of $372,357 on short-life PC computers and servers.

AEP Texas also fails to provide TNR with other systems critical to support high-productivity operations. For example, no maintenance-of-way systems are provided. Such systems have become indispensable for efficient maintenance operations on high-

speed, high-tonnage railroads. These systems integrate the vast amounts of data provided by modern track inspection vehicles such as geometry cars, rail profiling equipment, gage-restraint measuring systems, and rail flaw detection vehicles. They also provide for efficient scheduling of maintenance activities in an environment where track time is an expensive and scarce resource.

The railroad industry does not have a wide choice of off-the-shelf, third party systems for Engineering; most large railroads have developed these systems internally. Keeping to the ASP model, Mr. McCarren has specified a system called RailDOCS under development by 10 East, Inc. that relies on hand-held units for C&S and track inspectors to facilitate data collection. This system is currently in place for C&S on CSX; its expansion to other facets of Engineering is under development. Mr. McCarren spoke with Clay Gillette who handles 10 East's sales to the railroad industry and obtained a cost estimate for 100 users of $6,500 monthly. It appears that TNR as envisioned by AEP Texas would have approximately 85 users (*e.g.*, track inspectors, foremen, signal maintainers, *etc.* as well as their supervisors). Since RailDOCS is priced on a sliding scale, monthly usage is estimated at $6,000 or $96,000 annually. Mr. Gillette did not have cost estimates for incorporation of automated testing of vehicle data into the RailDOCS database available yet. Mr. McCarren estimates that at another $30,000 for a total of $126,000 annually for the RailDOCS system. It will also be necessary to develop project planning software for MOW. Mr. McCarren estimates $200,000 in development costs and $30,000 annually to operate such a system.

Similarly, AEP Texas does not supply a system for car repair billing. While RMI offers such as system as part of *RailConnect,* current practice in the railroad industry is

moving towards handheld units where repair information can be entered in the field. Such systems are offered by Wabtec and TMD. Such productivity-enhancing technology is critical for TNR, since no clerical position is specified for car repair billing. Mr. McCarren specifies the TMD system for TNR, which is the system used by A&M. Using A&M's costs as a model, he provides one hand-held unit for each 24-7 inspection crew specified by AEP Texas plus a spare unit. Mr. McCarren estimates this system will have as initial cost of $28,000, plus $73,000 annually.

TNR also fails to specify a system for tracking locomotive utilization and repair billing. Most large regional railroads have such a system, either purchased as part of a larger system suite (*e.g.*, WCS), developed internally (*e.g.*, DME/ICE), or adapted from software developed for other industries (*e.g.*, MRL). Witness McCarren estimates the development costs for a system integrated with *RailConnect* and the Alstom Dispatching System to be $200,000; annual expenses for updating the system would likely run 15% of the initial cost, or $30,000.

It also appears that the up-front cost for AEI readers fails to include the cost of installation. Based on a recent quote from Comet Industries for the A&M.[96] Mr. McCarren estimates that installation will cost about $11,500 per unit. TNR has 14 units, producing an installation cost of $161,077.

AEP Texas has specified a general human resources system that will be adequate for handling general HR requirements. However, due to the specific and burdensome requirements for testing and certification of railroad operating employees, especially locomotive engineers, additional systems support will be necessary in this area (and is

[96] *See* BNSF Reply electronic workpaper "AEI quote.pdf."

employed today by the incumbent, BNSF). In the case of TNR, Mr. McCarren specifies the *InfoRail* system from RailSoft Systems, Inc. in lieu of doing this manually with clerks (which are not included in TNR staffing). AEP Texas proposes to employ 839 operating employees (including non-executive management) whose certifications, qualifications, etc. need to be monitored and maintained. Annual license fees will cost $23,000 for *InfoRail* in addition to a one-time set-up fee of $2,500. BNSF's staffing revisions increase operating personnel levels to 1,315, which will increase costs to $31,575.[97] RailSoft Systems provides on-site training for $1,000 per class plus travel expenses. Mr. McCarren estimates that three classes including travel expenses will cost TNR approximately $5,000.

AEP Texas uses MAS200 for general accounting software on TNR. BNSF witness McCarren also has experience with the MAS family of products. WCS used and A&M uses a similar product, MAS90. Mr. McCarren notes that the capabilities of MAS90 were strained at WCS, and that the vendor, Best Software, Inc., recommends a higher-level product, MAS500 for companies the size of TNR.[98] Mr. McCarren spoke with a Mr. Brian Wilson, Sales Representative at Best Software, Inc., makers of the MAS500 (and also MAS90 and MAS200) software. He confirmed that for a company the size of TNR that MAS500 would be the best-fitting product of the three, and that they normally do not recommend MAS200 for companies exceeding $100 million in revenue. MAS90 is more limited yet, with a maximum of 15 users. MAS500 is sold through reseller partners; however, he estimated that implementation and purchase cost for a

[97] *See* BNSF Reply electronic workpapers "inforail.xls." and "infoRail license fee quote.doc."

[98] *See* http:// www.bestsoftware.com/mas500

company the size of TNR would run approximately $100,000 in initial expense. There are no ongoing expenses unless one buys a service contract, but the 15% allowance that AEP Texas builds in would definitely apply to this as well. There would be start-up training costs as well; Mr. McCarren estimates these at $10,000.

In the IT area, BNSF witness McCarren has updated the pricing of the various *RailConnect* modules to those currently published by RMI. Applying those prices to the units specified by AEP Texas (with the small exception of increasing the use of e-bol to provide for all the loaded coal trains) he arrives at an annual cost of $4,407,754 rather than the $3,709,420 cited by AEP Texas.[99]

In total, Mr. McCarren's estimate for IT is close to $5 million.

Table III.D.3-9

Operating System - Application Annual Costs	**AEP Texas' Estimate**	**BNSF Estimate**	**Difference**
RailConnect Suite	$3,709,420	$4,407,754	$698,334
Operating system – related enhancements	$0	$300,000	$300,000
InfoRail	$0	$31,575	$31,575
RailDOCS	$0	$126,000	$126,000
Project Planning Software	$0	$30,000	$30,000
TMD	$0	$73,000	$73,000
Locomotive System - upgrades	$0	$30,000	$30,000
Total	$3,709,420	$4,968,329	$1,258,909

However, as indicated earlier, those systems alone do not provide the customer service functions provided by BNSF and cannot support the level of operational efficiency and productivity proposed at TNR. It is not simple to enumerate the cost of

[99] *See* BNSF Reply electronic workpaper "RMI quote."

additional "bolt-on" systems because many of these systems do not exist as off the shelf products. They must either be developed or purchased in conjunction with a suite of systems, such as Transcentric's TCS system. In 2001, WCS paid approximately $4 million dollars for use of the TCS system, roughly $2.5 million of which was for carload-based charges.[100] BNSF witness McCarren does not attempt to extrapolate those charges to TNR (which would result in charges in excess of $10 million). He believes that a better basis to judge the appropriate cost for TNR's IT outsourcing is based on a percentage of expense approach, since most IT activity is related to activities in other areas. Mr. McCarren believes that at an absolute minimum a company like TNR would spend 3% of operating expenses on IT. WCS, in a similar outsourced environment averaged 3.2% from 1999 to 2001. This level is substantially below KCS's planned level of expenditure. With $263 million in initial claimed operating expenses, excluding insurance, TNR should expect to spend approximately $7.9 million in total IT expenses. As adjusted for BNSF's revisions that expense would be $10.52 million.

(c) Law and Administration Department

AEP Texas proposes a Law and Administration Department staffed by a General Counsel and two staff attorneys. Figure III.D.3-12 below shows that the total cost for legal expense, including safety and claims personnel and a secretarial pool, is $1.1 million (of which $500,000 is outsourced) or 0.1% of revenue compared to the industry standard of 0.7%.[101]

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[100] *See* BNSF Reply electronic workpaper "WC IT spending calculations.xls."

[101] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Legal vs. Rev Bar."

Figure III.D.3-12

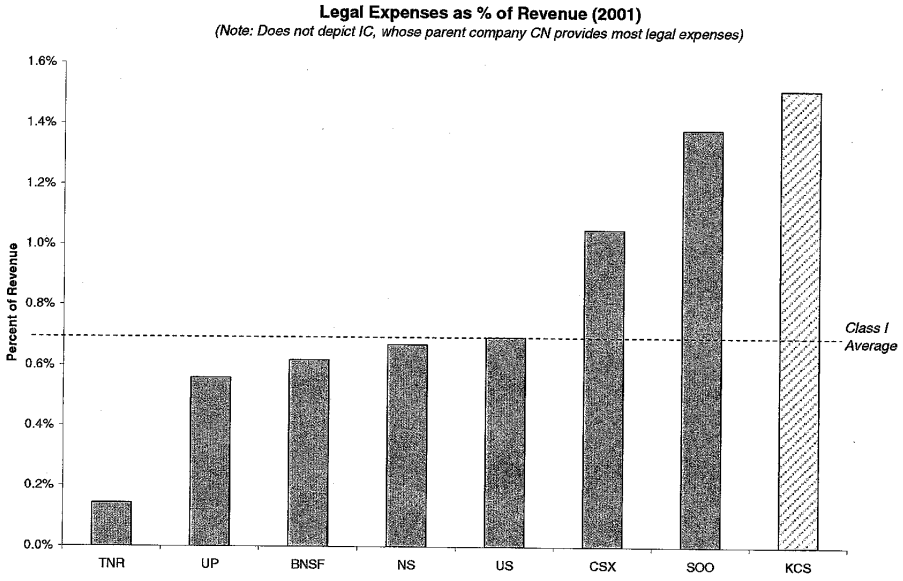
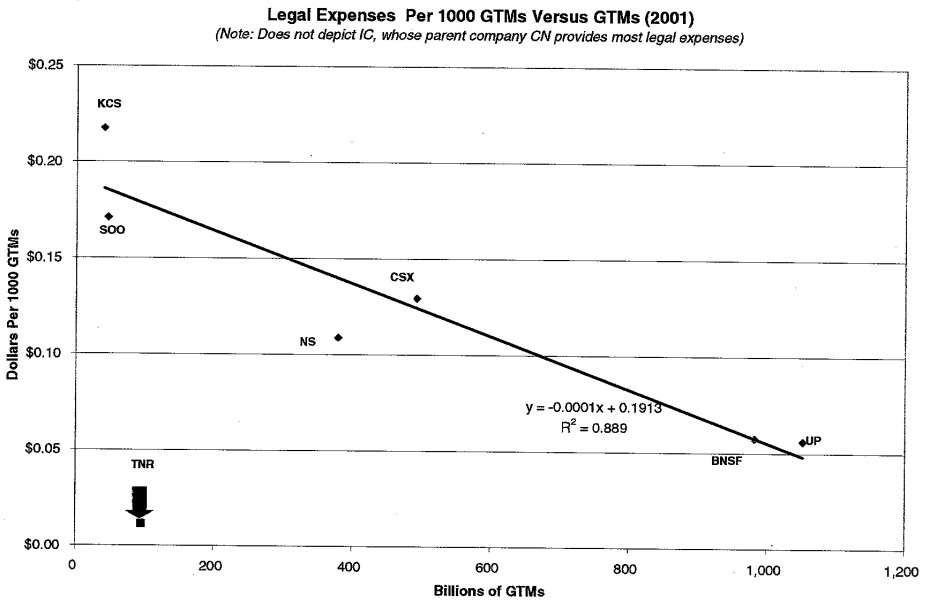


Figure III.D.3-13 shows that TNR's legal expenses on a per 1,000 GTM basis are significantly below what should reasonably be expected based on its GTMs. The expected legal expense for TNR based on the amount of traffic it moves should be approximately $0.18 per 1,000 GTMs not the $0.01 AEP Texas has budgeted.[102]

[102] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Legal vs. GTMs."

Figure III.D.3-13



Mr. McCarren notes that AEP Texas' level of attorney staffing for TNR is comparable to WCS' staffing during most of his five-year tenure at the company. Therefore he concurs with the staffing level proposed by AEP Texas, including a secretary/paralegal. However, Mr. McCarren breaks out the Human Resources ("HR") functions proposed by AEP Texas into a separate sub-department.

In the Claims area, AEP Texas provides a $125,000 annual budget for claims services. AEP Texas has included one Director of Safety and Claims and two Managers of Safety within the Law and Administration Department. Again, Mr. McCarren's real world experience at WCS indicates that more resources will be required. Prudent and proactive management of safety, claims and loss control for such a substantial company

requires more internal staffing than proposed here. As a standard of comparison, WCS employed 8 people in this area; MRL, with a much smaller operation employs { }.[103] Both use outsourced claims services to handle major claims events. Mr. McCarren accepts AEP Texas' outsourcing budget but increases the staff. This remains a very conservative projection; WCS outsourced claims expenses in 2000 for $439,000 and in 1999 for $561,000, far more than AEP Texas proposed.

The three Managers will handle the outsourced staff on routine claims items, safety and loss control and security. Those Managers will be responsible for coordinating the TNR safety effort company-wide, keeping abreast of industry best practices and ensuring that TNR policies minimize the probability of loss in a cost-effective manner. A modest corporate safety effort as outlined here is entirely consistent with and a necessary complement to the safety and training positions in the operating departments. In addition, they will function as a liaison with local law enforcement personnel. Again, this reflects common industry practice among smaller carriers (larger carriers have their own police forces). A close working relationship with local law enforcement is a key element to an effective loss control strategy, especially in the area of grade crossing safety and trespasser issues. Finally, Mr. McCarren would add an AVP-Safety and Loss Control to oversee this area within the Law and Administration Department. The result of these additions is a Safety and Claims group of five individuals that continues to employ outsourcing.

AEP Texas configures TNR as a large regional railroad spread out over 1155 miles of mainline, passing through six states with significant operations in four. AEP

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[103] *See* BNSF Reply electronic workpaper "MRL_Info.doc."

Texas proposes that TNR will employ 895 people in 2001. Significantly, AEP Texas has configured TNR as a non-union company. BNSF has already established that TNR would easily qualify for Class I railroad status; as such it would be the only non-union Class I railroad. In fact, according to the American Short Line and Regional Railroad Association fully 66% of Class II and III railroad employees are also represented by a union.[104] Maintaining non-union status will be a difficult task and one that will require an unrelenting effort and continuing investment.

AEP Texas proposes to include one Director of Human Capital ("HR") within the Law and Administration Department with a Manager of Training and four secretaries reporting to that position, for a total of 6 people. The secretaries are in a pool serving a variety of departments and department heads and are not dedicated HR employees. AEP Texas states "[t]his staff is sufficient to manage recruiting, compliance, compensation and benefits, employee relations and training since most of these functions will be out-sourced."[105] In fact, AEP Texas only provides an estimate to cover outsourced training; no outsourcing budget is provided for the other, critical HR functions. Therefore, Mr. McCarren includes two Directors: one of Personnel and one of Recruitment.

BNSF witness McCarren finds the staffing levels proposed by AEP Texas to be infeasible, especially considering the non-union status of TNR. He draws on his experience with WCS, which in the United States was almost entirely non-union during part of his tenure and remained over 70% non-union up until its acquisition by Canadian National. WCS was by far the largest predominantly non-union railroad. Mr. McCarren

[104] "North American Short Line and Regional Railroad's Profile," ASLRRA (Apr. 15, 2004).

[105] AEP Texas Opening Nar. at III-D-39.

notes that preservation of a non-union environment requires a more substantial and active HR Department than a traditional, unionized railroad. Sufficient HR employees need to be available to resolve employee issues that would otherwise be resolved through a grievance procedure in a union shop. Line operating managers have neither the time nor the ability to resolve such issues in a timely and fair manner.

While many HR functions are directly related to the size of the workforce, there are economies of scale in HR administration; specialized functions such as benefits administration do not increase proportionately with the work force. Therefore, to provide HR coverage equal to WCS, and remain non-union, TNR will require a ratio of HR professionals to overall employment similar to or slightly greater than that of WCS. TNR has only one position, the Director – Human Capital, assigned to directly interface with employees outside of the training area.[106] That is clearly inadequate.

WCS employed a total of 13 personnel in HR, excluding Claims, which was part of WCS' larger HR Department. Unlike TNR, WCS did not centralize training within HR, but kept it with its corresponding operating departments. No training personnel were included within the 13 member WCS HR staff. AEP Texas proposes that TNR will employ 895 employees in 2001, whereas WCS employed an average of 2,239 in 2000, meaning TNR has 40% of the employee force of WCS. In reply, BNSF determines that TNR will require 1,315 employees in 2001 (excluding capitalized MOW employees), raising TNR's percentage in comparison to WCS to 59%, which equates to 7 HR personnel if the Board accepts BNSF's employment revisions.

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[106] In its Narrative, AEP Texas refers to an HR Administrator at III-D-39. However, that position does not appear in its list of employees at III-D-27 and 41. *See also* "TNR Salaries.xls.

WCS had nine people, exclusive of compensation and benefits personnel, directly assigned to support a larger workforce. Proportionately, TNR would require four under AEP Texas' proposal (five under BNSF's revision) to achieve the same level of coverage. Mr. McCarren first revises the department by upgrading the Director – Human Capital to an Assistant Vice President. For reporting purposes this individual will continue to report to the Vice President – Law and Administration. The AVP's HR and Safety and Claims will share a secretary/administrative assistant. Mr. McCarren adds three HR Coordinators reporting to the AVP – Human Capital to handle this task under AEP Texas' proposed staffing levels and four under BNSF's. These individuals will also be responsible for ongoing recruitment of hourly employees once TNR is up and running.

TNR does not designate anyone to handle compensation and benefits, a key HR responsibility. Mr. McCarren adds a Director – Compensation and Benefits. As TNR grows, additional HR support will be needed to keep pace with an expanding workforce. Under BNSF's revision of TNR's staffing this Director would have an analyst.

AEP Texas apparently believes that HR staff directly interacting with employees is an unnecessary luxury and intends to have all such interface done by computers. Mr. McCarren has had direct experience with union organizing efforts at several railroads. He strongly believes that employees will make sure that they have individuals with whom they can interact about problems at work or other personal situations. If TNR fails to provide sufficient HR employees to cover this task, the employees will provide it themselves. However, instead of being known as HR Coordinators, the liaison personnel will then be known as the General Chairmen and Local Chairmen of their respective labor organizations.

Mr. McCarren does not believe that training should ordinarily be best housed within HR, especially when so much of it is to be outsourced. He has nonetheless honored AEP Texas' configuration and retained the Manager of Training within G&A as AEP Texas proposes. He has, however, added two assistant managers, to provide ongoing training activities of TNR employees (as distinguished from start-up training) and to provide for supervision of outside training services. By way of comparison, WCS had seven operating department trainers: one in Engineering, two in Mechanical and four in Transportation. TNR people will need periodic retraining in areas such as Roadway Worker Safety, Mechanical Safety, proper repair techniques, etc. In addition, attrition and new hires occasioned by business growth will add to training demand as well.

i) Outsourced Expenses

The proposed outside legal budget of $375,000 (excluding claims) is substantially below that required for a railroad of this size and scope. AEP Texas offers no justification for this number. WCS paid legal fees of $821,000 in 2000, $1.8 million in 1999 and $1.6 million in 1998; an average of $1.4 million. Another regional carrier, MRL, reports spending in excess of { } million in 2001 alone.[107] DM&E/ICE spends approximately { } after deducting legal fees associated with major financing transactions. While some reduction in legal expense can be expected for TNR due to its smaller number of employees, a reduction of 73% from the WCS level is not credible. Mr. McCarren believes that outside legal expenses should be conservatively budgeted at $1 million.

[107] BNSF Reply electronic workpaper "MRL_Info.doc."

AEP Texas makes no mention of outsourcing or material costs for HR other than training expenses. WCS found outsourcing the preferred route for applicant pre-employment testing (both attitude and aptitude). These tests greatly improved the quality of new-hires and reduced the percentage that failed to develop into successful employees or dropped out of training. *See* recruitment discussion at III.D.3.c.(4)(b). The expense of testing hourly employees is largely represented by the time and effort of HR professionals included in the proposed staffing levels. For supervisory and managerial hires, more expensive outside testing will be appropriate. WCS spent approximately $125 per finalist for these positions. Assuming three finalists per position, that represents an outsourced expense of $375 per position. Mr. McCarren has conservatively estimated testing costs at $100 per hired employee. In addition, HR at WCS administered a program of safety awards and incentives. Most companies in the railroad industry operate such programs in an effort to keep safety "top of mind" in their employees. At WCS, such programs cost approximately $70 per employee annually. Mr. McCarren adopts that unit cost for TNR.

ii) Environmental

Another important function that AEP Texas has failed to adequately staff is environmental engineering and compliance. Many railroads organize this function within their engineering department; however, it can be equally well situated under the General Counsel's office. BNSF witness McCarren suggests that this function be addressed by Mr. Albin in the Engineering Department.

(d) Transportation Department

Mr. McCarren agrees that a Vice President-Transportation is appropriate for the Transportation Department. He also includes an administrative assistant to assist the

Vice President and a secretary to assist the other employees in the department. The remaining Transportation employees that AEP Texas included in G&A, except for the marketing staff, which are discussed in Section III.D.3.c.i.(e) below, are not ordinarily recognized as G&A and, therefore, are addressed by Mr. Mueller in Section III.D.3.a above.

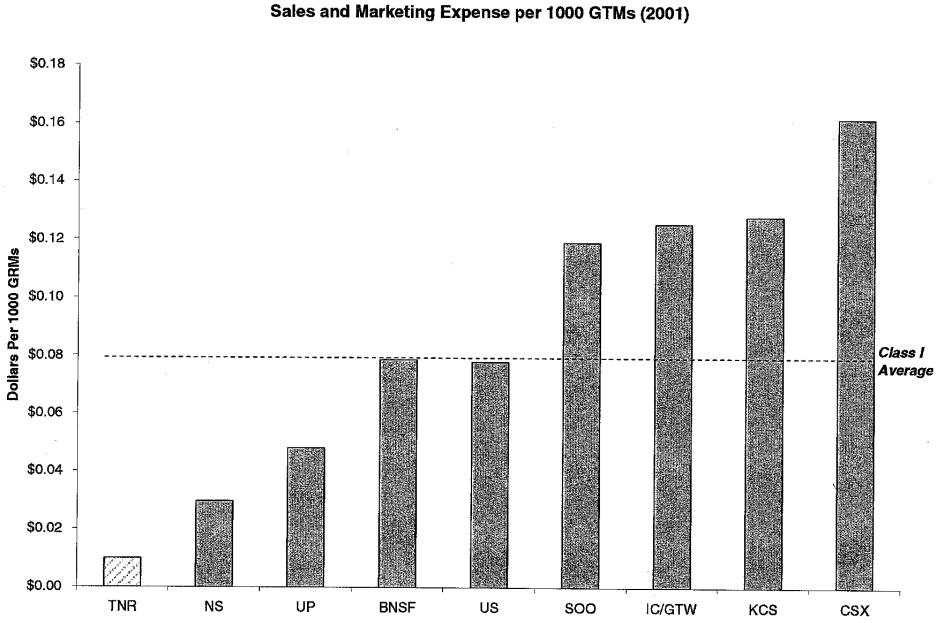
(e) Marketing Department

AEP Texas proposes a marketing staff of two Marketing Managers and an outsourcing expense of $120,000 purportedly to cover two FTE positions. This staff is intended to handle the sales and marketing needs of a railroad that is proposed to begin operations with $767.3 million in 2001 revenues, growing to $1.13 billion over 20 years. This staff is absurdly small by railroad industry standards, with an average revenue per marketing employee figure starting at $192 million and climbing to $282 million.

Figure III.D.3-14 below compares TNR's proposed marketing expenditures on a gross ton mile basis to that of other rail carriers; similar comparisons can be made using other denominators.[108] When the proposed marketing budget of TNR is compared to that of other Class I's on a per 1,000 GTM basis, the gap is astounding. Figure III.D.3-14 shows that whereas AEP Texas expects TNR to expend slightly less than $0.01 on marketing each 1,000 GTM, Class I's on average spend approximately eight times more.

[108] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Sales Mkting per GTM."

Figure III.D.3-14



The crux of AEP Texas' argument in support of underfunding the marketing function is circular. It claims that because it is entitled to identify a traffic group pursuant to the SAC test, it can assume that traffic will be available over the entire SAC analysis period without expending resources that would ordinarily be required by a carrier to ensure the availability of that traffic. In other words, AEP Texas argues it is not required to provide for traffic solicitation, which is the principal task of a railroad Marketing and Sales Department. AEP Texas states: "Unlike real-world railroads, the TNR does not need to engage in the constant solicitation of new business."[109] BNSF rejects AEP

[109] AEP Texas Opening Nar. at III-D-45.

Texas' argument that it is free from all the responsibilities and costs of traffic solicitation. While that position might be appropriate with respect to the issue traffic to the Oklaunion plant, it is totally unrealistic and manifestly unfair when expanded to include all of the third party traffic, including crossover traffic, which AEP Texas proposes that TNR handle. That position allows TNR to attract BNSF traffic while leaving BNSF with almost all of the associated marketing expense.

AEP Texas' proposed staff of four marketers, two in-house and two consultants, are in actuality what railroads commonly refer to as "marketing support." AEP Texas acknowledges as much when it states: "[i]n short, only 'maintenance marketing' for a defined group of shippers is required."[110] Witness McCarren believes it is debatable whether four individuals could, in fact, even handle all of the "marketing support" required for TNR. BNSF currently employs four people in equipment and service planning within its Coal Business Unit alone. To narrow the matters in dispute, BNSF witness McCarren will accept AEP Texas' argument that four FTE "marketing support" positions will be sufficient to handle TNR's marketing support requirements and that two of those four will be outsourced.

The largest discrepancy between AEP Texas' vision of TNR and that proposed by BNSF witness McCarren comes in the areas of traffic solicitation, market analysis and pricing. These are the core functions of real-world railroad Marketing Departments. AEP Texas, assuming a static world and an entitlement to traffic by virtue of the SAC test, assigns no people and zero cost to these functions. Mr. McCarren, having run several regional carriers in the real world, constructs a Marketing Department appropriate

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[110] *Id.*

for a TNR that would actually have to solicit business from customers and be subject to the normal change in markets that affects real railroads.

While AEP Texas presents a coal market that is competitively static (although growing on a formulaic basis), in reality markets, even for utility coal, change considerably over 20 years. In order to retain existing business levels, railroads must be constantly soliciting new business to replace old traffic. BNSF witness McCarren reports that his company, A&M, anticipates a 5% attrition of existing business every year. That equates to a 100% turnover in the twenty year time frame of the typical SARR.

Mr. McCarren finds that real-world railroads are intensely concerned about their customer base and revenue levels and consequently make marketing and sales a senior management concern. Mr. McCarren has worked for seven railroads ranging in size from less than $15 million in revenues to over $3 billion over a 27 year period; every one of them has had a Vice President or General Manager running marketing and sales. Not only do all Class I carriers have such positions, but regional carriers such as MRL, DM&E, and FEC do as well. Mr. McCarren places a VP-Marketing at the head of BNSF's proposed TNR Marketing Department, assisted by an secretary/administrative assistant.

AEP Texas includes in its workpapers information about AEP Texas witness Paul Reistrup's service with the Monongahela Railway Company ("MGA"). Included is "The Monongahela Railway Company Statement of Pricing Policy, May 1990." AEP Texas does not make clear their reason for submitting this document since Mr. Reistrup's service to the MGA was amply documented elsewhere. Nowhere in the complainant's

evidence does AEP Texas or Mr. Reistrup claim that a similar policy would be appropriate or reasonable for BNSF or TNR.

BNSF witness McCarren has direct experience with the Monongahela Railway, having served as Regional Superintendent – Industrial Engineering for the Central Region of Conrail in 1983-84. The Central Region was based in Pittsburgh, PA and included all Conrail lines connecting with the MGA. Conrail was an owner of the MGA and the dominant connecting carrier with respect to coal originated on the MGA. While taking nothing away from the marketing role performed by Mr. Reistrup on behalf of the MGA, Mr. McCarren observed that the bulk of the coal marketing effort with respect to joint MGA-Conrail traffic was performed by Conrail employees. In fact, Conrail regarded the MGA as a jointly owned terminal railroad, much like the Belt Railway of Chicago or the Terminal Railroad Association of St. Louis, not as an independent actor in the coal market. MGA lengths of haul between mine and interchange were generally less than fifty miles. Indeed, Conrail supplied the bulk of the locomotives and carrier-owned equipment for its trains when operating on the MGA. While the unique status of the MGA may have allowed Mr. Reistrup to handle its marketing requirements with minimal staff, that situation is not at all analogous to TNR, which is a vastly larger railroad and one *not* owned by its connecting carrier(s).

AEP Texas does not specify the basis in Mr. Reistrup's experience for its conclusions on TNR's marketing staff. As to some of Mr. Reistrup's other railroad experiences, during his tenure at CSX that carrier employed a considerable marketing staff, and even following a major downsizing in late 2003/early 2004, continues to employ more coal marketing personnel than BNSF while enjoying a significantly smaller

coal revenue base. Previously, when Mr. Reistrup headed the Traffic Department of the Illinois Central Gulf Railroad, that company employed a considerable workforce in the Traffic Department, which included sales, intermodal services and marketing, listing 81 positions (excluding intermodal operations).[111] Presumably, these were only the most senior people in the department.

BNSF witness McCarren observes that TNR has two distinct business segments: coal and non-coal. Coal dominates TNR revenues (94% plus) and TNR should devote the bulk of its marketing energies to that commodity. Interestingly, TNR proposes to handle 83% of the utility coal tons currently handled by BNSF, all at the origin (mine) end. Much of this business is crossover traffic returning to BNSF, but even so TNR's anticipated 2001 coal revenues of $723 million accounts for fully 36% of total BNSF coal revenues. TNR will handle traffic for over 100 destination power plants, each with its own fuel requirements and demand dynamics. This is not a simple business as claimed by AEP Texas.

Further, the coal marketing business is changing. Once dominated by long-term contracts, rail coal markets have been characterized in recent years by decreasing contract terms. BNSF reports that 25% of its coal volumes are covered by contracts expiring over a three year period. The dynamic market place requires substantial marketing staff.

BNSF currently staffs its coal marketing group with 16 people. An additional four positions provide direct support of the coal marketing effort but are organized in different sub-departments. Naturally, in an organization as large as BNSF, coal marketing receives substantial indirect support from a variety of marketing support

[111] Official Guide of the Railways (May 1971).

functions, which will generally be unavailable in the TNR environment. BNSF's coal marketing group also takes advantage of a large array of state-of-the-art information technology – indeed BNSF is widely acknowledged as the e-commerce leader among Class I railroads. The marketing group does not include customer service personnel, who are organized elsewhere (as at TNR). BNSF provides two coal desks that operate 24 hours a day, 7 days a week, 365 days a year in its Network Operations Center, and an "inner loop" desk that handles issues specific to the joint line in the PRB and an "outer loop" that handles all other coal traffic issues. In addition, BNSF coal marketing relies heavily on the Marketing Decision Support and Planning group to measure its operating performance relative to its commitments in customer contracts.

Of the 16 coal marketing employees, seven are directly involved with traffic, four handle equipment and service planning, two handle economic and cost analysis and one handles planning and related issues with the mines in the PRB. The remaining two positions consist of the group vice president and his administrative assistant.[112] Even including the four positions placed elsewhere in its organization, the BNSF marketing group is smaller than its principal competitor, UP, which lists 25 people as part of its "Energy Team Contact List" on the UP website. CSX employs 27 people in their coal marketing group following their recent reorganization and NS employs 39 in that capacity. With respect to coal marketing, BNSF is the "low cost, efficient provider."

Simple logic would indicate that TNR should field, at a minimum somewhere between 36% and 83% of the BNSF group, based on revenues and tonnages. TNR cannot assume that it is always the minority participant in a joint line movement, relying

[112] *See* BNSF marketing organization chart at BNSF Reply electronic workpaper "BNSF coal marketing.pdf."

on BNSF's coattails for its solicitation efforts. It will handle several traffic flows as purely local movements, and be dominant in some crossover coal traffic.

Eliminating the four "marketing support" personnel, the vice president and administrative assistant from each group, and multiplying the remainder (10 people in the case of BNSF) by the more conservative figure (the percentage of BNSF revenue to be claimed by TNR) would produce a TNR coal marketing group of three. Mr. McCarren divides this into an Assistant Vice President – Coal Marketing and two Market Managers.

SAC precedent supports Mr. McCarren's conclusions. In *FMC*, slip op. at 166, the Board noted that in a SAC case "any business plan that assumes, . . . that it would retain all of its customers must devote resources to all those customers." AEP Texas assumes not only that TNR will retain BNSF's customers, but that it will attract some of them to use a different route.

TNR will also handle a significant quantity of non-coal traffic between BNSF connections in Amarillo and Oklaunion. This traffic is primarily intermodal and merchandise freight. Here again, AEP Texas proposes to take advantage of its interpretation of the SAC test to take BNSF revenue while leaving associated cost behind with BNSF. If TNR were a real world railroad, it would have to take into account BNSF's alternate route for West Coast – Fort Worth traffic via Sweetwater and UP trackage rights — and provide resources adequate to ensure retention of that traffic.

In the modern era, railroads finding themselves in the situation of TNR with respect to the non-coal traffic (*i.e.*, receiving traffic from a carrier and delivering it to the same carrier at another point) normally enter into a haulage arrangement with the larger carrier. The larger carrier becomes the customer of the smaller one in this business

model. Examples include Arizona and California with BNSF (originally ATSF), Gateway Western with IC, IMRL with UP and WCS with CN. Such arrangements minimize the exposure of the haulage carrier to car hire and locomotive expenses, and place most of the marketing burden on the tenant. Normally, the haulage carrier would receive a rate significantly less than a normal division of revenue as a result. These arrangements are designed to reduce the tenant's cost compared to its other routing alternatives.

AEP Texas has chosen to model TNR as a division of revenue carrier, presumably because a line haul carrier's revenues are typically higher than those of a haulage carrier. Those higher revenues, however, bring with them higher costs in marketing, car hire accounting and revenue accounting, along with higher operating costs. The intermediate carrier (in this case TNR) must participate in the contracts and tariffs of its connecting carrier, and must make interline revenue settlements as well as car hire settlements for each carload handled. A real-world TNR, even in this model, would need to choose between the administrative simplicity of using standard quotes and the higher yield available by quoting individually on movements using its railroad between Amarillo and Oklaunion. Even if it chooses to use standard quotes, TNR will from time-to-time have to negotiate lower rates on highly competitive traffic opportunities or forgo that business. This is the experience of A&M and many smaller railroads that used standard quotes to reduce administrative requirements. Such quotes effectively become a cap, but not a floor, on per car earnings.

AEP Texas unreasonably assigns TNR the higher revenues of the traditional division of revenue model yet only provides for the smaller marketing and administrative

expense burden of the haulage model. An analogy for this would be a wholesale distribution business selling for full retail price. TNR cannot have its cake and eat it too.

BNSF witness McCarren provides the marketing staff required for TNR to participate in traffic solicitation activities as a fully participating intermediate carrier. Mr. McCarren believes that two Market Managers will be required to handle this traffic. One will handle principally intermodal traffic, which comprises 46% of the net non-coal tons and 49% of the non-coal revenues in 2001. The other Manager would handle principally carload non-coal traffic. Carload and intermodal traffic have substantially different customer groups and significantly varying supply and demand characteristics, to say nothing of different market and pricing structures.

With these additions the revised TNR Marketing Department is staffed as follows:

Table III.D.3-10

Vice President – Marketing	1
Administrative Assistant	1
AVP – Coal Marketing	1
Market Managers – Coal	2
Market Manager – Intermodal	1
Market Manager – Carload	1
Manager – Marketing Support	2[113]
Total	9
Outsourced Support (FTE equivalent)	(2)[114]

[113] These two managers are the same as those proposed by AEP Texas in its evidence.

[114] *See* Section (i) below, staff and services are outsourced as provided by AEP Texas in its evidence.

This level of staffing, while higher than that provided by AEP Texas, still provides an extraordinary level of staff productivity. Using TNR's revenue estimates, revenue yield per actual employee will be $76.7 million in 2001 ($63.9 million counting the outsourced staff). BNSF witness McCarren believes that staff will need to be increased during the forecast period, with TNR revenues ultimately exceeding $1.2 billion, a 57% increase. Mr. McCarren would increase staff by adding two coal marketing managers on a pro-rata basis as traffic ramps up over the 20-year forecast period. In order to keep support costs as low as possible, Mr. McCarren ramps up the outsourcing cost (revised to $150,000 in 2001 by BNSF) on a pro-rata basis during the study period, reaching $236,000 (3.15 FTE) in 2020. In the aggregate, though, revenue yield per employee will increase to $100.7 million in 2020 ($79.7 million counting the outsourced staff).

With BNSF's revisions TNR will not be able to achieve the revenues forecast by AEP Texas. BNSF fixes TNR's 2001 revenue at $654.6 million (15% less than AEP Texas) and 2020 revenue at $851.7 million (26% less than AEP Texas). The differences lie entirely in coal. Consequently, Mr. McCarren reduces the coal marketing force by one marketing manager in 2001 and two marketing managers in 2020, providing a net increase of one over the forecast period. Additionally, outsourced marketing support costs would be reduced 13% in 2001 to $130,000 and 20% in 2020 to $189,000.

Finally Mr. McCarren assumes travel and entertainment by the marketing employees at 15% of their annual salaries. He assumes 5% for all other G&A employees.

i) Outsourced Expenses

Mr. McCarren has discussed outsourcing marketing support costs with principals at three current providers of these services, Roy Blanchard at The Blanchard Company,

Sandra Dearden at High Road Consulting and Gary Hunter at Railroad Industries, Inc. He also spoke with Michael Smith, President of the Finger Lakes Railroad, who formerly ran a company providing marketing outsourcing for small railroads. All note that this market is thin, because many clients ultimately bring their marketing efforts in-house. Mr. Smith notes that his customer relationships typically have a life cycle of four to six years. Much of the work is project-oriented, or is performed for shippers rather than rail carriers. They believe the market can, however, support the requested "marketing support" services, either with their own employees or with sub-contractors.

Witness McCarren believes that the outsourcing costs shown for the two outsourced support employees is too low for the services required. The high productivity assumed implies that high performing people need to be employed. While outsourcing allows TNR to avoid railroad retirement taxes and other expenses associated with railroad employees, even outsourced employees must receive sufficient compensation or they will leave and the resulting turnover will increase costs. Mr. McCarren notes that the lowest grade management marketing employees at WCS (MG12, generally with titles such as Manager – Equipment) earned on average $52,230 in 2001. The next higher grade (MG13, generally with titles such as Assistant Manager – Marketing) earned on average $52,776. These figures represent pure salary, exclusive of profit sharing (generally 4% of salary), health benefits (approximately $8,000 annually), taxes and other benefits. Mr. McCarren estimates that on an outsourced basis, individuals of this caliber and experience would cost at least $75,000 annually, assuming a base salary of $52,500 and adding social security taxes, health insurance at $7,000 (based on 2003 family coverage insurance premiums at A&M), $5,000 in office, travel, and miscellaneous expenses and

10% profit margin for the outsource provider. Mr. McCarren believes this figure is conservative based on his discussions with the contract marketing group

(f) Engineering/Mechanical Department

Mr. McCarren agrees that a Vice President of Engineering and Mechanical would be appropriate for TNR. He also believes that person would require an administrative assistant. The remaining employees will be address in the Engineering and Mechanical sections.

(2) Compensation

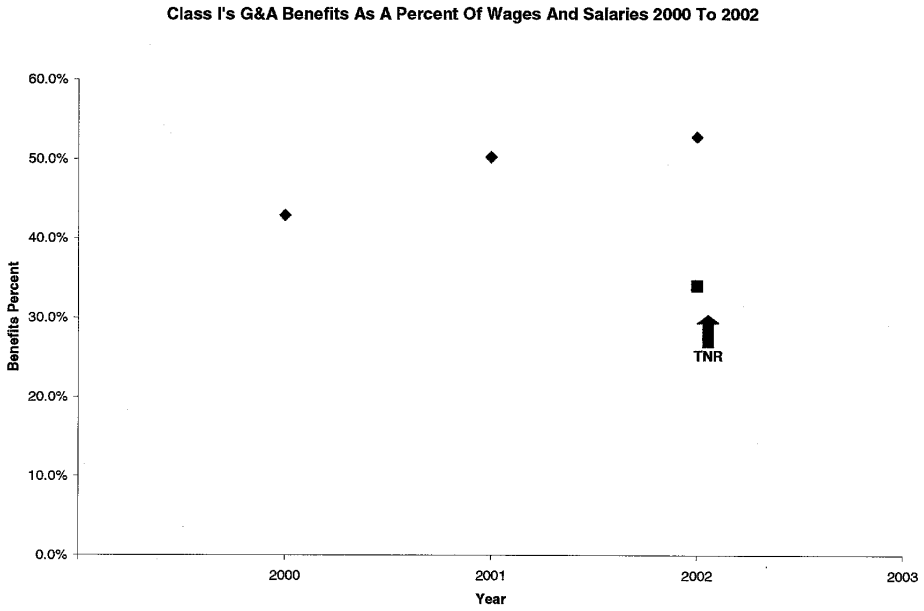
Regarding compensation for executive level employees, Mr. McCarren recommends salary levels based on a survey of salaries at public railroads. For non-executive level salaries, Mr. McCarren relies upon 2000 BNSF Wage Form A and B average annual salaries de-escalated to second quarter 2000 levels as discussed in the operating section above. The compensation for TNR operating and transportation personnel was discussed in detail in Section III.D.3.a. The compensation for the TNR Engineering and Mechanical personnel is discussed in Section III.D.4, below. The salaries and benefits for the TNR executives and G&A personnel Mr. McCarren recommends are summarized in Table III.D.3-11 below. In addition to these compensation costs, Mr. McCarren assumes fringe benefits of 43.2%.[115] AEP Texas recommends using only 33.9% fringe benefit costs based on AAR data used in calculating the RCAF during the second quarter of 2000. However, the actual fringe benefits paid by railroads for the full year 2000 and subsequently were much higher than 33.9% and were in fact higher than 40%, which is the level the Board accepted in *TMPA*.

[115] *See* BNSF Reply electronic workpaper "fringe benefits.xls."

In its reply evidence, BNSF uses fringe benefits ratios derived from what railroads report in their R-1's. This method is superior due to the reliability of the data and the ability to specify fringe benefits separately for G&A employees. For G&A employees, BNSF uses a three-year average of transportation-specific fringe benefits reported in R-1's for Class I railroads in the same peer group as the TNR, namely with less than $1 billion in freight expenses per year. The average 2000-2002 G&A ratio for those carriers was 43.2 percent. Figure III.D.15 shows where TNR falls with respect to Class I's G&A benefits as a percentage of wages and salaries.[116]

[116] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Benefits Percent."

Figure III.D.3-15



As a preliminary matter, Mr. McCarren notes that the location of TNR's headquarters in Alliance, Nebraska would not justify lower executive salaries than the salaries of railroads set out in the prior table. On the contrary, if anything, Mr. McCarren believes that TNR's salaries would need to be increased because of the need to attract qualified employees to Alliance. Nonetheless, he does not assume that the TNR would have to pay higher salaries as a result of the location of TNR headquarters and sets executive level salaries based on comparable railroads.

Mr. McCarren has surveyed publicly available information on executive level compensation at Class I, II and III railroads. That analysis summarized in Table III.D.3-11 below, shows salaries and bonuses for several railroad executives.

Table III.D.3-11

		Annual Compensation			Long Term Compensation		
Railroad	**Executive Position**	**Salary**	**Bonus**	**Other Annual Comp**	**Restricted Stock (Cum.)**	**Stock Options**	**Compensation (includes LTIP)**
BNSF (2001)	President & CEO	$676,000	$15,000		$1,350,451	350,000	$47,725
	EVP & Chief Marketing Officer	$324,400	$200,170		$424,501	80,500	$24,721
	EVP & COO	$350,000	$224,873		$438,746	114,226	$24,658
	EVP & CFO	$282,000			$664,907	92,528	$23,065
	EVP Law & Gov. Affairs, Sec.	$201,900	$174,039		$339,031	92,195	$96,464
CNW (1994)	Chairman, President & CEO	$445,000	$324,850				$137,793
	EVP - Operations	$157,913	$253,447				
	SVP - Sales & Marketing	$276,140	$201,582			12,500	$87,022
	SVP - GC & Secretary	$232,824	$169,961				$66,066
	SVP - Administration	$227,409	$166,009				$64,410
CSX (2001)	Chairman, President & CEO	$1,200,003	$1,000,000	$393,277		800,000	
	Vice Chairman & CFO	$520,833	$281,250	$252,893		110,000	
	President - CSXT	$475,000	$285,000	$221,683		175,000	
	Vice Chairman	$445,833	$240,750	$160,251		100,000	
	CSX World Terminals President & CEO	$331,667	$217,900	$62,606		50,000	
Illinois Central (1998 10-K)	President & CEO	$500,000	$387,500	$18,615		85,500	$175,734
	Senior VP - Operations	$217,420	$130,920	$71,522		30,000	$48,520
	Senior VP - Marketing & Sales	$188,674	$113,620	$11,657		30,000	$35,874
	VP, GC & Secretary	$173,982	$96,710	$12,676		19,500	$42,172
	VP & CFO	$188,674	$104,880	$10,808		19,500	$44,503
KCS (2001)	Chairman, President & CEO	$540,180				12,363	$8,052
	Executive VP & COO	$284,250				5,160	$8,052
	Senior VP & CFO	$222,678				3,507	$8,052
	Senior VP Operations - KCSR	$213,192				3,253	$8,052
	VP & GC	$156,067		$8,824		35,000	$5,453
Norfolk Southern (2001)	Chairman, President & CEO	$950,000	$959,025	$526,034		525,000	
	V Chairman & Chief Mktg Officer	$406,250	$273,406	$66,163		150,000	

		Annual Compensation			Long Term Compensation		
Railroad	**Executive Position**	**Salary**	**Bonus**	**Other Annual Comp**	**Restricted Stock (Cum.)**	**Stock Options**	**Compensation (includes LTIP)**
	V Chairman & COO	$510,417	$343,510	$150,400		150,000	
	V Chairman & CFO	$510,417	$343,510	$156,140		150,000	
	SVP - Administration	$270,000	$154,454	$33,768		60,000	
UP (2001)	Chairman & CEO Corp.	$1,100,004		$107,945	$4,500,000	150,000	$73,460
	President & COO RR	$683,340		$77,311	$1,575,000	75,000	$48,943
	SVP, GC, Sec	$421,900	$700,000	$196		35,000	$22,312
	EVP - Finance	$400,008	$340,000	$179	$127,500	35,000	$16,325
	EVP - Railroad Operations	$400,008	$212,500	$179	$318,700	35,000	$17,207
Wisconsin Central (2001)	President & CEO	$551,250	$104,462			100,000	
	President & CEO (N.Am.)	$300,000	$58,590			40,000	
	Executive VP & CFO	$200,000	$31,580			27,000	
	Executive VP - Corp. Dev.	$200,000	$31,580			27,000	
	VP & Chief Accounting Officer	$160,260	$32,613			14,800	
Emons (2001)	Chairman, President & CEO	$250,000	$69,672				$23,490
	SVP, CFO & Secretary	$144,815	$34,139				$9,364
	VP	$130,000		$2,224	$48,125		
	VP	$112,400	$36,228				$15,787
Florida East Coast (2001)	Chairman, President & CEO	$521,250	$243,716	$7,874		182,732	$7,874
	Vice Chairman	$325,000	$167,256	$7,050	$89,687	120,476	$7,050
	Executive VP, Pres. Florida East Coast Railway, LLC	$312,750	$106,585	$6,999		76,800	$6,999
	Exec VP, Secretary & CFO	$275,000	$141,524	$51,216		61,000	$6,840
	Exec VP, Secretary, & GC	$250,000	$128,659	$6,735		45,000	$6,735
Genesee & Wyoming (2001)	CEO & Chairman	$510,000	$355,400			56,250	$169,007
	President & COO (N.Am. Ops.)	$294,387	$105,400			22,500	$70,362
	CFO	$200,083	$100,000			28,125	$11,271
	Exec. VP - Corp. Dev.	$236,021	$86,400			16,875	$48,651
	SVP - Australia	$220,000	$110,000	$71,705			$67,836
Pioneer Railcorp (2001)	Chairman, President & CEO	$654,267					

		Annual Compensation			Long Term Compensation		
Railroad	**Executive Position**	**Salary**	**Bonus**	**Other Annual Comp**	**Restricted Stock (Cum.)**	**Stock Options**	**Compensation (includes LTIP)**
Providence & Worcester (2001)	Chairman & CEO	$342,464		$36,459			$45,236
	President & COO	$293,955				1,128	$37,758
	Treasurer	$138,846				281	$9,719
	VP Engineering	$114,192				223	$7,993
	Secretary & General Counsel	$109,373				90	$7,656
RailAmerica (2001)	Chairman, President & CEO	$802,917	$135,238	$2,833,680		350,000	
	CAO, EVP & Secretary	$325,000	$1,000	$925,766		150,000	
	SVP International Rail Group	$205,000	$1,000				
	EVP & COO North American	$325,000	$1,000			100,000	
	SVP & CFO	$220,000	$1,000	$123,505		30,000	
	CEO - Freight Australia	$200,000	$191,000			30,000	

	BNSF Sources: Year 2002 & 2001 Schedule 14-A; 2002 & 2001 Form 10-K
	CN Sources: Year 2002 Form 6-K; CN Website
	CNW Source: Year 1994 Schedule 14-A; 1994 Form 10-K
	CSX Sources:Year 2002 & 2001 Schedule 14-A; 2002 & 2001 Form 10-K
	IC Sources: Year 1996 Schedule 14-A; 1998 Form 10-K; Year 1998 R1
	KCS Sources: Year 2001 Schedule 14-A; 2001 Form 10-K; R1
	Norfolk Southern Sources: Year 2002 & 2001 Schedule 14-A; 2002 & 2001 Form 10-K
	UP Sources: Year 2002 & 2001 Schedule 14-A; 2002 & 2001 Form 10-K
	WCS Sources: Year 2000 Schedule 14-A; 2000 Form 10-K
	FECR Sources: Florida East Coast Industries Year 2001 Schedule 14-A; 2001 Form 10-K
	Emons Source: Fiscal Year 2001 (6/30/00-6/30/01) Schedule 14-A; Fiscal Year 2001 Form 10-K
	Genesee Source: Year 2001 Schedule 14-A; 2001 Form 10-K
	Pioneer Source: Year 2001 Schedule 14-A; 2001 Form 10-K
	P&W Source: Year 2001 Schedule 14-A; 2001 Form 10-K
	RailAmerica Source: Year 2001 Schedule 14-A; 2001 Form 10-K

(a) President/CEO

The salary that AEP Texas proposes for the President/CEO is based on the supposed 2000 salary level of the President/CEO of WCS. That person at the time was Mr. McCarren, BNSF's witness with respect to G&A costs in this proceeding. Mr. McCarren testifies that AEP Texas' purported compensation figure for him is incorrect

because it does not include all his compensation. In 2000, as WCS President, Mr. McCarren received total compensation (salary and bonus) of $358,590 plus 40,000 stock options for WCTC shares at a strike price of $13, which had a current value of $520,000. TNR, as a private company, has no such stock option offering. AEP Texas' salary for the CEO/President must be rejected because it fails to account for important elements of compensation.

The survey presented in Table III.D.3-11 shows a salary range of $250,000 to $1,200,003 for railroad CEO's. Bonuses for those same employees ranged up to $1,000,000, excluding stock options and other compensation. Stock options were granted to almost all those executives, ranging from thousands to hundreds of thousands of shares. Many received restricted stock as well, ranging in value to over $4.5 million in the case of the largest railroad. In addition, other annual compensation for those individuals went as high as $526,000. AEP Texas significantly understates the comparable level of compensation for railroad industry chief executives.

The railroads with revenues closest to — but lower than — that projected for TNR are IC ($650.2 million), KCS ($566.2 million) and Soo ($552.2 million). The IC CEO received total compensation of $887,500 plus 85,500 stock options. The KCS CEO received total compensation of ($540,180 in compensation and 12,363 option shares). Mr. McCarren has chosen KCS as the best model for TNR. KCS has the lowest compensation and therefore provides the most conservative comparison. KCS is also one of the railroads that Mr. McCarren determined earlier was most comparable to TNR.

KCS' CEO's compensation in 2002 was quite similar to 2001, $620,004 plus 13,207 stock options, further strengthening the case for using KCS as a model. KCS and

TNR arguably present different types of management challenges, but the level of management skills required is similar. Mr. McCarren acknowledges that without the opportunity for equity compensation a candidate for the job might seek more cash compensation, but based on his knowledge of the industry he believes that a compensation level of $540,000 would attract a qualified individual to the job.

(b) Vice Presidents

Using the same survey, Mr. McCarren notes that compensation for senior level vice presidents varies widely with the type of company and organizational structure. Many companies have Chief Operating Officers responsible for a significant section of their network, but TNR's structure is simplified and features strong department heads reporting directly to the President and CEO. Several similar jobs to the AEP Texas department heads at mid-sized railroads can, however, be identified:

- IC (1998) Sr. VP – Operations ($450,000)
- KCS (2001) Sr. VP – Operations ($213,192)
- IC (1998) Sr. VP – Marketing & Sales ($313,951)
- WCTC (2000) Exec. VP – Corp. Devp. ($231,580)
- KCS (2001) VP & GC ($156,067)
- IC (1998) VP, GC & Secretary ($283,368)
- IC (1998) VP & CFO ($304,359)
- KCS (2001) Sr. VP & CFO ($284.250)
- WCTC (2000) Exec. VP & CFO ($231,580)

Without exception, these individuals all received significant stock option grants along with their cash compensation; such equity compensation will not be possible at the privately-held TNR.

TNR plans to set in place a salary plan compensating vice presidents of four major departments at $223,217 for salary and bonus, based on WCS compensation in 2000.

As set forth above, when stock option consideration is included, competitive market compensation for the major department head positions is well above the levels proposed by AEP Texas. Nonetheless, Mr. McCarren believes that qualified individuals could be attracted to these positions if sufficient bonus compensation were added to raise expected cash compensation to $300,000. The Marketing Vice President position will require this pay level as well, given the degree of marketing challenge and the increased department size recommended by BNSF. Mr. McCarren recommends that the minor department vice presidents salary and bonus compensation be raised commensurately to $250,000.

Table III.D.3-12 below, summarizes the G&A Compensation used in BNSF's Reply Evidence:

Table III.D.3-12

Comparison of AEP Texas and BNSF G&A Personnel Compensation

	AEP Texas			BNSF			
Position	Personnel	Salary	Total	Personnel	Salary	Total	Difference
President and CEO	1	{ }	{ }	1	{ }	{ }	$ 190,525
Administrative Assistant	1	{ }	{ }	1	{ }	{ }	$ 29,565
Director Corporate Relations	1	{ }	{ }	1	{ }	{ }	$ 2,687
Director of Operations Control	1	{ }	{ }	Included in Operating			$ (89,255)
Director of Train and Locomotive Operations	1	{ }	{ }	Included in Operating			$ (89,255)
Director of Customer Service	1	{ }	{ }	Included in Operating			$ (89,255)
Customer Service Managers	8	{ }	{ }	Included in Operating			$ (609,520)

Manager of Operating Rules and Safety	1	{ }	{ }	Included in Operating			$ (73,313)
Director of Mechanical Services	1	{ }	{ }	Included in Operating			$ (89,255)
Manager of Testing/Environmental	1	{ }	{ }	Included in Operating			$ (73,313)
Vice President - Finance	1	{ }	{ }	1	{ }	{ }	$ 74,652
Secretary	0	{ }	$ -	1	{ }	{ }	$ 69,227
Assistant Vice President - Treasurer	0	{ }	$ -	1	{ }	{ }	$ 248,225
Assistant Treasurer	0	{ }	$ -	1	{ }	{ }	$ 91,942
Cash Manager	0	{ }	$ -	2	{ }	{ }	$ 143,011
Controller	1	{ }	{ }	1	{ }	{ }	$ 62,317
Assistant Controller Revenue	1	{ }	{ }	1	{ }	{ }	$ 2,683
Manager - Revenue	0	{ }	$ -	1	{ }	{ }	$ 75,520
Director Tax	1	{ }	{ }	1	{ }	{ }	$ 2,683
Director Financial Reporting	0	{ }	$ -	1	{ }	{ }	$ 91,942
Manager Financial Reporting	1	{ }	{ }	1	{ }	{ }	$ (13,635)
Property Accounting Analyst	0	{ }	$ -	1	{ }	{ }	$ 64,491
Sr. Financial Analyst	0	{ }	$ -	3	{ }	{ }	$ 193,473
Manager Accounting	0	{ }	$ -	1	{ }	{ }	$ 75,520
Revenue Accounting Clerk	1	{ }	{ }	6	{ }	{ }	$ 324,340
Assistant Controller Disbursements	1	{ }	{ }	1	{ }	{ }	$ 2,683
Manager Accounts Payable	0	{ }	$ -	1	{ }	{ }	$ 75,520
Manager Payroll	0	{ }	$ -	1	{ }	{ }	$ 75,520
Manager Revenue Analysis	0	{ }	$ -	1	{ }	{ }	$ 75,520
Revenue Analysts	0	{ }	$ -	1	{ }	{ }	$ 64,491
Manager Car Equipment Accounting	0	{ }	$ -	1	{ }	{ }	$ 75,520
Disbursement Clerks	1	{ }	{ }	2	{ }	{ }	$ 66,375
Payroll Coordinator	0	{ }	$ -	1	{ }	{ }	$ 64,491
Manager Miscellaneous Billing	0	{ }	$ -	1	{ }	{ }	$ 75,520
Director Internal Audit	0	{ }	$ -	1	{ }	{ }	$ 91,838
Manager of Administration	1	{ }	{ }	1	{ }	{ }	$ 2,207
Director Budgeting and Analysis	1	{ }	{ }	1	{ }	{ }	$ 2,683
AVP Information Technology	0	{ }	$ -	1	{ }	{ }	$ 221,281
Director of Information Technology	1	{ }	{ }	1	{ }	{ }	$ 2,089
IT Specialists	10	{ }	{ }	10	{ }	{ }	$ 18,841
Director of Purchasing	0	{ }	$ -	1	{ }	{ }	$ 91,838
Manager of Purchasing	0	{ }	$ -	2	{ }	{ }	$ 151,040
Director of Real Estate	0	{ }	$ -	1	{ }	{ }	$ 91,838
Manager of Real Estate	0	{ }	$ -	1	{ }	{ }	$ 75,520
General Counsel	1	{ }	{ }	1	{ }	{ }	$ 25,008
Staff Attorney	2	{ }	{ }	2	{ }	{ }	$ 4,179
Secretary/Paralegal	4	{ }	{ }	1	{ }	{ }	$ (106,689)

AVP HR	0	$ -	$ -	1	{ }	{ }	$ 248,225
AVP Safety & Claims	0	$ -	$ -	1	{ }	{ }	$ 221,281
Director Safety & Loss Control	1	{ }	{ }	1	{ }	{ }	$ 2,683
Manager Safety	2	{ }	{ }	2	{ }	{ }	$ 4,414
Director Recruitment	0	{ }	$ -	1	{ }	{ }	$ 91,838
Director Personnel	0	{ }	$ -	1	{ }	{ }	$ 91,838
Human Resources Coordinator	1	{ }	{ }	4	{ }	{ }	$ 196,866
Director Compensation & Benefits	0	$ -	$ -	1	{ }	{ }	$ 91,838
Analyst	0	$ -	$ -	1	{ }	{ }	$ 64,491
Claims Manager	0	$ -	$ -	1	{ }	{ }	$ 71,505
Secretary/Administrative Assistant	0	$ -	$ -	1	{ }	{ }	$ 40,856
Manager of Training	1	{ }	{ }	1	{ }	{ }	$ 2,207
Asst. Manager of Training	0	$ -	$ -	2	{ }	{ }	$ 143,011
Vice President Marketing	0	$ -	$ -	1	{ }	{ }	$ 297,869
Secretary	0	$ -	$ -	1	{ }	{ }	$ 69,227
AVP Coal Marketing	0	$ -	$ -	1	{ }	{ }	$ 221,281
Manager Coal Marketing	1	{ }	{ }	2	{ }	{ }	$ 94,359
Market Mgr - Other	1	{ }	{ }	4	{ }	{ }	$ 251,325
VP - Transportation	1	{ }	{ }	1	{ }	{ }	$ 74,652
Administrative Assistant	0	$ -	$ -	1	{ }	{ }	$ 69,227
Secretary	0	$ -	$ -	1	{ }	{ }	$ 40,856
VP - Engineering and Mechanical	1	{ }	{ }	1	{ }	{ }	$ 74,652
Administrative Assistant	0	$ -	$ -	1	{ }	{ }	$ 69,227
Manager of Budgets and Purchasing	1	{ }	{ }	0	$ -	$ -	$ (73,313)
Clerk	1	{ }	{ }	1	{ }	{ }	$ 2,417
Total	56	XXX	{ }	93	XXX	{ }	$ 4,326,149

(3) Materials, Supplies & Equipment

BNSF has reviewed the individual item unit costs that make up the overall material and expense costs for TNR G&A personnel. In general, BNSF accepts those items' unit costs, but applies them to the correct number of G&A personnel as determined by Mr. McCarren. Where Mr. McCarren has identified specific requirements for the TNR that were not included by AEP Texas, they have been added. In addition, Mr. McCarren adds $250,000 for miscellaneous purchased services and other. These funds will pay for miscellaneous costs such as janitorial service contracts, landscaping,

catering, and other miscellaneous unplanned operating costs. WCS spent approximately $1.7 million on such expenses in 1999.[117]

(4) Other General and Administrative Expense

(a) Professional and Outside Services

As explained in detail above, AEP Texas proposes to outsource some TNR functions. In recent SAC cases, the Board has accepted proposals to outsource several G&A functions as the basis for accepting the complainant's G&A staffing levels and cost estimates. However, in this case, as Mr. McCarren notes, AEP Texas offers no basis for its outsourcing cost estimates or staffing levels. By comparison, Mr. McCarren has provided substantial evidence to justify the outsourcing costs he employs and the level of staffing to expect in an outsourced environment. *See* discussion of outsourcing in sections above. A major area of outsourcing for TNR is initial training of operating employees, which is discussed in the following section.

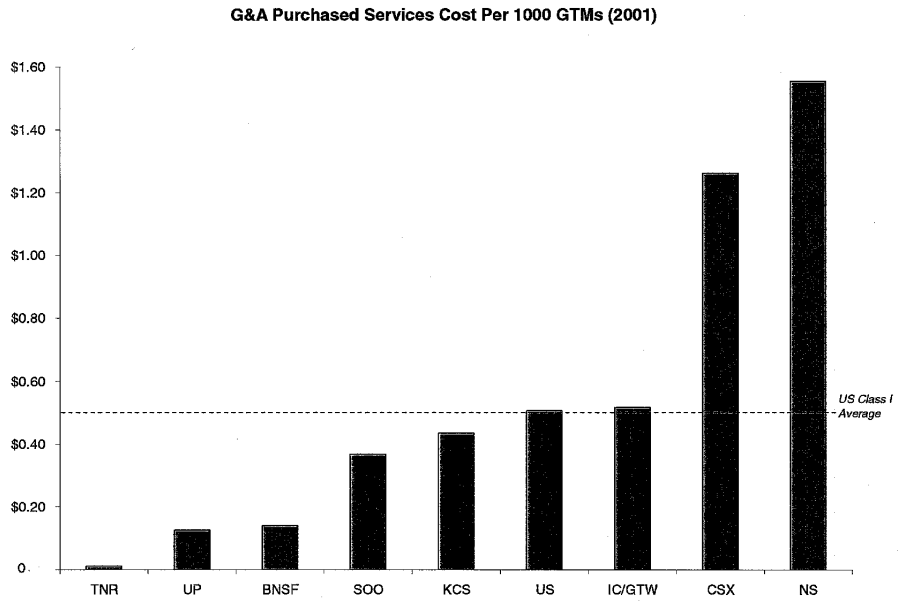
Mr. McCarren contends that AEP Texas' claims of the efficiency to be expected at TNR by outsourcing of G&A functions is significantly undermined by an analysis of TNR's expected budget for purchasing G&A services compared to Class I carriers. While AEP Texas contends that it will rely more heavily on outsourcing G&A functions than the Class I's do, in fact Figure III.D.3-16 shows that TNR expects to spend only 4% of its total G&A expense (or $0.011 per 1,000 GTM) on purchased services while Class I's spent on average 44% (or $0.51 per 1,000 GTMs) in 2001.[118]

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[117] *See* BNSF Reply electronic workpaper "WCS Other expenses.xls."

[118] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "PS by Account.

Figure III.D.3-16



This is clearly an anomalous result that severely undercuts AEP Texas' G&A proposals.

(b) Start-Up And Training

AEP Texas' assumptions that 60% of employees will be hired by word of mouth may be realistic once the railroad is established but is hardly likely to be correct for initial staffing. In fact, in order to ensure the largest pool of applicants and therefore the highest-quality of new hires, the company would likely advertise broadly in areas where it will have a concentration of employees. Unlike most start-up railroads developed in the past 20 years, TNR is not purchasing a line of railroad from BNSF with a pre-existing employment base. Thus the recruitment task will be considerably greater than normally

faced by new railroad companies. The Board has previously rejected the notion the TNR can expect to hire BNSF staff, which have been laid off as a result of the SARR.[119]

Railroad recruiting has been anything but easy of late. For example, recent publications discuss the problems railroads are encountering in filling train service positions.[120] In fact, UP spokesman John Bromley is quoted as saying that the railroad plans to "hire about 3,000 people this year and continue hiring for the next five years at the rate of 2,000 plus each year...nearly everywhere on [the] system, with emphasis on the West." The article goes on to state that "[c]rew shortages and service problems are not just limited to UP...North Dakota and Montana have been especially critical of rail car shortages on BNSF lines." Finally, the article specifically notes the fact that simply hiring personnel does not directly ease manpower shortage problems because of the lengthy training periods involved (four months). Clearly, significant training expenses are being incurred by the railroads.[121] In fact, railroads are having difficulty even finding people to train. Thus it stands to reason that railroads would incur significant recruiting *and* training costs for the same rank-and-file employees.

This point was vividly illustrated in a speech by Jack Koraleski, UP Executive Vice President – Marketing and Sales, given to the American Short Line and Regional Railroad Association annual meeting in St. Louis, MO on April 24, 2004. He spoke about Union Pacific's effort to hire more employees, principally train and engine service, to ease the shortage currently causing service difficulties for UP customers and

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[119] *CP&L*, slip opin. at 66-67.

[120] *Rail Business*, "UP Hiring to Address Crew Shortages," Vol. 10, No. 7 (Feb. 16, 2004).

[121] *Id.*

connecting short lines. In his speech, he stated that 30-35% of all potential new hires fail to pass the pre-hire drug screen and that another 30-35% fail to meet the literacy requirement. A substantial percentage of those who make it past those two tests fail to satisfactorily complete training requirements or find that they don't care for the requirements of railroad work. John Gray, UP Vice President and General Manager – Business Development, also in attendance at the same meeting, indicated that in some areas UP realizes only a 5-10% yield (performing service one year from hire date) of initial would-be hires. BNSF reports a similar experience, it recently accepted 400 applications for train and engine service in Tulsa and ultimately ended up with approximately 35 promoted conductors.

Mr. McCarren concludes that a start-up company would have to advertise 100% of the hourly and first-level supervisory workforce. Because of a need to generate a large candidate pool, extensive advertising will be required. For hourly workers, this would focus on local media and internet services, supervisory and higher level positions would likely also be advertised in trade publications.

The use of headhunters as proposed by AEP Texas does not comport with Mr. McCarren's experience. He finds it very unusual to use headhunters to staff hourly positions; generally only high-skill, specialty positions such as communications technicians, signal maintainers or dispatchers would be placed through recruitment firms and then only rarely. On the other hand, headhunters are commonly used for placing executives, especially where a start-up of this magnitude is envisioned. Mr. McCarren believes that the President, and 50% of the Assistant Vice President and Vice President positions would likely be filled through executive search. According to Mr. McCarren,

the normal fee for these executive level services is 33% of the first year salary and bonus, not 10% as used by AEP Texas. Such searches are normally done on a retained basis, where the search firm is paid whether or not they produce the successful candidate.[122] Nonetheless, BNSF assumes a more conservative fee of 25% of the first year salary for all TNR's employees above the first level supervisor.[123]

AEP Texas proposes using AMDG and Keeping Track Company for T&E employee training. While the third party training costs may well reflect the charges of those two companies, BNSF witness McCarren finds that the total cost of training the initial work force and subsequent replacement training will be far higher than estimated by AEP Texas. BNSF currently trains new hires for train service (regardless of experience or community college study) for 15 weeks in the territory in question. Three of those weeks represent classroom training. Mr. McCarren reviewed TNR's conductor training program with David L. Davis, a former Gateway Western Chief Train Dispatcher currently doing contract conductor training for Union Pacific. Mr. Davis reports that for graduates from outside training programs, specifically from AMDG, the supplementary training plan at UP involves five weeks of classroom training. Clearly TNR's program is insufficient in this area.

In the case of experienced conductor hires, Mr. McCarren believes that the current BNSF program fails to reflect the value of previous experience but that the proposed TNR program provides insufficient training and qualification time (1 week classroom , 2 weeks on the job training ("OJT")). Mr. McCarren proposes that experienced conductors

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[122] *Topgrading,* by Bradford D. Smart, at 80 (1999).

[123] *See* BNSF Reply electronic workpapers "TNR Training and Recruitment BNSF.xls," spreadsheet "Recruitment" and "OPR_EXP.xls," spreadsheet "Summary."

spend the same three weeks in classroom training and nine weeks in OJT training rather than the 15 currently required by BNSF. This reduces the overall training period required of experienced conductors from 18 weeks to 15 (which the novice requires) to 12; still more than the three specified by AEP Texas.

Mr. McCarren testifies that the largest portion of training expense is not the cost of the classroom training, but the wage costs for the employees undergoing that training and the subsequent on-the-job training. Typical training periods at many large carriers run four months for conductor training and an additional three to four months for engineer training (assuming the engineers are already conductors). Not all carriers reimburse new employees for outside conductor training and at some carriers, such as WCS, the engineer training may be shortened to some extent based on candidate performance. Mr. McCarren further connects training expenses as follows:

- "Conductor becoming Engineer" training is inadequate at 8 weeks – BNSF's program is 20 weeks, including 4-5 classroom weeks. This was just recently reduced from 24 weeks as a result of new simulator technology. TNR should use the BNSF standard.
- Experienced Engineers should have five weeks of classroom training and twelve weeks OJT.
- Classroom training course cost is based on the weekly training cost from the AMDG program times the number of weeks in training.
- All employees are compensated for travel expenses at AEP Texas proposed rates during classroom training.
- 80% of full wages are paid to all employees regardless of experience throughout the training period.
- Fringe benefits are paid.

In addition to the training cost and associated wages, there is a drop-out factor to be considered. Mr. McCarren has found 20% to be an appropriate drop-out rate for

trainee conductors and 10% for conductors training to become engineers. Given this attrition, carriers must over hire and over train to achieve their personnel requirements. For example, when WCS needed 10 conductors, it hired 12 assuming that two would drop out before matriculating. These drop-outs consume training expenses and will generally go through about half the training period before falling out. In order to hire the 12, of course, the TNR would interview and test far more, perhaps over 100, to find acceptable candidates. This factor is especially significant in the current environment where hiring quality train and engine personnel is unusually difficult.

All of these factors work in concert to increase the cost of hiring and training T&E personnel quite substantially over AEP Texas's estimate. Rather than the $7.5 million estimated by AEP Texas, Mr. McCarren believes that start-up T&E hiring and training will total $22.5 million.[124]

TNR's expenses also need to reflect recruitment costs on an ongoing basis. These are normally organized under the HR Department. BNSF attrition of { } is close to what Mr. McCarren experienced at WCS and is less than what the A&M experiences today. The BNSF rate appears to be an appropriate level to use for replacement. With AEP Texas' project work force of 895, a { } attrition rate creates { } openings each year. With BNSF's proposed work force of 1,315, annual replacements total { }. Mr. McCarren estimates annual training costs of $1.24 million, exclusive of the cost of the manager and assistant managers of training in Human Resources.

Finally, Mr. McCarren notes that AEP Texas has not provided for initial costs associated with financing the construction of TNR. The I.C.C. specifically contemplated

[124] *See* BNSF Reply electronic workpaper "Opr_Exp.xls."

shippers using the "prevailing market cost" for the cost of raising capital in stand-alone cases. *Coal Guidelines*, 1 I.C.C.2d at 545. The cost to construct the TNR is discussed in Section III.F below. Raising capital, particularly in the amounts contemplated here, is not cost free. Based on discussions he had with Peter Gilbertson, the President and CEO of Anacostia & Pacific, an expert in railroad startups, Mr. McCarren believes that TNR would need to employ investment bankers to raise this equity capital and it will cost approximately 4% of face value. This is significantly less than the fees of 6.9% experienced in the softer 2004 market for a public IPO.[125] Mr. McCarren notes that private financing would require significantly higher fees.

d. Other — IT Requirements

As discussed above, BNSF sets AEP Texas' IT capital and operating unit expenses at 3% of operating expenses.

[125] *See Wall Street Journal*, "Investment Banks See Fees Shrink in Battle With New Rules, Rivals," page A1 (May 18, 2004).

4. Maintenance-Of-Way

BNSF's principal on maintenance of way witness is Gerald G. Albin of TranSystems Corporation. Mr. Albin has many years of experience constructing and maintaining rail lines subject to heavy tonnage and time-sensitive freight. From 1970 through 1980, he held the positions of Assistant Maintenance Engineer, Regional Engineer, and Maintenance Engineer for The Burlington Northern Railroad Company ("BN") (predecessor to BNSF). From 1980 to 1988, he held various staff positions (Director & Assistant Director Maintenance Planning) in St. Paul and Kansas City as well as working for four years as Chief Engineer of the BN Springfield Region. From 1988 to 1995, he held the positions of Director Engineering, Chief Engineer Field Operations, Superintendent Roadway Engineering, and Assistant Chief Engineer of Design/Construction for the Southern Region of BN. During that period, Mr. Albin was directly in charge of maintenance and engineering activities on the TNR route. He has managed the construction of coal track including the design and construction of the grading, drainage structures, track and signal work. Mr. Albin has extensive experience supervising maintenance activities, and is well acquainted with the practice and problems associated with maintenance on lines experiencing similar tonnages and traffic as AEP Texas proposes for TNR. Thus, he is well positioned and highly qualified to critique AEP Texas' evidence and opine on the actual maintenance requirements for these lines.

In addition, William J. Rennicke of Mercer Management Consulting, Inc. ("Mercer") provides testimony on AEP Texas' MOW calculations. Mr. Rennicke is Managing Director of Mercer. He has been a railway executive and a consultant to railways in the United States, Canada and worldwide for nearly 30 years, specializing in railway strategic planning, management, and operations, and in project and transaction due

diligence transportation asset valuation and transactions (including mergers and acquisitions). He has testified extensively before the U.S. and Canadian legislatures and federal transportation agencies on rail regulation and rail transactions, and has spoken and published widely on issues affecting the productivity and capital needs of the rail industry. Before joining Mercer, he was a vice president of the Boston & Main Railroad and has also held operating positions with the Southern Pacific and New Haven railroads. Mr. Rennicke's testimony focuses on the unreasonableness of AEP Texas' MOW assumptions and the need to consider real world evidence in evaluating AEP Texas' evidence in this area. His testimony is presented as BNSF Reply Exhibit III.D.4-2.

BNSF's evidence on maintenance of way (MOW) costs is organized as follows:

Section III.D.4.a. (Critique of AEP Texas Maintenance-of-Way Plan) sets forth Mr. Albin's critique of AEP Texas' fundamentally flawed MOW plan for the TNR. This section explains that AEP Texas' MOW plan is based on a gross underestimation of the amount of daily MOW work that must be performed on a heavy tonnage railroad. Mr. Albin also explains that AEP Texas has grossly understaffed and under-equipped the in-house MOW forces and that AEP Texas' purported reliance on contractors to perform spot maintenance is ill conceived and grossly under-budgeted.

Section III.D.4.b. (Maintenance-of-Way Operating Expenses) sets forth Mr. Albin's estimate of TNR MOW operating expenses. This section is subdivided into subsections (1) TNR OE Personnel Requirements and Compensation; (2) TNR OE Track Maintenance Equipment, (3) TNR OE Contract Expenses; and (4) Summary of TNR OE Maintenance-of-Way. Mr. Albin's MOW operating plan is summarized and the details are presented in spreadsheet format in BNSF Reply Exhibit III.D.4-1.

Section III.D.4.c. (TNR Capital Maintenance-of-Way) sets forth Mr. Albin's estimate of the capital expenditures for TNR. Although these capital expenditures are, for the most part, captured in the DCF analysis through the inherent depreciation assumptions and will not be added to the stand-alone costs, it is important to develop this section in order to assess the reasonableness of the parties' estimates of MOW operating expenses, given the close relationship between capital and operating MOW expenditures. Mr. Albin's capital MOW plan is summarized and the details are presented in spreadsheet format in BNSF Reply Exhibit III.D.4-1.

Section III.D.4.d. (Total Annual Maintenance-of-Way Costs) compares AEP Texas' estimate of the total annual MOW costs to BNSF's estimate. In this section, Mr. Albin demonstrates that AEP Texas fails to capture the myriad of operating expenses that are required to keep the railroad in operation on a day-to-day basis.

Section III.D.4.e (Maintenance Outages) discusses the track time that must be scheduled to ensure that maintenance crews have ready opportunities to access the track when necessary to respond to emergency and other unplanned maintenance calls. This evidence was used by BNSF's operating witnesses in assessing AEP Texas' operating plan.

a. Critique of AEP Texas' Maintenance-of-Way Plan

AEP Texas' MOW plan provides too few people to perform the myriad day-to-day MOW activities on a high tonnage Class I railroad such as the TNR. To justify its meager MOW workforce, AEP Texas claims that it has outsourced a considerable amount of TNR's MOW activities and that it will realize productivity efficiencies through the use of cross-trained in-house MOW employees. In fact, AEP Texas' use of contractors is far more limited than it suggests. It would still rely on in-house MOW forces to perform the

great majority of daily spot maintenance activities that BNSF's MOW crews currently perform. But AEP Texas vastly underestimates the amount of day-to-day spot MOW work and other duties, such as inspections, that must be performed on the TNR to keep it operating. It also ignores specific challenges posed by the geographic characteristics of the TNR route. To the extent AEP Texas relies on contractors, it substantially underestimates the contract costs.

AEP Texas also vastly overstates any potential productivity efficiencies that might be realized through cross-training. BNSF acknowledges that there might be benefits to be realized from cross-training on low tonnage regional railroads where the daily MOW demands are not enough to occupy completely each craft's time. But on a high tonnage railroad, such as the TNR, where daily MOW demands are substantial, each craft is occupied full time. Under such circumstances, there is little opportunity to benefit from cross-training.

AEP Texas' same approach – reliance on a small cross-trained in-house workforce – has been used by complainants in other rate cases and has been rejected by the Board, most recently in *CP&L*. The Board stated that "CP&L has failed to meet its burden of establishing that a small, cross-trained MOW staff would be available and, even if available, whether such a limited MOW staff could provide the unplanned day-to-day maintenance that would be needed by a Class I railroad the size of the P & SH." *CP&L* at 69. The Board should reach the same conclusion here. Like the complainant in *CP&L*, AEP Texas has not provided any evidence that such a cross-trained workforce exists.

In light of these and other omissions, AEP Texas has not presented a maintenance-of-way plan for TNR that would support the operating requirements needed to provide the

necessary level of service to its customers. Its MOW evidence is seriously flawed because it fails to identify all of the activities and costs associated with the maintenance of a high tonnage railroad, and particularly those expenses that are typically characterized as operating expenses. Based on its underestimation of the work to be done, AEP Texas developed a MOW workforce that is too small and poorly equipped to handle the maintenance that actually would be required on TNR. These issues are addressed in more detail below.

(1) AEP Texas Totally Ignored The Costs Associated With Real-World Maintenance Activities Including Random Failures And Other Unexpected Problems

AEP Texas has designed a high density railroad primarily serving coal shippers, which demand consistent and reliable service. To be feasible, TNR must be able to provide at least the same level of service to these shippers as the incumbent provides.

A well-maintained railroad is critical to meeting these service levels. Inadequate maintenance leads to slow orders, track outages, decreased life of track structure and components, and, ultimately, reduced reliability of train transit times and degraded service. AEP Texas cannot posit a railroad that would have higher incidence of MOW outages due to its attempt to reduce maintenance costs and still expect to retain its customers, particularly those requiring reliable cycle times.

As explained below, AEP Texas has dramatically understated the level of day-to-day maintenance spending that would be required to provide the necessary level of service to the TNR shipper group. AEP Texas ignores the real-world evidence that the continuous movement of heavy loads at high speeds takes a toll on a railroad's physical plant through the myriad of relatively small localized infrastructure failures (*e.g.*, broken rail, surface and alignment defects) that require immediate response to keep the traffic flowing. It also

ignores the extraordinary and unplanned repairs that inevitably arise when the rail infrastructure is subjected to the continuous pounding of high tonnage, unit coal trains and the ravages of excessive heat, wind, rain, and other elements of nature.

AEP Texas proposes to maintain TNR's track to FRA Class IV minimum standards to permit the movement of 286,000 GWR cars at the maximum authorized train speeds (60 miles per hour). AEP Texas Opening Nar. at III-D-67. However, it fails to account for the magnitude of the maintenance required to maintain a railroad of TNR's size to these standards. Continuously cycling unit coal trains of up to 135 cars loaded to 286,000 pounds will subject TNR's track structure to tremendous pressures, requiring a far more extensive and sophisticated maintenance program than that proposed by AEP Texas.

Industry publications have devoted volumes to discussion of the impact of increasingly heavy tonnages on the railroads' track structures, and the increased maintenance – both remedial and preventive – that has resulted from such loadings. As one article notes, the increases in heavy axle load traffic over the past years "have led many railroads, and especially track managers, to a growing interest in the area of track maintenance in relation to heavy-haul loads."[126] Heavy tonnage railroads became concerned with the ever increasing train lengths and tonnages as they observed, and were forced to react to, the increased stress and fatigue of track components caused by these loads.[127] After years of analyzing heavy axle load traffic, and implementing substantial

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[126] Jennifer Gruber, *Heavy Haul Loads Require Top-Notch Track Maintenance*, Rail Track & Structures, December 1998 at 21. BNSF.RP.WP.III.D.4-0002 to 0004.

[127] *Id.*

improvements in maintenance methods and materials,[128] the railroads have concluded that, although preventive measures are of tremendous value, they do not eliminate the need for constant vigilance and frequent repair to the track structure. With the traffic levels assumed for TNR, it is important not only to maintain the railroad to the most up-to-date standards, but to explore additional testing to address new problems and challenges brought about by the increased loadings.

All of these factors result in frequent occurrences of unscheduled maintenance and the need for continuing repairs. AEP Texas, however, refuses to even acknowledge the existence of these heavy daily maintenance requirements, let alone account for them in its MOW plan.

Unplanned occurrences or random failures have a substantial impact on the railroad's operations. If the railroad's MOW plan does not take these events into account, the railroad will not be able to meet its operating requirements. BNSF maintains records of random failures. BNSF's Random Failures Reports record the daily instances of unplanned occurrences on BNSF lines that cause track outages, and thus disruption to traffic flows. These are *in addition* to mechanical *train* problems. The Report includes only those failures that the dispatcher's office records as a result of track/signal failures,

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[128] BNSF upgraded its track standard to 136-pound rail and more recently has begun using 141-pound rail. It also began using concrete ties in heavy haul areas, in sharp curvature and heavy grade areas and in most new construction areas. Ballast specifications were upgraded to require exclusive use of granite or similar material as lesser materials repeatedly broke down under the load. Rail grinding frequencies and techniques were improved. Switch (turnout) maintenance, including programmed switch grinding, and materials were upgraded. Rail lubrication was upgraded and tie/rail fastening systems were tested and improved. Techniques and technology for testing rail for internal defects also have improved, and greater emphasis has been placed on strengthening and protecting the subgrade and sub-ballast.

i.e., broken rail, signal failure, and hot box detector alarms. It does not include train delays due to faulty rear-end devices, locomotive failures, cars requiring set out, or other mechanical failures. Similarly, it may not include failures caused by events such as embankment failures, plugged culverts, low bridge end, switch maintenance (points not matching, frog low), and reported tight rail during hot weather. Furthermore, the duration of the failures in the Random Failures Report does not include all of the time necessary to correct the failure. For example, in the case of a broken rail, the time recorded in the Random Failures Report includes from when the dispatcher is notified of the problem to when the rail is temporarily repaired by being angle barred and trains begin running again. It does not include the subsequent track time to make permanent repairs, *i.e.,* removing the angle bars and welding the rail joint, grinding the rail to match, and tamping the area of the joint to allow trains to proceed at track speed.

On BNSF's line segments replicated by TNR, there were more than 5000 random failure occurrences in 2002, with an average duration of approximately 2.5 hours per outage. The table below shows the occurrences for the eleven major subdivisions on TNR. As AEP Texas' proposed tonnages on TNR are comparable to BNSF's existing tonnage, the occurrences in the table below are representative of the incidents that TNR could expect.

Table III.D.4-1
Summary Of Random Failure Occurrences
On TNR Line Segments (2002)

Subdivision	Total Number of Occurrences (2002)	Average Duration (Hours)
Angora	439	2.1
Black Hills	740	2.7
Boise City	125	3.2
Brush	795	2.6
Butte	652	2.1
Campbell	66	2.9
La Junta	64	3.5
Orin	1329	2.6
Pikes Peak	802	3.4
Pueblo	155	3.5
Red River	525	2.8
TOTAL	**5692**	

Source: BNSF Reply electronic workpaper "BNSF Random Failures 2002.xls" summarized at BNSF.RP.WP.III.D.4-0005.

When an undesired restricted signal indication is displayed in the field and/or on the dispatcher's board, for safety reasons a train must stop and wait at that location for authority from the train dispatcher before proceeding at restricted speed.[129] In addition to providing for the efficient movement of trains, signal systems also monitor track integrity and an undesired, restricted signal indicates that there is a problem either with the signals system or the track structure. The problem could be as minor as a burned out signal bulb or as significant as a broken rail, track obstruction by track equipment, water over the rail, or a major washout. Even relatively minor problems that could be easily corrected by a

[129] In most cases, the train is not stopped for the duration of the failure. Once it is determined that it is safe to proceed, the dispatcher will authorize the train to proceed at restricted speed, *i.e.*, a speed which will allow it to stop within one-half the range of vision, not exceeding 20 MPH. The train then proceeds at restricted speed until the problem that caused the restricted signal is found, *i.e.*, broken rail, switch problem, other track failure; or until it passes a more favorable signal at which time it may proceed at normal speed. All trains moving past this unwanted restricted signal are governed by these same rules until the problem is corrected and the signal allows for normal movement.

quick response from the MOW forces when first identified would cause rapid deterioration of the track if unheeded, leading to more track outages or even train derailments.

An effective and efficient MOW plan must include adequate staff and equipment properly positioned to handle these problems expeditiously and with as little disruption to traffic as possible. For example, the highly traveled lines on the BNSF Black Hills Subdivision experienced an average of 3.0 unplanned failures per day in the months of June/July 2001, and 2.0 average failures total in 2002, with an average duration of 2.7 hours per outage. Given the amount of traffic on these lines, it would be foolish not to have sufficient resources located in the immediate vicinity to handle these emergencies and keep the trains running.

Attending to these random failures is in addition to the internal staff's regular duties performing the FRA required inspections and the routine daily repairs that also must be performed diligently. The routine inspections and repairs cover hundreds of activities, including routine inspection of track, bridges, culverts, and other structures on the railroad; routine repairs to broken or defective rail, ties, or other track materials found during inspection; routine servicing of switch machines, wayside signals, crossing signals, and rail lubricators to keep them in good operating condition; snow and ice removal from switch points and other critical areas; maintenance rail grinding; restoring track to proper geometry through spot lining and surfacing; repairing short areas of fouled ballast; replacement of cross ties and switch ties that have failed in pockets and thus fail to meet FRA standards; gauging track that may be in violation of FRA standards due to broken spikes or deteriorated ties; repairing or replacing damaged or missing right-of-way items such as fences and signs; maintaining mechanical facilities, particularly the fueling

facilities; compliance with environmental laws regarding disposal of materials and operation of sewer plants and fueling facilities; controlling vegetation between chemical spraying activities; repairing properties and facilities damaged by floods or snow; maintaining lighting in yards; maintaining buildings and grounds; and countless other tasks that arise on property that extends approximately 1168 constructed route miles.[130] AEP Texas' maintenance plan as set out in its evidence fails to recognize the magnitude and importance of these task.

AEP Texas' off-hand treatment of MOW expenditures assumes that its railroad would not experience the track degrading impacts of heavily-loaded trains or adverse geological and weather conditions that affect real-world railroads. Indeed, AEP Texas claims that because the TNR is new, it will experience less MOW problems. AEP Texas presents no evidence to support this claim. Even assuming that the TNR was constructed using the best available construction materials and technologies – which it is not – it can still expect to incur substantial unplanned day-to-day maintenance needs. In Mr. Albin's experience with the construction and maintenance of new track on high tonnage railroads, no track is immune from random failures. In any event, while the TNR lines would be new at the beginning of TNR operations, they would soon experience the effect of heavy-haul operations that require close and constant MOW attention.

Moreover, there is no reason to believe that TNR would experience fewer maintenance problems than BNSF currently experiences on the lines replicated by TNR. In the past several years, BNSF has invested billions in upgrading old track facilities and

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[130] Does not include mileage over which TNR operates pursuant to a trackage rights agreement.

building additional track on the TNR route. As a result, BNSF's track facilities are state-of-the-art. Yet, as Table III.D.4-1 shows, BNSF experiences hundreds of failures on these lines annually as a result of, among other things, the constant pounding of heavy-wheel axle loads continuously cycling on these lines.

Indeed, in all likelihood, AEP Texas' TNR would suffer more random failures than BNSF suffers on the lines replicated by TNR. As Mr. Rennicke of Mercer Management explains in BNSF Reply Exhibit III.D.4-2, AEP Texas' choice of construction materials and methods have direct consequence for the TNR's future maintenance needs. A prime example is AEP Texas' choice of timber ties for all track on the TNR. Timber ties, while less expensive to purchase than concrete ties, have a lower life cycle generally, and on curves in particular. Timber ties do not perform as well on curves as concrete ties. As a result, curves built with timber ties suffer more alignment, surfacing, gauging, and tie failure problems than those constructed with concrete ties. In the real world BNSF has been replacing its timber ties with concrete ties on curves, certain tangents and all new double track along the TNR route, thereby reducing future maintenance needs on the route. AEP Texas, however, ignores the implications that the use of timber ties has for maintenance on TNR.

(2) AEP Texas Totally Ignored Problems That The TNR Will Encounter In Specific Geographic Areas

AEP Texas does not even attempt to address factors unique to the particular geographical areas on TNR's route that pose unique challenges to both construction and maintenance. These include:

- Excessive maintenance cost of cleanup of ballast and embankment from constant problems caused from coal dust blown from cars on the Orin and Black Hills Subdivisions;

- Chronic settlement problems caused by poor clay soil conditions on Butte Subdivision;
- Curve alignment and gauging problems on severe curves and grades on Crawford Hill – Butte Subdivision;
- Stabilization problems due to silty/sandy soils on Angora Subdivision;
- Stability issues and excessive track and ditch fouling due to rough terrain in vicinity of the Canadian River on Boise City Subdivision; and
- Embankment stability problems on Red River Valley Subdivision requiring special embankment protection and continual maintenance.

(3) AEP Texas' Proposed MOW Staff Would Not Be Adequate To Handle Either Routine Or Extraordinary Maintenance Occurrences

Because it ignores critical OE activities, the internal workforce that AEP Texas proposes is patently inadequate. As discussed more fully below, AEP Texas' skeletal MOW workforce is too sparse to handle even the routine MOW work, let alone unplanned emergencies. As a result, AEP Texas has developed an MOW OE budget insufficient to maintain the railroad at levels needed to provide high quality service for heavy axle unit coal trains moving over high density lines.

As described in Section III.A above, for its proposed SARR, AEP Texas took nearly all of BNSF's coal traffic that today traverses the lines replicated by TNR. In addition, it rerouted all BNSF traffic north out of the PRB. As a result, the tonnages experienced by TNR are substantially greater on the Black Hills and Butte Subdivisions than BNSF's current tonnages and, on other segments, are comparable to BNSF's current tonnages.

Table III.D.4-2
Comparison of AEP Texas Proposed Tonnage with Actual Tonnage
On Line Segments Replicated by TNR

Segment	Route Miles	AEP Texas' TNR 2020 Tonnage MGT/Mi.	Actual 2000 MGT/Mi	Revised TNR 2020 Tonnage MGT/Mi
Converse Junction – Donkey Creek	65.4	250.7	*188	96.5
Donkey Creek – Alliance	223.15	270.2	151	199.4
Campbell Subdivision	9.50	75.7	66	77.9
Reno Sub	5.76	109.9	*73	83.1
S. Logan – Converse Junction	9.60	19.2	*341	19.1
Campbell – E.D.C.	1.15	72.9	91	94.2
Alliance – Northport	33.56	84.2	93	82.0
Northport – Sterling	81.16	68.7	68	66.3
Sterling – Pawnee	14.46	66.3	66	63.7
Pawnee Jct – Denver	84.08	62.8	74	63.7
Denver – Pueblo	120.27	61.6	73	58.4
Pueblo – Las Animas	83.93	58.3	**24	53.3
Las Animas – Amarillo	243.56	53.7	**14/16	50.8
Amarillo – Oklaunion	176.86	51.1	50	48.9
TOTAL	**1143.44**			

* Includes Union Pacific tonnage as BNSF's MOW plan takes UP tonnage into account.
** Loaded coal trains did not traverse this route in 2000.
Source: AEP Texas Opening electronic workpaper "SpotMaint.xls"; BNSF Reply electronic workpaper "2000 Traffic Density Map.pdf."

As TNR will carry greater tonnage than BNSF carries currently on the lines replicated by TNR, one would expect that TNR would experience greater maintenance requirements and thus would have greater staffing and equipment needs. AEP Texas' hypothetical railroad, however, manages to increase tonnage over these lines while purporting to *reduce* maintenance staff far below that which BNSF currently has on the replicated lines.

For example, BNSF's present OE MOW staffing for the replicated lines includes 462 field crew members, not including field supervisors.[131] AEP Texas' proposed MOW field staff for those same line segments is 120 field workers (including 5 signal maintainers assigned to headquarters at Alliance).[132] There is no possible justification for such a discrepancy. As explained below, neither AEP Texas' outsourcing assumption nor its purported use of cross-trained employees would justify such an extraordinary low MOW staff. Mr. Rennicke shows that even if you convert all outsourcing costs into headcount equivalents, the TNR's MOW staff is totally unprecedented.[133]

AEP Texas' entire Engineering Department has only 30 managers and supervisors and 120 maintenance crew and structure crew workers to maintain 1677 miles (as proposed by AEP Texas) of main, second and third main track, six yards, and all the buildings, facilities and structures proposed by AEP Texas on TNR. As designed by AEP Texas, TNR has 18 crews of five members each. AEP Texas Opening Nar. at III-D-71. Each crew of five is expected to handle all of the routine FRA required inspections of track and bridge decks, all of the routine daily maintenance of tracks, bridges, and culverts, as well as all emergency maintenance in that territory. Each crew is also expected, with assistance of a small number of roving signal maintainers, to handle all FRA required signal inspection and maintain all signals, as well as maintain TNR's communications systems in its territory. AEP Texas' territories are as large as 70 route miles.

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[131] BNSF.RP.WP.III.D.4-0006 to 0031. The 462 field crew members referenced above perform OE maintenance exclusively. Capitalized maintenance is performed by production gangs who are accounted for separately.

[132] AEP Texas Opening electronic workpaper "SpotMaint.xls," Tab "MOW Prsonel."

[133] BNSF Reply Exh. III.D.4-2 at 20 to 22.

With crews spread out that far, travel time alone will preclude rapid response even to normal signal indications and calls from dispatchers to have signals cleared or track repaired to get the trains running. Failure to respond quickly to these and other calls with experienced personnel in the first instance and to provide prompt follow-up leads to deterioration of the track structure.

AEP Texas implicitly recognizes its crews will need reinforcement when it states that its crews can assist in neighboring sub-districts as necessary. AEP Texas Opening Nar. at III-D-81. Thus, rather than having crews dedicated to specific territories, TNR will rely on mobilizing forces, taking them away from other important maintenance activities. Such an arrangement precludes efficient MOW operations.

Also implicit in AEP Texas' development of personnel requirements is the assumption that contracting out certain activities such as rail geometry testing, weed spraying, ultrasonic rail inspection, rail grinding, bridgework, and building maintenance means these activities will not be performed with any regularity by the internal workforce. This narrow view ignores the obvious need on a railroad of this size for internal staff to handle the day-to-day responsibilities to grind, weld and build up frogs and switches; to repair crossings; to remove snow, ice and sand at switches and yards and other problem sites; to plow and maintain access roads on the right-of-way in order to maintain access to the track; and to perform electrical maintenance, carpentry and building maintenance. Moreover, BNSF currently contracts out most of the activities that AEP Texas contracts out. This has not relieved BNSF crews of their day-to-day responsibilities, and AEP Texas' outsourcing assumption likewise is no excuse for its understaffed MOW workforce.

AEP Texas' proposed force of 120 field workers is too small to keep trains moving regularly and efficiently under the engineering challenges described above. AEP Texas' meager internal force of 120 workers is set out in the following table.

Table III.D.4-3
AEP Texas' MOW Field Workers for TNR

Track Foremen	18
Track Maintainers (to handle all MOW activities for more than 1600 miles of constructed track, structures and facilities)	54
Signal Maintainers (section crew)	18
Signal Maintainers (roving)	6
Signal Maintenance (Alliance HQ)	5
Lubricator Technicians	6
Welders	6
Welder Helpers	6
Bridge Inspector	1
TOTAL	**120**

Source: AEP Texas Opening electronic workpaper "SpotMaint.xls," Tab "MOW Prsonel."

AEP Texas defends this minimal staffing as being comparable on a per route mile employee basis to MOW staffing on two low tonnage Canadian railroads, the Ontario Northland and the BC Rail. However, those railroads bear no relevance to the MOW needs of a heavy haul, high tonnage railroad like the TNR. The Ontario Northland, a struggling government owned railroad, primarily carries passenger traffic. According to AEP Texas, the Ontario Northland's maximum annual tonnage is approximately 6 MGT, a mere fraction of the tonnage on TNR.

BC Rail serves remote reaches of British Columbia. AEP Texas reports that BC Rail's maximum annual tonnage is 42 MGT, but its annual report shows that its average gross tonnage per route mile is less than 6 MGT.[134]

[134] BNSF Reply electronic workpaper "2002 BCRail Annual Report.pdf."

In any event, AEP Texas' calculation of route miles per MOW worker for these railroads is highly misleading. In response to BNSF's workpaper requests, AEP Texas revealed that its definition of maintenance worker included only a subset of MOW workers.[135] Its calculation includes principally track maintainers and excludes nearly all other MOW workers. Consequently, AEP Texas substantially overstates the number of route miles per employee on these railroads, thereby inferring far smaller MOW forces than these railroads actually employ.[136]

AEP Texas also purports to calculate the number of route miles per MOW employee on a segment each on the CP and the UP. But here again, its calculations of UP and CP's employees are based principally on the number of track maintainers on the segment and exclude other MOW employees. AEP Texas' workpapers show that UP employs several other MOW workers on the segment at issue that are not included in AEP Texas' calculations. It also shows that the territory covered by these employees is shorter than AEP Texas represents.[137]

Moreover, AEP Texas provides insufficient information and support for its claim to determine whether comparisons to these specific segments are relevant or its calculations valid. No information is provided regarding the tonnages or type of traffic over these lines or other MOW employees responsible for work on these segments, among other things. In

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[135] BNSF.RP.WP.III.D.4-0040.

[136] BNSF.RP.WP.III.D.4-0032 to 0078.

[137] AEP Texas Opening electronic workpaper "UP MOW Staffing.pdf" and BNSF.RP.WP.III.4-0078.

addition, AEP Texas' reliance on CP's MOW practices seems ill-advised as those practices were recently found deficient by the National Transportation Safety Board.[138]

AEP Texas attacks BNSF's MOW staffing levels, which it claims "do not appear to have significantly changed . . . in the past 20 years." AEP Texas Nar. at III-D-70. To support this claim, AEP Texas compares MOW staffing evidence that Mr. Albin recently sponsored in the Otter Tail rate case which was developed based on BNSF's practices, to purported staffing levels on BC Rail, Ontario Northland, and a segment each on CP and UP. Specifically, AEP Texas compares the route miles *per MOW employee* that Mr. Albin proposed for the Otter Tail SARR to the route miles *per track maintainer* that it calculated for these other railroads. In other words, AEP Texas' calculations of route miles per employee for UP and the three Canadian railroads include only a subset of MOW employees – principally track maintainers assigned to section crews – but its calculations for the Otter Tail SARR proposed by Mr. Albin include *all* MOW workers.[139] The results of this lopsided apples-to-oranges comparison are meaningless.

In fact, when an apples-to-apples comparison is made, it shows that Mr. Albin's proposed staffing levels for the OTRR and the TNR are reasonable. Table III.D.4-4

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[138] National Transportation Safety Board Public Meeting of May 9, 2004, *Report of Railroad Accident Derailment of Canadian Railway Freight Train 292-16*, BNSF.RP.WP.III.4-0079 to 0081.

[139] AEP Texas also erred in calculating the per track mile track maintenance section crew member for the UP segment. AEP Texas' workpaper shows that UP's three four-person section crews cover a 120 route mile territory and not the 200 miles territory used by AEP Texas in its calculations. AEP Texas Opening electronic workpaper "UP MOW Staffing.pdf" and BNSF.RP.WP.III.4-0078.

compares track section crew staffing levels[140] for UP, BNSF, and the SARRs proposed by AEP Texas, Otter Tail and Mr. Albin. Comparisons to the Canadian railroads are not made here because they would not be relevant and because AEP Texas did not provide sufficient data to make a meaningful comparison possible.

Table III.D.4-4
Comparison of MOW Track Section Crews Per Route Mile

Railroad	Route Miles	Average Annual Gross Tons	Track Section Crew Workers	Route Miles per Track Section Crew Worker
BNSF – OTRR	1202	54	222	5.4
BNSF – TNR	1168	85	224	5.2
Existing BNSF TNR Segments	1168	78	240	4.8
UP Gehring – Martin Bay	120	?	31*	3.9
AEP Texas TNR	1169	50 to 270	84	13.9

*May not include all UP track section crew workers.

Table III.D.4-4 shows that BNSF's MOW staffing levels are lower than the UP. This is not surprising since, as Mr. Rennicke explains, BNSF is recognized as the international leader in MOW practices. BNSF Reply Exh. III.D.4-2 at 14 to 15. As AEP Texas acknowledges and as Mr. Rennicke explains, Class I's have realized dramatic MOW productivity gains in the past decade. From 1980 to 2002, Class I's have achieved a remarkable 257 percent increase in productivity. *Id.* at 13 and 14. Mr. Rennicke's analysis shows that BNSF has been at the forefront of this productivity boom, making it the international benchmark. *Id.*

[140] As it is used here, the term "track section crews" include foremen, laborers, truck drivers, machine operators, welders, grinders, and track inspectors. It also includes district track gangs (district gangs typically cover larger territories than section crews and perform work that section crews are not able to get to).

BNSF's current staffing of field crew (462 including seasonal gangs[141]) is nearly four times the staffing levels that were proposed by AEP Texas for these same line segments. Yet, because AEP Texas reroutes current BNSF traffic out of the PRB, several segments of the TNR carry substantially more tonnage than the current BNSF. Tonnages for the remainder of the route are comparable to BNSF's current tonnages. As pointed out in Mr. Rennicke's statement, AEP Texas assumes productivity far and above any Class I railroad today, including the industry leader, BNSF.[142] AEP Texas never explains how it could realistically expect to achieve such unprecedented productivity, and there is no basis for this assumption.

The only explanation that AEP Texas offers to justify its skeletal staff is that the TNR makes considerable use of outsourcing and cross-training. But, as discussed below and in Mr. Rennicke's testimony, these claims amount to a shell game that seeks to avoid scrutiny of the underlying tasks that must be performed and the real costs of those tasks. AEP Texas has not budgeted nearly enough resources to pay contractors to perform the myriad day-to-day maintenance activities that its paltry in-house MOW forces will be unable to perform.[143] And, even assuming that TNR's extensive use of cross-trained MOW employees increased productivity beyond that realized by BNSF and other high

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[141] BNSF and other railroads employ part-time crews to assist the full-time staff with seasonal work such as plowing fireguards in the summer, snow removal in the winter, or stabilization and other special projects. These seasonal gangs are distinct from the system production gangs that handle the planned capital replacement projects (projects AEP Texas asserts are handled by contractors in its MOW program). Seasonal gangs are included in the OE staff counts, whereas production gangs are not. The production gangs are included in Mr. Albin's capital costs.

[142] BNSF Reply Exh. III.D.4-2 at 14 to 15, 20 to 21.

[143] *Id.* at 22 to 23.

tonnage railroads -- an assumption that is wholly unsupported by any evidence -- it would be unreasonable to expect an increase in productivity of the magnitude necessary to justify an MOW force that is a quarter of the force currently employed by BNSF on the same lines with less or comparable tonnage.

In addition to being too sparse, AEP Texas' limited MOW crews are stretched too thin to be efficient and effective. AEP Texas' proposed crews are expected to cover up to 70 miles of territory. They are also expected to assist on adjacent districts as needed. Under this MOW plan, crew members will not have the opportunity to develop the level of familiarity with all the facilities within an assigned territory that is critical to early detection of potential problems and rapid response to emergencies. Familiarity and proximity are crucial to an effective and efficient maintenance plan. As discussed in Section III.D.4.a below, to address this issue Mr. Albin stationed sufficient crews at significantly shorter intervals to enable them to know their territories well and to have sufficient crew and equipment accessible to respond within one to two hours to any point within their territories. In addition, to respond to off-hour emergencies on the heavily traveled northern portion of TNR's line, he assigned two each special night track men at Alliance, the principal yard for TNR, and at Donkey Creek, on the heavy tonnage portion of the line.

There are other challenges that would prevent AEP Texas' TNR from achieving productivity anywhere near that currently achieved by BNSF on the replicated lines. For example, BNSF has been building new double and triple track on the replicated lines with 25-foot track centers. As constructed by AEP Texas, TNR has only 15-foot track centers. With centers that narrow, for safety's sake, maintenance crews must stop work and stand

clear of the track each time a train passes on the adjacent track at track speed.[144] Such interruptions can substantially delay the completion of MOW work.

Nor does AEP Texas provide access roads to the track even where access roads currently exist on the replicated lines. Its MOW plan, however, assumes that its crews will have ready access to the track. AEP Texas Nar. III-D-79 and 117. As AEP Texas acknowledges, road access to a track and hi-rail vehicles allow crews the flexibility to move by road to different points on the track when traveling on the track is impractical due to train traffic. TNR's crews will not have such flexibility without access roads.

In its restatement of TNR, BNSF construction witnesses have included 25-foot track centers and access roads consistent with the existing facilities on BNSF's replicated lines.

(4) AEP Texas' Reliance On Cross-Training Does Not Justify Extraordinary Low Staffing

AEP Texas' MOW plan, with its limited employees, assumes its employees will be able to handle any and all tasks anywhere. AEP Texas Opening Nar. at III-D-99. While this may work on a small regional or short line railroad with limited train activity or low tonnages, it does not work on a major coal-hauling railroad with the trains, tonnages and configuration assumed for TNR.[145] On a heavy tonnage railroad, all skills are occupied

[144] Alternatively, trains would either have to stop and wait for crews to complete work or proceed under a slow order. AEP Texas' operating plan, however, does not account for these delays.

[145] A railroad might realize efficiencies from cross-training its MOW employees where those employees are often idle. But, where MOW employees are generally fully occupied, there are few, if any, benefits to cross training. In fact, there are significant costs associated with cross training, including higher recruitment, training, and compensation costs.

full time on their own projects and all workers must be fully skilled and qualified to perform the tasks they undertake. Many calls require response by personnel qualified in various skills, such as track, bridge, signals, communications, and electrical maintenance.[146]

Even the larger regional railroads employ crews that are skilled and specialized in individual maintenance activities, *e.g.,* track, bridge, signals. It is uncommon to find workers who are FRA-qualified in more than one or two skills, and extremely rare for persons to become and remain qualified in both track and signals, even though many calls require the expertise in both disciplines. Since there is no readily available labor pool of cross trained MOW employees available to TNR, it would have to invest additional resources in training its employees in multiple skills. Employees skilled in multiple crafts would likely command higher wages than employees skilled in just one craft. AEP Texas has accounted for none of these costs. Its proposal to minimize the MOW workforce by using cross-trained employees is unrealistic.

AEP Texas claims that the reason that BNSF has not taken advantage of cross-training is because of restrictive labor agreements. Of course, AEP Texas' argument assumes that there are productivity gains to be realized by using cross-training on a high tonnage railroad such as BNSF. But this is not the case and AEP Texas has presented no evidence supporting this assumption. As discussed above, there is more than enough work available on a high tonnage railroad that each craft is occupied full time. Further, specialization and skill on a high tonnage railway are critical.

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[146] Other than the railroad Chief Engineer, who typically gains his experience over the course of many years with the railroad, few railroad employees are qualified in more than one or two disciplines.

Moreover, labor agreements have not curtailed BNSF or any other Class I railroad from achieving dramatic productivity advances in the last two decades. Over the years, BNSF has introduced new practices and equipment, and reduced its MOW forces substantially. Larry Parker, BNSF's General Director Maintenance Planning, advised Mr. Albin that BNSF began making substantial reductions to its MOW forces in the mid-1980s, and has continued to make reductions. Since 1996, BNSF has reduced its MOW operating forces by an additional 26 percent, from 11,433 to 8,506.[147] As Mr. Rennicke shows other Class I's have reduced MOW forces and increased productivity, notwithstanding labor agreements. BNSF Reply Ex. III.D.4-2, at 12 to 13.

AEP Texas' opening evidence provides no support for its minimal staffing of MOW workforce. Indeed, TNR as conceived by AEP Texas would not be able to provide anything near the level of service that BNSF provides today.

(5) AEP Texas' Proposed MOW Equipment For TNR Is Inadequate

An efficient and effective workforce *must* be properly equipped. For a high tonnage railroad such as TNR, necessary equipment includes modern track and structure maintenance equipment (*e.g.,* switch/spot tampers, regulators, etc.). There must also be sufficient equipment so that crews and equipment are in close proximity to their territories, and to each other, to be able to respond immediately to problems with track or other structures assigned to them. Mr. Albin knows from his own experience that the only way modern heavy tonnage railroads have been able to *reduce* forces efficiently (a feat that AEP Texas accomplishes with the mere stroke of pen) is through the use of *more*

[147] BNSF.RP.WP.III.D.4-0082 to 0083.

equipment, such as tampers, regulators, speed swings, and other state-of-the-art equipment capable of working efficiently within short track windows and between trains, and through better trained and experienced employees.

In stark contrast to a well-equipped railroad, AEP Texas' MOW crews do not have enough of even the most rudimentary vehicles, equipment, and tools to allow crew members to attend simultaneously to different tasks. AEP Texas has equipped its crews with the bare minimum for a low tonnage, short line railroad that relies heavily on contractors for its MOW needs, but has not provided nearly sufficient equipment for crews working a heavy haul, high tonnage railroad such as the TNR. AEP Texas omits several pieces of equipment critical to an efficient MOW workplan and provides too few pieces for even its meager workforce.

A case in point is AEP Texas' choice of tamping tools. AEP Texas equips its crews with hand tamping tools powered by an air compressor or systems on a hi-rail vehicle. These tools are good for small jobs, but are highly inefficient for anything more than tamping a few feet of track. Track crews frequently must tamp several hundred feet of track in the process of removing a slow order. Using hand tampers to tamp a section of track that long would take days. Spot tampers and switch tampers[148] can perform the job in minutes. Yet, AEP Texas includes no spot or switch tampers in TNR's equipment inventory.

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[148] Switch tampers have the ability and flexibility to tamp every tie in a switch, tamping around the switch points, frogs, stock rail, etc. Switch tampers can also line and raise switches as required.

AEP Texas also provides too few ballast regulators[149] and speed swings.[150] While AEP Texas acknowledges, to a limited extent, the importance of ballast regulators, it provides just three ballast regulators for the entire 1168 mile TNR and uses them for the sole purpose of snow removal. While used for snow removal, ballast regulators were designed for, and are highly efficient at, moving and shaping ballast. In the real world, MOW track crews typically use ballast regulators on a daily basis, in conjunction with tamping operations.

Real world MOW track crews also typically utilize speed swings on a daily basis, as they allow crews to move heavy materials and equipment quickly. Speed swings are particularly adept at handling welded rail. AEP Texas provides just two speed swings for the TNR which is plainly inadequate.

Other key large equipment missing from AEP Texas' cost estimate include motor graders,[151] dozers,[152] front end loaders,[153] tractor mowers,[154] and cranes.[155]

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[149] A ballast regulator is a track-mounted machine used to shape the ballast shoulder, fill the cribs, broom the track and dress the track. It is used for preparing the ballast for tamping by smoothing the ballast and placing it in proper location after being dumped from ballast cars. The operation is needed to ensure proper drainage and re-establish the standard ballast section, which is very important in CWR territory. When equipped with a wing attachment, a ballast regulator can be used for snow removal from track section.

[150] A speed swing is a diesel-powered, rubber-tired machine with a hi-rail attachment used mainly as an essential machine for handling and setting/threading continuous welded rail in and out of track for relay or replacement projects. A speed swing is also capable, when equipped, for use on numerous other track maintenance projects, such as handling other material, *i.e.*, spike kegs, short pieces of rail, turnout material (switch point), frogs, and stock rail.

[151] A motor grader is a diesel-powered, rubber-tired machine equipped with a blade under the machine, used mainly for leveling/smoothing of roads or track grades in preparation for laying track or road work. A motor grader is also used for improving drainage by leveling ditches to drain.

AEP Texas omits smaller equipment that are frequently used by MOW forces including rail heaters/expanders, anchor machines, safety equipment and small tools for bridge and building maintenance, among other things.[156] The limited supply of equipment as well as the meager crew size makes it difficult, if not impossible, for crews to handle multiple simultaneous calls. The need to move equipment from one end of a district to another, or in the case of speed swings and ballast regulators, several hundred miles, also needlessly increases the duration of delays and track outages.

By providing just one vehicle to each track section crew, AEP Texas makes it difficult if not impossible for a crew to attend to more than one task at a time. All of this would mean that TNR will be unable to respond quickly to unplanned outages leading to increased duration and severity of operational disruptions.

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[152] Dozers are diesel-powered machines with a large blade on the front of the machine, and is mainly used for moving large quantities of earth. Dozers are used for plowing fire guards, improving drainage, building grade on roads, cleaning ditches, and moving cars or other equipment in a derailment.

[153] Front end loaders are diesel-powered, rubber-tired machines and are usually equipped with a bucket for picking up loose dirt, track or bridge material and moving it to a new location or loading it into rail cars or trucks. Front end loaders can also be used for improving drainage, building roads or railway embankment.

[154] Tractor mowers are rubber-tired machines, that when equipped with a mower attachment, are used for cutting vegetation on the railway to improve site distances, fire risks and safety of railway workers, drainage and snow build-up on railway. The tractor without the mower can also be used as a machine to move materials, etc.

[155] Cranes can be diesel or electric/locomotive. Cranes are rail-mounted and powered by tractor motors and are used mainly for handling heavier loads (40 to 60 ton), such as bridge girders and pilings, entire panelized turnouts and track panels. Cranes are also capable, when equipped with a draw bar, to handle two or three rail cars with maintenance material (rail, ties, etc.) or ballast for loading or unloading.

[156] Since AEP Texas includes no B&B personnel, and its allowance for small tools is calculated on a per person basis, it follows that AEP Texas has included no small tools for performing B&B maintenance. AEP Texas acknowledges, however, that in-house MOW forces will have to perform some B&B work. AEP Texas Opening Nar. at III-D-85.

While much maintenance work is accomplished by heavy maintenance machinery, hand tools are needed to perform the day-to-day smaller maintenance work. AEP Texas provides $2.2 million in its total annual budget for small tools and supplies for its internal workforce – of which 96 percent, or $2.1 million, is allocated to the operating budget.[157] Hand tools include impact and cutting tools such as spike mauls, sledge hammers, picks, tamping picks, chisels, track punches, tie adzes, and drift pins. There are also various leverage tools such as anchor wrenches, speed wrenches, rail forks, lining bars, and spike pullers. Other important tools such as tie and rail tongs or track jacks, ballast forks, and brooms, and measuring tools such as tapes, levels, and track and rail gages are mainstays of the railroad maintenance apparatus. These tools must be in adequate supply to allow crew members to work efficiently. But the amount AEP Texas budgets for these tools is inadequate.

(6) Outside Contractors Could Not Be Expected To Make Up For The Deficiencies In AEP Texas' In-House MOW Staff

AEP Texas argues that its extensive use of contractors to perform spot and program maintenance justifies an extraordinarily small in-house MOW workforce. This claim, however, does not stand up to scrutiny. For the most part, AEP Texas outsources the same OE activities that BNSF outsources. These include rail grinding, track geometry and ultrasonic rail testing, ditching, vegetation control, large bridge and building repair, yard cleaning, and large derailment response, among other things. With the exception of small maintenance on buildings and some communications system maintenance, AEP Texas

[157] AEP Texas Opening electronic workpaper "SpotMaint.xls," Tab "MOW Personel."

generally does not outsource the daily unscheduled spot maintenance activities that in-house MOW workers typically perform on a high tonnage railroad such as TNR. In other words, its in-house MOW forces will have to perform nearly all of the OE MOW activities that BNSF's in-house forces currently perform.

In the few instances in which AEP Texas assumes that contractors will perform unscheduled spot maintenance, it assumes that the contractors will perform both scheduled and unscheduled spot maintenance for the same or less than BNSF currently pays contractors to perform scheduled maintenance.

A case in point is building maintenance. AEP Texas assumes contractors will perform all building maintenance and upkeep from the small day-to-day activities such as weed control around buildings, HVAC repairs, electrical repairs, and plumbing repairs to major repairs such as roof replacement and storm damage repair. As explained below in Section III.D.4.b.(3)(e), AEP Texas, however, bases its costs for building maintenance on the cost that BNSF currently incurs to pay contractors to perform major building repairs. BNSF's daily spot maintenance activities are performed by its in-house B&B workers.

There are a few MOW operating expense activities which AEP Texas outsources that BNSF currently performs in-house such as spot building maintenance, communication inspection and spot maintenance, and bridge and culvert inspection. AEP Texas provides no support for its estimates of the cost of performing these activities and provides little detail of what contractors would in fact perform.

More importantly, its estimates are unrealistic. AEP Texas assumes that nearly all inspections and maintenance on TNR's communications system will be performed by an outside contractor for $337,966.52. It assumes that signal maintainers will also have the

time and expertise to perform spot maintenance on the communications systems.[158] AEP Texas Nar. at III-D-85. By contrast, BNSF currently employs and equips 45 communications fieldworkers to inspect and maintain the communications systems on the lines replicated by TNR.[159] The cost to BNSF in labor, equipment and materials exceed $3 million.[160] It is simply not realistic to assume that a real-world contractor would perform these same activities for a tenth of the cost BNSF actually incurs.

Nor is it sensible to entrust spot maintenance of communications system to contractors. Communication systems are part of the critical infrastructure of modern railroads. Since even small problems with the communication systems can lead to system-wide delays and outages, it is vital that problems be addressed quickly and effectively. Specially trained in-house crews can often respond immediately and are fully equipped with the proper knowledge and training to assess and address it. The same cannot necessarily be said of contractors.

Contractors generally cannot respond immediately. Contract forces historically have a large turnover of employees, and therefore cannot guarantee that at any given time they will have workers familiar with the territory and properly qualified for the tasks to be performed. Even when contractors retain long-term employees, because they must

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[158] The communication systems on a modern railroad are technologically sophisticated, complex systems that include radios, network data systems and microwave systems. Communications maintainers must be specially trained and have expertise in the systems that they maintain. AEP Texas' assumption that signal maintainers can also perform maintenance on communication systems is not realistic. In any event, the signal maintainers on AEP Texas' TNR are stretched far too thin to perform work outside signal maintenance.

[159] BNSF.RP.WP.III.D.4-0007 to 0011

[160] BNSF Reply electronic workpaper "III D 4 Communications Cost.xls."

respond to the needs of several clients, contractors cannot guarantee that the same employees familiar with the railroad's territory, maintenance problems and maintenance procedures will be available at any given time. An inexperienced workforce significantly increases the risk of errors as well as the probability of injuries – areas of concern to railroads that are addressed most effectively through internal training and supervision.[161]

For bridge and culverts, AEP Texas allocates $448,019.72 for bridge inspection and major repairs.[162] The contractor, together with the TNR's lone bridge inspector will conduct inspections every five years. AEP Texas Nar. at III-D-85 to 86. Inspections of bridge decks and all spot maintenance, other than large repairs, will be performed by TNR's in-house MOW forces. AEP Texas, however, provides no B&B employees to perform this work. *Id.* Thus, AEP Texas expects that the track section crews, who are already substantially over-extended, will have the time and qualifications to perform bridge spot maintenance and inspections.

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[161] Railroad maintenance employees are generally required to have several years of education, training and even certification in their fields, as well as several years of experience. Training and staying qualified are on-going processes. An individual may have some knowledge in various areas, but it is rare to have persons who consistently maintain the required training and certifications for more than one field. Mr. Albin's workpapers include job descriptions for various positions similar to those proposed for TNR. The job descriptions show that the level of experience and training required for those positions cannot be filled by inexperienced contract workers. For example, by FRA regulations, a track inspector must have at least one year experience in railroad track inspection or a combination of experience in track inspections and training from a course in track inspection or from a college level educational program related to track inspection. Most Class I railroads on lines handling the tonnage of TNR require this as a minimum, with most of their inspectors having much more than one year's experience. *See* Section III.D.3.c. for training costs.

[162] AEP Texas Opening electronic workpaper "SpotMaint.xls."

Like AEP Texas, BNSF also contracts out large repair jobs on bridges, including steel and concrete repairs, and certain inspection activities, *i.e.*, inspection of footings and underwater substructures. All other inspection and spot maintenance activities are normally handled in-house by BNSF's B&B department staff. On the segments replicated by the TNR, BNSF employs 49 B&B workers to perform the day-to-day spot maintenance on bridges and buildings.[163] When BNSF's full bridge and culvert inspection maintenance costs on the TNR route are properly accounted for, the cost is far higher than the amount budgeted by AEP Texas.

AEP Texas suggests that TNR's bridge repair costs will be low because the bridges will be new. AEP Texas Nar. at III-D-86. In fact, it expects no major repairs during the 20-year DCF period. Even assuming that AEP Texas were correct – which it is not – that would not justify its miniscule budget for spot maintenance and inspection of bridges and culverts. In any event, the reality is that new bridges are not problem free. In fact, in Mr. Albin's experience as head of BNSF's bridge department, new bridges frequently presented some of the biggest challenges and problems. Unexpected repairs are a fact of new bridge construction and AEP Texas' claim otherwise is wishful thinking.

AEP Texas also outsources scheduled crossing paving replacement and scheduled track surfacing and includes these costs as OE. Since the crossing replacement and surfacing activities that AEP Texas outsources are program maintenance, Mr. Albin treats them as capital expenses.

While it is unclear why AEP Texas includes these costs as OE, it does not change the fact that there is a substantial amount of unscheduled crossing maintenance and

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[163] BNSF.RP.WP.III.D.4-0006 and 00012.

surfacing that must be performed on a daily basis. For example, section crews are frequently required to perform surfacing to address soft spots that result from poor drainage, sub-grade problems, and alignment problems. These are a common occurrence on high tonnage railroads and cause slow orders. In addition, raising and resurfacing track is frequently required at bridge ends as a result of changes in stiffness of the track structure between the bridge deck and embankments. Crews must be able to respond quickly and efficiently to keep TNR operating fluidly. As AEP Texas' contract costs do not include unplanned spot surfacing TNR's in-house track crews will be called upon to perform these activities. But AEP Texas' track crews are too few and too ill equipped to perform surfacing activities quickly and efficiently.[164]

(7) In Contrast To AEP Texas' Plan, Mr. Albin Has Developed a Realistic MOW Plan

High tonnage railroads, such as BNSF, UP and other Class I's comparable to TNR, engage in two separate maintenance budgeting processes – (a) an OE budget to cover the day-to-day activities needed to keep the railroad running and (b) a program of cyclical asset replacements. Railroads classify maintenance expenses as either operating expenses or capital expenditures based on guidelines consistent with the STB guidelines for allocating such expenses in the railroad R-1s. It is this classification – based on whether the activity extends the asset life (capital replacement) or merely helps to maximize the asset life through maintenance and repair – that is the basis for the depreciation rates found

[164] As discussed in Section III.D.4.a.(5) above, TNR's track crews are not provided with the equipment necessary to perform spot surfacing, such as spot tampers and switch tampers. AEP Texas does outfit its crews with hand tampers. Using hand tampers, a crew could take days to perform surfacing activities that a crew properly equipped with spot and switch tampers could perform in minutes.

in the DCF analysis. Thus, by replicating these processes as closely as possible using TNR's system and operating conditions, Mr. Albin has developed a maintenance budget that is consistent with both actual practice and the underlying assumptions in the DCF analysis.

Mr. Albin's OE budget covers the myriad day-to-day tasks associated with keeping TNR operating and ensuring that TNR's assets achieve their predicted lives. These tasks are classified as OE on BNSF and other railroads. TNR's internal forces would handle most of these activities, but some work would be performed by contract forces when it is cost-effective to do so or when specialized but infrequently used equipment is required.

Almost all of the costs associated with TNR's daily maintenance force would be classified as OE. The only exceptions are headquarters-level managers, who are responsible for designing, planning, and overseeing both the day-to-day OE maintenance and the programmed work carried out by system production gangs or contractors, and track Roadmasters and B&B, signal, telecommunications, and electrical supervisors. Because some of these employees' time would be spent on program maintenance issues, Mr. Albin included them in the maintenance-of-way organization and split their time based on his real-world experience with the amount of time spent on program and OE projects, respectively.

b. Maintenance-Of-Way Operating Expenses

Mr. Albin's estimate of TNR's maintenance-of-way costs is based on a real-world view of the maintenance needs of a high tonnage railroad that is consistent with railroad practices. Mr. Albin built from the bottom up the equivalent of a real-world maintenance-of-way staff that would be needed on TNR. Based on his experience, interviews with BNSF Assistant Vice President Engineering Services, BNSF Division Engineers and

Roadmasters, and headquarters staff, observation of the lines to be replicated, and his review of records of recently needed maintenance on these lines, Mr. Albin identified the projects and problem areas that would be replicated on TNR and assigned work crews and dollars accordingly. The projects and workforce are based, to some extent, on BNSF's current MOW staffing for these lines, but they do not simply replicate BNSF's organization. They are tailored to the proposed TNR tonnages, train densities, plant size and facilities, weather conditions, and other unique situations on the TNR route to provide as lean a maintenance team as possible and still cover all the required maintenance activities. Mr. Albin's estimate of the number of people needed is based on existing positions tailored to TNR's needs and the BNSF's production rates for the completion of tasks based on the size of the task and the crew. The salaries for the internal workforce are based on BNSF Wage Rates for the particular maintenance-of-way positions selected.[165]

In many areas Mr. Albin relies on BNSF standards and MOW practices to develop the MOW plan for the TNR. As Mr. Rennicke explains in his statement, BNSF's MOW practices are considered "the best of the best" in the industry.[166] Over the past twenty years, BNSF has realized substantial productivity gains in MOW. As a result, BNSF has the least cost, most efficient MOW dynamics of all Class 1s and many international heavy haul, high tonnage railways. Its MOW employees per route mile are lower than all other Class 1 railroads. Its grinding practices have enabled it to extend rail life far beyond expectations. Frequent inspections and testing ensure that problems are caught early. Use

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[165] Wages, manpower and production rates backing up Mr. Albin's staffing calculations are included in his workpapers. BNSF.RP.WP.III.D.4-0130 to 0150.

[166] BNSF Reply Exh. III.D.4-2, at 14.

of specialized and experienced MOW forces ensure that repairs are done right.[167] Accordingly, reference to BNSF's standards is consistent with the SAC concept that the SARR should be the least cost, most efficient railroad.

Mr. Albin's MOW OE budget is discussed under the following headings: (1) TNR OE Personnel Requirements and Compensation; (2) TNR OE Track Maintenance Equipment; and (3) TNR OE Contract Work.

(1) TNR OE Personnel Requirements And Compensation

(a) Personnel Requirements

AEP Texas' TNR Engineering Department (which is wrapped in with TNR Mechanical Department) is significantly understaffed and omits key positions necessary for a railroad of TNR's size and tonnage.

AEP Texas divided the railroad into six maintenance districts and 18 sub-districts with a total of 18 track crews assigned to six MOW Supervisors and six Assistant Supervisors. Each crew will have five people including a foreman, three track maintainers and one signal maintainer. AEP Texas Opening Nar. at III-D-71. Each crew of five is expected to handle all of the routine FRA required inspections of track, bridges, and signals, all of the routine daily maintenance of tracks, as well as all emergency maintenance for a territory as large as 70 route miles. Although they can expect some assistance from six roving signal maintainers and six two-person welding crews, that help will be necessarily limited.

[167] While AEP Texas claims that BNSF's use of specialized forces is a result of restrictive labor agreements, the fact is that specialized forces are the most efficient for high tonnage railways.

In developing his restatement of workforces for TNR, Mr. Albin took into consideration the way in which railroads classify projects as capital expenditures or operating expenses, and in the real world, allocate salaries into those budgets. In his analysis, Mr. Albin began with the actual BNSF MOW staffing levels for these line segments, the salaries and wages of these positions, and the production rates for maintenance-of-way activities on the line segments replicated by TNR as a basis for his calculations. From these, he developed a MOW force that would meet the proven needs of a railroad carrying the tonnages and commodities selected for TNR.

The use of the existing BNSF as a benchmark is an obvious choice given that AEP Texas is replicating these lines and BNSF's existing traffic. However, Mr. Albin did not simply adopt BNSF's staff. Instead, he took into consideration the proposed tonnages for TNR and selected the least number of positions that could perform adequately the maintenance needed on these line segments and enable TNR to meet its operating and service obligations.

Based on these criteria, Mr. Albin designed TNR's Engineering Department with a Systems Engineering Office located at the railroad's headquarters in Alliance, and a field staff organized along departmental levels. The Systems Engineering Office includes 20 persons ranging from the Chief Engineer to the administrative clerks. The departmental offices are organized by skill (*e.g.*, track, bridge and buildings, signals, communications, electrical). Each department has one or more supervisors, depending on the amount of work, and several field workers assigned specifically to the tasks associated with that department. The table below summarizes the departmental organization and staffs in Mr. Albin's restatement of TNR's personnel requirements.

Table III.D.4-5
Mr. Albin's Restatement of TNR Personnel Requirements
Organized Along Departmental Lines

Department	Management/Supervisors	Field Workers
Systems Engineering Office	20	
Track Department	8	230 + 48 (seasonal)
Bridge & Building (B&B)	2	43
Signals Department	3	72
Communications Department	2	39
Electrical Department	1	10
Purchasing/Stores MOW Personnel	0*	10 (incl. Supervisor)
Total	**36**	**452**

*Manager included in G&A.
Source: BNSF Reply Exh. III.D.4-1, Maintenance of Way Organization.

In addition to the 16 supervisors and 394 full-time MOW field workers,[168] there will be 48 seasonal track employees who work approximately nine months of the year performing work best done in good weather. Thus, Mr. Albin concluded that the total MOW OE workforce required to maintain TNR to the appropriate safety and operating standards is 488, including the 48 seasonal track employees and the 10 Purchasing and Store Department MOW personnel.[169]

The staff positions and responsibilities for the Systems Engineering Office and for each department are discussed under Section III.D.4.b.(1)(a) below. The compensation for these employees is discussed in Section III.D.4.b.(1)(b).

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[168] Comparable BNSF's staffing on these same lines are as follows: Track (289), B&B (49), Signals (73), Communications (45), and Electrical (6) for a total of 462. BNSF.RP.WP.III.D.4-0006 to 0031. This total does not include management/supervisors.

[169] TNR also would require system production gang employees to perform the planned replacement of rail, ties, and other track materials. This is consistent with the way railroads staff programmed maintenance. Mr. Albin calculated the costs for these employees in order to demonstrate the minimum costs that TNR would incur to contract out these activities and to make clear that there is no overlap between replacement costs and operating costs. The cost associated with the system production gangs are capital expenditures and are not included in Mr. Albin's OE costs.

i) Systems Engineering General Office Requirements

The Systems Engineering General Office is responsible for the planning, budgeting, and supervision of the maintenance-of-way for all facilities – right-of-way, track structure, bridges, buildings, communications systems, signals, and electrical systems.

Mr. Albin's restatement includes a Systems Engineering general office that has a staff of 20 persons as well as a group of 16 field departmental supervisors. These include 8 roadmasters, 3 signals supervisors and 2 B&B supervisors, 2 communications supervisors and 1 electrical supervisor, as shown in Table III.D.4-5.

The general office staff includes

- Chief Engineer
- Director of Track
- Engineer Bridges & Buildings, and Electrical
- Director of Engineering
- Engineer Signals
- Engineer Telecommunications
- Field Engineer/Public Works
- Environmental Engineer
- Track Designer/Estimator
- Manager of Welding/Rail Detectors/Grinding
- Manager of Programs and Budgets
- Manager of Manpower Planning

- Manager Track Gangs
- Manager of Work Equipment
- Supervisor/Work Equipment
- Supervisor Welding/Grinding
- Four Administrative Assistants[170]

Each of these positions plays a vital role in establishing an efficient and safe maintenance program.

Although railroad systems groups generally spend more time on capital work projects than on day-to-day maintenance projects, a significant effort is expended by the systems engineering staff managing projects and budgets associated with operating expenses, as discussed in more detail below.

The system engineering department oversees both capital and OE maintenance operations, but at the higher management levels, the capital planning takes precedence. Mr. Albin has included system engineering employees for completeness but as noted above has split their time between OE and capital based on his experience of the time each position spends on each type of project.[171] For the Chief Engineer and his or her direct reports (the Directors of Track and Engineering; Field Engineer/Public Works; Signals Engineer; Telecommunications Engineer; Environmental Engineer; Engineer Bridges and Building; Track Designer/Estimator; and Manager of Programs and Budget), 33 percent of their time is classified as operating expense because of the lesser amount of time spent on

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[170] In his workpapers, Mr. Albin includes an organizational chart of the Engineering Department. BNSF.RP.WP.III.D.4-0151.

[171] BNSF Reply Exh. III.D.4-1.

managing operating budgets and dealing with operating spending and projects than on capital projects, as shown in the job descriptions below. Roadmasters and department supervisors' time, on the other hand, is classified as 66 percent OE because, although they are responsible for the planning and oversight of all work on their assigned territories, including capital replacement plans and projects, the largest share of their work involves supervising, planning and coordinating day-to-day maintenance and responding to emergency calls and problems. They are responsible for the daily decisions on work assignments, implementation of work plans, as well as making periodic inspections for quality control and overall effectiveness of the program, and safety implementation.

The following descriptions of the responsibilities of the management positions for TNR are based on actual job descriptions for BNSF employees with comparable positions.[172]

Chief Engineer. The Chief Engineer is responsible for planning, directing and controlling engineering and maintenance activities related to track, bridge, buildings, environmental and signal and telecommunications control systems facilities. His or her duties include developing and recommending plans and objectives for engineering and maintenance activities; developing and monitoring budgets; organizing staff; coordinating major facilities improvement and maintenance programs; directing engineering and maintenance personnel and activities to effect positive direction and compliance with approved safety practices; supervising bridge plan preparation; supervising signal plan preparation; supervising quality control programs in track, bridge, and control systems departments; and supervising environmental engineering personnel. He or she is also

[172] BNSF.RP.WP.III.D.4-0082 to 0129.

involved in furnishing professional engineering guidance; direct field and office planning for construction projects; direct design of track layouts for customer requirements; negotiating highway grade separation and yard right-of-way occupancy arrangements with utilities, highways, and other government agencies; review and approval of consultants' plans; overseeing capital budget preparation; and analysis of actual charges to projects.

Director of Track. The Director of Track is responsible for providing practical and technical leadership in track maintenance and improvement activities. His or her duties include reviewing information required for preparing the capital and operating budgets in line with current guidelines; evaluating the use of capital budget money; overseeing quality control of maintenance work; preparing short term and long term plans for maintenance of track and roadway equipment; developing improvement of facilities, maintenance of track and roadway equipment appurtenances; analyzing and investigating new and more functional equipment methods for maintenance; executing outside contracts; directing training programs; performing periodic inspection of track and right-of-way from geometry car, hi-rail and rail detector cars. He or she manages the capital program for ties, rail, and ballast. He or she also coordinates with the Program Engineer to schedule work gangs in conjunction with train movements to minimize the impact on train operations. This requires significant scheduling effort, as does the scheduling of efficient utilization of workers, work equipment, company service cars, and other work gang requirements. In addition, he or she is responsible for management of slow orders and works closely with the operating department and dispatchers to identify track windows for MOW projects. The Director of Track also is responsible for the planning, budgeting, supervision, and quality control of the large production track gangs for rail, ties and surfacing as well as for

quality control of smaller gangs. He or she works closely with the operating department to coordinate gang activity with train operations and other maintenance work.

Engineer Structure (Bridges and Buildings). The Engineer Structures (Bridges and Buildings) is responsible for the management of engineering and inspection of bridge work and the maintenance and construction of railroad bridges and other railroad related structures. His or her duties include supervising the preparation of engineering plans and construction specifications for maintenance and replacement of existing structures and construction of new structures; reviewing, inspecting and prioritizing projects; making special bridge inspections as needed and making recommendations for improvements; meeting with other departments and outside agencies in matters related to bridge planning and design; reviewing routine bridge plans affecting the railroad's interest prepared by various governmental agencies and outside consulting firms; and arranging for distribution of plans and ordering of materials. He or she is also responsible for improving engineering of electrical facilities and technical support to develop, install, monitor, and enforce compliance with standards and policies and for coordinating activities between the railroad and various power companies, cities, states and federal governmental agencies to ensure compliance with local codes and national electrical codes. This position's duties with respect to the electrical department include defining problems and establishing solutions, estimates, plans, bills of materials and specifications; researching advances in technology and making economic analyses and recommendations; conducting performance audits in the field to ensure compliance with standards; providing training on electrical codes, safety rules, and standards pertaining to electrical systems; investigating code violations and electrical problems/failures; providing support to field personnel on both capital and

operating projects; and maintaining up-to-date equipment unit inventories of various types and locations of electrical systems on the railroad.

Director Engineering. The Director Engineering is responsible for the planning, direction and control of engineering activities related to the physical plant within the areas of field engineering, office planning, public works and construction to assure the standards and quality of work of the railway are adhered. He or she is also involved in furnishing professional engineering guidance; direct field and office planning for construction projects; direct design of track layouts for customer requirements; negotiating highway grade reparation and right-of-way occupancy of various types, such as sewers, utilities, highways; reviewing and approving consultants' plans; overseeing capital budget preparation, and analyzing actual charges to projects to ensure that accuracy and budget constraints are met He or she directly supervises the Environmental Engineer, Field Engineer/Public Works, Track Design/Estimator, and Manager Programs and Budgets.

Signals Engineer. The Signals Engineer is responsible for directing the engineering activities of signal and control systems personnel to effect the most economical programs for installation, inspection, maintenance and repair of those systems and facilities. His or her other duties include directing personnel responsible for providing the design and plans for installation of controls systems and managing the CTC equipment and control centers; coordinating activities of railroad control systems with internal and external agencies; effecting optimal performance and efficiency of the physical plant; researching and developing new ways or systems to improve services; and implementing proper budgetary controls for signal control systems forces.

Telecommunications Engineer. The Telecommunications Engineer is responsible for directing the activities of communications system personnel to effect the most economical installation, inspection, maintenance and repair of the various communications systems and facilities. This position directly supervises and coordinates telecommunications projects involving micro-wave towers, radio and telephone systems, data lines and networks and locomotive repair shops. He or she directs the design and plans for installation of communication system, coordinates activities with internal and external agencies, researches and develops new ways for systems to improve services and implements proper budgeting controls. He or she also provides supervision and support for all field activities as well as leadership in the efficient movement of trains through an efficient telecommunications data network and in provision of necessary repairs when system is damaged by derailments, severe storms, etc. He or she directs the telecommunications department safety program and ensures coordination with signal department and operations department.

Field Engineer/Public Works Engineer. The Field Engineer/Public Works Engineer is responsible for planning, directing, and controlling engineering activities related to the physical plant within the areas of field engineering, office planning, public works, and construction. His or her duties include working on many projects that would not involve construction by the railroad (such as mine spur track proposals); directing negotiations of highway grade separations, and right-of-way occupancies of various utilities with governmental agencies; working with other railroads on track connections; overseeing capital budget preparation for such projects; and negotiating with respect to commercial, industrial, or residential properties that affect drainage and use of the

railroad's right-of-way. He or she also manages consultants who deal with complex specialized engineering issues and larger project.

Environmental Engineer. Environmental Engineering is an important function in today's world. The Environmental Engineer is responsible for managing all environmental activities such as remediation efforts, disposal of batteries, and cleanup of fuel and chemical spills from derailments. An important aspect of the environmental engineer's job is to establish close working relationships with all federal, state, and local environmental agencies. Environmental engineers are essential; it would be unrealistic in today's world for AEP Texas to assume that TNR would escape such critical assignments.

Track Designer/Estimator. The Track Designer/Estimator is responsible for designing track for both capital and operating projects and also functions as an estimator. He or she is required to submit AFE documents as required by the STB and accounting rules and prepare requisitions as necessary for capital and operating projects; review plans prepared by other parties such as consultants, contractors, state highway departments and other agencies; provide technical engineering assistance for carrying out maintenance and capital projects; maintain and update records relating to track changes, condensed profiles, track charts, etc.; and keep current on all railroad standards and policies relating to track design and staying familiar with AREMA standards.

Administrative Staff. As to the administrative staff reporting to these positions, since they mainly support the upper engineering staff, Mr. Albin classified 33 percent of their time as OE. Based on the volume of work actually performed by BNSF administrative staff, Mr. Albin estimated that TNR would need four administrative assistants to perform support functions for the systems engineering staff. These assistants

handle correspondence for utility permits, track leases, right-of-way occupancies and other operating permits; human resources matters such as maintaining training and safety logs; scheduling safety training and rules testing; tracing company service cars that distribute and pick up materials and scrap; maintaining FRA and DOT records; word-processing activities and miscellaneous activities such as mailings, telecopying and other administrative work; and providing some database support services. They also perform manpower planning functions.

In addition to these direct reports to the Chief Engineer, there are other important functions in the Engineering Department that are classified as OE. The positions that handle these functions are described below.

Manager of Welding/Rail Detectors/Grinding. The Manager of Welding/Rail Detectors/Grinding manages track maintenance programs. All of the grinding and half of the welding projects supervised by this position are classified as OE projects.

The Manager of Welding/Rail Detectors/Grinding is responsible for direct oversight of the production and quality of the welding and grinding field operations on the various roadmaster districts. He or she is also responsible for oversight of welding and grinding work associated with production gangs for rail relay, contract out of face grinding, switch and crossing grinding and other types of welding and grinding. He or she also oversees welding and grinding repair work to frogs, switch points and other rail joints, and assists in the preparation of the welding and grinding capital and operating budgets.

Manager of Programs and Budgets. The Manager of Programs and Budgets is responsible for developing the annual track maintenance programs. His or her duties include compiling recommendations for annual budget items and related track program

work and prioritizing and scheduling the work; compiling statistics on track maintenance programs; developing software needed to keep records for such maintenance; and budget management for programmed and operating maintenance.

Manager of Manpower Planning. The Manager of Manpower Planning hires all MOW employees and deals with employee claims, including preparing and handling job bulletins and seniority rosters for all union departments. BNSF presently has 39 people involved in this activity, so Mr. Albin's estimate of one manager and two assistants for TNR is extremely conservative. The allocation of the manpower planner's time reflects the proportion of time spent on capital as opposed to operating projects. The capital projects are seasonal and require less of his or her time than that of handling these activities for the full-time staff.

Manager of Track Gangs. The Manager of Track Gangs is responsible for the planning, supervision, and quality control of the large production track gangs, *i.e.*, rail, tie, and surfacing, as well as quality control and production of smaller gangs, including crossing and switch gangs. He or she works closely with operating department, roadmasters, B&B department and signal department to coordinate gang work with train operations and other maintenance work. He or she works directly with Director of Track on budgeting and scheduling gang activities and directly responsible for meeting product of cost goals.

Work Equipment Manager. The Work Equipment Manager manages the large amount of equipment that *must* be maintained on TNR. The Manager is responsible for supervising the work of the mechanics maintaining this equipment (whether it be internal staff or contractors) and for maintaining an inventory of parts for all the different pieces of

equipment. He or she is responsible for scheduling equipment movements and assignments between roadmaster districts to ensure maximum utilization of equipment, and for the timely dispatch of those parts to mechanics and to equipment in need of repair to ensure that the internal works gangs are not impeded by the breakdown of a key piece of work equipment. He or she also schedules shopping equipment for repairs and modifications and also recommends improved work methods for equipment repair and maintenance activities.

Supervisor of Work Equipment. The Supervisor of Work Equipment reports to the Work Equipment Manager and is responsible for directly supervising the work of the mechanics maintaining the work equipment. His or her responsibilities include the spot maintenance, production gang equipment and equipment utilized by B&B, signal, telecommunications and electrical departments. This position is nearly 100 percent in the field. The Work Equipment Manager and Supervisor jointly schedule equipment movements and assignments between roadmaster districts to ensure maximum utilization of equipment; work on schedules for shopping the equipment for repairs and modifications; recommend improved work methods and develop improvements of equipment; analyze and investigate new and more functional methods and equipment for maintenance activities; and assist on input to the capital budget for replacement and additional equipment.

Supervisor Welding and Grinding. The Supervisor of Welding and Grinding reports to the Welding/Grinding manager and is responsible for direct oversight of the production and quality of welding and grinding field operations on the various roadmaster districts. He or she is also responsible for oversight of welding and grinding work

associated with the production of gangs, *i.e.*, rail relay, contract out-of-face grinding, switch and crossing grinding, etc. He or she is also involved in supervision of welding/grinding and repair work to frogs, switch points, and other rail joints. The manager and supervisor welding and grinding jointly schedule and budget the welding/grinding program. They recommend improved work methods and equipment improvements

The Roadmasters[173] and other Departmental Supervisors are responsible for the planning, supervision, and oversight of the work of their departments.

All MOW supervisors, including Headquarters personnel, have as a top priority the preparation, implementation, and enforcement of an effective safety program. This is essential, because railroad activities can be very hazardous if safety precautions are not taken. Therefore, as much as twenty-five to thirty percent (25-30%) of an MOW supervisor's time can be spent on safety issues, including training, supervising, investigating, and reporting FRA reportable incidents. Follow-up after a serious accident or incident, whether a personal injury on the job or a derailment, is critical to ensure that, to the greatest extent possible, steps are taken to prevent a future occurrence.

ii) Departmental Maintenance-Of-Way

Consistent with railroad practice, Mr. Albin has determined his MOW staffing along departmental lines in order to provide a focused effort on major maintenance areas, such as Track, Bridge and Buildings, Signals, Communications, Electrical, and Stores. In doing so, he shows that even if all programmed maintenance were contracted out, that still

[173] A roadmaster is the equivalent of a departmental supervisor for track, but is assigned to a specific territory.

does not account for a significant proportion of maintenance work to be done, and certainly does not obviate the necessity for a well-staffed maintenance force.

For each department, Mr. Albin determined the skills (positions) required to maintain the structures and activities assigned to that department. He determined the number of persons required on the basis of the actual number and kinds of structures on TNR for which each group is responsible, the identification of the tasks and projects that the department would be responsible for, and BNSF production rates for accomplishing those tasks. The projects and individual responsibilities of the workforce for each department are described in detail in the subsections below.

An adequate internal maintenance force of well-trained individuals for each of these skill areas is critical to a good MOW plan. Department supervisors and workforces cannot rely solely upon program maintenance to replace damaged sections of rail or ties, turnouts, signal equipment, and electrical or microwave parts, because these components sometimes fail prematurely and must be fixed immediately.

Successful early detection of structural problems requires the combination of diligent oversight by supervisors and daily inspections by track/structure inspectors familiar with the territory. Many problems, however, are discovered only when a dispatcher receives a signal indication. A signal indication may require something as simple as a signal maintainer making an adjustment to a circuit at a switch point. On the other hand, it could require repair of a broken rail, which will require about two hours for a track crew with a boom truck to place new rail and joints and a three-hour track window the next day for a follow-up crew to replace the joints with welds and possibly even re-surface the joint areas. As such defects could cause a derailment, there must be an

immediate response from experienced crews fully equipped to resolve the problem. Thus, a robust, fully trained maintenance force is essential to minimize disruption to traffic flows, which is especially critical for high density traffic with cycle time and schedule requirements, such as the coal traffic on TNR.

Each department is discussed below.

a) Track Maintenance Personnel

AEP Texas' MOW field personnel are not organized on a departmental basis. Rather, they are divided into six districts and 18 sub-districts. Each district has a field maintenance supervisor, and an assistant supervisor. A crew of five crew members is assigned to each of the 18 sub-districts. Each crew has a foreman, three track maintainers, and one signal maintainer. AEP Texas Opening Nar. at III-D-71. AEP Texas also includes six two-person welding crews, one each assigned to the six largest sub-districts. AEP Texas Opening Nar. at III-D-84.

Mr. Albin's restatement of TNR personnel for the Track Department includes eight Roadmasters and the following field personnel:

Table III.D.4-6
Track Department Maintenance Force

Major Headquarters Location	Foremen/ Laborers	Machine Operators	Grinders/ Welders	Track Inspectors	Truck Drivers	Work Equipment Mechanics
Alliance	8	4	4	4	4	1
Donkey Creek	6	3	4	4	3	1
Edgemont	4	3	4	4	3	1
Sidney	4	3	4	4	3	-
Denver	4	3	4	4	3	1
Las Anamis Junction	4	3	4	4	3	1
Boise City	4	3	4	4	3	-
Amarillo	4	3	4	4	3	1
Minor (18) Locations*	36	18	-	-	18	-
Sub Totals	**74**	**43**	**32**	**32**	**43**	**6**
Grand Totals	**230 + 48 (6 seasonal workers at each of the 8 major headquarters) = 278**					

* Minor section crew headquarters are located at Converse, Reno, Moorcroft, Osage, Dewey, Crawford, Belmont, Northport, Brush, Keenesburg, Palmer Lake, Pueblo, La Junta, Springfield, Stratford, Marsh, Memphis and Quanah.

The positions and salaries listed under Track Department in BNSF Reply Exhibit III.D.4-1 are those for ongoing operating maintenance only and reflect the BNSF's personnel requirements for the typical activities involved in the day-to-day inspection and repair of the track structure. Mr. Albin performed a separate analysis (under Program Gangs in BNSF Reply Exhibit III.D.4-1) to determine the system production gangs that would be needed to accomplish the programmed maintenance-of-way.[174] This is the most reliable approach for two reasons. First, it recognizes that there is very little overlap between the work that is done by the system programmed capital replacement crews and the work performed by the full-time maintenance crews who handle the daily maintenance

[174] The system production gang workforce for programmed maintenance is included in BNSF Reply Exhibit III.D.4-1 under the heading "Program Gangs." As explained above, these gangs are not part of the internal OE workforce that handles day-to-day maintenance.

for an assigned territory. Second, it ensures that all of the operating-related activities are adequately staffed and that no crucial maintenance activity is overlooked.

For OE track maintenance, Mr. Albin divided the railroad into eight Roadmaster Districts (geographical segments) based at Donkey Creek, Wyoming; Edgemont, South Dakota; Alliance, Nebraska; Sidney, Nebraska; Denver, Colorado; Las Animas Junction, Colorado; Boise City, Oklahoma; and Amarillo, Texas. Each Roadmaster District covers 140 to 160 route miles and an average of 200 track miles. The size of each District was determined based on a system used on BNSF, and affirmed by other railroads, which takes account of the number of miles, the tonnage, track conditions, number of road crossings, turnouts, accessibility, and weather conditions. Generally, Class I railroads with line segment tonnages in the range of 100 MGT to 200 MGT assign Roadmaster districts averaging 130 route miles/180 track miles. The average district medium tonnage lines (50 to 100 MGT) is 145 route miles/200 track miles. The average district on lighter tonnage lines (30 MGT) of Class I, regional, and shortline carriers is generally 160 to 200 route miles/220 to 250 track miles.[175]

Roadmasters. Each Roadmaster is responsible for all track maintenance within his or her territory, including planning, employee training, coordination with other internal departments, and interaction with outside agencies. Each Roadmaster oversees track section crews, district gangs, welding/grinder crews and track patrol gangs.

Section Crews. In Mr. Albin's restatement, the Roadmasters at Donkey Creek, Edgemont and Alliance each oversee four section crews; and the Roadmasters at Sidney, Denver, Las Animas Junction, Boise City and Amarillo each oversee three section crews.

[175] BNSF.RP.WP.III.D.4-0152.

The heavy traffic districts have more crew members and more supervisors. Section crews consist of one track foreman, one machine operator, one laborer and one truck driver.

The section crews are required on a daily basis to handle approximately 40 route miles (depending on the traffic density in their assigned areas). The crews on the higher density lines have territories of 35 to 40 miles, while those on the medium density lines may have as many as 55 miles. Their responsibilities include replacing broken or defective track components. In addition, they repair track geometry defects as they are detected; repair and remove slow orders; make derailment and washout repairs; cut brush; make minor repairs to grade crossings; inspect track in accordance with FRA standards; clean up debris; maintain drainage facilities; maintain right-of-way fences; plow fireguards; regularly inspect, adjust, and lubricate all switches on the territory; replace damaged and missing signs; clean switches in the event of snow accumulation; spot raise bridge ends or areas of poor subgrade; maintain and service wayside curve lubricators and operate hi-rail curve lubrication systems; maintain orderly material stock piles; maintain safe walkways in the vicinity of buildings, platforms, switching leads, and sidings; weld and repair frogs; grind switches and stock rails; slot rail ends where necessary; field weld rail joints created as a result of replacement of defective or broken rail; replace defective insulated joints and joint plugs; maintain access roads; and gauge track, which is especially important on curves.

District Gangs. There are also 16 three-person district gangs to respond to major derailments, washouts, and other larger track problems. One night-duty crew member is assigned to Alliance, where the main yard and facility is located, and one to Donkey

Creek, to handle problems that arise during the off hours. Crews are on call 24 hours a day, seven days a week.

Welder/Grinder Crews. Each Roadmaster oversees two welder/grinder crews each consisting of a welder and a welder's helper. Welding crews are responsible for maintaining the condition of all frogs and switch points on the specified territory, and keeping the territory free of rail joints. On a high tonnage railroad, joints on welded rail cannot be tolerated because they become battered and chipped and result in broken rail. Therefore, where joints are created as a result of repairs to defective rail found by the detector cars,[176] welders must follow up immediately to weld all rail joints, if possible, within 24 hours of the occurrence on high tonnage lines and as quickly as possible on other lines in order to avoid battered joints. Welding crews also provide the equipment to grind switches, frogs and crossings. The maintenance gangs correct the major items that go beyond the scope of what the two-person track patrol crews can be expected to accomplish.

Machine Operators are part of the section crews and the 48-man seasonal gangs. Machine Operators operate front-end loaders, dozers, tractors, and speed swings, which are needed for day-to-day activities and to keep the territory clean of scrap rail and used ties and to maintain drainage and roadways. They also operate spot tampers, switch tampers, regulators, brooms, weed mowers, and cranes that are needed seasonally. All truck drivers who operate larger over-the-road vehicles must possess DOT and CDL

[176] Detector cars frequent the high tonnage portions of the railroad several times a month.

licenses, which requires TNR to provide regular training and testing and ensure the proper renewal of licenses.

Work equipment mechanics rove the system as needed for repairs and maintenance of equipment assigned to all departments including production gangs. Work equipment mechanics are supervised by the Manager, Work Equipment

Mr. Albin concludes that the minimum TNR track maintenance force required to perform the daily OE maintenance of the 1691 miles of track (includes mainline, second main, siding, yard, and set-out tracks) on TNR consists of 230 (+ 48 seasonal) regular track employees, stationed at 26 locations across the TNR rail system. BNSF Reply Exhibit III.D.4-3 is a schematic of Mr. Albin's MOW bases and crew locations. In addition there are 48 part-time track employees that handle seasonal works such as improving drainages, spot tamping, plowing maintenance roads on the right-of-way to allow access to the track, and special projects.

b) Bridge/Building Maintenance Personnel

AEP Texas assumes that all program and most of the spot maintenance on bridges will be handled by contractors. AEP Texas Opening Nar. III-D-85. AEP Texas provides a bridge and culvert inspector and assumes that the field crews will also perform bridge inspections and handle the daily (non-contract) spot maintenance. *Id.* at 72, 85. Other than the sole bridge inspector, AEP Texas includes no in-house B&B personnel to perform this bridge maintenance. AEP Texas' bridge inspection and maintenance plan is based on the unrealistic premise that its field crews will have both the time and the training to perform FRA mandated bridge inspections and maintenance on the 475 bridges on TNR, all the while tending to their myriad other duties. Indeed, responding to the inevitable

daily random failures alone will consume most of these crews' time, leaving little time to perform their other duties. As a result, bridge inspection and repair on TNR likely will be spotty at best, creating an unacceptable risk of slow orders, track outages, derailment, and non-compliance with FRA regulations.[177]

As to building maintenance, AEP Texas assumes that *all* of the spot maintenance work necessary to maintain its fueling facilities, locomotive repair shop, car shop, dispatch center at Alliance, and other buildings on TNR will be contracted out. AEP Texas Opening Nar. at III-D-86.

Reliance on outside contractors to perform all needed maintenance and upkeep of all facilities on TNR is not realistic. Repairs and adjustments to facilities and equipment at the fueling facilities, locomotive repair shop, car shop, dispatch center and other facilities must be made immediately so as not to delay or back-up traffic on TNR. Waiting for a contractor to respond is often out of the question.

In his restatement of B&B personnel, Mr. Albin has two B&B supervisors located at Alliance, where the major structures are located, including the locomotive repair facility, a car shop, fueling facilities, and headquarters office buildings, and Amarillo, Texas, where a yard and fueling facility are located. There will be two crews stationed at Alliance and one crew each at Amarillo, Donkey Creek and Denver. Each crew will have B&B crews consisting of a foreman, three carpenter/helpers, and one machine operator/truck driver. The B&B crews located at Alliance and Amarillo each also include

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[177] AEP Texas states on page III-D-109 that "major bridge structures would ...be inspected every five years on a rolling schedule." This is *not* the policy of BNSF for heavy tonnage track, such as the TNR route. Thorough inspection of all bridges are performed every year with interim inspections occurring on some bridges as needed.

an inspector and a water service mechanic. Two seven-person mobile gangs equipped with boom trucks, chase vehicles, and hydraulic tools round out the B&B Department. The mobile units assist in tightening bolts, cleaning steel spans, clearing brush and debris at bridge openings, and small maintenance chores at buildings and fueling facilities. The total full-time B&B workforce includes two Supervisors and the field personnel as set forth in Table III.D.4-7.

Table III.D.4-7
B&B Department Maintenance Forces

Location	Foreman	Inspector	Carpenter Helper	Water Service	Machine Operator/ Truck Driver
Alliance	2	1	6	1	1
Donkey Creek	1		3		1
Amarillo	2	1	3	1	1
Denver	1		3		1
Sub Totals	**6**	**2**	**15**	**2**	**4**
Grand Total	**43 (includes two seven-person mobile gangs)**				

Supervisors Bridges and Buildings. The two Supervisors of Bridges and Buildings directly supervise all B&B operating maintenance crews; the yearly bridge rebuilding, and scheduled maintenance programs. They also directly supervise the maintenance work on buildings, facilities and other related structures, *i.e.*, fueling, locomotive and car shops. They are responsible for bridge and building inspections; the review and prioritization of both operating and capital work for presentation to the B&B Engineer for funding; implementing the safety program for the department; coordinating B&B work with other departments, *i.e.*, track, signal, electrical, and telecommunications. They inspect and dispatch B&B forces to unplanned outages and emergencies involving

railroad structures such as bridge and culvert wash-outs and damage to structures from derailments, structures hit by high, wide loads, etc.[178]

Bridge Inspector. The Bridge Inspector is responsible for inspecting all bridges and large culverts and making instant repairs or calling in bridge crews as needed to address problems identified on inspection. (The track department will inspect and maintain culverts with less than 36" diameters.) The carpenters and helpers handle the larger repair jobs identified by the inspector.

Coordination between bridge maintenance crews and track department inspectors is essential as many maintenance tasks, such as raising bridge ends, aligning track on bridges, and ballast deck maintenance, require the expertise and involvement of both departments. The bridge crews work closely with track gangs to handle adjustments to structures required as a result of relay or tie work.

B&B Foremen. The B&B Foremen are responsible for direct supervision of the Bridge and Building crews. These crews are made up of carpenters, helpers, machine operators and truck drivers. The Foremen report to the B&B Supervisor who plans the projects that the foremen and crews perform. Examples of the type of work for which the Foremen is responsible on a daily basis are tightening bolts on bridges, adjusting bridge ties and other components on bridges and facilities, inspection and maintenance of large culverts, cleaning bridge spans and weeds and grass beneath and around structures, and fueling facility repair. B&B Foremen are also responsible for safety training and for implementing the B&B Department Safety Policy as it relates to their crews. They prepare

[178] In BNSF Reply Exhibit III.D.4-1, Mr. Albin has shown the B&B supervisors in his maintenance-of-way summary with the maintenance-of-way general office personnel and assigned 66 percent of their time to OE.

reports on production of crew, time sheets, safety audits and reports. They also must coordinate work with other MOW crews, *i.e.,* track crews and signal crews. Foremen are responsible for ensuring that their crews are properly equipped and have the material to handle the projects assigned.

B&B Mobile Crew. The B&B mobile crew, like the track and signal mobile crews, are staffed and equipped to travel the entire TNR system. The crew generally handles high priority maintenance activities such as emergency work, washouts, follow-up to derailments and other track structure outages and slow orders. The crew also handles preparation and follow-up maintenance work for the larger gangs such as tie, relay and surfacing (removal of crossing, etc.). The fact that the mobile crew can respond to the special maintenance needs that arise, helps to ensure that the headquartered crews are not taken away from the important work in their territories.

Truck Drivers. Truck Drivers for the track and B&B departments are responsible for the safe and effective operation of a specific type of equipment, *e.g.*, boom trucks, larger maintenance vehicles, hi-rail truck and B&B bridge inspection vehicles. This equipment is critical to the efficient operation of the maintenance crew on both small and larger crews and gangs. The vehicles are used for the safe transportation of manpower, track, bridge and building materials, such as smaller bridge components, ties, other track materials, switch points, and frogs, and for scrap hauling and territory clean-up. Hi-rail trucks are also used for work on track and bridges that are not accessible from the maintenance roads.

Water Service Mechanic. The Water Service Mechanic is responsible for piping, testing, inspections, repairs, routine cleaning and pumping of systems, and lubrication of

parts to keep them in proper working order on TNR's fueling facilities, water and sewer systems, boiler systems and other utilities on the railroad.

c) Signals Maintenance Personnel

AEP Texas includes a signal maintainer in each of its 18 field crews, six roving signal maintainers and five maintainers assigned to the dispatch center at Alliance. AEP Texas Opening Nar. at III-D-82. AEP Texas also includes seven Signal Supervisors. *Id.* AEP Texas calculated its signal maintainer needs based on a standard of one maintainer for every 2000 AAR units. This standard is purportedly based on a point system used by Canadian railroads to determine their signal maintainer's needs. This standard is more than twice that used by BNSF and other Class 1 railroads. In might be possible for a signal maintainer in a yard to handle such a large number of units, but if the units are spread out over a line, travel time becomes a factor and the number of units a maintainer can handle drops precipitously. On top of this already overwhelming workload, AEP Texas assumes that signal maintainers will also perform work normally performed by communications workers (work not otherwise performed by its outside contractors). This includes maintaining the microwave system, radios, telephones and data network systems. Indeed, every signal maintainer will answer to two supervisors, a signals supervisor and a communications supervisor.

Mr. Albin's restatement of TNR's signal needs includes a full-time staff of 72, including three Supervisors and the following field personnel:

Table III.D.4-8
Signals Department Maintenance Force

Location	Signal Maintainers	Foreman	Test Maintainer/Inspector	Dispatch Center/Tech
Donkey Creek	8	1	1	-
Alliance	7	1	1	3
Denver	6	1	1	-
Sidney	7	1	1	-
Las Animas	5	1	1	-
Amarillo	6	1	1	-
Sub-Total	39	6	6	3
Grand Total 72 (54 + Signal maintenance crew (6 crews) = 18)				

Signal Supervisors. Mr. Albin determined that three signal supervisors would be required for the territory covered by TNR, based on the workforce that has been established. The supervisors would be located at Alliance, Denver and Amarillo.

Signal Supervisors are responsible for the direct supervision of all signal operating maintenance crews as well as the yearly capital improvement program. This involves supervision and coordination of signal work on projects such as additional tracks, turnouts and other facility improvements. Under their direct supervision are signal maintainers, electronic technicians, signal inspectors and dispatcher center technicians. The Signal Supervisors, together with the Telecommunications Supervisors are directly responsible for maintaining all CTC equipment and dispatching control center equipment. Signal Supervisors supervise inspections, installation and maintenance of highway/railway crossing signal systems. The Signal Supervisors, together with the Telecommunications Supervisors, are responsible for preparing an operating and capital plan for presentation to the Engineer of Signals and Telecommunications; the implementation of the safety program for the department; and are involved in dispatching signal and

telecommunications forces in unplanned outages and emergencies requiring signal and telecommunications repairs.[179]

Signal Maintainers. Mr. Albin concluded that signal maintainers are required by FRA to perform a number of periodic tests on all wayside signals and highway crossings.[180] Approximately sixty percent (60%) of a signal maintainer's time is spent performing these tests. The other forty percent (40%) is spent on maintenance.[181] TNR would be required to comply with these FRA regulations, but AEP Texas' estimates and costs for maintenance personnel fail to take these requirements into account as AEP Texas provides no additional maintenance workers in this area to assist with the daily work.

Based on the network configuration of TNR, Mr. Albin determined that the existing TNR territory would have 39,000 AAR signal units requiring 39 signals maintainers across the system.[182] An AAR signal unit is an industry wide standard that assigns a unit value to every piece of signal equipment on the railroad.[183] The industry standard for AAR units per maintainer varies depending on the FRA requirements and rules for testing wayside signals and highway crossing equipment. Obviously, a maintainer can handle more units if the work units are confined to a small geographical

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[179] In BNSF Reply Exhibit III.D.4-1, Mr. Albin has shown the signal supervisors in his maintenance-of-way summary with the maintenance-of-way general office personnel and assigned 66 percent of their time to OE.

[180] BNSF.RP.WP.III.D.4-0153 to 0157.

[181] BNSF.RP.WP.III.D.4-0158.

[182] BNSF Reply electronic workpaper "III F 6 CTC System & Signals.xls," Tab "TOTAL CTC & SIGNALS."

[183] This standard was established by all railroads so a uniform method of billing could be used at joint facilities or at railroad/railroad crossings. BNSF.RP.WP.III.D.4-0159 to 0164.

area such as in a yard or terminal. However, if a territory exceeds 60 miles, the "windshield" time (*i.e.*, travel time) comes into play and the number of units must be reduced. In this area, where tonnage and windshield time are factors, Mr. Albin used a standard of one maintainer for every 900 to 1000 signal units which is consistent with BNSF's standard.

Signal Crews. Mr. Albin included signal crews at Donkey Creek, Alliance, Denver, Sidney, Las Animas Junction, and Amarillo. The signal crews maintain the specialized equipment relating to the CTC system and are responsible for keeping in good operating condition all wayside signals, crossing signals, hot bearing detectors, and power switches. Signal crews also must follow the work of track gangs, (relay, ties, surfacing) to test and make adjustments to any signal circuits that may have been disturbed during those activities. These crews work directly with the Track Department on line outages relating to broken rail and switch problems.

Signal Inspector. The signal inspector is required to perform relay testing as well as other signal related circuit testing. An inspector can normally handle about 200 miles of railroad. A signal electronic technician is responsible for keeping the network CTC in tolerance range and calibrating hot box detectors annually to maintain system integrity. Regular signal maintainers generally are not technically able to perform these tests.[184]

Dispatch Center Technician. In addition, Mr. Albin assigned three signal technicians to the Dispatch Center at Alliance.

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[184] *Id.*

d) Communications Maintenance Personnel

AEP Texas assumes that a combination of signal maintainers and contractors will perform all spot maintenance and inspections on the railroad's telecommunications system. AEP Texas Opening Nar. at III-D-85. But the signals department is already saddled by an overwhelming workload. It will have trouble keeping up with the inspection of maintenance of signals and will not be able to assist with communications equipment. This leaves the lion's share of the work to contractors. Inspecting and maintaining the communications system is a daily activity. The money budgeted by AEP Texas, however, is wholly inadequate to cover all the activities that the contractor will be required to perform on the communications systems located along the TNR's 1143 route miles. AEP Texas provides no support such as an offer or contract showing what services the TNR would receive for its money. And because AEP Texas does not know what its buying, it does not know how much it would cost. While it claims that such services are typically one to two percent of installation costs, it then calculates the contract cost based on 3.5 percent of the installation costs. AEP Texas does include a Communications Supervisor, however, who will oversee the signal maintainers together with the Signal Supervisors.

In his restatement of telecommunications personnel for TNR, Mr. Albin included two supervisors at Alliance and 39 field workers. The Telecommunications Department includes the following:

Table III.D.4-9
Telecommunications Department Maintenance Force

Location	Communications Maintainers	Microwave Technicians	Communications Technicians	Radio Shop Technicians	Foremen/ Supervisors
Alliance	3	5	1	5	1
Donkey Creek	4		1		1
Denver	2		1		1
Sidney	1		1		*
Las Animas	1		1		1
Amarillo	2		1	5	1
Sub-Total	**13**	**5**	**6**	**10**	**5**
Grand Total = 39					

* The foreman's duties for Sidney would be handled by the Denver signal foreman.

Telecommunications Supervisors. Telecommunications Supervisors are responsible for the direct supervision of all telecommunications operating maintenance crews as well as the yearly capital improvement program. This involves supervision and coordination of telecommunications work on projects. They directly supervise maintainers, microwave technicians, communication technicians, radio shop technicians, and the telecommunications foreman. Telecommunications Supervisors are also responsible for installation, inspections and maintenance of the microwave towers and system, and the radio and telephone systems for the railroad. They supervise the locomotive radio shop.[185]

Telecommunications Crews. Each of the six telecommunications crews consists of a foreman, a communications technician, and communications maintainers.

The foremen and technicians maintain the microwave systems, telephones, the infrastructure of the data network, the Automated Equipment Identification (AEI) sites and

[185] In BNSF Reply Exhibit III.D.4-1, Mr. Albin has shown the telecommunications supervisors in his maintenance-of-way summary with the maintenance-of-way general office personnel and assigned 66 percent of their time to OE.

the equipment identification video equipment located at those sites, and all other train yard cameras and scanning equipment.

The foremen and communications maintainers install and maintain cable (both underground and overhead) for data to the network, switches, interlockers, and the like. They also perform necessary maintenance on microwave towers and pole lines. They are responsible for responding to emergencies involving microwave and data network outages.

Radio Shop Technicians. Mr. Albin includes five radio shop technicians at Alliance. The radio shop technicians are responsible for maintaining the radios (diesel locomotive radios, portables, etc.) used on the railroad and maintain a radio repair shop with parts and supplies for repairing locomotive and portable radios and EOTDs.[186]

e) Electrical Maintenance Personnel

AEP Texas includes no electricians in its company maintenance-of-way personnel. AEP Texas apparently assumes that all electrical work will be handled by outside contractors. As explained in Section III.D.4.b.(3)(e) below, however, this assumption is based on a distortion of BNSF's evidence in Otter Tail. In Otter Tail, Mr. Albin budgeted 0.5 percent of original building cost to cover large building repairs and maintenance.[187] AEP Texas claims that this amount also includes day-to-day maintenance – which it does not. Based on this erroneous claim, AEP Texas omits any of the workers such as carpenters and electricians that would perform the day-to-day maintenance activities.

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[186] AEP Texas assumes that radio repairs will be performed by a contractor, but does not budget any expense for this.

[187] BNSF.RP.WP.III.D.4-0166

In his restatement of the electrical department personnel for TNR, Mr. Albin assigned this department a supervisor based at Alliance, and included additional personnel located at Amarillo. This department is set out in the following table.

Table III.D.4-10
Electrical Department Maintenance Force

Location	Foremen	Journeyman Electricians
Alliance	1	5
Amarillo	1	3
Sub-Total	**2**	**8**
Grand Total = 10		

Electrical Supervisor. The Electrical Supervisor provides technical and supervisory direction on projects. This position supervises the electrical staff, made up of electrical foremen and journeyman electricians. He or she helps develop, install, monitor and enforce compliance of standards, policies, methods and instructions that expedite the electrical department's activities. He or she also monitors projects for adherence to local and material electrical codes, provides input for budgeting and planning of electrical costs for capital and operating plans, maintains an up-to-date equipment inventory, provides recommendations for new electrical equipment and methods, and is responsible for implementing and coordinating the safety program for the department. The Electrical Supervisor is responsible for coordinating electrical work with other departments, *i.e.*, B&B, Signal and Telecommunications.[188]

[188] In BNSF Reply Exhibit III.D.4-1, Mr. Albin has shown the electrical supervisor in his maintenance-of-way summary with the maintenance-of-way general office personnel and assigned 66 percent of his or her time to OE.

Electrical Department Crews. The electrical department crews maintain the electrical facilities and systems that are necessary to rail operations. A few of the systems that the electrical department maintains are:

- HVAC systems in buildings,
- Power distribution systems in yards and other facilities,
- Area lighting in yards and parking lots,
- Power control and lighting in shops and office buildings,
- Electrical and fuel monitoring systems at fueling facilities,
- Emergency power systems,
- Electrical systems for signal and telecommunications,
- Electrical systems at waste water treatment plants, and
- Track switch heaters.

f) Purchasing/Materials Management Maintenance Personnel

AEP Texas included in its management staff a Manager of Budget and Purchasing, but provided no employees under this individual, possibly on the assumption that materials would be shipped directly to the worksite on a just-in-time basis. AEP Texas Nar. at III-D-32. Even though much of the material can be shipped directly from vendors to the worksite, some MOW and mechanical materials must be kept on hand for day-to-day maintenance and emergencies. Therefore, a small Purchasing and Materials Management (PMM) department is required for an efficient operation to avoid delays due to waiting for materials. Mr. Albin has estimated that ten MOW personnel would be required to handle the purchasing, inventories, receipt, and delivery of all maintenance materials required for TNR.

In BNSF's restatement of costs, the G&A department includes a PMM facility and a Director of Purchasing and a Purchasing Agent. As the Director and Purchasing Agent are

part of the G&A staff of TNR, their salaries are not included in Mr. Albin's MOW budget. Mr. Albin includes only the 10 MOW workers with responsibilities relating to engineering, MOW, operating, and mechanical departments. These workers are set forth in the table below.

Table III.D.4-11
Purchasing MOW Force

Purchasing Supervisor	1
Store Foreman	1
Machine Operator (forklift)	2
Crane Operator	2
Truck Driver	1
General Laborer	2
Administrative	1
Total	**10**

The PMM serves as a regional store for track, B&B, signal and communications, system electrical material, and roadway equipment parts. It also supplies locomotive and freight car parts to the repair shops, and supplies and monitors fuel, lubricating oil, and other such items for the fueling facilities. The store would operate three shifts per day, seven days per week. Truck deliveries of station supplies, freight car and locomotive parts, maintenance-of-way materials, AFE materials, and work equipment parts are made directly from this facility to departments on TNR. The transportation and disposal of hazardous waste materials also are handled through this facility.

The Purchasing Supervisor is responsible for supervising the employees engaged in ordering, loading, unloading, storing, issuing, and distributing materials and supplies to the departments. The Machine Operators operate the cranes and other machinery used in disbursing, receiving, loading, and unloading material.

The fueling facilities at Alliance and Amarillo, are supplied and managed by PMM department personnel who supply locomotive and freight car repair parts to the locomotive maintenance and servicing facilities at these points, and to the train yard and freight car repair tracks.

As the Purchasing Department procures and provides materials for both the capital and OE maintenance programs, a portion of the employees' time is allocated to OE maintenance based on the relationship of the materials purchased. Because most of the materials are consumed by OE related activities, Mr. Albin allocates 75 percent of the purchasing employees' time to OE maintenance.

(b) Compensation

AEP Texas claims that its MOW employees' salaries are "comparable to that for Class I employees," but provides no support for its MOW employee salary levels. AEP Texas Nar. at III-D-66.

To the base salaries, AEP Texas added ten percent for travel and meals and 33.9 percent for fringe benefits.

AEP Texas provides for miscellaneous small tools and supplies based on 35 percent of the annual salaries of its field MOW personnel. It provides $683 per manager/supervisor for office supplies and equipment.

Mr. Albin's labor costs for OE track personnel are taken from BNSF discovery documents providing the hourly wages for specific MOW positions.[189] Mr. Albin uses a { } percent overtime allowance, which reflects BNSF engineering office operating

[189] BNSF.RP.WP.III.D.4-0130 to 0150.

expense for overtime in 2000.[190] This is consistent with the percentages reflected in the Wage Forms A & B and is reasonable considering that maintenance individuals are on call at all hours of the day and night, including holidays.

Mr. Albin then applied a { } additive for fringe benefits, based on current BNSF records for 2000 fringe benefits paid to MOW employees.[191] AEP Texas' 33.9 percent is based on one quarter's worth of AAR data used to calculate the 2000 RCAF. As discussed in Section III.D.3.c.(2), use of just one quarter's data understates the fringe benefits actually paid in 2000. The actual fringe benefits for the full year exceeded 40 percent.

Mr. Albin also relied on standard railroad practice in developing his additives for materials and supplies and for travel, meals, and accommodations.

For materials and supplies, it is customary for railroads such as BNSF for *each* MOW department to include a labor-based charge for materials and supplies, which includes not only the myriad maintenance supplies and materials expended in performing its tasks, but also the required safety equipment.[192] The percentage of the additive for this item is based on the actual expenditures by each department for these materials and supplies. As set forth below, Mr. Albin applied each department's appropriate additive to the salaries of employees in that department. The materials additive should not be confused with the additive for *office* supplies and materials. Office supplies include paper,

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[190] BNSF.RP.WP.III.D.4-0130 to 0134.

[191] BNSF.RP.WP.III.D.4-0130 to 0134.

[192] This materials additive does not include the track maintenance equipment and tools which are accounted for separately. Nor does it include the cost of materials expended in operating equipment, such as saw blades and drill bits. Mr. Albin has included the cost of equipment consumables in his restatements of TNR's equipment costs.

pens, files, stationery, envelopes, and other office supplies. The materials additive covers the particular expendable materials consumed in performing maintenance tasks.

Like AEP Texas, Mr. Albin applied a ten percent additive to all OE wages and salaries to cover travel, meals, and corporate accommodations.

Mr. Albin's restatement of TNR's annual OE budget for MOW management by department is summarized below.

Systems Engineering Office. The OE portion of the General Office Staff salaries and wages is $864,773 for managerial staff and $1,418,399 for Roadmasters and Departmental Supervisors.

Track Department. The Track Department maintenance personnel cost includes a { } materials cost, based on BNSF records of the actual amounts used by BNSF to cover that cost. This covers the cost of small tools such as picks, chisels, wrenches, lining bars, measuring tools, and other such items that are regularly replaced as they wear out, as well as materials expended in the performance of tasks, such as nails, screws, spikes, adhesives, and other typical maintenance items. For the 230 track workers and 48 seasonal workers, that cost is more than $2.6 million, which is substantially higher than the amount allowed by AEP Texas. Mr. Albin's total cost for track department OE maintenance, including labor, fringe benefits, and other additives is $19,799,507.

Bridge and Building Department. The B&B department personnel cost for 43 employees includes a { } additive for structures' maintenance materials. The total B&B OE cost is $3,377,971.

Signals Department. The Signals Department personnel cost for 72 employees includes a { } materials cost because of the more expensive materials used in signal maintenance. The total cost is $5,856,710.

Telecommunications Department. The Telecommunications personnel cost for 39 employees includes a { } additive for materials, based on the actual cost of materials for this group. The total cost is $3,122,899.

Electrical Department. The Electrical department personnel cost for 10 employees includes a { } additive for materials, due to the increased costs for the tools and supplies involved in maintaining these systems. The total cost is $844,288.

Purchasing and Materials Management. The total OE budget for 10 PMM personnel is $517,916.

Total Salaries and Wages. BNSF Reply Exhibit III.D.4-1 depicts the personnel requirements, additives, and total costs for each of the departments of TNR Engineering Department. The total OE budget for company personnel is $35,802,464.

(2) TNR OE Track Maintenance Equipment

As discussed above in Section III.D.4.a.(3), AEP Texas inadequately outfits its MOW field personnel with the equipment necessary to perform their daily maintenance and inspection duties. BNSF Reply Exhibit III.D.4-1 includes a comprehensive list of the Systems Engineering and Departmental equipment requirements that would be reasonable for the daily maintenance requirements of a railroad with the geographic configuration and annual tonnage of TNR. Mr. Albin's estimate of TNR operating expense equipment requirements are based on the projects that would have to be undertaken by each department, the number of crews in each department that would be needed to perform such

projects, and the equipment that would have to be available to each crew or crew member, either on its own or in conjunction with other crews, to perform the work most efficiently. Where possible, equipment is shared. However, equipment that is used regularly, such as rail grinders, rail saws, drills, air compressors, generators, and rail expanders, must be in sufficient supply to allow each crew ready access when small jobs such as grinding frogs and switches and replacing rail come up.

AEP Texas' assumptions are not realistic. It is critical for railroads, particularly railroads carrying the tonnage and time-sensitive traffic that TNR carries, to own the equipment necessary to respond quickly and efficiently to unplanned maintenance needs as they arise. A list of specific quantities and types of equipment and tools needed by each department and each production work gang in each craft area is set forth in Mr. Albin's workpapers.[193]

Mr. Albin's estimate of the total cost of the maintenance-of-way equipment needed for daily operations on TNR is $13,756,431,[194] compared to AEP Texas' estimate of $2,033,306. Mr. Albin's designation of the kinds and quantities of equipment needed to maintain TNR to the appropriate operating and safety standards is far more realistic than AEP Texas'. In many instances, AEP Texas' inadequate allocation of equipment would cripple TNR crews' ability to handle multiple tasks simultaneously. Moreover, even assuming all program maintenance is contracted out, providing a minimal staff with a modicum of equipment to handle the daily maintenance is a false economy. An already

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[193] BNSF.RP.WP.III.D.4-0170 to 0180.

[194] BNSF.RP.WP.III.D.4-0181 to 0182. BNSF Reply electronic workpaper "III D 4 Maintenance of Way.xls, Tab "Annual Spot Equip."

sparse workforce of 120 persons would never be able to meet the demands of a high tonnage railroad such as TNR and would be further hampered without an adequate supply of the proper equipment. Based on AEP Texas' provision of equipment, TNR efficiency would be undercut awaiting the availability of MOW personnel and equipment. Staffing and budget constraints would lead to the deferral of maintenance, which is a dangerous and highly inadvisable practice, as deferral seriously exacerbates existing MOW problems. BNSF has had success in reducing its respective MOW forces to the extremely low present levels over the past five to six years only by researching/testing and equipping its MOW crews with modern day equipment, using concrete ties, and by handling the larger work projects with efficient system production gangs who handle not only the capital replacement programs, but also undercutting, shoulder ballast cleaning, out-of-face surfacing, and switch grinding.[195]

(3) TNR OE Contract Work

There are certain maintenance activities that generally are contracted out by both large and small railroads. AEP Texas' TNR would use contractors for vegetation control, rail geometry testing, rail grinding, ultrasonic rail testing, ditching, communications and signals, derailment, snow removal, track program maintenance, and miscellaneous outside engineering contracts for surveys and bridge work.[196] AEP Texas Opening Nar. at III-D-60 to 61. While Mr. Albin agrees with the use of contractors for many of these tasks, he takes issue with the wholesale contracting of communication, derailment cleanup and restoration of track, and track program maintenance. BNSF has found it more efficient to handle

[195] BNSF.RP.WP.III.D.4-0082.

[196] AEP Texas electronic workpaper "SpotMaint.xls."

either all or a portion of these responsibilities internally. Mr. Albin also disagrees that the costs are accurately reflected in AEP Texas' OE costs.

The differences between Mr. Albin's estimates of contract work and those of AEP Texas are driven for the most part by their use of different unit costs and different standards for determining the frequency with which track maintenance activities must be done. AEP Texas estimates many of its unit costs without any support or explanation of what is included in the cost. In other instances, AEP Texas claims to derive unit costs from BNSF contract costs, but overlooks key elements of the costs.

With respect to frequency standards, AEP Texas' standards are not supported. Mr. Albin bases his standards on the tonnages involved, his many years of experience, and the actual, tried and proven standards currently applied by heavy tonnage railroads.

Moreover, AEP Texas omitted entirely from its OE track maintenance estimate such crucial activities as

- Stabilization of cuts and fills due to poor soil conditions
- Embankment restoration and protection due to erosion of rivers, creeks and drainages
- Improvement and correction of drainage problems caused by severe weather conditions
- Maintenance of access roads and fire guards – crucial items to maintaining track structure efficiently
- Clearance of debris from drainways and drainage structures
- Special inspection of track and structures during extreme hot and cold weather, rain, ice and snow storms
- Providing proper attention to the three top priority maintenance issues on any railroad with the tonnage of TNR –
  - Curves (gauging, alignment, surface)

- Switches (adjust and maintain points, frog and ballast)
- Joint elimination in CWR

Mr. Albin assumes that TNR would contract for these track maintenance projects as well. As shown in BNSF Reply Exhibit III.D.4-1, Mr. Albin has included these costs in his estimate of contract work. Each of the OE contract costs is discussed below.

(a) Weed Spraying

AEP Texas included a unit cost of $296 per mile for regular weed control based on a quote from Asplundh. The weed spray is to be applied to 1691 track miles of TNR right of way. Mr. Albin accepts AEP Texas' unit cost.

In addition to regular weed spraying, the railroad must also spray for noxious weed control. Noxious weeds are those which have a harmful effect on agricultural productivity or to human health and welfare, and therefore are "outlawed" by state governments. In some areas, noxious weeds must be controlled from right-of-way line to right-of-way line, which results in increased application costs. Typically, noxious weed control and spraying is performed at the edges of the right-of-way to prevent noxious weeds from spreading to adjacent land. It must be performed separately from regular weed spray applications using chemicals specific to the type of weeds found in those areas. Generally, noxious weed control is performed using special equipment, such as off-track trucks and helicopters. Indeed, AEP Texas calculated the cost of noxious weed control in its workpapers, but did not include the cost in its evidence. Mr. Albin determined that approximately 584 track miles of TNR right-of-way in various pasture and agricultural areas must be sprayed for noxious weeds. He used BNSF's unit cost of ${ }/mile.[197]

[197] BNSF.RP.WP.III.D.4-0183.

BNSF also incurs costs for spraying brush and crossings. AEP Texas includes $100,000 for this activity under the heading "brush cutting/mowing." AEP Texas' cost is unsupported. Mr. Albin used BNSF's cost of ${ } per acre (same as noxious weed spray – converted to per acre). Approximately { } acres of crossings would require weed control.

The FRA also requires railroads to provide vegetation control under bridges, which involves spreading the pellets by hand. This time-consuming activity, however, is not contracted out by BNSF, but is handled by BNSF's internal mobile bridge crew. Therefore, Mr. Albin has not included any additional cost for this task in his restatement of contract costs. It should be pointed out, however, that AEP Texas has offered no evidence that it has included this important activity in either its contract or internal maintenance costs. Indeed, as AEP Texas' proposed track and structure crews have too few members to spare any for this type of activity, it is likely that TNR as staffed by AEP Texas would have to contract for this activity, but the costs to do so are clearly not reflected in AEP Texas' vegetation control costs.

Total costs for vegetation control are $791,599.[198]

(b) Ultrasonic Rail Testing

AEP Texas proposes to perform ultrasonic rail testing on mainline track only three times a year, purportedly based on CP standard for testing track with densities above 50 MGT. It applies a unit cost of { } per track miles based on invoices produced by

[198] BNSF Reply Exh. III.D.4-1.

BNSF in discovery.[199] Mr. Albin accepts AEP Texas' unit cost, but disagrees with the standard AEP Texas applies to determine the number of miles tested. As AEP Texas acknowledges, "ultrasonic rail testing is an important tool in preventing derailments because it helps reveal internal rail defects..." AEP Texas Nar. at III-D-104. Yet, AEP Texas proposes to test all lines only three times a year, regardless of whether the density on the line is 50 MGT or 150 MGT. Rail testing for internal defects is driven mainly by tonnage. Defects grow to become broken rail based on the number of wheels and weight of the wheels passing over the defect. A test frequency of three times a year is barely sufficient for 50 MGT track and grossly inadequate for high tonnage track, particularly for the 200 MGT segment, Donkey Creek to Alliance, Nebraska. The only way BNSF has been able to achieve longer life of rail is through strict rail maintenance procedures including grinding and rail detection.

AEP Texas' testing standard is particularly foolish given TNR's plan to perform rail grinding infrequently, in some cases only every 300 MGT.[200] Under such a spartan grinding schedule, it is inevitable that the rail will develop internal flaws. If such flaws are not detected early and addressed, they will lead to slow orders and derailments. Thus, AEP Texas' grinding regime would require far more frequent testing than AEP Texas claims.

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[199] AEP Texas Opening electronic workpaper "Spot maint.xls," Tab "Unit Costs" shows that it used a unit cost of ${ } per rail and not the ${ } shown at AEP Texas Nar. at III-D-4-104.

[200] Volpe Center: Structures and Dynamics Division website at www.volpe.dot.gov. BNSF.RP.WP.III.D.4-0185.

Even with frequent rail grinding, rail lines which handle the tonnage levels proposed for TNR should be tested regularly. BNSF's standard for rail testing is to test all rail every 15 MGT. This frequency is required to locate internal rail defects and remove portions of rail that are defective before they develop into failures that could result in derailments and/or interruption of service. Mr. Albin determined that 6354 miles of rail would have to be tested annually on TNR for a total cost for ultrasonic rail testing of { }.

(c) Rail Grinding

AEP Texas' standard for rail grinding is to grind every 50 MGT on curves of three degrees or more; to grind all other rail every 100 MGT for standard rail and every 300 MGT for premium rail. AEP Texas' grinding standards are purportedly based on a study of rail grinding by CN and TTCI reported in December 2000.[201] But that study does not support such infrequent grinding as AEP Texas claims.

The CN/TTCI study that was reported in December 2000, studied the impact of varying rail grinding frequencies on six test sites on CN. The test track sections each consisted of "concrete ties, elastic fasteners, and new premium rail made to CN clean-steel specifications" installed on curves of 3 degrees and greater. Each test site was divided into three sections. One section was ground every 12 to 13 MGT, one section at every 21 MGT, and one section was left un-ground as long as possible. While the no-grind group was able to withstand 164 MGT before grinding was necessary, it then required multiple passes to remove damage and re-profile, and required grinding again at 176 MGT and 233

[201] Kevin Sawley and John Robinson, *Rail Grinding on CN*, Railway Track & Structures, December 2000. BNSF.RP.WP.III.D.4-0190 to 0192.

MGT. But CN\TTCI did not conclude from this study, as AEP Texas implies, that such a corrective grinding regime was advisable. Far from it. CN recommends a preventative grinding strategy that includes grinding at average intervals of about 20 MGTs in territory with severe conditions and a high percentage of curves and at intervals of about 30 MGTs in territories with moderate conditions and a lower percentage of curves.[202]

Another problem with AEP Texas' reliance on the results of the no-grind testing regime, is that while CN was initially able to avoid grinding the test rail for 164 MGTs, there is no evidence to suggest that it is sensible to extend grinding intervals to this length. Defects began to form long before grinding at 164 MGT. Since the test track was under constant monitoring, any potentially catastrophic defect would have been identified long before it became a real problem.

Since that study, railroads have continued to study and refine their rail grinding practices. Not one has adopted a corrective rail grinding strategy as AEP Texas proposes. Indeed, there is broad consensus in the industry that an aggressive preventative grinding regime, such as BNSF's, is optimal.[203]

BNSF's general policy is to grind curves greater than three degrees every 15 MGT, curves less than three degrees every 30 MGT and tangents every 60 MGT to maximize rail life. The parties agree on the number of passes: one pass is sufficient if grinding is performed on the above frequencies for tangent and curves less than three degrees. Curves greater than three degrees as a general rule require two passes. BNSF's standards are the

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[202] *Id.*

[203] Peter Sroba, Eric Magel, and Fred Prahl, *Getting The Most From Rail Grinding*, Railway Track & Structures, December 2003, at 30. BNSF.RP.WP.III.D.4-0193 to 0196.

result of decades of experience and experimentation with grinding frequencies, and are considered the "best practices" in rail grinding.[204] If the rail is not ground regularly, it deteriorates and additional passes at additional cost would be required to properly profile the rail. It is important that a rail profile be maintained that fits the wheel profile of the heavy cars. If this is not done, areas of high stress are created in the ball of the rail, resulting in defects and fatigue.

The only way heavy haul Class I railroads have been able to improve rail life to one (1) BGT and beyond is through a diligent rail maintenance program. Strict adherence to an aggressive rail grinding schedule is an integral part of such program.[205]

Even more important is an aggressive special grinding program at switches and crossings involving grinding at the frog, stock rail and switch points. Switches are by far the highest maintenance item on a heavy tonnage railroad both for track and signal maintenance forces. Modern switch grinding equipment has made it possible to improve turnout component life and to reduce outages at turnouts resulting from switch points and other components not matching or being out of alignment. Special grinding must also be done to rail at crossings because the large production grinders must pass by crossings due to flangeway restrictions. The rail at crossings takes both the load from trains and from

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[204] *Id.* at 30. BNSF.RP.WP.III.D.4-0193.

[205] Tom Judge, *Grinding Delivering on its Promises*, Railway Track & Structures, June 2003, at 53; Robert J. Derocher, *Keeping a Low Profile*, Progressive Railroading, June 2003, at 50; Mike Roney, Dave Meyler, Eric Magel and Peter Sroba, *Optimizing the System on CPR's BC South Line*, Railway Track & Structures, July 2001, at 26; Mischa Wanek, *HAL Maintenance of Way Demands: Grinding and Lubrication*, Railway Track & Structures, July 2002, at 26. BNSF.RP.WP.III.D.4-0197 to 0213.

traffic and thus requires special care. Mr. Albin has included grinding of switches and crossings in his rail grinding calculations.

For regular grinding, Mr. Albin calculated 2,200 pass miles including a single pass on tangents and curves less than three degrees and a double pass on curves greater than three degrees. Mr. Albin's calculations are included in BNSF Reply electronic workpaper "III D 4 Maintenance of Way.xls." AEP Texas used a unit cost of ${ } per mile applied to 860 miles. AEP Texas derived its unit cost from a BNSF invoice attached to a BNSF contract with { }. As with other contract costs, AEP Texas includes labor but omits the additional costs for {

}.[206] BNSF's cost per pass mile in 2000, which includes the contract and additional costs, was ${ } per pass mile.[207] Mr. Albin applied that cost to 2,199 pass miles per year, for an annual cost for rail grinding of ${ }.

Mr. Albin has included switch grinding using BNSF's standard grinding frequency of 50 MGT and cost of ${ } per switch for a total cost of ${ } per year.[208]

Grinding at crossings is done at the same frequency as for mainline track. Based on the number of crossings on TNR and a unit cost of ${ } ({ } indexed to year 2000 costs}), Mr. Albin's cost for grinding at crossings is ${ }.[209]

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[206] BNSF.RP.WP.III.D.4-0214 to 0215.

[207] BNSF.RP.WP.III.D.4-0216.

[208] BNSF Reply Exh. III.D.4-1; BNSF.RP.WP.III.D.4-0216 to 0217.

[209] BNSF Reply Exh. III.D.4-1.

(d) Track Geometry Testing

AEP Texas applies a standard for track geometry testing of six times a year on main lines and uses a unit cost of $56 per track mile. Mr. Albin accepts AEP Texas' standard but disagrees with its unit cost.

In developing the unit cost, AEP Texas misapplies a BNSF contract with the Holland Company. That contract provides, among other things, a base rate of ${ } per week and a target production rate of { } miles per week based on a { }.[210] While the contract provides for a { } week for the contractor to meet the target production rate, in calculating a per mile unit cost, AEP Texas assumes a 40-hour work week. Nevertheless, AEP Texas continues to assume that the contractor will meet its target production rate of { } miles per week. It is simply not reasonable for AEP Texas to assume the same rate of production in a shorter time than provided for in the contract.

Even assuming a { } work week, it is unreasonable to use the target production rate to calculate a per mile unit cost. In the real world, track geometry crews are frequently interrupted by priority traffic. There are days that the track geometry equipment will not be allowed on the track at all, due to priority train traffic or be asked by the dispatcher to move on the highway to a completely new location on account of maintenance work in the area. As a result, in Mr. Albin's experience, the target rate is frequently not achieved. The contract recognizes that {

[210] BNSF.RP.WP.III.D.4-0236.

}

mile productivity.

Moreover, track geometry crews frequently reserve mobilization activities for the {

}

and that the target production rate is always achieved.

Mr. Albin relies on a unit cost of ${ } per test mile based on BNSF's actual costs in 2000 for track geometry testing.[212] The unit cost includes the costs for both the labor and equipment. Application of the ${ } unit cost to the 9438 test miles that Mr. Albin determined would require testing under AEP Texas' standard results in a total cost of ${ }.

(e) Miscellaneous Outside Contracts

For miscellaneous contracts, AEP Texas includes $750,000, but provides no support for this amount. Moreover, AEP Texas asserts that this amount is supposed to include surveys and bridges.

Based on his experience with contractors and his analysis of the structures and facilities on the lines replicated by TNR, Mr. Albin independently determined that the cost for bridge repairs and special inspection would include concrete repairs, underwater inspection for scour on the substructure of the 474 TNR bridges, and steel repairs to the bridges for a

[211] BNSF.RP.WP.III.D.4-0236.

[212] BNSF.RP.WP.III.D.4-0216.

total contract costs of ${ }. This amount is separate from the amount allocated for normalized bridge replacement.

For all contract maintenance on buildings, AEP Texas has included just $96,621.73, representing 0.5 percent of the original building cost estimated by AEP Texas. Since AEP Texas includes no electricians, carpenters, masons or water service employees in TNR's internal workforce, this amount would have to include all facets of building maintenance, including the numerous daily repairs and spot upkeep that TNR's numerous buildings will require. AEP Texas claims that its 0.5 percent allocation is based on Mr. Albin's testimony in the Otter Tail rate case. But in his restatement of the Otter Tail SARR's MOW workforce, Mr. Albin included electricians, carpenters, masons, and water service employees to attend to the day-to-day activities associated with building maintenance. The 0.5 percent covered the larger repairs and maintenance projects that would be contracted out. If AEP Texas is to rely on Mr. Albin's expert testimony, then it must be consistent with that testimony and either provide additional MOW forces to perform daily maintenance or include additional amounts adequate to cover the cost of hiring contractors to perform such work. AEP Texas has done neither.

As in Otter Tail, Mr. Albin's restatement of the TNR's MOW workforce included employees to perform the day-to-day building maintenance and general upkeep. Contract maintenance costs to perform major repairs are generally 0.5 percent of the construction cost of such facilities. Therefore, Mr. Albin has included $342,561 for contract building maintenance based on BNSF's restatement of TNR's building construction costs.[213] Based

[213] BNSF Reply Exh. III.D.4-1.

on his experience and conversations with BNSF engineers, Mr. Albin also includes under miscellaneous engineering :

Table III.D.4-13
Miscellaneous Engineering Costs

Major bridge design	$247,664
Fueling facility design	$150,189
Miscellaneous surveys, permits, studies, signals and electrical design	$125,000
Building engineering	$76,948
TOTAL	**$599,801.00**

Source:

(f) Ditching

AEP Texas uses two-foot ditches on the TNR. AEP Texas estimates that ten percent (120) of the route miles would require ditching annually at a cost of ${ } per track mile based on BNSF discovery documents. Mr. Albin accepts AEP Texas' estimate of the percentage of route miles to be tested annually, but disagrees with AEP Texas' calculation of the unit cost.

To develop a purported per track mile unit costs, AEP Texas uses BNSF's invoices from { }. However, AEP Texas divides the total cost by the total number of *pass* miles shown on each of the invoices. This produces a per *pass* mile cost. The invoices also show total number of *track* miles. Dividing total cost by total number of *track* miles yields a per track mile cost of ${ }.[214] BNSF also pays additional cost for travel time from one job to another and the cost of a full-time pilot/flagmen for the project. In 2000, its per mile cost for ditching was ${ }, which results in total ditching costs for TNR of ${ }.[215]

[214] BNSF.RP.WP.III.D.4-0238.

[215] BNSF.RP.WP.III.D.4-0238.

(g) Snow Removal, Derailment And Casualty Repairs.

AEP Texas has included $150,000 for snow removal and $25,000 for storm debris removal, but has not provided any support for these amounts. According to BNSF records, in 2002, BNSF spent a total of ${ } on snow removal and weather-related costs across BNSF system which equals approximately ${ } (${ } indexed to year 2000 costs). In addition to snow removal, these expenditures account for costs associated with ice, storms, flooding and other weather related costs. Mr. Albin applied the per route mile cost to TNR' 1168 route miles for a total snow removal and weather-related cost of ${ }.[216]

AEP Texas has included $4.5 million for derailments and $100,000 for washouts. While Mr. Albin disagrees with the amounts allocated to each of these categories, he agrees that the total amount is a reasonable estimate of what the TNR can expect to incur annually in derailment and other casualty losses.

(h) Environmental Cleanup & Prevention

AEP Texas included $80,000 for environmental maintenance and $259,517.17 for fuel equipment repairs. Mr. Albin accepts AEP Texas' estimate of fuel equipment repair costs as it is consistent with BNSF's experience. He disagrees, however, with AEP Texas' estimate of environmental clean-up costs.

Railroads routinely incur substantial annual expenses for environmental mitigation associated with maintenance of fueling facilities and clean up of fuel spills. Over the past ten years, BNSF incurred more than ${ }, or more than ${ } annually, for

[216] BNSF.RP.WP.III.D.4-0239 to 0241.

environmental mitigation and diesel fuel clean-up at BNSF's fueling facility in Belen, New Mexico.[217] The Belen, New Mexico fueling facility is a state-of-the-art facility that is well maintained. It has all the proper containment and complies with all regulations. Unfortunately, spills occur at even the best maintained facilities and clean-up costs are expensive and must be dealt with immediately. It is only reasonable to assume that the fueling facilities on the TNR would incur similar costs ({

}). The costs incurred by BNSF are for clean-up/mitigation costs and normal costs of inspection and repairs of fuel tanks, pumps and pipelines. Therefore, Mr. Albin included ${ } environmental mitigation and fuel repair costs in his restatement of OE contract costs.

(i) Surfacing

AEP Texas includes as an OE surfacing of track by a contractor every three to four years depending on tonnage. Program maintenance such as this is distinct from the daily spot surfacing required on a high tonnage railroad such as TNR. In his restatement of the TNR MOW plan, Mr. Albin treats program surfacing as a capital expense that is performed by BNSF production gangs. Spot surfacing is included as an OE expense and is performed by track crews properly equipped to perform the work efficiently.

(j) Yard Cleaning

AEP Texas includes $40,000 for annual yard cleaning costs. Mr. Albin accepts this cost.

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[217] BNSF.RP.WP.III.4-0242.

(k) Special Maintenance Costs

In certain areas of the TNR route, BNSF currently confronts special maintenance problems. These include ballast fouling caused by coal dust, embankment stabilization issues, and curve alignment and gauging problems. BNSF incurs additional maintenance costs in addressing these challenges. AEP Texas has not explained how it will avoid these problems and fails to include any costs to address them.

i) Coal Dust in the PRB

According to BNSF Roadmaster Wayne Meidinger, who until recently was stationed at Douglas, Wyoming, and was responsible for maintenance activities on the southern part of the Orin Line, coal dust is a substantial problem. The strong Wyoming winds blow the dust off the open top coal cars exiting the mines and spread it over the entire embankment. The coal dust covers the track and fouls the ballast, leaving a blackened layer of dust from several inches to a foot and a half thick. Photographs provided by Mr. Meidinger effectively demonstrate the problem.[218] The coal dust presents a major maintenance challenge, but more seriously, a safety hazard as any fire on the right-of-way will start the coal burning. Burning coal can only be extinguished by pouring dirt over it. For this reason, BNSF maintenance supervisors have worked with local county fire marshals to devise a plan to deal with this situation.[219] In 2002, Mr. Meidinger undercut eight miles between MP90 and 98 (between Bill and Walker, Wyoming) to clear the track of coal. Using a dozer, grader and loader, they gathered, loaded, and hauled to

[218] BNSF Reply electronic workpaper "III D 4 COAL DUST ON THE ORIN LINE.ppt."

[219] In 2003, BNSF was charged ${ } by the Wright, Wyoming Fire Department for fighting coal dust fires on BNSF right-of-way. BNSF.RP.WP.III.D.4-0243 to 0244.

North Dakota for disposal approximately 100 carloads of dust spoils. A similar campaign was undertaken on several other stretches of the Orin Line. These projects involved removing coal dust ranging in depths from two to eight inches and in width from eight to thirty feet, as shown on a chart in Mr. Albin's workpapers.[220] The photographs, showing before and after clean-up, depict the extent of the problem and the magnitude of the maintenance effort.[221]

On a recent inspection trip, Mr. Albin observed this problem firsthand. He observed that the worst fouling occurs between MP27 and 58 on the Orin Subdivision with lesser problems between MP0 and 27 on the Orin Subdivision and between Gillette and Kara, Wyoming on the Black Hills Subdivision. BNSF budgeted ${ } for clean-up work done in 2003 and planned in 2004.[222] This work includes spot undercutting, switch undercutting, and surfacing. Based on Mr. Albin's conversation with Division Engineer John Cech, Mr. Albin estimates that this work will be performed over a five year period, at an annual cost of ${ }, and that BNSF will continue to incur annual costs at this level thereafter.

ii) Stabilization Issues

The poor clay soil condition from Ardmore to Joder (MP440-446) on the Butte Subdivision regularly requires stabilization of sub-grade and re-sloping of cuts and fills, at an annual cost of ${ }.[223]

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[220] BNSF.RP.WP.III.D.4-0268.

[221] BNSF Reply electronic workpaper "III D 4 COAL DUST ON THE ORIN LINE.ppt."

[222] BNSF.RP.WP.III.D.4-0245 to 0267.

[223] BNSF.RP.WP.III.D.4-0269 to 0271.

The sandy/silty soils from MP11 to 12 and MP23 to 25 on the Angora Subdivision require regular stabilization of the embankment and slopes and ditching at an annual cost of ${ }.[224]

The rough terrain with 30 to 50 foot cuts and fills at MP19 to 25 south of Canadian River Bridge on the Boise City Subdivision regularly requires clean up of rock falls, ditching, and slope stabilization work at an annual cost of ${ }.[225]

BNSF incurs special costs to address embankment stability problems in the MP234 to 238.1 on the Red River Valley Subdivision. Annual maintenance costs to address these issues include rip rap protection and restoration and placing jetties to direct the river and prevent erosion of the railway embankment. The annual cost of these activities is ${ }.[226]

iii) Alignment and Gauging Issues on Crawford Hill

Crawford Hill (MP410 to 420) with its heavy grade (1.5 percent) and severe curvature, (eight three-degree curves, two two-degree curves, one four-degree curve, and two eight-degree curves) has proved particularly difficult to maintain. The curves move in and out six to ten inches with the changes in temperature during spring and fall of the year. In the 1980s, when timber ties were in use on this segment, BNSF incurred substantial costs to realign and gauge the track on a frequent basis. As AEP Texas has selected timber ties for TNR, it can expect to incur the same costs to align and gauge the tracks that BNSF incurred when it used timber ties on Crawford Hill. By replacing timber ties with concrete

[224] *Id.*

[225] *Id.*

[226] *Id.*

ties on the Crawford Hill, BNSF minimized the effects of excessive movement, and reduced derailments and track outages. Based on the experience with timber ties on the Crawford Hill, Mr. Albin includes an additional maintenance cost of ${ } annually.[227]

(4) Summary Of Maintenance-Of-Way OE

AEP Texas' evidence fails to support its assumptions about the maintenance requirements of TNR's plant. AEP Texas' MOW staff is meager, its equipment inadequate, and it has offered little or no support for its numbers. Its implied assumption that a substantial amount of maintenance will be handled by contractors is a shell game designed to avoid having to address the real-world activities and real costs associated with providing adequate maintenance. With respect to operating expense contract costs for activities that are typically contracted out, AEP Texas' estimates are understated because it uses unsupported frequencies for track maintenance activities such as rail grinding and testing, miscalculates the quantities for other contract work such as weed control, and applies unsupported unit costs. Under SAC principles, AEP Texas has the burden of proof to show in its opening evidence that its assumptions are reasonable and that its costs are supported. AEP Texas' evidence fails to meet its burden of proof on maintenance of way OE.

BNSF's witness Mr. Albin has developed a detailed bottom-up analysis of the MOW costs for the TNR. BNSF's evidence is well supported, detailed and conservative. AEP Texas' total MOW OE cost is $27.9 million. Mr. Albin's total restated cost is $69.6 million. BNSF's evidence should be used in this case to assess MOW costs for the TNR.

[227] BNSF.RP.WP.III.D.4-0272 to 0273.

c. TNR Capital Maintenance-Of-Way

Even though the annual capital cost is not added into the stand-alone costs, the exercise of developing these costs demonstrates the unrealistic nature of AEP Texas' MOW plan and allows the Board to compare AEP Texas' cost estimate with other real-world experience.[228] The development of a capital MOW plan also allows the Board to ensure that the capital MOW activities are properly accounted for in the TNR operating plan.

In his restatement of capital costs, Mr. Albin developed his capital budget for programmed maintenance in the same way that he developed the operating maintenance-of-way budget – adhering to the principles for classifying MOW activities and costs as either capital or operating expense. He calculated the annualized replacement costs for each category of capital asset. For the programmed track maintenance he developed both the labor and materials cost for track replacement by building from the bottom up the system production gangs that are needed to handle the annual program maintenance of the 1691 miles of track BNSF calculated for TNR. Details of his capital budget calculations are included in his workpapers and in BNSF Reply Exhibit III.D.4-1.[229]

(1) Work Train Equipment

AEP Texas acknowledges that the TNR will require work trains to deliver ballast in the areas to be surfaced. AEP Texas, however, understates the amount of ballast

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[228] The program replacement of capital assets (or the capital portion of MOW expenditures) is already accounted for in the DCF analysis through the inherent depreciation assumptions. Nevertheless, the development of the total MOW budget, operating and capital, allows the Board to ensure that all MOW costs are appropriately accounted and that the MOW plan is realistic.

[229] BNSF Reply electronic workpaper "III D 4 Maintenance of Way.xls."

needed. It also fails to recognize other work train needs for such activities as rail relay, tie replacement, undercutters, shoulder ballast cleaning, bridge work and miscellaneous spot maintenance and emergency work. Consequently, AEP Texas understates the number of work trains required. AEP Texas also overstates the per day cost for work trains.

In his restatement, Mr. Albin determined the number of work trains that would be needed on TNR. Specifically, Mr. Albin calculated the number of work train days that would be needed for each activity, including tie distribution, rail gang distribution, surfacing and ballast distribution, and miscellaneous scrap clean-up. His estimate includes the cost for picking up released rail and ties. As state laws prohibit burning creosote coated scrap wood ties, they must be removed to an approved landfill, sold for landscaping, or disposed of in an environmentally acceptable manner. Mr. Albin took that into consideration as well. Mr. Albin also estimated the costs for crews to load and unload materials from work trains. He estimates that maintenance of TNR would require { } days for miscellaneous maintenance work) at ${ } per day for track maintenance for an annual OE cost of ${ } and a capital cost of ${ }.[230]

Mr. Albin determined that TNR would need four work trains operating throughout the year. The work trains are used for such tasks as delivery and pick up of material for replacement track and bridge work and for maintenance activities such as hauling rip rap, dumping emergency ballast, hauling away waste from yard cleaning, hauling debris, etc. Mr. Albin conveyed work train requirements to BNSF witness Mr. Mueller, who then

[230] BNSF.RP.WP.III.D.4-0274 to 0275.

determined the number of locomotives needed for the work trains and included that locomotive cost in his operating costs in Section III.D.3.

d. Total Annual Maintenance-Of-Way Costs

Mr. Albin's estimate of the total annual cost of maintaining TNR, including costs for personnel, materials, equipment, and outside contract work, is $144.1 million at First Quarter 2000 levels. Of this amount, $69.6 million represents the amount attributable to OE. A comparison of Mr. Albin's estimate with AEP Texas' estimate is set forth in Table III.D.4-14.

Table III.D.4-14
Comparison Of Summary Of BNSF Estimate Of Total Maintenance And OE Maintenance Costs To AEP Texas' Opening Statement

Item	Railroads (Millions)	AEP Texas (Millions)
Personnel	$54.4	$26.1
Training*	$4.7	$0.9
Normalized Track Materials and Capital Maintenance	$46.2	$38.5
Contract Work	$14.8	$14.0
Equipment	$21.5	$2.0
Work Trains	$2.6	$0.1
Total Maintenance Cost	**$144.1**	**$81.6**
Operating Expense	$69.6	$27.9

*AEP Texas calculates MOW training costs in its First Errata Opening workpapers.
Source: AEP Texas Opening electronic workpapers "SpotMaint.xls," "TNR_OP_EXP.xls." BNSF Reply Exh. III.D.4-1.

As Table III.D.4-14 demonstrates, AEP Texas has understated the MOW costs associated with maintaining a railroad designed to accommodate the traffic designated for TNR.

As Mr. Rennicke's analysis shows, Mr. Albin's estimate of total MOW costs are reasonable when compared to the real-world experience of Class I railroads. Figure III-5 of BNSF Reply Exhibit III.D.4-2 projects that a realistic estimate cost per route mile to maintain a railroad of TNR's density would be approximately $133,000. Mr. Albin's

estimate of $123,000 per route is on the conservative side. By contrast, AEP Texas' estimate of less than $70,000 per route mile is wholly unrealistic.

e. Maintenance Outages

As discussed above in Section III.C.2.a, AEP Texas' operating analysis failed to account for MOW maintenance outages. There are three types of essential railroad maintenance activities that require extended periods of track time: (1) programmed replacement by system production gangs, *i.e.,* rail, tie, surfacing, planned contract work, and the like, (2) regular inspections and planned daily maintenance, and (3) maintenance work required to address unplanned events like the repair of broken rail, realignment of surface, or other emergencies that disrupt traffic. Programmed MOW work can be planned to avoid interference with peak traffic periods. To a lesser extent, the more regular inspections and planned day-to-day maintenance can also be worked around peak traffic periods, although it cannot be altogether ignored just because traffic volumes are heavy. Safety would be compromised if a railroad totally avoided routine inspections just because traffic levels were high during a particular time. But the third category of maintenance activities cannot be planned or avoided regardless of the level of traffic.

AEP Texas based its operating plan on the RTC model that analyzes train movements for what AEP Texas considers to be a peak traffic period. AEP Texas' RTC analysis assumes that there will be no maintenance activity on the railroad during that period. While it may be reasonable to assume that the railroad would not schedule its programmed replacement of assets, or its seasonal contracting activities such as weed spraying, ditching, rail grinding, track geometry, etc. during the peak period, it is unrealistic to expect that *no* maintenance will be conducted during that or any other period on a railroad handling the tonnages TNR is assumed to be handling and running the

numbers of trains TNR is assumed to be operating. Some maintenance must be performed in the heavy-tonnage territories throughout every week of the year. BNSF's experience bears this out and there is no basis for assuming anything to the contrary.

In his analysis of BNSF's Random Failure Reports for 2002, discussed more fully in Section III.D.4.a.(1), Mr. Albin noted that on the line segments replicated by TNR, during the peak year of 2002, there were a total of 5,692 incidents on TNR line segments or an average of 15.5 occurrences per day, with resulting track outages averaging 2.5 hours each. These occurrences cannot be ignored and time must be spent performing maintenance that shuts down the lines in order to address them.

In addition, other inspections and immediate repairs of detected problems must be conducted regardless of traffic volumes. Indeed, the need for regular performance of this maintenance activity increases with the increase in tonnage. Examples of situations requiring track time even during peak periods include:

- Immediate follow up and repair of any problems found by track inspectors;
- Closer inspection and subsequent repair of rough track reported by track and train crews;
- Immediate inspection of signal outages and malfunctions;
- Maintenance of turnouts, grinding frogs, welding frogs, and switch points;
- Mechanical adjustments of switches and corresponding signals;
- Prompt attention to track irregularities requiring adjustment or alignment and surfacing;
- Raising and maintenance of bridge ends, especially on open deck bridges in high tonnage areas;
- Immediate correction of drainage problems that could damage the subgrade or impede traffic;

- Maintenance to switch heaters and blowers;
- Inspections after unusual events, such as major rain or snow storms.

Often, equipment needed for repairs is too large to move by road and must move by rail. For example, a normal and somewhat minor daily occurrence is the need to raise or align track to remove a slow order. This must be done immediately to avoid a more serious outage or track failure. It may take two to three hours to move the large equipment into place, complete the job and return the equipment to storage. During that time, the track is closed to traffic. Similarly, a simple task such as unplugging a culvert or cross drain between double main tracks in an inaccessible area (*i.e.,* on a high fill or cut) may need several hours of track time, but that time is essential to avoid soft subgrade and an eventual slow order if the condition is not corrected.

AEP Texas' operating plan provides no opportunity for TNR's MOW workforce to respond to the daily unplanned maintenance that is inevitable on a railroad the size and tonnage of TNR. In any event, as discussed above, TNR's MOW plan provides too few workers too sparsely equipped to perform all of the maintenance that would be required to keep TNR operating. For these reasons, AEP Texas' MOW plan should be rejected and Mr. Albin's MOW plan should be accepted by the Board as the best evidence of record.

5. Leased Facilities

AEP Texas assumed that, as the replacement for BNSF, TNR would participate in any joint facility agreements on the same basis as BNSF. In particular, AEP Texas assumed that TNR would operate between Sterling and Union, Colorado via BNSF's trackage rights over UP. AEP Texas Opening Nar. at III-D-126. BNSF agrees with AEP

Texas that the appropriate rate is 3.1 mills per-GTM plus an annual interlocker fee of $14,889.[231]

6. Loss & Damage

BNSF accepts AEP Texas' formula for determining loss and damage costs for TNR.[232]

7. Insurance

AEP Texas computed TNR's insurance cost based on application of BNSF's 2000 ratio of insurance to freight operating expenses (less depreciation, casualties and insurance) at 2.94% to arrive at a cost of $7.7 million in 2001. In proposing its estimate, AEP Texas offered no rationale for why its approach should be accepted, except that the methodology had been accepted in past SAC cases.[233] AEP Texas failed to report that all the parties in the cases it cited agreed to that approach. BNSF believes that approach substantially understates the casualty and insurance expense TNR can reasonably expect to expend. BNSF's witness Mr. McCarren consulted with experts at Mercer Management Consulting, which provided information about expected casualty and insurance costs from its affiliated insurance provider, Marsh Inc. Mr. McCarren also consulted with A&M's insurance broker, Aon. Mr. McCarren testifies that a carrier the size of the hypothetical TNR would not be able to achieve the low casualty and insurance costs as a percentage of operating expenses that are enjoyed by BNSF. While the TNR would qualify as a Class I

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[231] *See* BNSF Reply electronic workpapers "LUMs and Carmiles (AEPTX-BNSF).xls," worksheets "TR Fee" and "Summary," and "OPR_EXP.xls," worksheet "Summary."

[232] *See* BNSF Reply electronic workpaper "OPR-EXP.xls," worksheet "Summary."

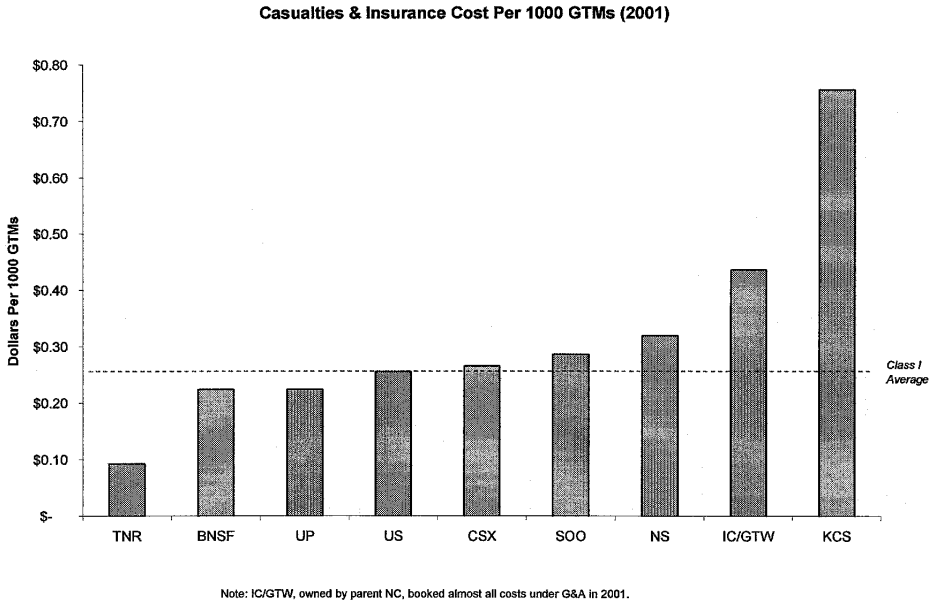
[233] *See* AEP Texas Opening Nar. at III-D-127.

railroad in terms of revenue, there is a significant difference in size between the largest Class I railroads like BNSF and the smaller Class I railroads the size of the TNR. Size makes a very significant difference in the total insurance costs of a carrier. Class I carriers the size of BNSF are self insured with deductibles per incident of around $25 million. Limited resources and investor demands require smaller carriers to self insure at much lower levels, approximately $5 million. Beyond the self insured level, Class I carriers, and most regional and shortline carriers, secure insurance through major insurers such as Marsh, AIG and Aon. The lower the self-insurance level, the higher the insurance premiums. Over a long period of time, all other things being equal, it costs more to insure a risk than it does to bear it (otherwise the insurance industry would not exist). As a result, smaller carriers pay more in insurance and casualty costs as a percentage of their expenses than larger carriers do.

To illustrate the unreasonableness of AEP Texas' application of the 2000 BNSF ratio of insurance to freight operating expenses (less depreciation, casualties and insurance) of 2.94% to AEP Texas, Mr. McCarren made several comparisons. First, he examined the 2001 casualty and insurance expense per 1,000 GTMs of Class I's based on information supplied by Mercer. That analysis shows that AEP Texas' estimate of casualty and insurance costs for TNR is grossly underestimated when compared to Class I experience. Chart III.D-1 shows that AEP Texas' estimate of casualties and insurance is approximately one-third of the projected level per GTM of other Class I railroads. This chart also illustrates that smaller railroads pay more in casualties and insurance costs than larger railroads do.

Using the data from that analysis, Mr. McCarren calculates AEP Texas' expected casualty and insurance cost based on cost per gross ton mile. He applies the 2001 U.S. Class I railroad average cost of $0.255/1,000 gross ton miles to TNR's projected 95.5 billion gross ton miles to arrive at an estimate of $24.4 million for TNR in 2001. He notes that even at this level, the estimate displays significant returns to scale that smaller carriers such as IC/GTW, WCS, and KCS, all with ratios above $0.40/1,000 gross ton miles, did not achieve.

Chart III.D-1



Note: IC/GTW, owned by parent NC, booked almost all costs under G&A in 2001.

Next, Mr. McCarren, in consultation with Marsh, Inc. and Mercer Management Consulting, developed a "bottom up" estimate of casualty and insurance costs of $23.9 million based on AEP Texas' proposal for the size of TNR in 2001. That estimate

includes $16.9 million in self insured casualty cost and $7.0 million in insurance premiums, which is further detailed in BNSF's workpapers.[234]

Mr. McCarren then refers to the 2003 *Casualty Cost of Risk* analysis that surveyed 23 industries, including 40 transportation service companies. Using that study, Mr. McCarren identifies the expected cost of risk for a transportation service company the size of TNR (with $200 million to $1 billion in revenues) at $22.7 per $1,000 of revenue.[235] By comparison, TNR's peers WCS (in 2000), IC/GTW (in 2001) and KCS (in 2001) experienced costs of $32.8, $52.4, and $33.8 per $1,000 of revenue, respectively.[236] Using the $22.7 per $1,000 of revenue figure and AEP Texas' estimate of revenues at $767 million, he computes a 2001 total casualty and insurance expense of $17.4 million.

Finally, Mr. McCarren analyzed the insurance operating expense ratio as a percent of total operating expenses for Class I carriers with less than $1 billion of expenses, which was 6.32% in 2000 and 4.69% in 2001 for an average of 5.49% (excluding depreciation and casualty and insurance expense).[237] Applying that ratio to the purported 2001 TNR freight operating expense of $263.5 million (less depreciation and casualty and insurance costs) yields an annual casualty and insurance expense for TNR of $14.5 million. Although this methodology results in the lowest estimate of casualty and insurance cost, BNSF uses this methodology to recalculate TNR's casualty insurance cost using its revised

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[234] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Mercer Cost of Risk Estimate."

[235] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "Cost of Risk data."

[236] *See* BNSF Reply electronic workpaper "G&A Charts," spreadsheet "2001 data."

[237] *See* BNSF Reply electronic workpaper "insurance.xls."

operating expenses for 2001 of $359.5 million to arrive at a cost of $19.7 million. Since TNR's operating expenses will grow over the twenty year forecast period, TNR's insurance costs will increase throughout the period. As Mr. McCarren's analysis illustrates, BNSF's calculation of TNR's casualty and insurance cost is conservative, well supported and more reasonable than the $7.7 million amount AEP Texas proposes.

8. Ad Valorem Tax

AEP Texas estimates ad valorem taxes for TNR in the states of Wyoming, South Dakota, Nebraska, Colorado, Oklahoma and Texas at $6.1 million.[238] This figure results from an adjustment designed to exclude taxes on leased equipment. BNSF rejects this adjustment to arrive at total taxes for TNR of $7.5 million.

9. Other

a. Cost Related to Rerouted Traffic

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[238] *See* BNSF Reply electronic workpaper "G&A Costs," spreadsheet "RE and non-inc taxes per RM."

b. Summary of Annual Operating Expenses

Table III.D.9-1
Annual Operating Expense For The TNR – 2001

Item (1)		AEP Texas TNR Amount ($ millions) (2)	BNSF TNR Amount ($ millions)
1.	T&E Personnel	44.3	58.0
2.	Locomotive Lease Expense	31.9	33.5
3.	Locomotive Maintenance Expense	26.3	29.8
4.	Locomotive Operating Expense	90.8	103.9
5.	Rail Lease Expense	5.1	7.7
6.	Material and Supply Operating	1.2	2.3
7.	Ad Valorem Taxes	6.1	7.5
8.	Joint Facility	4.1	4.5
9.	Operating Managers	12.0	17.7
10.	General and Administrative (including IT and training)	12.9	28.8
11.	Loss and Damage	0.9	0.7
12.	Insurance	7.7	19.7
13.	Maintenance of Way	28.0	65.1
14.	**Total**	**271.3**	**379.2**

211050

PUBLIC VERSION



BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Docket No. 41191 (Sub-No. 1)

AEP TEXAS NORTH COMPANY
v.
THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

Reply Evidence of
The Burlington Northern and Santa Fe Railway Company

NARRATIVE

Volume II of II

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May 24, 2004

E. NON-ROAD PROPERTY INVESTMENT

1. Locomotives

AEP Texas assumed that all of the TNR's locomotives would be leased and BNSF accepts this arrangement. The TNR's locomotive requirements and operating costs are discussed in Section III.C.1.b and III.D.1.

2. Rail Cars

The TNR's rail car requirements and leasing costs are discussed in Section III.C.2.e and III.D.2.

3. Other

The TNR's company motor vehicles and office equipment, such as computers, software programs, telephones and the like are discussed as operating expenses in Section III.D.3. Maintenance-of-way equipment that is used to support the day-to-day maintenance activities of the TNR's MOW departmental workforces is discussed in III.D.4.b.(2) and equipment used to support the program replacement maintenance activities is discussed in Section III.D.4.c.(2).

F. ROAD PROPERTY INVESTMENT

BNSF's road property investment evidence is sponsored by the following experts: Arnold S. Tesh of FTI Consulting, Inc. (FTI) (III.F.1 Land); Robert C. Phillips, P.E. of Ralph Whitehead Associates, Inc. (RWA) (III.F.2 Roadbed Preparation); Michael R. Baranowski of FTI (III.F.2 and spreadsheets); Cassie M. Gouger, P.E. of FTI (III.F.3 Track Construction, III.F.5 Bridges, III.F.6 Signals and Communications, III.F.8 Public Improvements); James Primm, Consultant on subcontract to RWA (III.F.7 Buildings); and Robert H. Baughman, P.E. of RWA (III.F.9 Mobilization, III.F.10 Engineering and III.F.11 Contingencies) (together "BNSF Engineering Consultants"), and William J. Rennicke of Mercer Management Consultants, Inc. ("Mercer Management") (III.F.11 Contingencies, III.F.12 Construction Schedule and BNSF Reply Exh. III.F-4).

This team of experts have reviewed AEP Texas' road property investment evidence and concluded that AEP Texas has used improper assumptions or incorrect calculations and thus has understated road property investment costs, in some areas by substantial amounts. The problems with AEP Texas' assumptions and development of costs are explained in detail in Sections III.F.1 through III.F.12.

As discussed more fully in the Argument in Section I and in Sections III.F.11 and III.F.12, BNSF employed the services of William J. Rennicke of Mercer Management Consultants, Inc. to provide an overall assessment of the AEP Texas proposed construction schedule and construction cost estimate from the real-world perspective of a commercial and financial analyst. That analysis reveals the unacceptably high risk that the TNR could not be constructed on the schedule and at the cost proposed by AEP Texas. In fact, the probability of completion on time and at cost was so low that Mr. Rennicke concluded that the AEP Texas plan in the real-world would be rejected by commercial and financial analysts as infeasible.

For the reasons set out in Sections III.F.1 through III.F.12, the Board should apply BNSF's cost assumptions in carrying out its analysis of the stand-alone costs for the TNR. The differences between BNSF and AEP Texas on the issues in dispute are set out in the table below.

Table III.F-1
Summary of BNSF's Estimate of Road Property Investment
for AEP Texas North Railroad Versus Complainant's Estimate at 1Q2000 Levels

Item	BNSF 2000 Amount ($Millions)	AEP Texas 2000 Amount ($Millions)	Difference
III-F-1. LAND	326.9	89.5	237.4
III-F-2. ROADBED PREPARATION			
a. Clearing and Grubbing	2.1	2.3	-0.2
b. Earthwork	741.6	548.3	193.3
c. Lateral Drainage	0.2	0.2	0.0
d. Culverts	34.5	29.7	4.8
e. Other	153.3	31.4	121.9
III-F- 3. TRACK CONSTRUCTION			
a. Geotextiles	0.7	0.0	0.6
b. Subballast and Ballast	228.0	155.9	72.0
c. Ties	176.4	160.2	16.2
d. Track (Rail)	225.8	290.1	-64.4
e. Switches (Turnouts)	42.6	41.9	0.7
f. Other	93.6	93.6	0.0
Track Labor	272.6	322.3	-49.7
III-F-4. TUNNELS	0.2	0.0	0.2
III-F-5. BRIDGES	196.3	167.5	28.8
III-F-6. SIGNALS AND COMMUNICATIONS			
a. Centralized Traffic Control System (CTC)	135.6	108.7	26.8
b. Hot Bearing Detectors and Dragging Equipment Detectors	2.5	2.4	0.2
c. Communications	17.2	10.8	6.4
III-F-7. BUILDINGS AND FACILITIES			
a. Fueling	30.0	7.8	22.2
b. Locomotive Facility	16.8	13.1	3.6
c. Station/Office	2.3	1.6	0.7
d. Roadway buildings	12.9	3.4	9.6
e. Other	7.7	21.2	-13.6
III-F-8. PUBLIC IMPROVEMENTS			
a. Fences	33.0	7.6	25.4
b. Roadway Signs	0.4	0.2	0.1
c. Crossings	43.0	6.9	36.1
III-F-9. MOBILIZATION	59.3	9.6	49.7
III-F-10. ENGINEERING COSTS	360.1	137.8	222.2
III-F-11. CONTINGENCIES	493.8	202.7	291.1
TOTAL	**3709.1**	**2468.2**	**1241.0**

Source: AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "TOTALS;" BNSF Reply Exh. III.F-1.

1. Land

As mentioned above, Arnold S. Tesh, CRE, is sponsoring BNSF's land testimony. Mr. Tesh reviewed the testimony of Mr. Thorne, AEP Texas' property valuation witness, regarding the cost of acquiring property for the hypothetical stand-alone railroad TNR from mines located in the Powder River Basin ("PRB") in Wyoming to the Oklaunion Generating Station located in Vernon, Texas.

Mr. Tesh is a real property consultant and certified real property appraiser at FTI Consulting, Inc. He has been valuing real estate for more than 37 years, including 25 years spent performing property appraisals for use by railroads. Mr. Tesh did not perform an independent analysis of TNR's land valuation, but he did analyze AEP Texas' valuation. There are a number of problems with Mr. Thorne's analysis, such as the size of the valuation units he chose and the date of the sales transactions used for the valuation. Since Mr. Tesh did not perform his own independent analysis, he has not attempted to correct those errors.

Mr. Tesh, however, was able to correct a significant error in Mr. Thorne's analysis. That error relates to the way in which Mr. Thorne established the value for TNR parcels in the County of Denver in Colorado. For reasons not otherwise explained or addressed in AEP Texas' Narrative description of Mr. Thorne's work or in Mr. Thorne's valuation report, AEP Texas' methodology for establishing value for the most valuable Colorado county is different from the methodology used elsewhere on the right of way and, more importantly, different from the description in the AEP Texas Narrative.

Although not discussed anywhere in evidence, the methodology used by AEP Texas for parcels in Denver County sets their value based on the lowest quartile of comparable sales transactions for each land usage grouping in the area. In effect, this methodology arbitrarily establishes the value of the most valuable land along the TNR route on the right of way at the

price of the lowest quarter of comparable sales in the area. Neither AEP Texas nor Mr. Thorne explains why this methodology was used, and the fact that such a methodology is being utilized at all is deeply buried in AEP Texas' real estate electronic workpapers. No specific reference or index is offered of what data is being provided in the land electronic workpapers, which are merely described in AEP Texas' Narrative as the III-F-1 folder.[1]

Mr. Tesh is unaware of any land valuation methodology that uses the quartile method employed by AEP Texas. Indeed this methodology is directly contrary to the usual manner in which land used by railroads is valued. Ordinarily, land being assembled to create a rail corridor commands an assemblage premium or an enhancement to its value over the value of comparable land in the area. That assemblage premium is not included in SAC analyses. However, the quartile method employed by AEP Texas effectively decreases the expected valuation of the land and it produces an artificial reduction in the apparent land value. The Board has never endorsed such an approach and there is no possible justification for doing so here.

By failing to conduct a meaningful appraisal that evaluates the characteristics of the right-of-way along the proposed route and matching those characteristics with comparable sales information. AEP Texas cannot demonstrate that the quartile produces anything but arbitrary results. The only fact that can be determined with certainty is that the quartile analysis arbitrarily values the TNR right-of-way at the low end of the range of comparable sales. It is no surprise

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[1] *See* AEP Texas Opening Nar. at III-F-2, note 1. The index for the electronic workpapers provide no further clarity, referring only to file names. The Board has clearly instructed the parties to provide more detailed information regarding citation to workpapers in its evidence *Duke/NS*, Docket No. 42070, slip op. at 2. The relevant electronic workpapers calculating the quartile appear in AEP Texas' Opening electronic workpaper "DENVER1.xls," in file III-F-1, "State data," spreadsheet "Colorado."

why AEP Texas pursues the quartile approach -- real estate in Denver County is costly and establishing a value based on quartiles reduces those costs.

To put the quartile into perspective, the weighted average cost per acre based on the quartile is less than one-sixth of the weighted average cost per acre based on the mean of the comparables selected by AEP Texas. Such a wide disparity between the quartile and the mean suggests that there are elements of value in the sales above the quartile that were not considered by the AEP Texas approach. Because AEP Texas has not conducted any analysis of what those elements of value represent and why they are not relevant to the TNR, there is not basis for excluding them.

Without any reasoned basis for AEP Texas' quartile valuation or explanation of why the sales above the quartile are not relevant, the only option for correcting the understatement of Denver County real estate costs based on the record is to reject the arbitrary quartile approach and base values instead on the average of the comparables identified by AEP Texas. This correction increases AEP Texas' land valuation for the TNR by $237.5 million to $327.0 million.

Mr. Thorne calculated prices for 273.34 acres of land for yards and other facilities and 61.5 acres of land for microwave towers at a cost of $934,240 and $188,001, respectively. BNSF engineering consultants calculate that the actual acreage required for yards and facilities is 252.11 acres. Mr. Tesh recalculates the value of the land for those yards and other facilities using Mr. Thorne's per acre value to arrive at a value of $745,352.

F.2 - F.12 CONSTRUCTION AND ENGINEERING OVERVIEW

BNSF's construction and engineering evidence is presented by a team of engineers from FTI and RWA, independent consultants on subcontract to RWA, and Mercer Management. These BNSF Engineering Consultants have extensive expertise in railroad construction, as described in their witness qualification statements in Section IV.

BNSF's Reply Narrative on Construction and Engineering Costs includes an Overview in which BNSF Engineering Consultants critique AEP Texas' basic assumptions and specifications. It then discusses each of the major categories of engineering and construction costs identified by the Board in its March 12, 2001 decision in STB Ex Parte No. 347 (Sub-No. 3), *General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases*. Consistent with the Board's guidelines for filing SAC evidence, the Reply Narrative is organized into sections addressing the following topics:

1. Land. (Land was discussed in the previous section)

2. Roadbed Preparation. This topic covers the many grading activities involved in preparing the roadbed upon which the track will be constructed. These activities include clearing and grubbing, excavation (earthwork), placement of embankment, lateral drainage, culverts, and other smaller items.

3. Track Construction. This topic covers the rail, ties, ballast and other track material used in constructing the railroad. It also includes costs for transportation of materials from suppliers to the site and labor and equipment for construction.

4. Tunnels. This section covers tunnels and similar structures. There are no existing tunnels on the TNR, but there is a 123-foot "super span"—a Structural Steel Pipe through which trains travel—described in this section.

5. Bridges. This section covers the design, specifications and methodology for costing construction of bridges on the TNR.

6. Signals and Communications Systems. This section covers the Centralized Traffic Control (CTC) system, Failed Equipment Detectors, and the Microwave and Land Mobile Radio (LMR) systems needed on the railroad to provide essential communications.

7. Buildings and Facilities. In addition to the headquarters, office, crew and yard offices on the TNR, this section includes discussion of the costs to construct fueling facilities and locomotive and car repair shops.

8. Public Improvements. Under this heading, fences, road crossings and crossing warning devices are discussed.

9. Mobilization. Under this heading, the costs for mobilizing and demobilizing laborers and equipment involved in the construction of the railroad are discussed.

10. Engineering. This section covers discussion of the costs involved in providing engineering services to plan, design and oversee construction of the railroad.

11. Contingencies. This heading includes a discussion of the necessity of providing a contingency additive to the estimated construction costs to account for unplanned events.

12. Construction Schedule. This section includes a discussion of deficiencies in AEP Texas' proposed schedule.

Under each heading and subheading, BNSF Engineering Consultants discuss AEP Texas' inclusion (or omission) of items covered under that category heading, as well as AEP Texas' selection of construction specifications, quantities, and unit costs for each component. Where AEP Texas' selection of an item, specification, quantity or unit cost is well supported and feasible, BNSF Engineering Consultants have accepted it; where AEP Texas has failed to include an item, or to support its selection, or the selection is infeasible or impractical, they have substituted a more appropriate selection.

No major railroad project, such as the construction of a stand-alone railroad, has been undertaken since the construction of BNSF's Orin Line in 1976-1977 and CNW's Western Railroad Property Inc. (WRPI) lines in 1983, and even these major projects were of a significantly lower magnitude than that of the construction of the TNR. The TNR is assumed by AEP Texas to cover 1,168.54 route miles and include all of the essential facilities of a Class I railroad, whereas the Orin and WRPI were lines significantly shorter extensions of existing lines. As shown in the Mercer Report, the cost per track mile for the CNW/WRPI project was

approximately $6 million in 2000 dollars, whereas AEP Texas's estimated cost per track mile for the TNR is only $1.5 million.

As a guiding principle for the construction of a railroad with the size, tonnage and traffic proposed for the TNR, BNSF Engineering Consultants have relied on real-world specifications, including BNSF, industry and AREMA standards.

As shown in Table III.F-1 above, and in more detail in BNSF Reply Exhibit III.F-1, AEP Texas has *understated* the reasonable construction costs that would be incurred to construct a railroad project of this magnitude by $.1.2 billion.

The first specific construction cost category BNSF addresses is Roadbed Preparation, which is designated Section III.F.2 according to the Board's format requirements (Section III.F.1 (Land) was considered previously).

2. Roadbed Property

a. Roadbed Preparation—Clearing, Grubbing, Stripping, Foundation Conditioning and Undercutting

(1) Clearing and Grubbing

"Clearing" is the cutting of all trees, stumps, brush, shrubs and other vegetation at a level not more than six inches above ground, and the disposal of all cut material, other fallen branches and all surface litter. "Grubbing" is the removal and disposal of all stumps, roots and embedded logs, and all boulders and debris visible on the surface.[2]

AEP Texas developed costs for clearing and grubbing based upon the acres per track mile that were identified as having been cleared and/or grubbed when the rail lines being replicated by the TNR were originally constructed, as reported in the ICC Valuation Section "Engineering

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[2] AEP Texas Opening Nar. at III-F-10.

Reports" and other ICC valuation documents for segments of the TNR for which such reports were available. AEP Texas increased the reported quantities slightly to account for the larger modern day roadbed section it specifies for the TNR. For BNSF line segments used by the TNR that were constructed more recently, AEP Texas included no costs for clearing and grubbing. This is because the BNSF source documents referenced by AEP Texas did not separately identify quantities for clearing and grubbing.

BNSF conservatively accepts AEP Texas' methodology for determining clearing and grubbing quantities for the TNR. Although clearing and grubbing were clearly required as part of the BNSF new line construction,[3] because those quantities were not separately identified in the source materials, BNSF's Engineering Consultants did not include separate costs for these activities in their restatement.

AEP Texas develops its low clearing and grubbing unit costs based primarily on its assertion that much of the route would require minimal clearing, involving mostly the removal of brush and grasses, and not trees.[4] AEP Texas develops two separate costs for clearing and a single cost for grubbing from the RS Means Handbook for 2000. For the acreage identified within the historical documentation as requiring both clearing and grubbing, AEP Texas uses the

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[3] Section 3.2 through 3.2-5 of the BNSF Gillette North construction specifications (which include the Eagle Butte to Campbell segment) state that clearing and grubbing are required, but should not be separately itemized in the billing. Instead, they should be included in the cost for excavation. Thus, Orin Line *quantities* for earthwork do not include *quantities* for clearing and grubbing, but the costs for those activities are incidental to the earthwork *costs*. BNSF.RP.WP.III.F-0185 to 0187.

The 1983 WRPI specifications also require clearing and grubbing, and state that payment for such shall be made per lump sum. *WRPI Specifications,* § 201. BNSF.RP.WP.III.F-0188 to 0191.

[4] AEP Texas Opening Nar. at III-F-19.

Means clearing cost of $4,063.22 per acre for medium cutting and chipping of trees to 12 inches in diameter and adds to that a grubbing cost of $2,557.44 per acre.

For cleared acres that do not show corresponding reported quantities for grubbing, AEP Texas applies a cost for $181.65 per acre for the clearing of medium brush with a dozer and brush rake. AEP Texas provides no justification for this dramatically lower clearing cost other than a suggestion that its inspection team determined that much of the route would require "minimal clearing" and that the clearing would be "removal of brush and grasses as opposed to trees."[5]

The BNSF Engineering Consultants reviewed carefully AEP Texas' proposed clearing and grubbing cost and, based on their experience and their observations on their field trip, decided to accept AEP Texas' clearing and grubbing costs for acreage that will require both clearing and grubbing (though BNSF costs will be slightly different due to location factor changes), and to reject AEP Texas' cost for clearing with a brush rake for the remainder of the acres cleared. The brush rake selected by AEP Texas is essentially an open bulldozer blade with teeth that scrape the ground surface and can dislodge brush and push it into a pile. The unit cost proposed by AEP Texas covers pushing the brush into a pile along the right-of-way, but does not include any cost for removal and hauling of the brush pile for disposal. Because this method of clearing with a brush rake is similar to the initial phases of the stripping operation necessary to remove otherwise unsuitable material from the roadbed, the BNSF Engineering Consultants did not apply a separate cost for clearing, but instead included this activity with their stripping costs.

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[5] *Id.*

(2) Stripping

"Stripping" involves the removal of surface organic material that will create a weak zone in the final roadbed. According to AREMA, areas of cuts and fills should be stripped of all vegetation, sod, topsoil and unsuitable material. It notes that for fills, the area to be stripped will generally be confined to areas where fill height is four feet or less.[6]

This requirement is consistent with BNSF current construction practices, which typically require the contractor to remove the top six inches of ground along the proposed roadbed before any excavation or embankment work can commence.[7] In cut areas, the stripping operation ensures that unsuitable material is not placed as fill in an embankment area elsewhere within the project. In fill areas, stripping is important to ensure that the fill material placed is cohesive with the insitu material in order to prevent the development of a slip plane[8] or other common subgrade failure.

AEP Texas does not include any costs for this activity in its construction costs for the TNR, nor any discussion of it in its Narrative, presumably because stripping, although a common and necessary practice, is not reflected as a separate line item in the Engineering Reports.

Current BNSF bid contracts require this activity, but do not provide a separate line item for the cost. This is because the areas requiring stripping are not identified in the contract

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[6] The Track Cyclopedia defines stripping as follows: "Stripping is an operation necessitated by professional observation (or perhaps by soil tests) that surface organic material will create a weak zone in the earth mass of the final roadbed." See BNSF.RP.WP.III.F-0197, 0195.

[7] Stripping is different from the topsoil stockpiling and placement required by the state of Wyoming. Stripping is grading out unsuitable materials and is required whether or not topsoil placement is required.

[8] A slip plane is a failure surface of a slide due to a weak plane. BNSF.RP.WP.III.F-0198.

documents themselves. Rather, the contract language specifies that the contractor will conduct stripping operations at the direction of the railroad engineer and that it will be compensated for the work at its price for excavation. For example, in the original Orin Line specifications under "Topsoil," the contract documents state explicitly that "Removal of topsoil from its original location and placement in stockpile will be measured and paid for at the contract unit price for 'Excavation'."[9] Thus while stripping occurred on the Orin Line, the quantities and costs were not included in the original contract bid documents.

In this case, however, neither the clearing and grubbing nor the earthwork excavation unit costs from Means includes costs for activities associated with stripping. Stripping is listed as a separate item with its own unit cost in the Site Preparation section of Means, indicating that this activity is beyond the scope of what is provided for in unit costs applied to common, loose rock and solid rock excavation.

To account for this cost, BNSF's Engineering Consultants have conservatively developed costs for stripping six inches of topsoil only for the embankment portion of the right-of-way based on the following unit cost from RS Means 2000:

2230-880-0200	Stripping Topsoil, and stockpiling, sandy loam 300 HP dozer, ideal conditions	$0.57/CY

The 300 HP dozer was selected because of the heavy, difficult-to-work-with clays that will be encountered along the TNR route.[10]

(3) Undercutting

Undercutting involves the excavation and removal of materials that cannot function as railroad subgrade and their replacement with suitable materials. The unsuitable materials

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[9] BNSF.RP.WP.F.III-0421 to 0422.

[10] BNSF.RP.WP.III.F-0002 to 0007, 0199.

typically include muck through swamp or other low-lying areas, large rocks, boulders and other materials that might inhibit proper compaction of the roadbed. AEP Texas has ignored the undercutting of unsuitable material during the grading operation. In the region traversed by the TNR, it would generally be expected that a minimum of 5 to 10% of total excavation for a roadway project would require undercutting. This percentage was based on an analysis performed by a geotechnical expert with the RWA firm.[11] In estimating the TNR's construction costs, BNSF Engineering Consultants conservatively assumed that only 5 percent of total excavation would require undercutting.

Removal of most undercut materials can be accomplished with standard excavation equipment. The BNSF Engineering Consultants selected the versatile hydraulic excavator to accommodate the myriad of materials requiring removal. The BNSF Engineering Consultants assumed that the undercut materials would be wasted and replaced with borrow, and that the borrow, like other embankment, would require compacting. Details of the BNSF Engineering Consultant's development of the cost for undercutting are set forth in the following table.

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[11] BNSF.RP.WP.III.F-0200 to 0201.

Table III.F.2-1
BNSF Reply Undercutting Unit Cost

Excavation	
Backhoe, hydraulic, crawler mtd., 3 CY cap. = 160 CY/hr.	$2.35
For loading onto trucks, add 15%	$0.35
42 CY rear or bottom dump, 1/2 mile haul	$2.07
Total Excavation Cost	$4.77
Front End Loader, Wheel Mounted, 5 CY bucket	$7.65
20 CY Dump Trailer, 1 mile round trip, 2.5 loads/hr.	$2.77
Spread dumped material, by dozer, no compaction	$1.38
02315-300-5640 Sheepsfoot Roller, 6" lifts, 4 passes	$0.86
Total Undercutting Cost	$17.43

Source: BNSF Reply electronic workpaper "III F 2 TNR Grading.XLS," worksheet "III F Unit Costs"

Details of BNSF's restatement of clearing, grubbing, stripping, and undercutting quantities and costs are included in BNSF electronic workpaper "III F 2 TNR Grading.xls."

b. Earthwork

(1) Segments For Which Engineering Reports Exist

In developing earthwork quantities for the TNR, AEP Texas relied on the information contained in the ICC Engineering Reports (ICC Bureau of Valuation Form No. 561) for those line segments that were in existence when the ICC conducted its rail line valuations studies circa 1915. For the portion of the TNR route between Las Animas Jct., Colorado and Amarillo, Texas, AEP Texas used other ICC Bureau of Valuation documents containing information generally comparable to the Engineering Reports. These documents contain estimates of actual earthwork quantities for each valuation section of the BNSF predecessor railroads by type of material—common, loose rock and solid rock—based on construction standards typical of that period. AEP Texas adjusted the reported earthwork quantities to reflect more modern railroad

roadbed construction specifications for the TNR and applies a pro-rata portion of the adjusted quantities to the portions of each BNSF valuation section used by the TNR.

To minimize the amount of dispute between the parties, BNSF's Engineering Consultants have adopted much of AEP Texas' approach in their restatement of the TNR earthwork quantities, including the use of the Engineering Reports and other source documents selected by AEP Texas. The primary exception relates to the assumption regarding track centers.

AEP Texas assumes 15-foot track center spacing for all TNR double and triple track. In order to provide the same level of service that the BNSF provides to its customers today, the BNSF Engineering Consultants included 25-foot track center spacing everywhere along the proposed TNR route that BNSF has such spacing today.[12]

(2) Segments For Which There Are No Engineering Reports or Other Historical Quantity Data

There are no Engineering Reports or other historical information for six segments of the TNR that were constructed subsequent to the completion of the ICC valuation studies: (a) Donkey Creek to South Logan, Wyoming; (b) Eagle Butte Junction to Campbell, Wyoming; (c) Reno to Black Thunder Jct., Wyoming; (d) North Wye Track for Antelope and North Rochelle Mines; (e) Amarillo Connection; and (f) Arapahoe and Harrington Destination Spurs.

For three of these segments – Donkey Creek to South Logan, Wyoming, Eagle Butte Junction to Campbell, Wyoming and Reno to Black Thunder Junction, Wyoming – AEP Texas developed earthwork quantities from BNSF's actual construction experience on the Orin Line. For the North Wye Track for Antelope and North Rochelle Mines and the Amarillo Connection, AEP Texas estimated earthwork quantities using Eagle Point engineering software. For the

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[12] BNSF.RP.WP.III.F-0202 to 0210.

remaining segments – the Arapahoe and Harrington Destination Spurs – AEP Texas uses the per mile earthwork quantities for the adjacent valuation sections.

(a) Converse Yard To Donkey Creek And Reno To Jacobs Jct.

AEP Texas developed earthwork quantities for Donkey Creek to South Logan, Wyoming, Eagle Butte Junction to Campbell, Wyoming and Reno to Black Thunder Junction, Wyoming based on testimony of BNRR witness Jerry Masters provided in ICC Finance Docket No. 37021.[13] In that testimony, Mr. Masters provided excavation figures covering the portion of BNSF's Orin Line from Reno to Orin Jct., which was constructed by BNSF in the 1970's using a 28-foot roadbed. AEP Texas Opening Nar. at III-F-27, 28. AEP Texas assumes that the TNR constructs the line between Donkey Creek and Converse Jct. with a 28-foot roadbed width and assumes a 24-foot roadbed for the line from Converse Jct. to South Logan and between Reno and Jacobs Ranch Jct. For the line segments it assumes will be constructed with a 24-foot roadbed width, AEP Texas reduces the Orin Line quantities accordingly. The BNSF Engineering Consultants accept AEP Texas' assumptions and quantities for the Donkey Creek to Converse Junction segment.

The Converse Junction to South Logan and Reno to Jacobs Ranch segments were built by BNSF with a 28-foot roadbed. Because AEP Texas has not demonstrated that the soils along these lines could support the anticipated traffic volumes on a smaller, 24-foot roadbed, the BNSF Engineering Consultants reject AEP Texas' quantities and replace them with quantities based on the actual roadbed width built by the BNSF.

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[13] *Iowa Pub. Serv. Co. v. Burlington North R.R. Co.,* ICC Docket No. 37021; AEP Texas Opening workpaper pp. 04314-04321.

(b) Eagle Butte to Campbell

AEP Texas used an earthwork quantity per mile calculation based on the Orin Line actual quantities, adjusted to reflect a 24-foot roadbed width. There is no need, however, to estimate the earthwork requirements for this segment because the actual build quantities for this line are available from BNSF's records. These records are similar to those relied upon by AEP Texas for the Orin Line quantities and have been used by the BNSF Engineering Consultants as the source for the earthwork requirements for the Eagle Butte to Campbell segment. Copies of the actual contract documents are included in the BNSF Engineering Consultant's Reply workpapers.[14]

~~(c)~~ North Wye Track for Antelope and North Rochelle Mines and Amarillo Connection

AEP Texas estimated earthwork quantities for these two line segments using an engineering computer program developed by Eagle Point. The program uses data drawn from United States Geological Survey ("USGS") topographical maps and user supplied inputs of railroad subgrade elevation, roadbed cross section and crossing and bridge information to estimate earthwork quantities. Using Eagle Point, AEP Texas estimated 2,064 cubic yards of excavation and 363,033 cubic yards of fill for the north wye tracks for Antelope and North Rochelle Mines and 117,038 cubic yards of excavation would be required for the Amarillo Connection.[15] The BNSF Engineering Consultants reviewed the Eagle Point information produced by AEP Texas in its work papers and conclude that the earthwork quantities it produces for the Antelope and North Rochelle Wye tracks are acceptable but that the quantities

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[14]BNSF.RP.WP.III.F-0211 to 0220.

[15] AEP Texas did not provide the Eagle Point software as part of its work papers. The BNSF Engineering Consultants were, however, able to identify problems with the earthwork quantities computed by AEP Texas using the software based on the limited amount of information AEP Texas did produce.

for the Amarillo connection are understated. This understatement is caused primarily by AEP Texas' use of railroad subgrade elevations for this line segment that do not provide adequate clearance beneath the existing BNSF Hereford Subdivision track.

Notwithstanding AEP Texas' allegations to the contrary,[16] BNSF provided in discovery the plan and bid quantities for the Amarillo connection, which was built by BNSF in 2003. BNSF has used these actual earthwork quantities from the discovery materials as well as the other relevant quantities (topsoil, clearing and grubbing, etc.) for the Amarillo connection, thereby eliminating the problems encountered by AEP Texas in trying to estimate the quantities.

(d) Arapahoe and Harrington Destination Spurs

Two of the TNR's local destinations, the Arapahoe plant near Denver, Colorado and the Harrington plant near Amarillo, Texas require the construction of TNR-owned destination spurs from the mainline. For the Arapahoe spur, which exists today on the alignment proposed by AEP Texas, the Complainant develops earthwork quantities based on the per-mile quantities for the adjacent valuation section.[17] The BNSF Engineering Consultants inspected the Arapahoe spur and agree that the earthwork quantities for the adjacent mainline are representative of the earthwork requirements for the spur and accept the AEP Texas methodology.

The Harrington spur is different. Although it is not mentioned anywhere in its Narrative, AEP Texas has changed radically the alignment of a portion of the spur to serve the Harrington plant from that in place on the BNSF line today. AEP has decided to serve the Harrington Plant

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[16] At page III-F-30 of its Narrative, AEP Texas complains that BNSF did not provide any information on this connection in discovery (notwithstanding AEP Texas' request that it do so). In fact, BNSF produced information related to the Amarillo Connection in discovery, at pages 05700, 05353 to 05357, and 05359. These documents are included in the BNSF Engineering Consultant's work papers at BNSF.RP.WP.III.F-0221 to 0227.

[17] AEP Texas Opening Nar. at III-F-30.

via a new connection from the north, coming off the main line at milepost 3.1 of the Boise City Subdivision[18] in place of the current BNSF operation, which is served from the south via a connection at milepost 2.4 of the Boise City Subdivision.[19] The new north-facing segment will connect with the existing Harrington spur at a point approximately one mile from the main line, on an alignment that has a one percent grade and crosses a number of creeks.

With its current switch alignment, BNSF is required to bring Harrington bound trains into its Amarillo yard and switch the power from the head-end to the rear – effectively turning the train around – to make a head-end move into the plant. The new alignment proposed by AEP Texas will permit the Harrington plant to be served directly off the TNR mainline.[20]

AEP Texas assumed that the mileage for this new connection would be the same as that for the existing south-facing connection and that the earthwork quantities would be comparable to those in the ICC Engineering Report for the adjacent mainline segment. Although the mileage for the new connection is close to that of the existing spur, the assumption regarding earthwork quantities is wrong and dramatically understates the earthwork needed for the new spur. While the new alignment is indeed more operationally efficient, because of the terrain that needs to be crossed to approach from the north, the grading effort for this alignment is considerably more than mainline Engineering Report quantities.

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[18] *See* AEP Texas Opening Exh. III-B-1, page 17 of 20 showing the connection to Harrington Plant at MP 3.1 and AEP Texas Opening electronic work paper "TNR Miles.xls."

[19] BNSF.RP.WP.III.F-0228 is an excerpt from the BNSF Boise City subdivision track chart showing the existing spur at MP 2.4 facing south.

[20] AEP Texas does not provide any TNR facilities to permit switching of the locomotive consist from the head-end to the rear, nor does it provide for any extra time in its operating plan for this maneuver. Therefore the only operationally viable means of serving the Harrington plant is from the north.

To properly develop the earthwork requirements for this new connecting spur, it was first necessary to plot the alignment beginning at milepost 3.1 of the Boise City subdivision up to a connection with the existing spur to the Harrington plant.[21] The new connection will comprise approximately 4,800 feet of the 5.17 mile Harrington spur, on a one percent grade in the loaded direction. The new alignment was provided to BNSF witness Mr. Phillips of RWA, where it was plotted on a United States Geological Survey topographical map. The BNSF Engineering Consultants determined that 65,372 cubic yards of earthwork would be required for this 4,800 foot connection.[22] For the remainder of the Harrington spur the BNSF Engineering Consultants accepted AEP Texas' earthwork quantities.

(3) Crawford Hill Line Change

In order to accommodate the traffic and routing assumptions of its operating plan, the TNR will require triple track on a portion of the Butte subdivision between milepost 406.15 and 423.60. A portion of this segment, between milepost 408.39 to 415.00, is known on the BNSF as Crawford Hill and was the site of a massive line change undertaken by the BNSF in the early 1980s to improve the operating efficiency of heavy unit coal trains originating in the Powder River Basin. The line change included double tracking of the entire 6.61 mile segment and required approximately 2.2 million cubic yards of earthwork just for the double track.[23] Triple tracking this difficult territory will require substantially more earthwork. Although the AEP

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[21] AEP Texas did not include any diagrams of its proposed alignment in either its hard copy or electronic work papers.

[22] BNSF.RP.WP.III.F-0229 to 0240.

[23] "A Niagara of Traffic From A Wyoming County The Size of Connecticut," TRAINS 45, 48 (November 1989) at BNSF.RP.WP.III.F-0241 to 0262.

Texas engineering experts should be aware of this line change,[24] they based their earthwork quantities for this segment on the old ICC Engineering Report quantities, understating quantities considerably.

Triple tracking this line segment would be a massive undertaking. BNSF knows this because in 1997 it commissioned TranSystems to design grading plans for triple tracking Crawford Hill. TranSystems determined that triple tracking the line would require an average of 63,000 additional cubic yards of earthwork per mile.

In their restatement of TNR construction costs, the BNSF Engineering Consultants developed the earthwork quantities for triple tracking Crawford Hill based on (1) the 2.2 million cubic yards of earthwork required to double track the line and (2) the incremental 63,000 cubic yards per mile determined by TranSystems required to expand from double to triple track. Details of these calculations are set forth in the BNSF Engineering Consultant's work papers.[25]

(4) Yards and Interchange Tracks

AEP Texas assumes that TNR will have two yards, one at Alliance and a second yard at Las Animas. The TNR will also have six locations to interchange trains with the BNSF. These locations are West Campbell and South Logan, Wyoming, Alliance, Nebraska, Las Animas Jct., Colorado, and Amarillo and Oklaunion, Texas.

BNSF has accepted the TNR proposed yard at Alliance and interchange track locations, although BNSF operating experts Messrs. Mueller and Wheeler have moved the Las Animas Yard facilities to Amarillo and modified the size of each facility to accommodate the proposed

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[24] At least three of AEP Texas' field trip photographs are taken from the area of the line change, one – waypoint W6 – with a notation of "Steep Cut." In addition, the BNSF track charts show the mile post equation at the east end of the line change as MP415.69 = MP415.00. BNSF.RP.WP.III.F-0263 to 0268.

[25] BNSF.RP.WP.III.F-0269 to 0304.

TNR traffic levels. In their restatement of the TNR construction costs, the BNSF Engineering Consultants have reflected the configuration changes identified by Messrs. Mueller and Wheeler and have added the required facilities at Amarillo.

AEP Texas based the grading requirements for the TNR yards on an assumed fill height of one foot and either 15-foot or 25-foot track centers, depending on the track spacing specified by its operating witness, applied to the miles of track in each yard. AEP Texas argues that such small yard earthwork quantities are necessitated by the calculations performed by the parties to remove from the Engineering Report quantities earthwork attributable to yards from earthwork attributable to the mainline section. The BNSF Engineering Consultants have inspected each of the yard, interchange and facility locations proposed for the TNR and found that no special circumstances related to earthwork are present at any of the locations. As a result, the BNSF Engineering Consultants accept AEP Texas' assumption of one foot of fill for TNR yard locations. They did, however, adjust the required quantities to reflect the track layouts determined by Messrs. Mueller and Wheeler.

While BNSF Engineering Consultants did accept the earthwork specifications of AEP Texas for the TNR yards, they have determined that, due to the expansion of the Alliance Yard to the east, demolition of several buildings located in the path of expansion is necessary.[26] There are nine buildings of varying construction styles that need to be removed, as shown in the BNSF workpapers.[27] They have developed a cost for demolition of each type of structure from RS Means[28], for a total of $809,127.

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[26] BNSF.RP.WP.III.F-0305 to 0306.

[27] *Id.*

[28] BNSF.RP.WP.III.F-0307 to 0311.

Table III.F.2-2 compares the yard earthwork quantities assumed by AEP Texas with the yard earthwork quantities included by BNSF in its restatement.

Table III.F.2-2
Comparison of Earthwork Quantities

Yard Location	AEP Texas Earthwork Quantities	BNSF Restated Quantities
Alliance	360,390 CY	274,427 CY
Las Animas	28,237 CY	0 CY
Amarillo	0 CY	38,567 CY

Source: BNSF Reply electronic workpaper "III F 2 Grading.xls;" AEP Texas Second Errata electronic workpaper "III F 2 TNR GRADING.xls."

(5) Unit Costs

AEP Texas relies on the Means Handbook as the source of the TNR earthwork unit costs. In its discussion of roadbed preparation costs, AEP Texas describes why it believes its use of Means is conservative and likely overstated for the earthwork requirements of the TNR. AEP Texas cites a number of factors it believes render the Means data conservative. These include:

- Means does not appropriately capture economies of scale that might benefit the TNR.
- Means, as an estimating tool, does not recognize all the benefits the TNR could realize through the competitive bid process, claiming that a project the size of the TNR would benefit from competitive bids.

AEP Texas also references actual bid prices of unclassified excavation for large road projects in the TNR states as a measure of the conservative nature of its Means-based cost estimates. After all this rhetoric, AEP Texas concedes that it used Means as the source to be consistent with cost-estimation techniques used by the Board in previous rate cases.[29]

Based on a detailed review of AEP Texas' workpapers, BNSF's Engineering Consultants determined that AEP Texas has misinterpreted the 2000 Means Handbook data, producing

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[29] AEP Texas Opening Nar. at III-F-14 through III-F-17.

earthwork unit costs that are flawed in a number of respects. Most critically, the unit costs selected by AEP Texas from Means are not correct for the type of earthwork activities necessary to construct the TNR roadbed. This is primarily the result of AEP Texas' scattershot selection of the earthmoving equipment, ranging from the smallest, lowest cost equipment for excavating materials to massive off-road haulers. In addition, AEP Texas overlooked in its development of earthwork costs several necessary elements, many of which were included as part of the original Orin Line construction. Overall, AEP Texas has understated earthwork unit costs for the TNR.

In their review of AEP Texas' evidence, the BNSF Engineering Consultants have considered carefully AEP Texas' claims regarding the legitimacy of the Means Handbook as the source for TNR earthwork unit costs. They conclude that the characteristics AEP Texas cites are precisely those that make Means representative of the earthwork costs likely to be incurred in building the TNR.

In its Opening Evidence, AEP Texas claimed that the average project cost of $1.0 million upon which Means bases its prices is not reflective of the economies of scale that could benefit the much larger TNR. BNSF submitted a workpaper request asking for backup of this figure, and AEP Texas removed its $1.0 million dollar average cost statement in a subsequent Errata, though it did not remove its argument about RS Means not taking into account economies of scale. Missing from AEP Texas's rationale, however, is the fact that the TNR will be built in a total of 30 months, with all of the mass earthwork and grading for the 1,192 route mile system occurring in a six-month time period from February through July, 1999.[30] In order to accomplish this feat, the TNR will need to grade just under 200 route miles *per month*. Assuming

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[30] AEP Texas electronic work paper "Construction Schedule.xls."

unconstrained resources, the TNR grading will have to be divided into hundreds of individual grading packages, evaporating any benefit related to economies of scale.

AEP Texas' other claim—that because of its large size, the TNR will benefit from the competitive bid process, producing lower than expected costs—also crumbles when the average size of each earthwork bid package is taken into consideration. Further, AEP Texas fails to consider that, because of the remoteness of much of the TNR route, the number of contractors actually available to compete in the bidding process will likely be small.

Finally, AEP Texas' comparison of its Means based price for common excavation to actual bid prices for unclassified excavation for large road projects in the TNR states does not demonstrate that the Means costs are overstated. Rather these bid prices show that excavation costs can vary wildly across projects. By basing its costs on a large, nationwide sample of heavy construction projects (which are adjusted by Means location factors to be representative of the costs along the proposed route), the Means costs are more reflective of the actual cost than the small sample chosen by AEP Texas.

In preparing its Reply Evidence, BNSF Engineering Consultants inspected the TNR route and visited construction sites in the vicinity of the proposed line, documenting the types of equipment that was actually being used by contractors in the region. The BNSF Engineering Consultant's reply to AEP Texas' earthmoving equipment selections is based on the equipment currently relied upon by earthmoving contractors in the TNR region.

The BNSF Engineering Consultants visited two construction projects and a Caterpillar equipment dealer in the vicinity of the TNR. The construction sites were for earthmoving projects in Belmont, Nebraska and in Commerce City, Colorado. They also interviewed

representatives of Wagner Equipment Company, the Caterpillar dealer located in Commerce City.

The Route 2 and Route 71 project in Belmont involved the excavation of over 150,000 cubic yards of material from natural or native contoured ground. The equipment observed by the BNSF Engineering Consultants included CAT 627 twin engine scrapers pushed by a CAT D-9 dozer. Also observed were a CAT D-9 dozer with a single shank ripper, motorgraders, water truck, sheepsfoot roller and excavators. The material being excavated consisted of heavy soil interlaced with bentonite (a white colored clay) mixed with areas of rock that required ripping. In their discussions with the grading contract foreman, the BNSF Engineering Consultants were informed that because of the consistency of material and the presence of rock, elevating scrapers, or paddles pans would not be practical for this job site.

On the Interstate 70 and Tower Road construction site in Commerce City, larger CAT 631 scrapers assisted by CAT D-9 dozers were deployed. According to the contractor foreman, the CAT 631s were being used because the construction site had plenty of room for the large equipment to maneuver. The foreman explained that on roadbed construction projects with less maneuvering room, CAT 627 scrapers are the preferred selection. The BNSF Engineering Consultants also observed a variety of other construction equipment at the site, including an off-highway water truck distributing water for compaction and a tractor spreader helping to spread material dumped by the scrapers.

Notes and photographs from these visits are included in the BNSF Engineering Consultants workpapers.[31]

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[31] BNSF.RP.WP.III.F-0105 to 0115.

(a) Common Excavation

Common excavation includes more than the cost of excavating material classified as common earthwork at the time of the original ICC valuation.[32] It includes the cost to reuse a portion of those excavated materials in the TNR roadbed as embankment as well as the cost to transport a portion of the materials that will not be used as embankment to a dump site to be "wasted."[33] AEP Texas assumes that 70 percent of the earthen material excavated for TNR will be reused as embankment. BNSF's Engineering Consultants adopt this assumption. However, as confirmed by their field observations, a number of different types of specialized earthmoving equipment are required to excavate the variety of materials classified as "common" along the TNR route and to transform a portion of those materials into a finished roadbed (and trimmed waste sites).

As explained in the field inspection notes of the BNSF Engineering Consultants, the soil condition over much of the route of the TNR is sandy and silty clay, some of which is laced with bentonite. Clay materials are heavier and more difficult to excavate than common earth. This fact is reflected in the Means unit prices, which for certain pieces of equipment show lower production rates and higher unit prices for working with clay. For other equipment, Means advises that a 60 percent additive to the common excavation cost is required when working with clay. The AEP Texas engineering experts did not consider the types of soil that would be

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[32] The instructions to the valuation engineers from the ICC were to classify all earthwork that did not meet the ICC's established criteria for solid rock or loose rock as common.

[33] Waste is the term applied to material excavated during the construction of the roadbed that cannot economically be reused in the roadbed as embankment. Typical reasons for wasting materials are that the amount of excavation exceeds the amount of embankment required, or that the place where the embankment is required is far enough away from the point of excavation that it becomes too costly to haul materials to the embankment site. In some instances waste is material that is unsuitable for embankment.

encountered along the TNR route. Their specific observations of the territory focus only on the topography along the route. There is no mention of the types of soils, nor any specific mention of the presence of clay or the difficulties associated with excavating clay.[34] Indeed, the AEP Texas engineering experts did not base their common earthwork equipment selection on the soil conditions observed during their field inspection, but rather only on the basis of equipment previously accepted by the Board in Western rate reasonableness cases.[35]

AEP Texas' unit cost development of common excavation is summarized in the following table.

Table III.F.2-3
AEP Texas' Development of Common Excavation

Means Unit	Embankment	Waste	Weighted
Loading into scraper 3000' haul, common earth	$3.11	$3.11	
Compaction via Roller	*$0.48*		
Compaction via Sheepsfoot	*$0.86*		
Avg. Compacting (above)	**$0.67**		
TOTAL	$3.78	$3.11	
Embankment/Waste Split	70.0%	30.0%	
Weighted Cost			$3.58

Source: AEP Texas electronic workpaper "TNR EARTHWORK COSTS.xls," tab "COMMON EARTH."

AEP Texas also develops an alternate cost for common excavation assuming a power shovel, off-highway hauler and dozer of $3.79 per cubic yard. As with AEP Texas' primary common excavation unit cost, this unit cost does not consider the added costs of excavating clay.

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[34] AEP Texas Opening Nar. at III-F-35.

[35] AEP Texas Opening Nar. at III-F-37.

However, because AEP Texas does not use this alternate cost anywhere in its analysis, it will not be addressed by the BNSF Engineering Consultants.

AEP Texas bases its primary unit cost for common excavation on the Means cost for an elevating scraper that AEP Texas assumes can efficiently excavate, haul, dump and spread excavated materials at an average rate of 530 cubic yards per day. The Means Handbook includes unit prices for five different types of scrapers.[36] AEP Texas provides no explanation of the criteria it employed in selecting the elevating scraper. Indeed, the elevating scraper selected by AEP Texas is the lowest cost, lightest duty and least versatile of all of the scrapers listed by Means and it is unsuitable for excavating the materials that will be encountered during construction of TNR. The simple fact that the elevating scraper carries the lowest Means per cubic yard unit cost for the common excavation does not mean, as AEP Texas might assert, that it reflects the most efficient and economical choice for TNR excavation. Rather, it means that it is the lowest cost, least versatile of the scrapers offered. Indeed, the lack of versatility of the elevating scraper will lead to reduced production, which would translate directly to higher costs per cubic yard.

Most contractors refer to the elevating scraper as a "paddle-pan," because it is essentially a big pan with a wide set of scrapers driven by belts on each side to elevate material and dump it into its own trailing pan. *The Track Cyclopedia* describes elevating scrapers as appropriate for lighter work and as "designed for gathering and scraping up loose material," and notes that these scrapers can "work alone *in loose* materials where the additional cost of a cat tractor is not

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[36] Means includes unit costs for an 11 CY elevating scraper, a 14 CY self propelled scraper assisted by ¼ dozer, a 21 CY self propelled scraper assisted by ¼ dozer, a 10 CY towed scraper assisted by ¼ dozer and a 15 CY towed scraper assisted by ¼ dozer. A "¼ dozer" refers to the ratio of dozers (push cats) to scrapers. Here ¼ means one dozer push cat for four scrapers to meet the production rates.

justified."[37] This equipment is generally used for very loose material that in most cases first has been windrowed by a dozer or motor grader. It is not practical, or in most cases possible, to use this type of equipment for the heavy excavation required for TNR where the material will not be loose, but in its natural state.[38] In addition, in areas of clay excavation, because of its cohesive characteristics, the clay sticks to the paddles of the paddle-pan, reducing further the throughput capacity of the equipment and thereby increasing the cost per cubic yard.

Further, most references to elevating scrapers note that they are traditionally used in smaller site preparation or agricultural applications. The Caterpillar website advertisement features the 613 C Series II (11 CY) Elevating Scraper stripping the topsoil in an agricultural use, which is consistent with the BNSF Engineering Consultants understanding of the equipment's capabilities.[39]

Based on their field analysis, the BNSF Engineering Consultants found that the excavation of common earth in the region is typically accomplished in one of two ways – using twin-engine scrapers or hydraulic excavators.[40] Where common materials consist primarily of heavy clay, the twin-engine scraper assisted by pusher dozers is the primary choice among contractors, with the two most popular scraper models being the CAT 627 and CAT 631. Their rated capacity is 21 cubic yards and 31 cubic yards respectively. Because of the heavy clays prevalent in the area, it is necessary for these pans to be assisted by dozers. The regional

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[37] *The Track Cyclopedia* at 60 (emphasis added). BNSF.RP.WP.III.F-0312.

[38] The soils that will be encountered along the TNR are cohesive and semi-cohesive, *i.e.,* clay and silt. These materials are very small and when wet, they are sticky, but when dry, they are hard and difficult to crumble -- *i.e.,* they are not loose.

[39] BNSF.RP.WP.III.F-0313 to 0315.

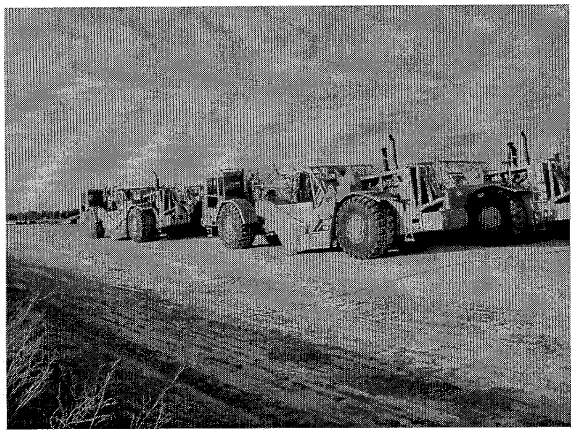
[40] The self-elevating elevating scraper chosen by AEP Texas was not employed on any of the projects sites visited by the BNSF Engineering Consultants.

equipment supplier deploys dozers ranging from a modest CAT D-7 to a much larger CAT D-10. The larger D-9 and D-10 models, as discussed in more detail below, can also be used economically for ripping operations because of their weight and horsepower.

The BNSF Engineering Consultants have selected the smaller 21 cubic yard self-propelled scraper as the basis for the common excavation cost for the TNR because (1) it is less expensive than the larger 31 cubic yard model and (2) it has better maneuverability for working along the narrow TNR right-of-way than the larger model. Means publishes a cost per cubic yard for common excavation and a higher cost for excavation of clay with the 21 cubic yard scraper. The BNSF Engineering Consultants plotted the route of the TNR on a USGS map depicting the mixture of clays in the mid-continent region. From that, they determined that 35 percent of the common excavation along the TNR route will involve difficult-to-work clay materials, and that the soils for the remainder of the route are generally consistent with the Means common earth designation. The BNSF Engineering Consultants developed a weighted average cost for a 21 cubic yard scraper based on the 35 percent clay/65 percent common mix. Photographs depicting certain of the earthmoving equipment selected by the BNSF Engineering Consultants are included as BNSF Reply workpapers.[41]

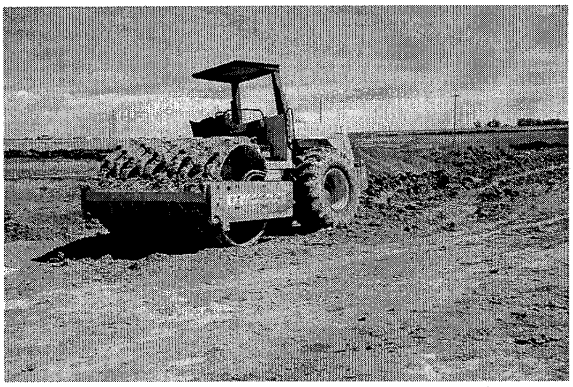
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[41] BNSF.RP.WP.III.F-0108 to 0115.



CAT 627 Twin Engine Scraper

For compaction of the embankment material, AEP Texas develops a cost based on an average cost of a steel wheel vibrating roller and a sheepsfoot roller. Sheepsfoot rollers are used to compact embankment material in this region and were found on the roadway construction sites visited by the BNSF inspection team. The BNSF Engineering Consultants thus conclude that compaction for excavated material is primarily accomplished by the use of a sheepsfoot roller. The texture of the sheepsfoot is designed to break up dirt clods and push small rock down into the embankment layers. Steel wheel rollers would not work well in this region because rather than compact the small rock with the dirt, they would bridge over these areas, resulting in inconsistent compaction patterns. The steel wheel rollers proffered by AEP Texas are primarily used for the final shaping of the roadbed section and compaction of base stone as the photo in AEP Texas' narrative depicts on page III-F-38. The BNSF Engineering Consultants' common earthwork excavation costs are summarized in the table below.



Rubber Tired Sheepsfoot Roller

Table III.F.2-4
BNSF's Development of Common Excavation Costs

Means Unit	Embankment	Waste	Weighted
Self propelled scraper, 21 CY 1/4 push dozer, Common earth, 3000' haul (65%)	$2.46	$2.46	
Self propelled scraper, 21 CY 1/4 push dozer, Clay, 3000' haul (35%)	$2.12	$2.12	
Compaction via Sheepsfoot	$0.86		
Total	$5.43	$4.58	
Embankment/Waste Split	70.0%	30.0%	
Weighted Cost			$5.18

Source: BNSF Reply electronic workpaper "III F 2 TNR Grading.xls," worksheet "IIIF Unit Costs."

Water, which is necessary for compaction of embankments, is discussed in Section III.F.2.d.(6) below. As explained there, AEP Texas has only included the cost of transporting and applying the water, and BNSF Engineering Consultants have added the cost of the actual water to AEP Texas' unit cost.

(b) Loose Rock Excavation

AEP Texas builds its per cubic yard unit cost for excavating loose rock from the Means Handbook. AEP Texas uses an average of the smallest (200 HP and 300 HP) dozers and an assumption of ideal conditions to rip the loose rock material, a 3 CY Shovel for loading and 42 CY off-highway haulers to transport to either embankment or waste sites. Compaction was added to the embankment portion of the unit cost while at the waste sites, AEP Texas has added spreading costs. AEP Texas states in its Narrative that it has "shown that most of the rock formations that occur throughout the area of the TNR's construction consist of striated rock, which is layered and therefore rippable."[42] Although AEP Texas only provides geological data for Colorado in its workpapers, BNSF agrees that rock that is apportioned to loose rock in the ICC Reports is rippable, but does not agree that the rock is all soft trap rock and medium shale that can be removed under ideal conditions.

BNSF has reviewed AEP Texas' selections and concluded that some of the equipment chosen by AEP Texas would not, and in many cases could not, be used for ripping loose rock along the TNR proposed route. AEP Texas' unit cost development of loose rock excavation is summarized in the following table.

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[42] AEP Texas Opening Nar. at III-F-40

Table III.F.2-5
AEP Texas' Development of Loose Rock Excavation

Means Unit	Embankment	Waste	Weighted
Ripping Trap rock, medium, ideal conditions	$2.86	$2.86	
Ripping Shale, soft, ideal conditions	$1.62	$1.62	
Avg. Ripping	$2.24	$2.24	
Shovel, 3CY capacity	$1.01	$1.01	
Off Highway hauler 42 CY rear bottom dump ½ mile round trip	$2.07	$2.07	
Spread dumped material by dozer-no compaction		$1.38	
Avg. Compacting	$0.67		
TOTAL	$5.99	$6.70	
Embank./Waste Split	70%	30%	
Weighted Cost			$6.20

Source: AEP Texas electronic workpaper "TNR EARTHWORK COSTS.xls," worksheet "LOOSE ROCK."

As explained in the remainder of this subsection, the unit selections by AEP Texas are a clear indication that AEP Texas did not choose from Means the proper equipment for the job, but focused rather on picking the lowest cost option. Any perceived economies generated by this technique will quickly evaporate, however, because the equipment will not be able to achieve its rated daily throughput in the TNR construction environment. This will ultimately push unit costs above those for more suitable equipment.

AEP Texas averages the Means cost for "ripping soft shale under ideal conditions," using a 200 HP dozer, and for "ripping medium trap rock under ideal conditions" using a 300 HP dozer. There are three fundamental problems with AEP Texas' selection. First, AEP Texas has not established that the materials classified as loose rock that would be encountered during the

construction of TNR represent medium hard trap rock or soft shale. Second, it has not established that ripping conditions would consistently be ideal. Third, as discussed under solid rock, AEP Texas assumes that 50 percent of the materials classified by the ICC valuation engineers as solid rock could be ripped using today's modern equipment. AEP Texas has not factored into its loose rock excavation equipment choice the ripping of harder materials previously classified by the ICC as solid rock.

AEP Texas includes in its workpapers two pages that contain geological graphs from "Engineering Geology in Colorado" that show the geologic age of the various formations occurring across Colorado and southern Wyoming (unconsolidated formations, sedimentary rocks and igneous rocks).[43] While this graph names the formations, they do not describe anywhere that these formations consist of soft shale and medium hard trap rock. Further, there is no mention that such formations could or would present ideal ripping conditions. The only way to determine what type of rock will be encountered, and, therefore, the appropriate equipment, is to take borings along the TNR. Such an approach, however, is not practical in a SAC analysis.

The BNSF Engineering Consultants confirmed through their field trip surveys that the equipment most commonly provided by equipment suppliers for ripping rock in this region is the larger D8 through D10 dozer—a D8 with a ripper is shown in the picture below. Although there will be some soft shale and medium hard trap rock in ideal conditions, AEP Texas' unit cost does not accommodate those instances where harder rock or adverse conditions will occur. AEP Texas cannot prove that ideal conditions will always occur or that the antecedent railroads never had adverse working conditions. Since all the conditions that are represented under the Means unit cost for trap rock and shale will likely be encountered during construction of the TNR,

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[43] AEP Texas Opening electronic workpaper "GeologySW36.jpeg."

BNSF's Engineering Consultants, in their restatement of AEP Texas' loose rock unit costs, reject AEP Texas' selection of dozers and rock conditions and use the average unit price from Means for all the trap rock and shale ripping costs. These unit costs vary from ripping soft rock under ideal conditions (200 HP Dozer, Caterpillar D7) to very hard rock under adverse conditions (460 HP Dozer, Caterpillar D10). Considering the various conditions that are possible and the lack of detailed information on the rock conditions, and the fact that the field trip of the TNR confirms that larger equipment is typically used for ripping, the average of the costs is a more reasonable estimate of the likely cost of ripping rock along the TNR route than the estimate provided by AEP Texas.



CAT D-8N with Ripper Attachment

Once the rock has been ripped loose, it must be gathered into piles suitable for loading into trucks. AEP Texas selects the Means unit cost for a 3 CY shovel outfitted on a 75-ton crawler crane to load "common earth piled."[44] AEP Texas provides no support for its selection of a 3CY shovel other than a photograph at page III-F-38 of its narrative showing a power shovel

[44] BNSF.RP.WP.III.F-0327.

loading an off road truck. The photo however, depicts exactly what defendant railroads have been trying to explain in the recent stand-alone rate reasonableness proceedings – that the shovel selected by AEP Texas is typically used in large quarry operations and is not well suited for railroad roadbed excavation.[45]

AEP Texas further misleads the Board by depicting a power shovel that is much larger, and much more costly than the equipment priced by Means. The power shovel displayed by AEP Texas is an O&K 40E. Unlike the 75-ton crawler crane upon which the Means costs are based, the O&K 40E has an operating weight in excess of 100 tons and a price tag of approximately $840,000.[46]

The BNSF Engineering Consultants reject AEP Texas' unsupported selection of a 3CY power shovel and instead develop the cost of excavating loose rock and loading the materials into trucks based on the Means cost for a 3 CY hydraulic excavator. The Earthmover Encyclopedia describes the hydraulic excavator as follows:

> With the possible exception of the bulldozer, the hydraulic excavator is probably the most familiar of all earthmoving machines. Hydraulic excavators can be seen working on every kind of construction job from road maintenance, trenching, and foundation work to mass excavation on major industrial sites, as well as in quarries and surface mining operations. Their sizes range from the smallest "toys," weighing less than 2 tons, to some of the largest excavators being produced today. They are made by hundreds of manufacturers in every industrialized country around the world. Thousands of new machines are produced each month.[47]

In past proceedings, the Board, based on misleading statements by complaining shippers, has dismissed the use of hydraulic excavators as trenching tools unsuitable for roadbed excavation. In fact, the hydraulic excavators cover a wider spectrum and are thus more flexible

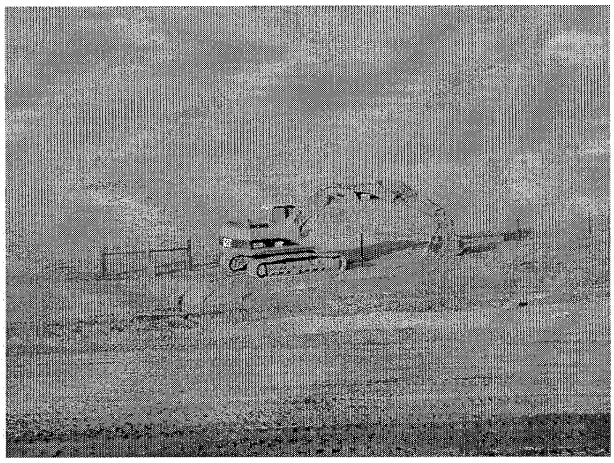
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[45] BNSF.RP.WP.III.F-0330A.

[46] BNSF Reply electronic workpaper "O&K RH40E.pdf."

[47] BNSF.RP.WP.III.F-0344.

(and feasible) than the power shovel selected by AEP Texas. According to manufacturer specifications, hydraulic excavators have a maximum digging height that is higher than a comparably sized power shovel and can dig to depth far lower than a power shovel.[48]



Hydraulic Excavator

AEP Texas also neglects to include the cost to move the ripped rock material into the piles for efficient loading into off-highway haulers. BNSF Engineering Consultants had added "dozing ripped material with 100' haul" with a 300 HP dozer to ensure that the excavator could achieve its rated capacity and not spend time scurrying around to consolidate ripped materials. The mid-sized 300 HP dozer was chosen consistent with the development of the average ripping unit cost developed above.

Consistent with AEP Texas' assumptions, the ripped loose rock materials will be excavated and loaded into trucks. AEP Texas also fails to include two separate additives required by Means for such a loading operation. First, the piled common earth upon which the Means costs are developed is easier to excavate than piled loose rock. Means recognizes this by

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[48] BNSF.RP.WP.III.F-0331 to 0340.

providing additives and deductions to the common earth excavation cost for excavating materials that are more difficult and less difficult to excavate than common earth. Specifically, Means provides an additive to common earth excavation for "heavy soil or stiff clay" of 60 percent, an additive for "wet excavation with clamshell or dragline" of 100 percent and a deduction for "soft soil or sand" of 15 percent.[49] The ripped loose rock that will be loaded by the hydraulic excavator is more difficult to excavate than heavy soil or stiff clay, but is not as difficult as wet excavation with a clamshell or dragline, thus qualifying for the 60 percent additive recommended by Means. However, the BNSF's Engineering Consultants have not applied this additive to the loose rock excavation costs.

Second, Means clearly and unconditionally requires an additive of 15 percent for loading excavated materials onto trucks. The excavated loose rock will be placed in trucks for haulage to either embankment along the TNR route or to a waste pit. AEP Texas does not explain why the 15 percent additive for loading bulk excavated materials onto trucks was not included in its unit costs. This modest additive captures the extra time required to evenly distribute the load in the hauler bin for safe transport and downtime associated with the trucks positioning themselves for loading. BNSF's Engineering Consultants have properly included the 15 percent additive in their restatement of loose rock excavation costs.

In determining the cost of hauling the excavated loose rock materials for embankment purposes along the TNR roadbed or to a waste pit, AEP Texas selects an off-highway hauler with 42 CY capacity. BNSF's Engineering Consultants accept this equipment and cost.

Once the excavated materials have been hauled for placement in embankment or dumped as waste, the dumped material must be spread and shaped by a bulldozer. AEP Texas recognizes

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[49] BNSF.RP.WP.III.F-0327.

that the material dumped from the off-road hauler to be wasted must be spread by a bulldozer. AEP Texas however provides no explanation of why this cost would be applicable to materials dumped from haulers for waste, but would not be applicable to materials dumped from the same hauling vehicles for use as embankment.[50] In fact, because materials dumped from haulers are not evenly distributed, a bulldozer is necessary in both circumstances. BNSF's Engineering Consultants have added the necessary cost for spreading dumped material by dozer with no compaction to the cost of material used as embankment. BNSF Engineering Consultants use a cost for loose rock compaction based on the cost of a sheepsfoot, similar to their treatment of common compaction costs discussed above.

The table below summarizes the loose rock excavation costs developed by BNSF.

Table III.F.2-6
BNSF's Development of Loose Rock Excavation

Means Unit	Embankment	Waste	Weighted
Avg. of Ripping Shale and Trap Rock	$3.27	$3.27	
Dozing ripped material, 460 HP, 100' Haul	$1.49	$1.49	
Excavating Bulk Bank Measure, Common earth piled, Backhoe, hydraulic, crawler mounted 3CY capacity + 15% for loading	$2.70	$2.70	
Off highway hauler, 42 CY rear/bottom dump, ½ mile	$2.07	$2.07	
Spread dumped material by dozer-no compaction	$1.38	$1.38	
Compaction via Sheepsfoot	$0.86		

[50] In fact, AEP Texas' failure to include a cost for spreading dumped materials in its costs for materials used in embankment produces the counterintuitive result of higher loose rock costs for excavation that will be wasted than for excavation that will be used as embankment.

Means Unit	Embankment	Waste	Weighted
TOTAL	$11.77	$10.91	
Embankment/Waste Split	70%	30%	
Weighted Cost			$11.52

Source: BNSF Reply electronic workpaper "III F 2 TNR Grading.xls," worksheet "IIIF Unit Costs."

(c) Solid Rock Excavation

As it does with other components of earthwork, AEP Texas builds its unit cost per cubic yard for excavating solid rock by starting with prices from the Means Handbook. Again, AEP Texas has not provided any explanation of the process it used to determine the type of blasting that would be required to remove the solid rock from its beds, nor does it provide any explanation for the equipment it selects for loading, transporting, dumping and compacting solid rock. The only justification it offers is that its equipment and blasting selections, and therefore its unit costs, are consistent with those approved by the Board in previous stand-alone cases.

It appears from its workpapers that AEP Texas used the Means Handbook to find the lowest unit costs for the solid rock components and selected them without any regard for the amount or type of rock that will be encountered during the construction of the TNR. BNSF reviewed AEP Texas' selections and concluded that for most of the solid rock excavation components, AEP Texas chose the wrong component. AEP Texas's unit cost development of solid rock excavation is summarized in the following table.

Table III.F.2-7
AEP Texas's Unit Cost Development of Solid Rock Excavation

Means Unit	Embankment	Waste	Weighted
Drilling and blasting rock over 1500 CY	$7.10	$7.10	
Bulk drilling and blasting	$5.00	$5.00	
Avg Drilling and blasting	$6.05	$6.05	
Excavate and load blasted rock, 3CY power shovel	$1.32	$1.32	
Off Highway hauler 42 CY rear bottom dump 1/2 mile	$2.07	$2.07	

Means Unit	Embankment	Waste	Weighted
round trip			
Spread dumped material by dozer-no compaction		$1.38	
Avg. Compacting	$0.67		
TOTAL	$10.11	$10.82	
Embankment/Waste Split	70.0%	30.0%	
Weighted Cost			$10.32

Source: AEP Texas Opening electronic workpaper, "TNR EARTHWORK.xls," worksheet "SOLID ROCK"

The first problem is AEP Texas's selections from Means for blasting costs. AEP Texas selects the unit price for "drilling and blasting only, rock, open face, over 1500 CY" and the price for "bulk drilling and blasting, can vary greatly, average" and then, without explanation, simply averages the two blasting prices. AEP Texas provides no explanation of why or how it determined the two unit prices it selected would be applicable to the TNR construction and, indeed, they are not. Both unit costs selected reflect the economies attributable to large scale blasting operations. In fact, the bulk drilling and blasting average cost selected by AEP Texas typically relates to bulk blasting in quarry operations. The economies that produce these lower average unit costs will not be available to the builders of the TNR. The amount of solid rock along the route – even before considering AEP Texas's solid rock unit cost adjustment[51] – is not great enough to generate such economies. Based on AEP Texas' earthwork calculations, earthwork excavation on the TNR will involve 4.8 million cubic yards spread over its 1,168-plus

[51] As explained in more detail below, AEP Texas arbitrarily reduces the unit cost of solid rock excavation by asserting that half of the materials that were classified by the ICC valuation engineers as solid rock would be rippable by modern earthmoving equipment. On the basis of that assertion only, the unit cost applied by AEP Texas to the solid rock quantities developed from the Engineering Report data is an average of the solid rock and loose rock unit costs it develops from Means.

route miles. This results in an average of approximately 4,116 cubic yards per mile.[52] At these volumes, the economies attributable to the bulk drilling and blasting cost in Means could never be achieved and the use of that unit cost here must be rejected.

The appropriate blasting unit cost for the TNR is one that recognizes that while certain economies might be available in blasting larger beds of solid rock, most of the blasting that will occur will be less than "bulk". BNSF's Engineering Consultants corrected AEP Texas' blasting price to conservatively reflect only the price of "drilling and blasting only, rock, open face, over 1500 CY."

Blasting of solid rock produces rubble of all shapes and dimensions, ranging from dust and pebble size fragments to large boulders. Large boulders, which are depicted in photographs of a recent construction blasting site in Blackhawk, Colorado, included in BNSF's workpapers,[53] present a number of construction related issues. First, standard engineering practice is to not permit rock greater than 24 inches in size to be used as fill. This practice is confirmed by the WRPI construction contract documents. Section 204 – Embankment construction instructs:

> When rock, cemented boulders, and other embankment materials are excavated at approximately the same time, the rock shall be incorporated into the outer portion of the embankment and the other material shall be incorporated into the center of the fill. Care shall be utilized during the placement of the fill to ensure that those materials containing rock also contain sufficient finer material to fill the voids and allow uniform compaction. The rocky fill material shall be placed in a manner that insures the rocks are uniformly distributed. No rocks larger than 24 inches shall be allowed in the fill. Rocks which hinder uniform compaction of the compactable materials shall either be reduced in size as necessary to obtain the desired compaction or shall be wasted. No rock

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[52] Taking into account AEP Texas' assertion that half of what was classified as solid rock would be rippable by modern earthwork equipment would reduce the amount of material requiring blasting to only 2,058 cubic yards per mile.

[53] BNSF.RP.WP.III.F-0352 to 0354.

> fragments larger than 4 inches in their greatest dimension will be permitted in the upper 6 inches of the subgrade.

WRPI Construction Specifications Section 204.03.4.[54]

Second, large boulders cannot be handled efficiently by mechanical earthmoving equipment. Again, the WRPI construction contract documents are instructive. In Section 213 – Blasting, the WRPI contract documents state:

> Blasting shall be in accordance with these specifications and the requirements of the General Conditions. Blasting shall be used in cut sections only as necessary to loosen rock or cemented material and to reduce those materials to sizes that can be handled by mechanical earth moving equipment.

WRPI Construction Specifications Section 213.01.1.[55]

In addition, the Means unit costs under "Drilling and Blasting" recognize that there is an added cost associated with handling large boulders as the following examples demonstrate:

02315-340-5000	Excavate and load boulders, less than 0.5 CY	$11.65
02315-340-5020	Excavate and load boulders, 0.5 CY to 1 CY	$14.35

These higher costs reflect the fact that production rates for the excavation of blasted rock rubble are considerably lower than those achievable in bulk loading operations like quarries. Indeed, both of these costs are multiples of the $1.32 per CY cost used by AEP Texas to excavate and load blasted rock with a 3CY power shovel. The unit price selected by AEP Texas clearly assumes that the material that is left after drilling and blasting the solid rock is a suitable size for fill or waste and that the material will be small enough to be easily excavated and placed into the trucks. Thus AEP Texas basically ignores the cost of the additional effort required to deal with boulders.

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[54] BNSF.RP.WP.III.F-0355 to 0357.

[55] BNSF.RP.WP.III.F-0358.

There are two ways to correct this deficiency in AEP Texas's excavation unit costs. The first is simply to substitute the higher Means cost for excavating boulders in place of the excavation cost used by AEP Texas. The second is to add costs to reduce those boulders that are needed for embankment to a manageable size that will allow the proper excavation equipment to achieve its rated production capacity. To minimize the amount of dispute between the parties, BNSF's Engineering Consultants have decided to accept AEP Texas's cost to excavate blasted rock with a 3CY shovel, but to include the added cost of reducing blasted rock to a manageable size.

Based on their observations of the blasting job in Blackhawk, Colorado, BNSF's Engineering Consultants determined that 40 percent of the blasted rock rubble meets the standard maximum of 24 inches criteria and can be used without further processing as embankment. They assumed that 30 percent of the blasted rubble exceeds the 24 inch maximum and will require additional drilling and blasting to meet the 24 inch maximum standard. For the remaining 30 percent of the blasted rock that is too large for use as fill and will be wasted, they assumed that one-sixth of the materials (approximately five percent of all blasted materials) would be too large to be transported by truck and would require additional drilling and blasting. Because all of this waste material is oversized, the 3CY shovel assumed to excavate and load blasted rock materials for use as embankment will not be able to handle these larger pieces. As such, the $1.32 unit cost cannot apply. For these materials, the following Means cost is applicable:

02315-340-2800	Boulders under 1/2 CY, loaded on truck, no hauling	$12.35

BNSF's assumptions are summarized in the following table.

Table III.F.2-8
BNSF's Assumptions For Solid Rock Excavation

Breakdown of Blasted Rock Rubble	Embankment	Waste	Combined
Additional Blasting			
Rubble suitable for embankment without further blasting	40.0%		40.0%
Boulders, drilled and blasted	30.0%	5.0%	35.0%
Boulders wasted without further blasting		25.0%	25.0%
TOTAL	70.0%	30.0%	100.0%
Applicable Excavation			
Excavate and load blasted rock, 3CY shovel	70.0%		70.0%
Boulders under 1/2 CY, loaded on truck, no hauling		30.0%	30.0%
TOTAL	70.0%	30.0%	100.0%

Source: BNSF Reply electronic workpaper "III F TNR Grading.xls," worksheet "IIIF UNIT COSTS."

For boulders that require additional drilling and blasting, BNSF's Engineering Consultants selected the following cost from Means:

02315-340-2900 Boulders, drilled, blasted $17.80

AEP Texas assumes the same equipment that would haul, spread and compact the loose rock excavation will be used for solid rock excavation. BNSF's Engineering Consultants thus make the same corrections to AEP Texas's solid rock hauling and spreading assumptions that are described above under loose rock.

The table below summarizes BNSF's restatement of solid rock excavation costs.

Table III.F.2-9
BNSF's Development of Solid Rock Excavation

Means Unit	Embankment	Waste	Weighted
Drilling and blasting rock over 1500 CY	$7.10	$7.10	
Dozing ripped material, 300 HP, 100' Haul	$1.49	$1.49	
Boulders drilled, blasted	$7.63	$2.97	
Excavate and load blasted rock, 3CY shovel	$1.32		
Boulders under ½ CY, loaded on truck, no hauling		$12.35	
42 CY rear or bottom dump, ½ mile haul	$2.07	$2.07	
Spread dumped material, by dozer, no compaction	$1.38	$1.38	
Sheepsfoot compaction	$0.86		
TOTAL	$21.85	$27.36	
Embankment/Waster Percentage	70%	30%	
Weighted			$23.50

Source: BNSF Reply electronic workpaper "III F TNR Grading.xls," worksheet "IIIF UNIT COSTS."

AEP Texas does not apply the solid rock unit price it develops from Means to the TNR solid rock quantities estimated from the engineering reports. Instead, AEP Texas asserts that because modern earthmoving equipment is capable of ripping materials that were classified by the ICC Valuation Engineers as solid rock, the applicable unit cost should be the average of the Means developed cost for loose rock and solid rock. BNSF's Engineering Consultants agree that modern day equipment is more capable than the vintage of equipment available at the time the engineering valuations were conducted. Because they did not conduct a detailed special study of the type of rock that would be encountered during the construction of the TNR, they accept AEP Texas's assertion. The weighted unit cost applied by BNSF's Engineering Consultants to the TNR solid rock quantities is $17.51 per cubic yard.

(d) Borrow

The table below sets forth AEP Texas's development of borrow costs from Means.

Table III.F.2-10
AEP Texas's Development of Borrow Costs From Means

Means Unit	Embankment
Front end loader - wheel mounted 5 CY bucket	$7.65
Hauling 20 CY dump trailer - 1 mile round trip	$2.77
Compacting	$0.67
TOTAL	$11.09

Source: AEP Texas TNR_EARTHWORK.xls" worksheet "BORROW."

BNSF's Engineering Consultants accept AEP Texas's development of borrow costs with one exception. As explained above under loose rock excavation, materials dumped for use as embankment require a bulldozer to spread the dumped materials in accordance with the engineering specifications for embankment. BNSF's Engineering Consultants have thus added the cost of a dozer to spread the dumped borrow material in the embankment. The table below summarizes BNSF's borrow cost.

Table III.F.2-11
BNSF's Restatement of Borrow Costs

Means Unit	Embankment
Front end loader - wheel mounted 5 CY bucket	$7.65
Hauling 20 CY dump trailer - 1 mile round trip	$2.77
Spread dumped material by dozer-no compaction	$1.38
Compacting	$0.86
TOTAL	$12.66

Source: BNSF Reply electronic workpaper "III F TNR Grading.xls," worksheet "IIIF UNIT COSTS."

(e) Fine Grading

AEP Texas's earthwork unit cost estimates fail to include the cost of fine grading.[56] Fine grading using specialized equipment is necessary to ensure that all cuts, fills and ditches are left in a neatly trimmed condition to the specified widths, elevations and particularly to the

[56] AREMA section 1.3.5.21 at BNSF.RP.WP.III.F-0359. See also BNSF Specifications for Excavation and Embankments Section 03200, subsection 3.7. BNSF.RP.WP.III.F-0360.

appropriate slopes. Fine grading requires specialized equipment to eliminate ruts or depressions on the surface of the subgrade that cause water pockets, and is a vital step in avoiding future drainage problems and to ensure that the roadbed elevations are consistent with the construction specifications. Because the TNR roadbed will be traversed by heavy off-highway haulers transporting excavated materials for use as embankment, these ruts and depression will likely be substantial.

Fine grading is a standard requirement for railroad roadbed preparation. For example, the WRPI specifications state that "[p]rior to placing any sub-ballast materials, the subgrade shall be prepared as specified in Section 208, tested, and accepted by the Engineer. Any ruts, depressions, or soft spots shall be corrected with like subgrade materials and brought to the cross section and grades detailed on the plans."[57] Comparable language is present in BNSF's construction contracts.

AEP Texas's unit costs for earthwork taken from RS Means do not include the fine grading of the subgrade, before subballast placement, and the finishing of the slopes.[58]

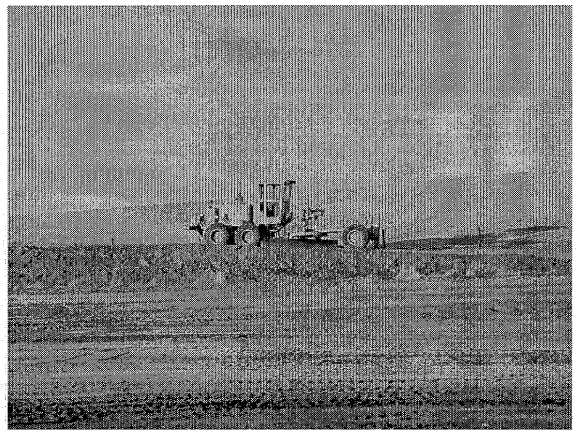
RS Means develops a fine grading crew (B-11L) that includes a motorgrader with operator and one laborer. This crew was used as a base, and then modified by adding a water truck with driver, steel wheel roller with operator, a Gradall (ditching machine) with operator and one paddle pan with operator. The daily rates supplied by Means were applied for a total daily rate of $5,076.40 per day. A larger motorgrader was substituted for the smaller version supplied by Means. Production was also increased from 3500 square yards per day to 5000

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[57] BNSF.RP.WP.III.F-0360A.

[58] In typical grading contracts, fine grading is included in the earthwork costs. The Means Handbook costs these activities separately. BNSF.RP.WP.III.F-0363.

square yards per day. The final cost for fine grading came to $1.02 per square yard (1Q2000; no indexing applied)



Motorgrader

BNSF's Engineering Consultants have adjusted AEP Texas's earthwork unit costs to include these costs. Details of their calculations are included in BNSF's electronic workpapers "Fine Grading Crew.xls."[59]

c. Culverts

A culvert is "an enclosed channel serving as a continuation of and a substitute for an open stream where that stream meets an artificial barrier such as a roadway, embankment or levee."[60] Culverts are used to control surface drainage, primarily to prevent standing water on the surface of the roadbed. Various factors are involved in designing a culvert, but the objective is to design an economical structure to handle the flow of water along with any debris with minimum

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[59] BNSF.RP.WP.III.F-0361 to 0362 has an additional description of fine grading equipment requirements.

[60] AMERICAN IRON AND STEEL INSTITUTE, HANDBOOK OF STEEL DRAINAGE & HIGHWAY CONSTRUCTION PRODUCTS, 301 (1993). BNSF.RP.WP.III.F-0366 to 0369.

damage to the railway or adjacent property. AEP Texas assumed in its Opening Narrative that there would be two different types of culverts on the TNR—corrugated metal pipe (CMP) culverts and reinforced concrete box (RCB) culverts. AEP Texas Opening Nar. at III-F-45 to 46. Overall, AEP Texas included $29.7 million for TNR culvert costs.

BNSF's Engineering Consultants agree with the types of culverts selected by AEP Texas, but disagree with both AEP Texas' inventory of TNR culverts and its development of culvert unit costs and total costs. Specifically, AEP Texas' evidence suffers from four types of errors: (1) calculation errors; (2) inventory errors; (3) installation methodology errors; and (4) unit cost errors.

(1) Calculation Errors

AEP Texas made two culvert calculation errors that substantially effect its total unit costs. First, AEP Texas, in determining the total costs for culverts, inexplicably included the costs for RCB culverts ($11.7 million) twice.[61] AEP Texas' corrected culvert costs of $18 million are summarized below in Table III.F.2-16.

Table III.F.2-12
AEP Texas' Culvert Costs After Adjusting for Calculation Errors

Type	Length	Cost
Standard		
CMP	118,996 LF	$4.3 million
RCB	23,766 LF	$11.7 million
Subtotal	142,762 LF	$16.0 million
Exc, Bedding, Compaction, Rip Rap		
CMP and RCB		$2.0 million
Total	142,762 LF	$18.0 million

Source: AEP Texas First Errata electronic workpaper "TNRR Culvert.xls," and "IIIFTOTAL.xls."

[61] AEP Texas Second Errata electronic workpaper, "IIIFTOTAL.xls," worksheet "Culvert Costs," cell L68.

AEP Texas also made a substantial and more complicated calculation error in adjusting the length of existing culverts to reflect the additional number of TNR tracks the culvert would pass under. AEP Texas accounted for the mainline track length of the culvert with a 15-foot conversion factor in their calculations.[62] However, because they also added in the actual mainline culvert length to the total adjusted length, every culvert has been overestimated by 15 feet. BNSF Engineering Consulting have removed this additional length from their culvert calculations.

(2) Inventory Errors

Based on their review of the culvert inventory produced by BNSF in discovery and an analysis of the proposed TNR route, BNSF Engineering Consultants have determined that 481 culverts needed to be added to the TNR mainline culvert inventory. Specifically, AEP Texas inexplicably neglected to include 481 culverts located along 217 miles of the TNR—from milepost 0.0 to milepost 53.74 and from milepost 65.8 to 75.0 on the Orin line; from milepost 363.25 to milepost 367.66, and at milepost 443.89 on the Butte line; from milepost 52.0 to milepost 78.75 on the Pikes Peak Subdivision; from milepost 0.99 to milepost 131.6 on the Boise City line; and two culverts on the Sand Hills subdivision. BNSF Engineering Consultants have included all these culverts in their restatement of the TNR's culvert inventory.[63] AEP Texas also included culverts from the BNSF inventory that were located on lines not being replicated by the TNR. BNSF removed those culverts from its restatement.

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[62] AEP Texas' 15-foot conversion factor appears in column P, "Final Adjusted length of pipe" in AEP Texas First Errata electronic workpaper "TNRR Culverts.xls."

[63] BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "lengths & sizes of culverts."

AEP Texas also neglected to construct most of the 44 approach culverts that are found along the TNR. They did include three of these approach culverts because the culverts were included in the BNSF culvert inventory that was supplied to AEP Texas in discovery. AEP Texas treated them as standard culverts placed under tracks and therefore adjusted them for the number of TNR tracks at that location, as described above. Approach culverts do not need to be adjusted for multiple tracks because they do not run under the tracks, but alongside them. BNSF has removed those approach culverts from AEP Texas' inventory of standard culverts and has included them with the other 41 approach culverts identified on the BNSF track charts for the Campbell, Orin and Reno Subdivisions, costing them at their real world, unadjusted length. Although AEP Texas acknowledged that the BNSF track charts contained culverts not present on the culvert inventory, it defends its omission of these additional approach culverts by stating that it relied solely on the more comprehensive BNSF inventory. AEP Texas Opening Nar. at III-F-48. That rationale is inconsistent with AEP Texas' reliance on track charts for other items, most notably lateral drainage. AEP Texas constructed the lateral drainage that is found on the track charts on the Campbell subdivision. Approach culverts serve a purpose very similar to lateral drainage. The lateral drainage and approach culverts are both shown with similar dashed lines parallel to the mainline on the track charts. AEP Texas' decision to construct the one type of drainage identified on the track charts, but not the other makes no sense. Therefore in its restatement of culvert costs, BNSF has included 44 approach culverts, in addition to the 481 standard culverts discussed above.

In its Opening Narrative, AEP Texas claimed to "replicate the culvert areas used by BNSF on the lines being replicated." AEP Texas Opening Nar. III-F-44 to 45. However, they made adjustments from box culverts to pipe culverts that result in improper reductions in the area

of a culvert. More specifically, they built box culverts ranging from 1' x 1.5' to 4' x 4.3' with culverts ranging from 18 inches to 30 inches.[64] By way of example, AEP Texas replaced one 4' x 4.3' box culvert with a 30 inch CMP—*i.e.*, a box culvert with and area of 17.2 SF was replaced by a CMP of area 4.9 SF. Clearly this is inappropriate. AEP Texas made this sort of erroneous adjustment 96 times in its TNR inventory. In its restatement of the TNR culvert inventory, BNSF substituted CMP culverts with an area more closely approximating that of the box culvert it is replacing.[65]

Details of the BNSF Engineering Consultants' culvert inventory additions are set forth in the BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "lengths & sizes of culverts."

(3) Installation: Methodology and Quantity Errors

While AEP Texas included costs for excavation, rip rap, bedding, and compaction for the culverts that they constructed on the TNR, BNSF Consulting Engineers disagree with their installation methodology and development of quantities of installation materials for several reasons. A discussion of BNSF Engineering Consultants' reasons, along with a description of BNSF's own installation approach and methodology for developing those quantities, follows.

(a) RCB Culvert Installation

Excavation. Installation of RCB culverts is generally by open embankment construction, and is closely followed by grading crews performing a portion of the backfill and compaction over each RCB culvert. However, the majority of excavation and backfill work is performed by

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[64] AEP Texas First Errata electronic workpaper "TNRR Culverts.xls," worksheet "lengths & sizes of culverts."

[65] BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "lengths and sizes of culverts."

the culvert crew. This is because the excavating and backfilling at the point of installation facilitates the process by protecting the work from heavy grading equipment and wash-outs caused by rain during the construction period. The excavation work undertaken by the culvert crew may include the removal of unsuitable foundation materials, channel straightening, diversion channels, using cofferdams, excavation for placement of the bedding materials at the proper elevation, and establishing proper grade. Because these operations are not performed by the grading crews, the costs associated with such work is not captured in the grading investment totals. BNSF Engineering Consultants have determined that AEP Texas did not sufficiently account for excavation activities accompanying box culvert installation.

AEP Texas' excavation formula only provided for an excavation depth of four inches. AEP Texas Opening Nar. at III-F-46. However, as AEP Texas' own workpapers show, the floors of the pre-cast reinforced box culverts are at least ten inches thick.[66] Unless AEP Texas plans on raising the flow lines and pool elevations at all RCB culvert locations, the minimum excavation required, before excavating for the bedding, is ten inches. This quantity is required in addition to the excavation required to provide for the appropriate 12 inches of bedding depth underneath the RCB culvert, as discussed below. This results in a minimum excavation depth of 22 inches at all RCB culvert locations, which BNSF Engineering Consultants have provided for in their excavation quantities.[67]

BNSF Engineering Consultants also do not accept AEP Texas' excavation formula that assumes an excavation width equal to the diameter of the culvert plus two feet, which allows one

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[66] AEP Texas Opening Workpapers p. 10703.

[67] BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "bedding & rip rap costs."

foot of clearance on each side of the RCB culvert.[68] AEP Texas Opening Nar. at III-F-46. This one-foot clearance does not provide enough room for necessary compaction of the backfill on each side of the culvert. BNSF witnesses provide for two feet of clearance to facilitate backfilling and compaction—this extra foot is particularly necessary on account of AEP Texas' use of a 24-inch wide vibratory roller for compaction, which BNSF accepts.

BNSF Consulting Engineers have applied the following more appropriate excavation formula for RCB culverts—an excavation length equal to the length of the culvert, an excavation width equal to the diameter (width) of the culvert plus four feet, and an excavation depth of 22 inches.

Bedding and Compaction. BNSF Engineering Consultants reject AEP Texas' specifications for bedding, and instead include in their excavation formula the 12 inches of bedding underneath the box culvert called for in AREMA standards.[69] They have provided compaction for this quantity of bedding in their restatement of culvert costs.[70]

Backfill and Compaction. AEP Texas did not include any cost for backfilling RCB culverts above the bedding line, which BNSF Engineering Consultants disagree with. As described above, much of the excavation and backfill work around culverts is specialized and is performed by the culvert crew, rather than the grading crew. The backfill work of culvert crews may include compacting select fill material to the haunch of the pipe (for CMP culverts only), construction of cross-over pads for protection from heavy equipment, and controlled backfilling

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[68] AEP Texas First Errata electronic workpaper "TNRR Culvert.xls," worksheet "bedding & rip rap costs."

[69] AREMA Chapter 8, Part 16 Concrete Box Culverts, Section 16.7.5, at BNSF.RP.WP.III.F-0370.

[70] BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "bedding & riprap;" BNSF.RP.WP.III.F-0371 to 0373.

to maintain balanced loading on the culvert at all times. These costs are not captured under the category of standard grading and should be accounted for in culvert costs.[71]

BNSF Consulting Engineers provided for backfilling to the top of RCB culverts by the culvert crews using select granular fill and controlled compaction methods. This assures balanced loading on the culvert at all times during backfilling, seals the bedding material and protects the culvert from wash-out, and helps protect the culvert from heavy grading equipment. While it is unrealistic to assume that a ready source of well-graded, granular material will be naturally available at every culvert site, BNSF does not challenge AEP Texas' assumption that it would be able to locally obtain material and no costs for its procurement have been added.

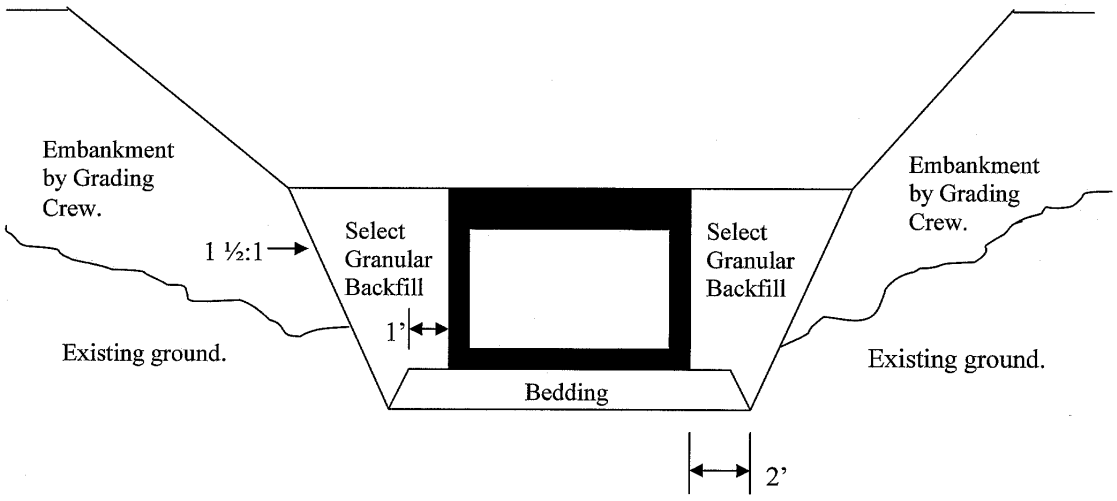
In the real world, an investigation of the grades at each RCB culvert site would be necessary to accurately determine the backfill section for each culvert. Such investigation is impractical for purposes of this case. As such, BNSF assumes that the backfill section on each side of a RCB culvert is trapezoidal, shown below in Figure III.F.2-1.[72]

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[71] *See* AREMA Chapter 8, Part 16 Concrete Box Culverts, Sections 16.2.2, 16.2.3, 16.5.6, and 16.7.5, and AREMA Chapter 1, Part 4 Culverts, Sections 4.12.2, 4.12.3, 4.12.4, 4.12.9 and 4.12.10 at BNSF.RP.WP.III.F-0374 to 0380.

[72] This trapezoidal section is defined by a line extending from the base of the RCB culvert for a distance of two feet, vertically and horizontally perpendicular to the sides. From thence, the line proceeds up and away from the base at a 1.5:1 slope to the top of RCB culvert elevation. This area, each side, is defined by calculation (L1 + L2)/2 * RCB height. BNSF's backfill quantity formula is: [((2' + RCB height' * 1.5) +2)/2 * RCB height'] * 2 * 1 FT = CF/LF.

Figure III.F.2-1
BNSF RCB Culvert Design



(b) CMP Culvert Installation

Excavation. As with RCB culvert installation, culvert crews perform a majority of the excavation and backfilling at culvert sites, and the grading crew performs minimal final grading. BNSF Engineering Consultants account for these culvert operations that are not performed by the grading crews, and therefore not included in the grading costs. For CMP culverts, BNSF witnesses apply the same excavation formula that was used for RCB culverts.[73]

Consistent with BNSF's RCB culverts specifications, the width of excavation for CMP culverts is extended to two feet past the side of the culvert because the backfill beneath the haunches of the pipe must be compacted by laborers and as the extra room is required for proper operation of the hand tampers.

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[73] BNSF Reply electronic workpaper ""III F 2 Culverts.xls," worksheet "bedding & riprap."

Bedding and Compaction. BNSF Engineering Consultants have provided for an excavation depth of 12 inches, consistent with AREMA standards.[74] In its Opening Narrative, AEP Texas stated: "[T]he amount of compaction is equal to the same volume excavated, minus the volume of the culvert." AEP Texas Opening Nar. at III-F-46. This formula for compaction is inappropriate, however. AEP Texas only excavated for the bedding *beneath* the pipe with CMP and RCB culverts, and correctly replaced the identical quantity of bedding. Therefore, contrary to AEP Texas' Narrative, the volume of the pipe or box culvert does not need to be deducted from the bedding compaction quantity. In actually developing costs, AEP Texas did not deduct the volume of the culvert from the RCB culvert bedding compaction quantities, but did deduct the pipe volume from the CMP bedding compaction quantities. BNSF Engineering Consultants correct this error in their restatement.[75]

Backfill and Compaction. As with RCB culverts, AEP Texas did not include any cost for backfilling CMP culverts above the bedding line. BNSF does not accept this exclusion, and applies the same general backfill and compaction formulas for both RCB and CMP culverts. BNSF Engineering Consultants again assume that the backfill section on each side of a CMP culvert is trapezoidal, as shown below in Figure III.F.2-2.[76]

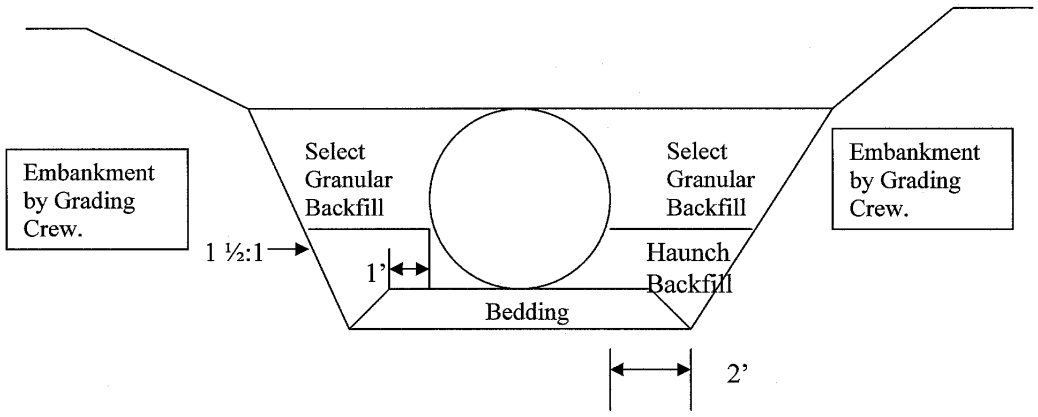
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[74] *See* AREMA Chapter 1, Part 4 Culverts, Sections 4.12.2, 4.12.3, 4.12.4, 4.12.9 and 4.12.10 at BNSF.RP.WP.III.F.-0376 to 0380; BNSF Engineering Consultants applied the following bedding quantity formula for CMP culverts: CMP length * [CMP diameter + 4 feet] * 12 inches.

[75] BNSF Reply electronic workpaper "III F 2 Culverts.xls," worksheet "bedding & riprap."

[76] This trapezoidal section is defined by a level tangent line at the base of the CMP that extends for a distance of two feet past each side of the pipe, or the pipe diameter (FT) plus four feet. From there, the line proceeds up and away from the base at a 1.5:1 slope to the top of CMP elevation. This area is defined by calculation: (L1 + L2)/2 * CMP height – CMP End Area. BNSF's backfill quantity formula is: [(CMP Diameter (FT) + 4')+(CMP Diameter (FT)* 3 +4)/2 * CMP Diameter (FT)] – (PI* Diameter (FT)/2)^2 = CF/LF.

Figure III.F.2-2
BNSF CMP Culvert Design



(4) Unit Cost Errors

AEP Texas developed material unit costs for CMP culverts from a quote from Lane Enterprises, Inc., and the unit cost for RCB culverts is taken from quotes from Hanson Pipe & Products and from South Dakota Concrete. In developing its unit cost for CMP and RCB culverts, AEP Texas included costs for excavation, bedding, compaction and rip rap from RS Means, but, despite its statement to the contrary, did not include costs for the actual installation of the CMP and RCB culverts.[77] AEP Texas also applied a RS Means location factor to their quotes from specific suppliers, which is inappropriate. The use of a location factor is appropriate where a party uses a universal cost estimating tool like RS Means, which does not take into consideration the geographic location of the supplier; however, where a cost is developed from a quote by a supplier in a specific locale in response to a request, altering that price on the basis of geographic variation is not appropriate. The cost of an item that is purchased from a vendor in

[77] AEP Texas claims that it has included installation from RS Means on page III-F-45 of its Opening Narrative, but its statement of culvert costs does not include installation of the culverts themselves. AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "Culvert Costs."

Rapid City, South Dakota does not need to be adjusted to recreate the price differential that results from purchasing that item there as opposed to another city. Additionally, AEP Texas, in converting costs from non-2000 costs to 2000, took the historical factor and the location factor and erroneously averaged the two before applying them to its unit costs. The location factor and the historic factor are two independent factors that are applied separately to the unit cost. BNSF Engineering Consultants have applied each factor independently where each was required.

In their restatement of AEP Texas' culvert investment, BNSF Engineering Consultants have added installation costs based on 2000 RS Means unit costs for pipe installation (which they have adjusted for location) to AEP Texas' CMP and RCB culvert costs. Including the RS Means location factor is appropriate in this instance as it is being applied to a geographically-generic RS Means unit cost rather than to a supplier cost. BNSF Engineering Consultants have removed the RS Means adjustment factor on items where the unit costs AEP Texas used were provided by actual suppliers. Details of these calculations are set forth in BNSF Reply workpapers.[78]

BNSF Engineering Consultants accept AEP Texas' cost for CMP culvert transportation. The quote AEP Texas obtained from Lane Enterprises expressly includes the delivered costs from Pennsylvania to Gillette, Wyoming or Vernon, Texas, which BNSF Engineering Consultants conservatively assume would cover delivery to points in between. However, the quotes from Hanson Pipe & Products Inc. and South Dakota Concrete Products Company for RCB culverts only include transportation from Grand Prairie, Texas, to Vernon, Texas, or from Rapid City, South Dakota, to Gillette, Wyoming, respectively. Since AEP Texas plans on

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[78] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Culvert Cost;" BNSF.RP.WP.III.F-0372 to 0373.

multiple grading packages to complete the aggressive construction in the time frame presented in Opening, RCB culverts will have to be delivered to other railheads that are not covered by the Hanson and South Dakota Concrete quotes. As described in greater detail in Section III.F.3.i, BNSF Engineering Consultants determined the number of railheads required to meet AEP Texas' construction schedule and computed the additional transportation costs to deliver the RCB culverts to these additional railheads along the TNR route.[79]

BNSF Engineering Consultants accept AEP Texas' unit costs for rip rap, compaction and bedding. However, they do not accept the equipment used for excavating the trench for bedding. AEP Texas uses a 3CY shovel cost which is taken from the bulk excavation section of RS Means, which is inappropriate for the more precise digging required to craft the trench that is required for bedding, as noted above. BNSF uses a ¾ CY hydraulic backhoe from the trench excavation section for RS Means, which is specifically suited to the type of excavation required before culvert installation.[80] Additionally, AEP Texas developed a cost for compaction which included a backfill material cost, but applies that to the bedding quantity, which overstates costs because the bedding costs are quantified separately. As a result, BNSF has added compaction of bedding material to the unit cost for bedding material and uses the compaction unit cost that AEP Texas developed for the restated backfill material unit cost.

BNSF's calculations show a system-wide requirement of 161,245 LF of standard and approach culverts for a total cost of $34.7 million. The table below compares BNSF's total cost of culverts with that of AEP Texas, after the double count of RCB culvert costs is removed. The details of the calculations and unit costs, along with an inventory of the culverts on the TNR, are

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[79] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Culvert Cost."

[80] BNSF.RP.WP.III.F-0381.

contained in BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Culvert Costs."

Table III.F.2-13
Comparison Of BNSF's Estimate Of Culvert Cost With AEP Texas' Estimate In Opening Evidence

	AEP Texas	BNSF	Difference
Total Feet	142,762 LF	161,245 LF	18,483 LF
Total Cost (Millions)			
RC Box Culverts	$4.3 million	$14.0 million	$9.7 million
CMP	$11.7 million	$9.6 million	-$2.1 million
Total Culvert Cost	**$29.7 million** ($16.0 million after correcting for RCB double count)	**$34.7 million**	**$5.0 million** ($18.7 million)
Excavation, Bedding, Compaction, Rip Rap	$2.0 million	$10.9 million	$8.9 million
TOTAL COST	**$31.7 million** ($18 million, corrected)	**$45.6 million**	**$13.9 million** ($27.6 million, corrected)

Source: AEP Texas First Errata electronic workpaper "TNRR Culvert.xls;" BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Culvert Costs."

d. Other

(1) Drainage Ditches

AEP Texas used trapezoidal drainage ditches that are two feet wide and two feet deep, based on the Board's decisions in *Duke/NS, Carolina, Duke/CSX, WPL* and *TMPA*. It also claimed, "In many cases, this size ditch is larger than the existing ditches on the antecedent BNSF lines." AEP Texas Opening Nar. at III-F-49. While the Board has accepted the use of a drainage ditch with a two-foot bottom width as feasible in prior proceedings, it is out of line with AREMA standards. The AREMA standard for drainage notes that ditches may be either trapezoidal or V-shaped. If a trapezoidal ditch is used, the AREMA standard specifies a

minimum bottom width of three feet.[81] At the time that the BNSF lines were constructed, they generally were constructed with V-shaped ditches. Thus AEP Texas' comparison of the trapezoidal ditches it proposes against BNSF's historical and actual use is inaccurate and irrelevant. Because some railroads have constructed track segments using ditches (assumedly trapezoidal) with bottom widths of only two feet, the Board accepted that specification in prior proceedings as feasible. While use of such narrow ditches might be feasible in limited areas where surface drainage is not a critical problem, the use of the narrower ditches along the entire length of a 1,100 mile railroad is far from ideal, or even pragmatic.

In excavated sections of the roadbed, drainage ditches parallel to the tracks are needed to drain water off the surface of the roadbed and to hold eroded soil, debris and snow away from the track structure. Ditches should be adequately designed to ensure that no water will remain on the roadway surface to cause damage to the roadbed or interfere with traffic. Because ditches are subjected to erosion, sedimentation, change of channel and overflowing, they should be sufficiently wide to offer enough capacity to contain soil erosions or rock fallout without clogging and becoming unusable. Wide ditches also provide a place to accumulate snow away from the track structure itself. For these reasons, AREMA Section 1.2.4.2d. specifies a *minimum* bottom width of three feet for trapezoidal ditches. The use of narrower ditches by some railroads—under circumstances or conditions not explained by AEP Texas—should not be sufficient grounds to supplant the industry standard.

Nonetheless, in light of the Board's rulings in prior cases, BNSF does not challenge AEP Texas' specification of two-foot bottom ditch widths, but notes that the use of two-foot ditches

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[81] *See* AREMA Chapter 1, Part 1 Roadbed, Section 1.2.4.2d, at BNSF.RP.WP.III.F-0382.

across the TNR system will inevitably result in increased clogging of surface drainage systems, requiring increased maintenance to the repair damage to the roadbed.

(2) Retaining Walls

Rather than build masonry retaining walls, AEP Texas proposed constructing the TNR with gabions (galvanized steel mesh boxes) filled with rock, which BNSF Consulting Engineers accept. AEP Texas Opening Nar. at III-F-50. AEP Texas correctly extracted the square yards of retaining wall materials listed under masonry, timber, ties and pilings in the Engineering Reports, as well as the additional materials listed in the Engineering Reports under "Protection of Roadway." BNSF's Engineering Consultants accept AEP Texas' calculation of the square yards of retaining wall material found in the Engineering Reports for line segments covered by the reports as the first step in determining the quantities of the gabions that will be required along the TNR. However, BNSF Engineering Consultants have determined that the size of the retaining walls (and therefore the gabion quantities) need to be adjusted on account of AEP Texas' widening of the road bed and switching to gabion structures. For the reasons discussed below, these two adjustments, as well as the fact that AEP Texas' reliance on the ICC Reports ignores every additional retaining wall built by the railroad since its original construction, justify the doubling of the retaining wall quantities.

BNSF Engineering Consultants have first identified the need to adjust the Engineering Report retaining wall quantities to accommodate the expanded roadbed section used by AEP Texas for the TNR. In its Opening Evidence, AEP Texas increased the roadbed widths on embankments by seven to nine feet and in cuts by 20 to 24 feet from the original standard roadbed section upon which the Engineering Report quantities are based. AEP Texas Opening Nar. at III-F-26 to 27. Measuring from the center line of track will move the break point of the

slope out an additional three feet on embankments and an additional eight feet in cuts, which will have a significant effect on the retaining wall requirements of the TNR.[82]

Retaining walls are deployed in special circumstances where there is not enough room to construct the full standard roadbed section. An adjacent roadway, building, side hill, stream or other obstacle encountered during construction, may dictate the need for a retaining wall. Widening the roadway does not relieve or move the constraint of the obstacle encountered. Therefore, the retaining walls will need to be enlarged to accommodate the wider roadbed. The BNSF Engineering Consultants calculated the amount by which the retaining wall quantities reflected in the Engineering Reports would need to be increased to accommodate AEP Texas' larger roadbed section. For example, a two-foot wall that was built in a cut to accommodate a 1.5:1 slope, after being moved out eight feet, would need to be increased to over seven feet tall. Additionally, the amount of pressure bearing on the wall is significantly increased as the wall is moved, requiring a much larger foundation for a more substantial wall. Details of these calculations are set forth in BNSF's Reply workpapers.[83]

While they accept AEP Texas' substitution of gabion baskets for the existing retaining walls, BNSF Engineering Consultants have found that AEP Texas did not account for the difference in volume between the retaining wall constructed with timber board or masonry stone and a comparable wall using gabions. Gabions are constructed with a height to base ratio of 2:1, and are constructed using a stepped pattern, all of which mean that one cubic yard of existing

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[82] BNSF.RP.WP.III.F-0383 to 0388.

[83] *Id.*

retaining will not equate to one cubic yard of gabion material (and, as discussed in the workpapers, may actually equate to six or more gabion cubic yards).[84]

Finally, AEP Texas has included only those retaining walls that show up on the ICC Reports. Therefore, they have excluded any retaining walls that occur along lines for which there is no ICC data, and any retaining walls that have been added since that time, including areas of recent BNSF construction and improvements that AEP Texas had undertaken on Opening to add capacity to the replicated BNSF line. Based on all these factors, BNSF Engineering Consultants have conservatively doubled AEP Texas' retaining wall quantities.

(a) Unit Costs

In developing unit costs for retaining walls, AEP Texas selected a unit cost from RS Means for gabion retaining walls, which BNSF Consulting Engineers accept. However, AEP Texas omitted trenching expenses in determining installation costs for the retaining walls. The complicated process for installing retaining walls, including trenching, is demonstrated in BNSF's Reply workpapers.[85] Based on the details of this process contained therein, BNSF Engineering Consultants have added trenching costs from RS Means.[86] The total costs for retaining walls are included in BNSF Reply Exhibit III.F-1.

(3) Rip Rap

AEP Texas based its cost for rip rap on material quantities reported in the Engineering Reports and on the Masters testimony for the Orin Line data, and developed a unit cost from RS

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[84] This construction method is demonstrated in the installation guidelines issued by Maccaferri Inc., a leading world-wide manufacturer of gabion baskets, which are included as BNSF.RP.WP.III.F-0389 to 0415.

[85] *Id.*

[86] BNSF.RP.WP.III.F-0416.

Means. AEP Texas Opening Nar. at III-F-50. BNSF Engineering Consultants accepts AEP Texas' rip rap costs.[87]

(4) Utility Relocation

AEP Texas included costs for utility relocation on the line segments of the TNR constructed after 1930 (when the Amarillo to Las Animas line was built by BNSF's predecessor) but omitted these costs on the remaining line segments on the theory that such costs constitute entry barriers. AEP Texas Opening Nar. III-F-51. Relocation of utilities is a cost that is incurred when construction of rail lines require the crossing of existing utility lines, including electrical power lines above and below ground, gas and oil pipelines, telephone lines and cables, fiber optic cables and water mains. For the most part, line segments of incumbent railroads replicated by the SARR in a SAC case were built before such utilities were in place. Thus, complainants have argued that the incumbent did not incur such costs and that they should be excluded as entry barriers. The Board has upheld that position, most recently in its decision in *Duke/CSX*.[88]

In light of the Board's refusal to allow relocation costs for utilities on anything but the newly constructed line segments, BNSF's Engineering Consultants accept AEP Texas' per mile unit cost for relocation of utilities and apply it to the miles of newly constructed segments. Additionally, AEP Texas constructed over 71 track miles that supplement the number of lines that BNSF has in their system today. The majority of this increased capacity is on the Donkey Creek to Alliance segment, where AEP Texas provided complete double tracking, and triple tracking near Crawford Hill. Since these track sections do not exist currently and would have to be constructed by AEP Texas, BNSF Engineering Consultants have added the 71-plus miles to

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[87] BNSF Reply electronic workpaper "III F TNR Grading.xls."

[88] *Duke/CSX*, slip op. at 83.

the utility relocation quantity. Also, BNSF has constructed approximately 55 miles of capacity improvements along this same section of railroad in the last ten years which AEP Texas failed to include; these miles were also added to the utility relocation quantity.[89] BNSF incurs costs for utility relocation on second and third main expansion projects. For example, an AFE that BNSF produced in discovery shows that $15,000 was paid for utility relocation on a 2,720 track foot siding extension project at Chillicothe, Texas, which is located on the TNR.[90] AEP Texas has used this extended siding in their TNR, so they should incur these costs for utility relocation, as well as topsoil, seeding, and environmental compliance, in the same manner that BNSF did.

Calculations of utility relocation costs are included in BNSF's electronic workpaper "III F TNR Grading.xls," worksheet "IIIF_13Othr CST."

(5) Slope Stabilization (Topsoil Placing/Seeding)

AEP Texas included costs for placing topsoil only in locations where BNSF included topsoil on the line segments of TNR that were constructed within the past 40 years. AEP Texas asserted that it allegedly used the same procedures as those accepted by the Board in *WPL*—*i.e.*, using quantities and unit costs based on the testimony of Jerry R. Masters in *IPS* and a percentage of right-of-way methodology accepted by the Board in *WPL*. AEP Texas Opening Nar. at III-F-52 to 53. However, AEP Texas included only costs for topsoiling, not for seeding, claiming—as complainants have done in prior cases—that the cost of seeding is included in the topsoil cost. *Id.* But none of the complainants, including AEP Texas, has offered any evidence that seeding was covered by the topsoil contract from the Orin Line, nor that that is a common practice to treat the two as a single event and cost.

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[89] BNSF has incurred the expense for these capacity improvements, as demonstrated in the workpapers at BNSF.RP.WP.III.F-0202 to 0205.

[90] BNSF Reply electronic workpaper "AFE A990454.pdf."

The Board has accepted Complainant's argument, most recently in *TMPA*, that the costs of seeding for the Orin Line were included in the cost of topsoil placement.[91] This understanding is contrary to the recollections of BNSF witness Albin and his colleagues who worked on the Orin Line project and believe that the seeding for that line was separately handled by an independent contractor. Their recollection is consistent with BNSF's current approach to seeding and topsoiling in new construction. Bid summary sheets for recent projects list topsoil placing and seeding separately, and BNSF construction specifications treat seeding as an independent item.[92] In addition, the Orin Line specification under "Topsoiling" states that, "Payment for "Placing Topsoil" will be made at the contract unit price per cubic yard which payment "will constitute full compensation for handling, loading and hauling from stockpile, for preparing slopes, for placing topsoil on slopes to the depth shown on the plans, and for all labor, tools, equipment and incidentals to complete the work."[93] No mention of seeding was included in the explanation of "Placing Topsoil", which is consistent with BNSF's position that the seeding was done at a later time under a separate arrangement. Additionally, seeding typically is done on a seasonal basis, and the proper time would often not coincide with the placing of topsoil.

Based on evidence of BNSF's contracting practices for topsoil and seeding, and the Board's statements in *PPL* to the effect that placing topsoil without seeding is useless, there is no basis for either excluding seeding costs or to assume that they are included in the topsoil cost.[94]

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[91] *TMPA*, slip op. 122.

[92] BNSF.RP.WP.III.F-0417 to 0422.

[93] BNSF.RP.WP.III.F-0421 to 0422.

[94] *PPL* at 19.

Therefore, BNSF Engineering Consultants include expenses related to both of these activities in their slope stabilization costs.

BNSF Engineering Consultants also believe that AEP Texas' use of a 1978 cost, indexed to 2000, is completely unjustified. All other grading costs used by both AEP Texas and BNSF's Engineering Consultants are taken from current sources. There is no logical reason for treating this single cost category differently than all others and relying on a unit cost that is 22 years out of date. The only plausible reason for holding this unit cost from 1978 in such high esteem is so that the complainants can perpetuate an earlier misunderstanding of this cost and thus continue to enjoy the advantage of that error in virtually every SAC case since that time. The logical way to resolve the issue is to use the 2000 RS Means costs for placing topsoil and for seeding for the segments of the TNR that were recently constructed.[95]

On the remainder of the route, AEP Texas excluded virtually all topsoil and seeding as an entry barrier on the grounds that BNSF did not incur costs for seeding when the lines were originally built. In omitting these costs for a majority of the TNR mainline, AEP Texas elects to forego a valuable preventive measure that ensures that the slope will remain stable over an extended period of time. In the years before this practice became standard, continuous slope re-stabilization was necessary. Erosion of the embankment slopes causes instability to the track when shoulders are eroded to the point that the ballast section cannot be held and maintained. Erosion of cut slopes causes loosened material to fill the ditches, impeding drainage and causing soft track conditions, and issues compounded by AEP Texas' decision to use two-foot drainage ditches, rather than the AREMA minimum of three feet. Because the exposed soils are loose, winds blow the fine sand and silt into the ballast section, further fouling the ballast and impeding

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[95] BNSF.RP.WP.III.F-0423 to 0424.

drainage, causing irregularities in the line and surface of the track, and eventually resulting in slow orders. Fouling of the ballast and sub-grade failures will require additional surfacing of the track, and the embankment and cut slopes will require periodic re-stabilization. In fact, a recent article explaining the importance of using high quality machinery for these activities to protect the ballast and subballast notes that the cost to not do so—*i.e.,* the costs associated with erosion—can be as high as 809 percent of original construction costs.[96] However, given the Board's approach to these costs in recent cases, BNSF Engineering Consultants do not dispute AEP Texas' exclusion, except in the limited areas listed below.

As discussed in Section III.F.2.c.(4) on utility relocation, AEP Texas constructed new double and triple tracking for which it has incorrectly omitted topsoil and seeding. BNSF Engineering Consultants have added one-half of the quantity required for a single track to each of those additional track miles. AEP Texas also neglected to provide for seeding and topsoiling expenses for the 55 miles of capacity improvements that BNSF has incurred to costs for over the last decade, primarily between Donkey Creek and Alliance. BNSF Engineering Consultants have included the costs for both seeding and topsoil placement for these new line segments as well as the new TNR yards.

BNSF Consulting Engineers have determined that the total cost for topsoil and seeding on these newer line segments is $7.0 million.[97]

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[96] "Sub-Structure can add life to rail, ties," by Darrell D. Cantrell and Rainer Wenty, *Railway Track & Structures*, March 2003. BNSF.RP.WP.III.F-0425 to 0427.

[97] BNSF Reply electronic workpaper "III F TNR Grading.xls," worksheet "IIIF_13Othr CST."

(6) Water for Compaction

AEP Texas correctly recognized the need to ensure that the moisture content of the soil on the TNR's fills is within an acceptable range. AEP Texas Opening Nar. at III-F-53. Along the TNR, water for compaction will be needed for 70 percent of the common excavation (30 percent is waste) and 100 percent of the borrow quantities. AEP Texas claimed to provide water for compaction for the entire TNR route. They developed the number of gallons per cubic yard from BNSF's actual experience in constructing the Orin Line, and used a unit cost for water from the Wyoming Department of Transportation (DOT). AEP Texas Opening Nar. at III-F-54.[98]

The BNSF Engineering Consultants accept AEP Texas' calculation of the number of gallons per cubic yard from the Orin Line construction, as well as the application of its gallons/CY to the TNR common excavation and borrow quantities. BNSF Engineering Consultants also accept the unit cost used by AEP Texas of $0.009 per gallon, but only as a single part of the total cost required for TNR water for compaction. The Wyoming DOT contract specifications shows that the contractors were responsible for the transportation and application of the water, and the State was responsible for providing and paying for the water to be used on the project. Specifically, the WYDOT contract specifications state the following:

> WYDOT is responsible for acquiring all temporary water rights, access to water and payment of fees, royalties and other considerations for highway construction. The Contractor will be responsible for the transportation and application of water to and on the project.

Therefore, the average bid price that AEP Texas relied on only reflects the costs the contractors would incur in transporting and spreading the water at the jobsite. Accordingly, BNSF Engineering Consultants have added the cost of the actual water to AEP Texas' unit cost

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[98] The Wyoming DOT information relied upon by AEP Texas is contained in Workpaper Volume 21 at p. 10616, and is reproduced as BNSF.RP.WP.III.F-0316 to 0322.

for handling the water, taken from RS Means.[99] The average cost for water, including transportation and spreading, for the TNR is $0.01 per CY of earthworks.

(7) Road Surfacing

Road surfacing includes the cost for the construction of road detours that are built during construction, and the resurfacing of existing roads that are damaged during the construction process. AEP Texas has included road surfacing only for public crossing on certain rail lines that were built within the recent past. AEP Texas omits these costs for all other segments as entry barriers. AEP Texas Opening Nar. at III-F-54.

Although BNSF is aware that the Board has accepted the exclusion of these costs as entry barriers, BNSF contends that the Board's treatment unfairly benefits complainants in SAC cases for two reasons. First, it relieves the SARR from the real-life, time-consuming and costly activities that railroads continually encounter with respect to road crossings. Second, it provides the SARR with advantages that were never available to the incumbents. The fact that the road infrastructure is in place today is a substantial benefit to the TNR both during the actual construction and once the railroad becomes operational. Once operations begin, maintenance crews can use the road infrastructure to access portions of the right-of-way without tying up track time. Similarly, taxi drivers hauling relief train crews will make significant use of the road network to get crews to "outlawed" trains. In fact, AEP Texas even justifies its failure to construct a network of access roads to the TNR right-of-way on the fact that access to the TNR is provided by adjacent highways and other public roadways. AEP Texas Opening Nar. at III-F-55.

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[99] BNSF.RP.WP.III.F-0323 to 0326; BNSF Reply electronic workpaper "III F 2 TNR Grading.xls," worksheet "IIIF_13Othr."

Moreover, there is evidence that BNSF's predecessors incurred costs for roads even back before the Engineering Reports were developed. As described more fully in Section III.F.8, the BNSF Engineering Consultants extracted from the Engineering Reports the material quantities for at-grade crossings identified under ICC Account 15 – Crossings and Signs, and have determined there were sufficient quantities of crossing materials to construct a significant additional amount of at-grade crossings along the TNR route at the time the Engineering Reports were prepared.[100] As AEP Texas has provided for detoured road expenses for each of the crossings they cost out in their Opening Evidence, BNSF Engineering Consultants have included road surfacing/road detouring expenses for those additional road crossings that they have determined will be built by the TNR.

Even if the Board does not allow costs for road surfacing at the public crossings shown on the ICC Engineering Report segments but excluded by AEP Texas, the Complainant's own evidence on costs for newer line segments is flawed. AEP Texas included road surfacing only for public crossings on the rail line between South Logan and Donkey Creek, Eagle Butte to Campbell, Las Animas to Amarillo and the two plant spurs to Harrington and Arapahoe, and for private crossings on the rail line between South Logan and Donkey Creek, Eagle Butte to Campbell and Las Animas to Amarillo.[101] AEP Texas appears to have inadvertently omitted public and private crossings on the Reno subdivision, which according to their own methodology, should be included as a recently constructed line segment. BNSF Engineering

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[100] BNSF Reply electronic workpaper "III F 8 Grade Crossings.xls," worksheet "ICC."

[101] AEP Texas Second Errata electronic workpaper "TNR Grading.xls."

Consultants have included this segment in determining road surfacing costs. There are a total of 33 public and 49 private crossings on additional capacity miles.[102]

In developing their costs for road surfacing on the new line segments, AEP Texas used a 10' x 300' detour for private crossings and a 24' x 500' detour for public crossings to determine the quantities per crossing. AEP Texas then applied the RS Means unit cost for "Bank Run Gravel, 6" to the private crossing quantity to develop its private crossing unit cost. For public crossings, AEP Texas developed a unit cost from various RS Means prices for the public crossings.[103]

BNSF Engineering Consultants accept AEP Texas' costs for private and public crossings, but applies them to the increased number of quantities determined from the ICC reports. Total costs for road surfacing are included in BNSF Reply Exhibit III.F-2.

(8) Construction Access Roads and Staging Areas

According to its Opening Narrative, AEP Texas did not included costs for any access roads to the TNR because (1) the TNR right-of-way is accessible from highways and roads, and (2) the initial construction process includes the use of heavy equipment that will automatically create access roads. AEP Texas Opening Nar. at III-F-55.

Even if AEP Texas' assertions are accepted, access to particular TNR construction sites from existing highways and roads will not be sufficient. AEP Texas stated in its narrative that the multiple grading and bridge packages are simultaneously initiated in month 11 of the construction schedule, "with special focus on access to critical sites and establishment of staging areas." AEP Texas Opening Nar. at III-F-112. However, AEP Texas assumed that this would be

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[102] BNSF.RP.WP.III.F-1420 to 1422.

[103] AEP Texas Opening Workpapers Vol. 21, p. 10599-10600; AEP Texas Second Errata electronic workpaper "TNR Grading.xls."

possible without making any provision for access roads. More specifically, AEP Texas does not account for the fact that certain bridges are located in areas that are not adjacent to highways or public roads and would require access and construction staging areas. Additionally, it does not seem to have considered that these construction areas will not benefit from right-of-way grading activities that do not pre-date the bridge construction stage under the aggressive schedule posited by AEP Texas.

Therefore, BNSF Engineering Consultants have provided for the placement of access roads at bridge construction sites that are in more isolated areas not adjacent to existing public roadways.[104] At these sites, they have built 24-foot roadways with four-inch stone base surfacing, and applied a unit costs derived from RS Means.[105] BNSF Engineering Consultants have also provided for staging areas at the largest of the TNR bridges, located at mileposts 111.50, 590.31, and 238.08, and at seven of the transportation railheads they have placed along the TNR route for the delivery of track and bridge materials from various suppliers.

(9) Environmental Mitigation

Measures to control environmental factors are necessary expenditures in constructing a railroad and a natural outgrowth of preventive measures taken as part of the normal construction process. AEP Texas did not include any costs for environmental compliance for most TNR lines segments, consistent with Board precedent; they included $0.7 million for erosion control for the recently constructed line segments for which the railroad indisputably incurred such costs. AEP Texas Opening Nar. at III-F-55 to 56. AEP Texas calculated a cost per mile based on its assertion that environmental compliance costs on the Orin Line—$1.5 million in 1997

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[104] BNSF Reply electronic workpaper "III F TNR Grading.xls," worksheet ""Bridge Roads;" BNSF.RP.WP.III.F-0428 to 0449.

[105] BNSF.RP.WP.III.F-0450.

dollars. AEP Texas indexed that cost to 2Q00 and used the mileage from Caballo Jct. to South Morrill. It then applied that unit cost to 97.2 route miles of new line segments to develop a per mile cost of $6,846.[106] BNSF Engineering Consultants accept AEP Texas' unit cost methodology, but added costs to cover the additional capacity miles mentioned above in Section III.F.2.c.(4) on utility relocation.

(10) Land for Waste Quantities

AEP Texas assumed that 30 percent of the material excavated during the construction of the TNR will not be re-used as embankment and will instead be wasted along the right-of-way. AEP Texas included costs for additional land along the right-of-way to accommodate the dumping of the waste material, as well as costs for the dumped material to be moved and shaped by a bulldozer. AEP Texas Opening Nar. at III-F-42. BNSF's Engineering Consultants agree with the waste ratio and the inclusion of these costs.[107]

(11) Alliance and Amarillo Yard Paving, Drainage, Lighting and Fencing

AEP Texas included cost for yard surfacing, drainage, lighting, and fencing in Alliance and Las Animas yards. AEP Texas includes 426,392 SY of gravel roadways in the Alliance yard and 47,061 SY gravel roadways for the Las Animas yard. AEP Texas includes costs for yard lighting, drainage, fencing and surfacing of $20.6 million. As described in Section III.B.3, BNSF Consulting Engineers have determined that the fueling and inspection facilities that AEP Texas placed there on Opening need to be relocated to Amarillo, and have sited the TNR's

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[106] AEP Texas Second Errata electronic workpaper "TNR Grading.xls."

[107] BNSF Reply electronic workpaper "III F TNR Grading.xls."

second major yard there.[108] BNSF Engineering Consultants have applied AEP Texas' yard paving, lighting, fencing and drainage quantity calculations to the new yard at Amarillo and the updated yard at Alliance, with the exceptions noted below.

While AEP Texas has provided sufficient gravel roadways throughout the TNR yards, they have not provided paving of the roadways along the inspection tracks, which BNSF Engineering Consultants maintain is necessary to limit dust and provide an adequate working surface for the inspections to be performed. BNSF Engineering Consultants developed the quantities and applied a unit cost from RS Means.[109] For all other yard roadway surfacing, BNSF Engineering Consultants agree with AEP Texas quantities but adjusted them for the track changes in the yards; they also apply AEP Texas' gravel road unit cost to the restated surfacing quantities.

For drainage in the TNR yards, the length of pipe used in the drainage calculations should be 4,245 LF to cover the entire track length, instead of the 3,945 LF of pipe AEP Texas placed there. The graph that AEP Texas included in their Opening electronic workpapers demonstrates that AEP intends to have the drainage system along the entire length of the tracks.[110] The unit costs vary slightly because AEP Texas used 2001 Means costs while BNSF used the more appropriate 2000 Means costs.

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[108] The removal of the Las Animas Yard has eliminated the need for general yard paving, drainage, lighting and fencing, and BNSF has removed the costs AEP Texas specified for those locations in its Opening Evidence.

[109] BNSF.RP.WP.III.F-0451, 0459; BNSF Reply electronic workpaper "III F 2 Yard computations.xls."

[110] AEP Texas Second Errata electronic workpaper "Building Sites.xls," worksheet "Lights & drainage paving;" BNSF.RP.WP.III.F-0452.

For TNR yard fencing, BNSF's unit cost for fencing differs from AEP Texas' because AEP Texas used residential fencing, while BNSF Engineering Consultants used the more appropriate industrial fencing.[111] As discussed in Section III.F.7 in greater detail, BNSF's total lighting costs are depart from AEP Texas' because the Complainant included the basic light fixture but failed to add the additional, necessary components, including bollards, foundations, and brackets. BNSF has developed unit costs for each of these materials from RS Means.[112]

As described in Section III.F.7, AEP Texas also neglected to provide footings on the catch basins, as well as any excavation or backfilling of the catch basins or pipes. BNSF Engineering Consultants have provided for these items, and have included the costs for the actual yard in the BNSF earthwork totals. The costs for these items associated with buildings (and adjacent parking lots), and facilities are included in the statement of costs in Section III.F.7.

Each of these minor changes are reflected in BNSF's restatement of these costs in Reply electronic workpaper "III F 2 TNR Grading.xls."

(12) Construction Lighting

Construction work at night, which will be necessary under AEP Texas' aggressive construction schedule, requires night-lighting for a portion of the construction period. This becomes critical during the winter months as daylight lasts only a little over eight hours a day. This will require a lighting crew at night to move, set-up and maintain lights for construction equipment and crews. BNSF Engineering Consultants have included costs for one lighting crew per grading crew for construction during the winter months.[113]

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[111] BNSF.RP.WP.III.F-0454 to 0455, 0459.

[112] BNSF.RP.WP.III.F-0456 to 0457.

[113] BNSF Reply electronic workpaper "III F 2 TNR Grading.xls," worksheet "Const. Lgt;" BNSF.RP.WP.III.F-0454 to 0455.

(13) Summary

The table below summarizes the grading (roadbed preparation) costs that BNSF's Engineering Consultants determined would be necessary to construct the railroad to the specifications necessary to meet the tonnage requirements of TNR. Details of the calculations for earthworks are included in BNSF Reply Exhibit III.F-2.

Table III.F.2-14
Summary of Grading Costs

Item	BNSF Total Cost ($Millions)	AEP Texas Total Cost ($Millions)	Difference
Earthwork			
Common	171.2	110.7	60.6
Loose Rock	25.3	13.5	11.8
Solid Rock	80.5	26.8	53.7
Borrow	464.6	397.3	67.2
Earthworks -- Total	741.6	548.3	193.3
Water for Compaction	12.7	10.7	2.0
Clearing – Total	1.3	1.5	(0.2)
Grubbing – Total	0.8	0.9	(0.0)
Fine Grading	19.9	0	19.9
Stripping	3.6	0	3.6
Construction Lighting	8.7	0	8.7
Lateral Drainage	0.2	0.2	0.0
Retaining Walls	10.3	5.1	5.2
Rip Rap	4.5	4.6	0.0
Road Surfacing	19.5	4.4	15.0
Relocation of Utilities	2.5	1.8	0.7
Placing Topsoil	3.5	1.5	2.0
Seeding	3.4	0.0	3.4
Land for Waste Quantities	0.2	0.1	0.0
Environmental Compliance	1.6	0.7	0.9
Construction Site Access	1.7	0.0	1.7
Yard Demolition	0.8	0.0	0.8
Yard Drainage and Paving, Lighting and Fencing	24.0	20.6 (incl. in III.F.7 Buildings)	1.3
Total	**897.1**	**600.3**	**296.8**

Source: AEP Texas Second Errata electronic workpaper "TNR GRADING.xls," worksheet "IIIF Summary;" BNSF Reply electronic workpaper "III F 2 TNR Grading.xls," worksheet "IIIF Summary."

3. Track Construction

Track construction entails the procurement, transportation and installation of the many components that come together to create the actual track structure for a line of railroad, including subballast and ballast, rail, ties, plates, clips, anchors, spikes and the various components of turnouts. In AEP Texas Opening Exhibit III-F-1 under "Track," AEP Texas listed forty-nine (49) track components, not including itemized labor unit costs. It included the costs for thirty-nine (39) of those components in its Opening Evidence, as well as in the restatement of costs contained in the First and Second Errata that AEP Texas filed after submitting its Opening Evidence. BNSF Engineering Consultants address in their Narrative those items where they disagree with AEP Texas' specifications, quantities or unit costs.

The quantity of each particular track component depends in large part on the total miles of track to be constructed. In its Opening Evidence, AEP Texas included 1,168.54 constructed route miles[114] and 1,237.95 mainline track miles.[115] There are minor discrepancies between AEP Texas' Opening estimate of total route miles and BNSF's route mile estimate on Reply. As described in Section III.B.1, BNSF witnesses have made several minor adjustments to the TNR route that result in a small decrease in the total number of TNR route miles. These changes include a reduction to the length of the Alliance Yard, the addition of a second leg of the mainline's wye track in the Alliance Yard, the addition of approximately 0.5 miles of Oklaunion spur track that AEP Texas failed to include, and several minor adjustments for incorrect milepost location calculations along the TNR. As a result of these corrections, additions and deletions,

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[114] AEP Texas Opening Nar. at III-B-7.

[115] AEP Texas Opening Nar. at III-B-20.

BNSF's track construction costs are based on its restated total of 1,168.38 constructed route miles.

In addition to these route mile changes, BNSF capacity and operating witnesses have also made adjustments to the track mile count after conducting an in-depth capacity study, taking into consideration BNSF's restatement of the TNR traffic group posited by AEP Texas in its Opening Evidence. BNSF witnesses have determined that the only reduction necessary to the TNR mainline as a result of BNSF's traffic restatement is the removal of a single siding between Amarillo and Oklaunion (mileposts 303.87 and 305.47). As discussed in Section III.F.3.d.(3).(c), BNSF operating witnesses have also increased the total mainline track miles as a result of providing set-outs with sufficient length to accommodate bad-order and maintenance-of-way equipment storage, as posited by AEP Texas.

BNSF's experts have also made minimal adjustments to the TNR yards, which reflect the reduction in capacity resulting from BNSF's revised traffic assumptions, as well as the construction of adequate trackage to meet the performance requirements that AEP Texas has postulated for the TNR. These yard adjustments include:

- the removal of fueling and inspection facilities from Las Animas (to be placed at Amarillo);
- the removal of receiving and departure tracks at Alliance East, Alliance South, and Las Animas;
- the addition of staging tracks at Campbell;
- the addition of fueling tracks and inspection tracks at Amarillo;
- the addition of a crossover between the mainline and interchange tracks at the Oklaunion interchange and at the Amarillo interchange.

Schematics of the revised track and yard configurations are included in BNSF's Reply Evidence as Exhibit III.B-1.

Based on those changes, BNSF Engineering Consultants have restated construction costs to reflect 1690.76 total track miles. BNSF Reply Nar. § III.B.2. These additional miles of track increase the quantities for all track components, as reflected in BNSF Engineering Consultants' restatement of TNR construction costs.[116]

In reviewing AEP Texas' Opening Evidence, BNSF Engineering Consultants have identified several inconsistencies between AEP Texas' construction standards for the TNR as stated in its Narrative and AEP Texas' actual development of track quantities and total costs in its supporting workpapers. For example, AEP Texas stated at page III-F-61 of its Opening Narrative that all branch lines should be constructed with Grade 5 (7"x 9") wood ties, but used Grade 3 (6"x 8") wood ties in determining the tie costs for branch lines in its electronic workpapers.[117] Additionally, at several points in the Opening Narrative, AEP Texas gave conflicting specifications for the same track component. For instance, according to AEP Texas' Section III.F.3 rail specifications, 136-pound premium rail is required for the track segments between Donkey Creek and Alliance, between Donkey Creek and South Logan, and on mainline areas with curves of three degrees or more. AEP Texas Opening Nar. at III-F-61. The description of premium rail use in Section III.B, however, excluded the Donkey Creek to South Logan segment. AEP Texas Opening Nar. at III-B-21. BNSF Engineering Consultants have addressed each of the inconsistencies that they have discovered in the individual sections below.

Aside from minor track mile adjustments and changes made to address inconsistencies in AEP Texas' Opening Evidence, of the thirty-three (33) track components identified by AEP Texas in Exhibit III-F-1 that are addressed in this section, BNSF Engineering Consultants only

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[116] BNSF Reply electronic workpaper "III F TNR Construction.xls."

[117] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "Track Quantities."

disagree with AEP Texas' quantities on five (5) track material components and with the omission of five (5) components. These include:

- geotextiles
- ballast on spur and branch lines (omission)
- subballast in yards and on spur and branch lines (omission)
- transition ties (omission)
- 136-pound premium rail
- crossing diamonds (omission)
- switch stands
- switch stand targets and masts (omission)
- rail lubricators
- spikes

Likewise, BNSF Consulting Engineers have accepted AEP Texas' unit costs for a majority of track components. AEP Texas' unit costs were developed predominantly from quotes obtained from actual suppliers and, in most instances, include the cost for transportation to at least one location along the TNR. Although AEP Texas obtained a collection of very low costs by extracting individual unit costs from a combination of quotes from numerous, scattered suppliers, BNSF price data, and RS Means, BNSF has accepted a majority of the Complainant's material unit costs. BNSF Engineering Consultants disagree with the manner in which AEP Texas applied indexing to its non-RS Means unit costs. Specifically, AEP Texas inappropriately applied RS Means location factors where the unit cost was developed from a supplier's quote or BNSF price list. Indexing for location is appropriate when a complainant relies on universal, generic costs developed from an estimating tool like RS Means, which does not take into consideration variations in price that result from the geographical location of a supplier. It is not

appropriate to adjust for location where the complainant chooses to rely upon a price quote from a specific supplier in a specific location. Therefore, BNSF Engineering Consultants have removed the RS Means location factor that AEP Texas applied to these material unit costs, but have not removed it where AEP Texas applied it to an RS Means unit cost. Additionally, AEP Texas, in converting costs from non-2000 costs to 2000, took the historical factor and the location factor and erroneously averaged the two before applying them to their unit costs. These are two independent factors that should separately be multiplied by the unit cost, which BNSF Engineering Consultants have done.

Additionally, when AEP Texas developed a unit cost for a track material using RS Means, it uniformly neglected to include the 10 percent overhead and profit ("O&P") component that RS Means lists for inclusion with their total unit costs. According to the RS Means Cost Data Book, a 10 percent O&P additive should be added to all bare material costs to reflect the associated operating expenses and profit margin that would be built into a price obtained from an actual supplier.[118]

With the exception of these indexing and O&P adjustments, and systematic adjustments made to the transportation component of AEP Texas' unit costs which are discussed below, BNSF Engineering Consultants agree with the unit costs that AEP Texas supplied for all but the following six (6) components:

- geotextiles
- ballast
- subballast
- Grade 3 ties

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[118] BNSF.RP.WP.III.F-0466.

- rail
- field welds

For all track materials, BNSF Engineering Consultants have undertaken a detailed analysis of AEP Texas' treatment of transportation costs. They have concluded that, for most track components, AEP Texas failed to include sufficient costs to cover transportation of those materials from the manufacturer or supplier to the necessary TNR construction railheads. AEP Texas did not reveal in its Opening Evidence its proposals for the location and/or number of railheads that would be needed along the TNR, nor was it consistent in obtaining material delivery costs to multiple destinations along the TNR that could potentially serve as AEP Texas' railheads. Rather, transportation costs were addressed by the Complainant on an item-by-item basis, with AEP Texas relying predominantly on suppliers' bids that included delivery to, on average, between one and three locations along the TNR. As discussed in Section III.F.3.i, the portion of AEP Texas' unit costs attributable to transportation typically does not cover the expense associated with supplying the materials to a sufficient number of locations along the TNR.

Moreover, AEP Texas' Opening Evidence posited an aggressive 12-month schedule for laying track across the entire TNR. AEP Texas Opening Nar. at III-F-112. BNSF Engineering Consultants have conservatively determined that, in order to preserve any possibility of meeting this schedule, AEP Texas would need to make use of six to seven railheads no further than 300 miles apart. BNSF's analysis of AEP Texas' pattern of delivery, as well as a description of the BNSF Engineering Consultants' adjustments to provide sufficient railheads according to AEP Texas' track construction schedule, are contained in Section III.F.3.i. BNSF Engineering Consultants have adjusted the transportation component of material costs where necessary to

provide transportation to this minimum number of railheads required to construct the TNR according to AEP Texas' schedule.

The following subsections set forth BNSF Engineering Consultant Gouger's analysis of each track component for which she disagrees with either the quantity or the total unit cost proposed by AEP Texas, as well as AEP Texas' treatment of transportation costs for these materials.

a. Geotextiles

(1) Specifications

Geotextile fabric is placed on the roadbed grade to protect the ballast and subballast from contamination and to provide additional stabilization and support in areas of poor drainage and soil quality. Turnouts and crossings are areas that generally require additional support, making them regular candidates for geotextile use. BNSF standardized construction specifications require that geotextiles be placed between the subgrade and subballast.[119] In its recent ruling in *CP&L*, the Board concluded that, given the general acceptance of geotextile use by the railroad industry, the cost of placing geotextiles under turnouts and crossings generally should be included in SAC construction projects.[120]

AEP Texas provided for geotextile placement under turnouts and at-grade crossings. AEP Texas Opening Nar. at III-F-56 to 57. However, AEP Texas failed to include geotextiles at railroad crossings, which share the characteristics of turnouts and road crossings (*i.e.*, diverse lateral forces) that the Board noted in *CP&L*.[121] BNSF Engineering Consultants have placed

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[119] BNSF.RP.WP.III.F-0467 to 0471.

[120] *CP&L*, slip op. at 89.

[121] *Id.*

geotextiles under turnouts and road and railroad crossings. The quantities of geotextiles required at these locations are discussed in the subsections below.

(2) Geotextiles Under Turnouts

AEP Texas calculated the quantity of geotextile fabric under turnouts by determining the quantity per turnout type using a formula set out in its workpapers.[122] Its Opening Evidence showed the use of a 17-foot wide strip of geotextile fabric at the point of switch end of each turnout and a widened 24-foot section at the end possessing long switch ties.[123] BNSF Engineering Consultants agree with this layout with the exception that the geotextile fabric should be extended to encompass the entire switch structure, including the transition ties ahead of the point of switch. This would require an additional section, 17-feet wide by 16-feet long, at each turnout. AEP Texas included a two foot allowance for overlap, which is consistent with AREMA guidelines and which BNSF witnesses accept.[124] BNSF Engineering Consultants calculated the quantities for each type turnout as follows:

Turnout No.	Ahead of POS	+	Lap	+	POS to end Long Ties	x	SF to SY	=	**Total**
#10	272 SF		223.71 SF		2378 SF		X11.1%		**320 SY ea.**
#14	272 SF		308.57 SF		3820 SF		X11.1%		**429 SY ea.**
#20	272 SF		437.79 SF		4653.5 SF		X11.1%		**596 SY ea.**

BNSF Engineering Consultants' quantity calculations are included in BNSF's Reply workpapers.[125] They have also discovered that while AEP Texas correctly calculated the amount

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[122] AEP Texas Opening Workpaper Vol. 21, pp. 10744-6.

[123] *Id.*

[124] AREMA Chapter 1, Part 10 Geosynthetics, Section 10.1.5, at BNSF.RP.WP.III.F-0472.

[125] BNSF.RP.WP.III.F-0473 to 0475.

of geotextiles underneath the turnout in its workpapers (minus the fabric required underneath the long ties before the point of switch), AEP Texas used a different quantity in determining geotextile totals for the TNR. In its Opening Narrative, AEP Texas stated that the quantities included in its III.F total costs includes only the amount of fabric required for the turnouts, as at-grade crossings already include geotextile costs. AEP Texas Opening Nar. at III-F-57. However, the final quantities of geotextiles include only the amount of fabric required for the *overlap* multiplied by the number of turnouts, and not the fabric required for the entire turnout plus the overlap.[126] BNSF Engineering Consultants apply the correct per-turnout quantity to the total number of turnouts found on the TNR

Table III.F.3-1
Comparison Of BNSF And AEP Texas Quantities
Of Geotextiles Per Turnout Size

Turnout Size	AEP Texas Quantity per TO	BNSF Quantity per TO
No. **10**	**289.08** SY	320 SY
No. **14**	**398.73** SY	429 SY
No. 20	**565.70** SY	596 SY

Source: AEP Texas Opening Workpaper Vol. 21, p. 10744-10746; BNSF.RP.WP.III.F-0473 to 0475.

(3) Geotextiles Under Road Crossings

At each point where a highway or road crosses the TNR, there will be either an at-grade crossing or a separated crossing such as an overpass or underpass. It has become standard practice to underlay the subballast of an at-grade crossing with a non-woven geotextile to add strength and to protect the subballast and ballast from the transmission of fine soil particles from the subgrade. The subgrade in a grade crossing is required to take a much more demanding loading than that of a typical track section, because it is subjected to many more loading cycles

[126] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "TOTALS."

as a result of being traversed by both rail and vehicular traffic. Geotextiles also serve an important drainage function. Because the adjacent road prevents water falling on the tracks from draining off from the subgrade and subballast layer, geotextile fabric allows it to pass through to the subballast and then the subgrade but impedes the upward movement of soil particles, preventing the fouling of the ballast section.

AEP Texas accepted the placement of these materials under all at-grade crossings and included the cost for these materials in the total unit cost for its rubber/asphalt and concrete crossings. AEP Texas Opening Nar. at III-F-57. As discussed in Section III.F.8.c, BNSF Engineering Consultants have constructed TNR crossings as they currently exist on the BNSF lines being replicated by AEP Texas' SARR, which include rubber, concrete and timber crossings. BNSF applies the unit costs that AEP Texas developed for the rubber/asphalt and concrete crossings, both of which include geotextile materials and installation. Where timber crossings (which do not already include geotextiles) are used, BNSF Engineering Consultants have added the cost of providing and placing the geotextile fabric to the crossing unit cost. In these instances, they have used one roll width of geotextile fabric under each crossing for the length of the crossing plus an additional ten feet on each side of the crossing.[127]

(4) Geotextiles Under Rail Crossings

As described above, BNSF Engineering Consultants have added geotextiles underneath all crossings, including under railroad crossing diamonds, which are subject to significantly more loading than a typical track section due to traffic from two railroads crossing over the one spot, and experience similar drainage problems to turnouts and at-grade crossings. BNSF Engineering

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[127] The computation for geotextiles under grade crossings is 12' wide x (length of crossings) x 11.1%=SY; BNSF.RP.WP.III.F-0476. The cost for geotextiles under road crossings are included in the unit cost for the crossing.

Consultants have determined that each railroad crossing would require a single strip of geotextile fabric approximately 12-feet wide by 25-feet long under each track of the crossing diamond, which equates to 50 SY per diamond.[128] At each place where a railroad crosses the TNR, BNSF Engineering Consultants have included costs for the necessary geotextiles.

(5) Unit Cost

BNSF Engineering Consultants generally accept AEP Texas' materials costs taken from RS Means 2000 for 600-pound tensile strength geotextile fabric, but use the total RS Means cost which includes O&P and installation, as geotextile placement was not included in the itemized labor bid the Complainant obtained from Windgate Constructors.[129]

b. Ballast and Subballast

(1) Specifications

As AEP Texas correctly stated in its Opening Narrative, ballast and subballast serve to distribute heavy track loads to the native subgrade at a bearable pressure level. AEP Texas Opening Nar. at III-F-57. Additionally, the ballast holds the track structure in place and allows for regular, necessary maintenance of the track surface and alignment. Both layers provide necessary drainage of water away from the track in a manner that helps preserve subgrade stability. The subballast layer also performs the additional, essential functions of allowing water to escape from the ballast section and filtering finer grained subgrade soils to prevent intrusion into the ballast.

The ballast that AEP Texas proposed to use is locally obtained granite, crushed according to the standards laid out in the AREMA guidelines. AEP Texas used subballast that consists of

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[128] BNSF.RP.WP.III.F-0477.

[129] AEP Texas Opening Workpapers Vol. 21, pp. 10738-9.

materials similar to the ballast, crushed and compacted to provide a well-graded, dense layer of crushed rock similar to a road base material. AEP Texas Opening Nar. at III-F-58 to 59. Consistent with AREMA standards, AEP Texas constructed the TNR mainline with a 20-inch ballast/subballast section, consisting of twelve inches of subballast and eight inches of ballast. AEP Texas has also adjusted the quantities of ballast for placement under curved sections of track. *Id.* On mine leads and helper and setout tracks, AEP Texas included only eight inches of ballast and six inches of subballast. AEP Texas did not place subballast in any TNR yards—providing only a ten-inch layer of ballast, placed directly on top of the yard fill. *Id.*

BNSF Engineering Consultants accept the ballast/subballast depths specified by AEP Texas for typical track segments, with the exception of (1) the amount of ballast placed under curves between one and three degrees (discussed in Section III.F.3.b.(3)), and (2) the exclusion of any subballast under all TNR yard tracks.

AEP Texas defended its exclusion of subballast in all TNR yards by citing the near absence of dynamic loading over these areas and asserting that the bearing capacity of the yard subgrade is sufficient with only ten inches of ballast and no subballast. AEP Texas Opening Nar. at III-F-59. However, AEP Texas ignores the additional and equally important purposes that subballast serves under yard track as well as mainline track.

Subballast provides the essential functions of (a) subgrade preservation through its unique drainage characteristics, and (b) ballast protection through the filtering of fine-grained subgrade particles. With respect to drainage, George F. Sowers, a renowned authority in this field, included "the proper permeability or drainage characteristics" among his list of requirements for constructing a sound geotechnical foundation in his book, INTRODUCTORY SOIL

MECHANICS AND FOUNDATIONS: GEOTECHNICAL ENGINEERING.[130] Subballast serves as a drainage median for the track bed, allowing water to seep through the ballast to the impervious subballast layer where it moves laterally, away from the ballast and the subgrade. AREMA standards also stress this important function:

> The sub-ballast must be sufficiently impervious to divert most of the water falling into the track to the side ditches to prevent saturation of the subgrade which would weaken the subgrade and contribute to failure under load...[and] must be sufficiently pervious to permit release of capillary water or seepage of water to prevent the accumulation of water below the sub-ballast. This condition could cause failure of the subgrade.[131]

Subballast also serves as a transition zone between the subgrade (or subsoil fill) and the ballast, acting as a barrier filter separating the two layers. AEP Texas admitted as much in its Opening Narrative, stating that "the subballast provides a filter to prevent finer grained subgrade soils from intruding into the ballast." AEP Texas Opening Nar. at III-F-57. According to renowned railroad engineering scholar William W. Hay, "the subballast acts to prevent penetration of the subgrade by heavy ballast particles and seals off the upward movement of moisture and soil particles from the subgrade beneath."[132] This is consistent with AREMA, which states that the impervious subballast layer serves "as a buffer or filter to prevent subgrade material from penetrating the sub-ballast"—without the subballast layer, these subgrade particles will foul the permeable ballast section.[133]

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[130] GEORGE M. SOWERS, INTRODUCTORY SOIL MECHANICS AND FOUNDATIONS: GEOTECHNICAL ENGINEERING 235 (4th ed., Macmillan Publishing Co., Inc 1979), at BNSF.RP.WP.III.F-0478.

[131] AREMA Chapter 1, Part 2 Ballast, Section "Commentary", at BNSF.RP.WP.III.F-0479.

[132] WILLIAM W. HAY, RAILROAD ENGINEERING (2nd ed., John Wiley & Sons 1982), at BNSF.RP.WP.III.F-0480.

[133] AREMA Chapter 1, Part 2 Ballast, Section 2.11.1, at BNSF.RP.WP.III.F-0481.

Subgrade fill alone will not adequately meet these requirements. Subgrade fill does not—and indeed could not—perform the same necessary draining and filtering tasks that subballast does. Subgrade fill consists of precisely the fine material from which subballast protects the ballast. Moreover, without a subballast material to seal off the subsoil, rainwater on the track will move directly to the subgrade underneath where it could pool, seep into the subgrade causing degradation, and even potentially lead to swelling and shrinking of a magnitude that could damage track, regardless of how thoroughly the subgrade material is compacted.[134] As the AREMA guidelines state, a minimum six inches of compacted subballast "is considered necessary to perform the separation of layers and shielding of the roadbed from weather functions."[135] For all these reasons, subgrade does not provide an acceptable subbase for ballast and, therefore, BNSF Engineering Consultants have, consistent with BNSF practice, placed six inches of subballast in TNR yards.

The use of six inches of subballast under yard tracks is also appropriate given the construction sequence of the SARR. From both economic and efficiency standpoints, it is most sensible to use six inches of subballast and place it immediately on top of the shaped and compacted subgrade. This provides a hard working surface for constructing the track and laying ballast and avoids any moisture damage in the period between soil compaction and ballasting that would inhibit ballast trains entering the area. It also limits disruption and damage to the subgrade during the tamping process.

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[134] While Dr. Sowers acknowledges that shrinking and swelling mechanisms are complex and difficult to predict, there is a pronounced chance of shrinkage cracks 0.5 meters wide and 5.0 meters deep developing in arid areas like those across which the TNR is built. SOWERS, INTRODUCTORY SOIL MECHANICS 171-4, at BNSF.RP.WP.III.F-0482 to 0485.

[135] AREMA Chapter 1, Part 2 Ballast, Section 2.1.1.5.3.1, at BNSF.RP.WP.III.F-0486.

The same factors—rainfall, ballast contamination, potential shrinking and swelling, construction practices—that lead to the placement of a combination of ballast and subballast along the mainline and other non-yard sections of any railroad, including the TNR, exist in yards as well. Therefore, BNSF Engineering Consultants have applied the same eight inches of ballast and six inches of subballast that it has applied under setout and helper track.

(2) Material Availability Along The TNR

AEP Texas' final calculation of the transportation costs associated with ballast are contained in its Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "BALLAST UNIT COSTS." This electronic workpaper indicates that ballast for the TNR will be delivered by rail from quarries that currently supply ballast to the BNSF lines in this area. BNSF Engineering Consultants agree that there are sufficient sources of track ballast and subballast available along the TNR. As discussed more fully in Sections III.F.3.b.(4) and III.F.3.i, BNSF Engineering Consultants accept AEP Texas' general methodology of determining a transportation additive for track ballast, and in fact adopt it in determining the costs to cover transportation to TNR railheads for other materials. However, they have made adjustments to the railheads on the TNR to address track construction scheduling and sequencing issues, and correct for calculation errors made by AEP Texas. These changes, addressed below, ultimately impact BNSF's unit costs for subballast and ballast.

(3) Ballast and Subballast Quantities

In its Opening Evidence, AEP Texas provided drawings of standard track sections relying on AutoCAD 2004 software to determine the quantities of ballast and subballast for these standard track cross-sections.[136] In the first of two errata filings following the submission of its

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[136] AEP Texas Opening Workpaper Vol. 21, pp. 10724-37.

Opening Evidence, AEP Texas corrected its ballast quantities, subtracting the amount of ballast that would be replaced by the tie which is imbedded in it.[137] The recalculated final costs reflecting the decreased ballast quantity are found in the AEP Texas First Errata electronic workpaper "Ballast subballast.xls," and it is this statement of quantities that BNSF Engineering Consultants have addressed.[138]

For determining ballast and subballast quantities, BNSF Engineering Consultants generally accept the formula developed by AEP Texas, with the exception of its quantity calculations for curves between one and three degrees. On these curves, AEP Texas failed to account for the equilibrium elevation at the speeds present on the TNR, *i.e.*, a train traveling around a curve at a particular speed is subject to centrifugal forces and at a certain height and angle (the equilibrium elevation), the outside rail is made to bear half the force/weight of the passing train. The appropriate banking (superelevation) height for the outside rail is obtained by the placement of additional ballast underneath the tie, and is an important means of decreasing the opportunity for derailment. AEP Texas accounted for this factor in determining the quantity of ballast under curves that are three degrees and higher, but failed to apply the same principles in determining ballast quantities on curves under three degrees. When this factor is calculated in the manner laid out in the AREMA guidelines, these TNR's one to three degree curves require

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[137] Letter from Daniel M. Jaffe to Brooke L. Gaede of April 23, 2004, at 2.

[138] This is one of several instances where AEP Texas has provided inconsistent evidence pertaining to the same track component. AEP Texas' schematics show a crowned top subballast with a 1/4 inch per foot slope, but the subballast quantities where calculated correctly to reflect the use of a flat subballast top. The crown would be inappropriate because, when using a track laying machine, the subballast needs to be flat, as a crown in the subballast will damage the ties under the weight of the tracklaying equipment. BNSF Consulting Engineers, therefore, have not adjusted these quantities to reflect the schematics.

the same amount of ballast under-tie as required for a five degree curve.[139] BNSF Engineering Consultants have adjusted the ballast quantities for these curve sections accordingly.

Additionally, AEP Texas failed to account for any of the ballast and subballast quantities and the associated installation costs for the 21 miles of TNR branch and spur tracks that it has included in its schematics. BNSF Engineering Consultants corrected AEP Texas' quantities to include these sections.[140]

(4) Unit Costs

(a) Ballast

AEP Texas determined a unit cost for ballast by averaging a combination of prices derived from independent quarry quotes and a price list provided by BNSF in discovery.[141] AEP Texas calculated the transportation component of each of the unit prices by multiplying the mileage between the distributor and the destination/railhead by the per ton mile transportation additive of $0.035 per ton mile applied by the Board in *WPL*. AEP Texas then developed a unit cost of ${ } per cubic yard from the average of those prices.[142] BNSF accepts this general method for computing a unit price for ballast, though BNSF Engineering Consultants have made adjustments to the TNR delivery points that have a minor impact on the total unit cost of ballast, as described below.

BNSF Engineering Consultants have determined that an additional railhead for ballast and subballast distribution, located at Alliance, Nebraska, is necessary to achieve completion of

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[139] BNSF.RP.WP.III.F-0487.

[140] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Total Cost."

[141] AEP Texas' Opening Workpaper Vol. 21, pp. 10748-10750

[142] *See* AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "BALLAST UNIT COSTS."

construction within the time frame AEP Texas has proposed. Ballast is one of the few track materials for which AEP Texas has provided delivery along the TNR to a substantial number of locations, requiring minimal adjustment to the transportation component of the unit cost. BNSF Engineering Consultants have adjusted the ballast cost to reflect the transportation to this single, additional railhead, applying AEP Texas' methodology, outlined above.[143] BNSF Engineering Consultants have also applied this same methodology to determine the transportation additive for all material unit costs that did not include sufficient delivery, as described in Section III.F.3.i below.

BNSF Engineering Consultants also correct for two errors in AEP Texas' calculation of its ballast unit cost. First, the distance that AEP Texas applied in developing the transportation cost from the Granite Canyon quarry to Sterling, Colorado, relied on the use of a railroad that no longer exists.[144] BNSF Engineering Consultants have corrected the transportation component to reflect the fact that ballast will have to travel a longer distance over an alternative route.[145] Second, AEP Texas indicated in its workpapers that it was using the Davis quarry cost that BNSF supplied in discovery, but then used a different (and lower) cost in its actual unit cost calculations.[146] BNSF Consulting Engineers have included the correct unit cost for the Davis

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[143] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "BALLAST UNIT COSTS."

[144] According to its workpapers, AEP Texas routed the ballast from Sterling, Colorado, to Cheyenne, Wyoming, across a railroad that no longer exists there. *See* AEP Texas Opening Workpaper Vol. 21, at 10767, and BNSF.RP.WP.III.F-0489 to 0491.

[145] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "BALLAST UNIT COSTS."

[146] AEP Texas indicates its use of the Davis quarry unit cost in Opening Workpaper Vol. 21, p. 10750, but relied on a different, less expensive unit cost in Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "BALLAST UNIT COSTS."

quarry. After correcting these errors, BNSF witnesses recalculated the average price of { } per CY for ballast materials using the same methodology proposed by AEP Texas.

(b) Subballast

In developing its unit costs for subballast, AEP Texas did not take an average of various costs as it did for ballast, but instead extracted a single material unit cost of ${ } per net ton from a single BNSF AFE produced in discovery—a unit cost that is out of line with the real-world cost of subballast.[147] AEP Texas' total per ton cost of { } was determined by using the cost shown for {

}, the only transportation cost included in the Complainant's subballast unit cost. AEP Texas also independently determined the labor cost of placing subballast, using a per mile quote from Windgate Constructors.

BNSF accepts the material cost of { } per net ton extracted from the AFE, although AEP Texas's own workpapers show that it obtained a bid for a comparable stone at a significantly higher price.[148] BNSF Engineering Consultants disagree, however, with the use of the dump train rental portion of the { } cost as the complete cost of transportation. Basing a total transportation cost on this single dump train rental fee is problematic because it does not take into account the cost of transporting the dump train to the actual railhead or the cost of the dump train crew needed to unload the subballast. Moreover, it is inappropriate to use the same dump train rental cost for the TNR project as that used (and shown in the AFE as "per day") on a

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[147] In the course of discovery, BNSF produced a master list of AFEs, and then produced all AFEs that were requested by AEP Texas. Out of this substantial amount of BNSF bid data, AEP Texas selected a single unit cost from BNSF AFE A980010, which is included in AEP Texas's workpaper Volume 21, at p. 10751.

[148] AEP Texas' workpapers included a quote of $3.75 per net ton from Guernsey stone, at p. 10749

job where BNSF obtained subballast from the Guernsey quarry and delivered it to the Guernsey Tunnel project which was only five miles away. It is unrealistic to assume that a rental fee for use over a five-mile distance would translate to a rental fee for movements travelling over 208 miles from quarry to jobsite. Accepting AEP Texas' material cost of { } and their assumption that this subballast price would be available at the same quarries as the ballast material, BNSF developed the subballast transportation cost by applying the same methodology that AEP Texas used to determine the transportation portion of its ballast cost.[149] The resulting unit price for subballast material and transportation is { } per net ton. BNSF accepts the per mile cost for labor that AEP Texas developed from the Windgate Constructors quote.[150]

c. Ties

(1) Tie Specifications

In its Opening Evidence, AEP Texas included two types of wooden crossties for use in constructing the TNR. AEP Texas Opening Nar. at III-F-61. For mainline track, AEP Texas proposed 7"x 9"x 8'- 6" Grade 5 ties, and for yard, setout and helper tracks, it proposed 6"x 8"x 8'- 6" Grade 3 ties. BNSF Engineering Consultants accept the use of the 7"x 9"x 8'- 6" crossties at the AEP Texas spacing of 20.5 inches for all TNR mainline locations. BNSF also accepts the Grade 3 ties at the 24-inch spacing that AEP Texas specified for yard, setout and helper track as adequately supporting the track and distributing the train loading to the ballast and subballast sections.[151]

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[149] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "BALLAST UNIT COSTS."

[150] BNSF Engineering Consultants' discussion of the Windgate quote for all track installation costs appears in Section III.F.3.j.

[151] AEP Texas discussed tie spacing in III.F.3.b Ballast, on p. III-F-58.

In their review of AEP Texas' tie evidence, BNSF Engineering Consultants discovered an inconsistency between AEP Texas' specifications for branch lines and what it has actually costed out for those sections in its spreadsheets. On page III-F-61 of its Opening Narrative, AEP Texas stated that branch lines are being constructed with the Grade 5 ties, but then costed the ties for these lines segments using the less expensive Grade 3 ties.[152] BNSF has followed the specification that AEP Texas spelled out in its Narrative, and has placed Grade 5 ties on all branch lines.

(2) Tie Quantities

The conversion factors used by AEP Texas to calculate tie quantities (3,091 ties per mile at the 20.5-inch spacing and 2,640 ties per mile at the 24-inch spacing) have been accepted by BNSF Engineering Consultants, as has AEP Texas' methodology for calculating final quantities.[153] With the exception of BNSF Engineering Consultants' correction for the Complainant's failure to place Grade 5 ties on branch lines, the differences between AEP Texas' and BNSF's final crosstie counts are due to BNSF's minor adjustments to the configuration for the TNR, as described in Section III.B.1, and summarized in the introduction to Section III.F.3.

(3) Unit Costs

AEP Texas' unit cost for mainline Grade 5 ties was developed from RS Means.[154] However, its $31.00 unit cost includes only the 2000 RS Means material portion of the total unit cost. BNSF Engineering Consultants accept AEP Texas' use of RS Means to determine the price

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[152] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls;" the Windgate quote appears in AEP Texas' Opening Workpaper Vol. 21, pp. 10738-9.

[153] AEP Texas' development of the conversion factor is contained in AEP Texas electronic workpaper "IIIFTOTAL.xls" worksheet "Track Quantities" and is summarized in AEP Texas Opening Exhibit III-F-1.

[154] AEP Texas Workpaper Vol. 21, p. 10773.

for these ties, but have added ten percent for O&P, for a total unit cost of $34.70, including delivery.

AEP Texas' yard, setout and helper track crosstie costs for the TNR were developed from a price quote by Koppers Industries.[155] The Koppers quote included prices for 6"x 8"x 8' - 6" Grade 3 ties, as well as for 7"x 9"x 8' - 6" Grade 5 ties (though, as described above, AEP Texas used the less expensive RS Means price to develop its unit price for Grade 5 ties). The prices quoted by Koppers gave both a delivered cost and a cost that applied when the ties were picked up from the plant. The quote showed that Grade 3 ties were available from the Denver plant for delivery to Gillette, Wyoming, or from the Somerville, Texas plant for delivery to Vernon, Texas, or for pick-up at both of those plants. Quotes for the Grade 3 (6" x 8" x 8' - 6") ties showed a delivered price of $27.05 each to Gillette, Wyoming, (or $20.85 at the Galesburg, Illinois, plant) and $24.00 each delivered to Vernon, Texas (or $21.00 at the Somerville, Texas plant). There is no indication anywhere in the quote that these Grade 3 ties would be available at the Denver Plant. Nonetheless, AEP Texas developed two unit costs for the Grade 3 ties, one of which is the supplier-delivered cost from Somerville, Texas of $24.00, and one for which AEP Texas improperly took the un-delivered, material-only cost for Galesburg, Illinois plant ties, and added on an independent delivery fee, taken from the internet, reflecting the cost of shipping those ties from Denver to Gillette, Wyoming. However, as the quote shows, and BNSF Engineering Consultants have confirmed, the Denver plant does not make Grade 3 ties, and therefore cannot serve as AEP Texas' source for those ties.[156] Moreover, the internet insta-quote

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[155] AEP Texas Workpaper Vol. 21, pp. 10770-1.

[156] BNSF.RP.WP.III.F-0492.

of $718 from the American Freight Company ("AFC") is totally unsubstantiated.[157] Nothing in the AFC quote explains either the commodity, quantity, origin or destination of the shipment, but AEP Texas' witness' handwritten notes on the document state that the quote pertains to "Kopper Ind." and "Denver to Gillette" and divide the $718 quote by "200" to derive a unit cost of $3.59. Nowhere in AEP Texas' evidence is the significance of the amount 200 substantiated. AEP Texas added this Denver-to-Gillette freight charge to the $20.85 per tie cost at the Galesburg, Illinois plant to derive a unit cost of $23.27 which it then applied to half of the TNR Grade 3 tie quantity. Clearly, this is unacceptable—AEP Texas cannot rely on a quote from a specific location (Galesburg, Illinois) and then price the transportation as though the material were located more advantageously (Denver, Colorado). Therefore, BNSF Engineering Consultants accept the unit costs quoted by Koppers that reflect a transportation cost from the actual place where the ties are located—$24.00 from Summerville to Vernon, Texas, and $27.05 from Galesburg, Illinois to Gillette, Wyoming. As described in Section III.F.3.i, BNSF Engineering Consultants adjusted the transportation costs to account for the additional railheads required to maintain AEP Texas' construction schedule.

(4) Transition Ties

According to its Opening Evidence, AEP Texas ignored the need for transition ties and did not place them anywhere on the TNR. The use of transition ties in areas such as road crossings and turnouts is well documented in both AREMA and BNSF standards.[158] Because of the transition from a flexible track structure to a rigid one, the additional tie length is required to

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[157] AEP Texas Workpaper Vol. 21, p. 10772.

[158] Sample BNSF standards for transition ties at turnouts are included in BNSF.RP.WP.III.F-0493 to 0495; AREMA Plan No. 913-52 uses varying sized timbers to transition, BNSF.RP.WP.III.F-0496.

insure stability and minimize wear of materials at these locations. To avoid having to purchase and stock several tie sizes, railroads typically use a standard transition tie that can be installed in multiple settings. The BNSF standard is to use a series of ten 10'x 7"x 9" wood ties ahead of each turnout point of switch and at road crossings where additional support for the track and for the crossing materials is required. The longer ties at highway crossings spread the load and allow the use of wider crossing surface materials that better withstand the highway traffic loads. Accordingly, BNSF Engineering Consultants have placed transition ties at turnouts and road crossings. The unit cost of ${ } for transition ties is taken from the BNSF February 2000 price list produced by BNSF discovery.[159] BNSF Engineering Consultants have also adjusted the transportation component of this cost to reflect changes made to TNR railheads as discussed in Section III.F.3.i.

d. Track (Rail)

In its Opening Narrative section on rail, AEP Texas specified the use of 136-pound standard CWR for TNR mainline track, with premium rail for the track between Donkey Creek and Alliance, between Donkey Creek and South Logan, and on mainline areas where curves are three degrees or greater. AEP Texas stated that it would place 136-pound standard rail on all other mainline, branch, and spur tracks. AEP Texas also stated that it would use 115-pound relay CWR rail for yard, interchange and setout tracks. AEP Texas Opening Nar. at III-F-62. There are several points in AEP Texas' evidence on rail where AEP Texas strayed from the specifications. As described below, BNSF has determined costs that are consistent with the standards that AEP Texas describes in the rail section of its Narrative, Section III.F.3.d.

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[159] BNSF.RP.WP.III.F-0497; the BNSF price list was originally produced as BNSF/AEPTX 06490.

(1) Mainline

(a) Specifications

AEP Texas placed 136-pound standard CWR rail along most of the TNR mainline. As described above, AEP Texas placed 136-pound premium rail in three places—Donkey Creek to Alliance, Donkey Creek to South Logan, and mainline curves of three degrees or more. AEP Texas Opening Nar. at III-F-61. The description of premium rail use in Section III.B, however, excluded the Donkey Creek to South Logan segment—another example of AEP Texas inconsistency. AEP Texas Opening Nar. at III-B-21. An examination of AEP Texas' cost spreadsheets reveals that AEP Texas did not place premium rail on the Donkey Creek to South Logan line segment as it stated it would in its III.F.3 track construction specifications, but instead used less expensive standard 136-pound rail. BNSF Engineering Consultants have corrected this, and accept the remaining AEP Texas specifications for the weight and use of rail for the TNR mainline.

(b) Quantities

Upon investigation of AEP Texas' rail evidence, BNSF Engineering Consultants have discovered that AEP Texas dramatically overstated their total rail material costs by over $80 million dollars. AEP Texas misstated the quantities for premium rail by including twice the quantity of rail that was being delivered to both locations as a result of an incorrect workpaper equation.[160] BNSF Engineering Consultants have corrected this error. AEP Texas calculated rail quantities assuming a 1440-foot length, which is the standard manufacturer length for rails, and BNSF has used this length in determining its restated rail quantities. With the exception of the

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[160] The miscalculation occurs in AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "TOTALS," cells D21 and D22.

removal of AEP Texas' $80 million miscalculation and conforming AEP Texas' workpapers to the standards set out in its Narrative, the differences between BNSF's and AEP Texas' quantities of mainline rail are a result of minor track adjustments made by BNSF operating and capacity witnesses.

(c) Unit Costs

According to AEP Texas' Opening Narrative, it obtained unit costs for all rail types from the Pohl Corporation based in Houston, Texas. AEP Texas has included in its Opening workpapers a phone record of what appears to be a very general estimate of rail costs.[161] In fact, at the top of the phone record is that statement "WILL FAX QUOTE," indicating that the estimate is less than firm and will be replaced by an actual quote. However, AEP Texas has taken the Pohl estimates and added the costs for transporting the rail to Gillette, Wyoming and to Vernon, Texas.[162]

AEP Texas' use of the Pohl estimate is problematic in two ways. First, the admittedly opaque phone record indicates that the rail would be available for delivery to Gillette and/or Vernon from the plant in Reading (Pennsylvania), rather than Houston, where Pohl maintains a district office. Therefore, transportation costs need to cover delivery from the rail location (as implied in the estimate), not the sales office. Second, BNSF Engineering Consultants have been

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[161] AEP Texas Opening Workpaper Vol. 21, p. 10779.

[162] AEP Texas Second Errata electronic workpaper "IIIFTOTAL," worksheet "MATERIAL UNIT COSTS."

unable to obtain any information clarifying or verifying the content of the Pohl estimate, either from AEP Texas or from Pohl itself.[163]

As a result of the difficulties in clarifying the Pohl estimate or obtaining a more specific quote from them, BNSF Engineering Consultants have instead applied the unit costs for the three rail types contained in the BNSF materials price list which BNSF produced in discovery.[164] For 136-pound premium rail, BNSF Engineering Consultants have applied the BNSF unit cost of { } per LF after adjusting the cost for transportation from Pueblo, Colorado, where the rail is welded, to the various TNR railheads, as described in III.F.3.i. For 136-pound standard rail, they have taken a unit cost of { } from the 2000 BNSF price list, and similarly added transportation for a unit cost of { }. The BNSF price list cost for 115-pound relay rail of { } per LF is likewise adjusted for transportation from the Pueblo plant.

(2) Branch and Destination Spurs

AEP Texas stated in its Opening Narrative that branch and spur tracks would be built with 136-pound standard rail. AEP Texas Opening Nar. at III-F-61. AEP Texas further stated that it would use 136-pound premium rail on branch lines with curves that are greater than three degrees. AEP Texas Opening Nar. at III-B-22. However, in determining the cost for rail for these track sections, AEP Texas used the cost for the less expensive 115-pound relay rail

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[163] As shown in AEP Texas' workpapers, BNSF witness Gouger was unable to obtain information from Pohl, and enlisted the help of BNSF personnel responsible for procurement, who were also unsuccessful. BNSF.RP.WP.III.F-0498 to 0500. Additionally, BNSF made a request for additional supporting workpapers pertaining to the Pohl memorandum, and were informed that AEP Texas had no additional relevant workpapers. *See* AEP Texas Response to BNSF's Third Request for Workpapers, Docket No. 41191 (Sub-No.1) (April 2, 2004), at 5, which is included in BNSF's Reply electronic workpapers.

[164] BNSF.RP.WP.III.F-0501; the BNSF price list was originally produced as BNSF/AEPTX 06490.

instead.[165] BNSF Engineering Consultants have followed the specifications that AEP Texas laid out in its Narrative, and use 136-pound standard rail on branch lines and on destination spurs, and premium rail on curves over three degrees.

As described in III.B.3, BNSF has added a staging track to the Campbell Subdivision branch line. Additionally, as discussed in Section III.F.3.j, AEP Texas has omitted the labor costs associated with laying the track for all 21 miles of TNR branch and spur lines. BNSF Engineering Consultants have corrected this error.

(3) Yard and Setout Tracks

(a) Yard Tracks

In its Opening Narrative, AEP Texas stated that it would use 115-pound relay CWR rail in yards, with the exception of the main running tracks that pass through the yard, which were to be constructed to the same standard as the adjacent mainline tracks. AEP Texas Opening Nar. at III-B-28. AEP Texas placed two yards along the TNR, at Alliance, Nebraska and at Las Animas Jct., Colorado, the TNR's largest interchange point. AEP Texas Opening Nar. at III-B-30. BNSF Engineering Consultants accept this specification.

BNSF witnesses Mueller and Wheeler evaluated AEP Texas' yard configurations at both Alliance and Las Animas and determined that certain sections of these yards did not have adequate capacity to perform the functions that AEP Texas specified in its Opening Evidence. They also determined that particular yard sections could be downsized based on BNSF traffic changes. Additionally, BNSF has relocated the fuel and inspection facilities at the Las Animas Yard to a more appropriately situated yard at Amarillo, Texas, after determining that placing

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[165] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "Track Quantities."

these facilities at Las Animas meant that trains would be stranded along the TNR without fuel and/or would exceed 1,500 miles between inspections. These changes are described below.

At Alliance, BNSF witnesses Mueller and Wheeler have determined that six receiving/departure tracks can be removed from the East Yard, and two tracks can be removed from the South Yard, due to the elimination of certain TNR traffic. There have also been minor changes to yard track lengths and configuration in order to serve the Alliance facilities, as described in III.B.3.

On Opening, AEP Texas placed its other TNR yard at Las Animas Jct., Colorado. However, as described in Section III.B.3.b, BNSF operating witnesses have determined that the placement of the TNR's secondary fueling and inspection facilities at Las Animas is not feasible. They have discovered that AEP Texas' placement of fueling and inspection operations at Las Animas is problematic, leaving multiple trains without fuel and/or in violation of inspection requirements. As a result of these findings, BNSF has moved the Las Animas fueling and inspection facilities to Amarillo and have built the TNR's second yard there, adding three fueling and inspection tracks to serve these facilities. BNSF capacity experts have also placed an additional crossover in the Amarillo Yard to facilitate interchange. Finally, they have placed additional tracks there to support the facilities that BNSF has located there.

The Las Animas yard continues to serve as an interchange location, and while BNSF Engineering Consultants have removed three yard tracks that AEP Texas placed there on Opening, it has added another interchange track.

BNSF Engineering Consultants' yard rail quantity calculations reflect the changes made to the Las Animas, Amarillo and Alliance yards.[166] In all, BNSF has constructed the TNR with a total of 61.34 miles of yard track.

(b) Setout Tracks

AEP Texas stated that it intends to have the setout tracks double as temporary storage tracks for maintenance-of-way equipment. AEP Texas Opening Nar. at III-B-22. While AEP has built the setouts as double-ended, they did not include sufficient length to accommodate the dual purposes of holding bad-order cars and MOW equipment. BNSF Engineering Consultants have constructed one of the two setouts around each FED with an additional 1,400 feet, the length of track needed to accommodate large pieces of maintenance equipment, including ballast trains, welded rail delivery and pick-up trains, and other large production surfacing gang equipment consists.[167] Ballast and rail trains can easily reach 1,400 feet in length, and all of this equipment must clear the main tracks and operating sidings to avoid delaying trains or reducing capacity on the line. Under the BNSF configuration with elongated sidings, both the operating and maintenance needs will be efficiently accommodated.

AEP Texas built only 0.11-mile long (or 581 foot-long) setout tracks, which is contrary to its statement in the Narrative that it would provide for 600 feet of setout track in the clear. AEP Texas Opening Nar. at III-F-78. AEP Texas' approach does not account for the distance from the end of the turnout to the clearance point. For the other setout track located near FEDs which

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[166] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Rail."

[167] As explained in Mr. Albin's discussion of maintenance-of-way issues in Section III.D.4, it is important to have maintenance equipment stored close by. However, the equipment needs to be kept off the mainline to minimize disruptions to traffic flows. This requires the construction of maintenance-of-way tracks sufficient to accommodate the longest MOW equipment. BNSF.RP.WP.III.F-0502.

have not been elongated, BNSF Engineering Consultants have added the correct length to provide 600 feet in the clear, as AEP Texas specified.

(c) Interchange Tracks

According to AEP Texas, the TNR will require interchange points at the following locations: West Campbell and South Logan, Wyoming; Alliance and North Port, Nebraska; Las Animas and Sterling, Colorado; and Amarillo and Oklaunion, Texas. AEP Texas Opening Nar. at III-B-5. BNSF capacity witnesses Mueller and Wheeler evaluated AEP Texas' interchange facilities and determined that an additional crossover at the Oklaunion interchange and at the Amarillo interchange would be required. This minor change is reflected in BNSF's final track quantities.[168]

AEP Texas constructed the interchange tracks with 115-pound relay rail. AEP Texas Opening Nar. at III-F-62. BNSF Engineering Consultants accept this specification, as well as AEP Texas' unit cost for this type of rail, after making transportation cost adjustments.

(4) Crossing Diamonds

AEP Texas did not construct, and thus failed to include costs for, crossing diamonds anywhere on the TNR. This is despite the fact that AEP Texas' own research into the antecedent railroad's crossing costs concluded that the BNSF and its predecessors were responsible for constructing at least four crossings found along the TNR, and the fact that AEP Texas developed a crossing diamond unit cost.[169] BNSF Engineering Consultants, therefore, have constructed four diamonds where the TNR crosses over what would have been a pre-existing Union Pacific line—two at Northport on the Angora Subdivision near milepost 34.43, one at Sand Creek on the

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[168] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "Rail."

[169] AEP Texas Opening Workpaper Vol. 21, p. 10851.

Brush Subdivision at milepost 537.25, and one at Stratford on the Boise City Subdivision at milepost 85.48.[170]

Although AEP Texas did not include any costs for crossing diamonds, they provided a unit cost from L.B. Foster for materials and transportation only, indexed to $55,735.14.[171] While BNSF Engineering Consultants generally accept the unit cost, they have added in a very conservative cost to cover installation. Crossing diamond installation can be highly technical, depending on the particular angle of the crossing, the subgrade and the drainage characteristics of the area—as a result, the costs for installing a crossing diamond can be quite high. However, given the minimal number of crossings along the TNR, BNSF Engineering Consultants have applied only the No. 20 turnout track construction cost AEP Texas obtained from Windgate Constructors.[172] They index the L.B. Foster quote for a revised unit cost of $53,882 per crossing diamond.[173]

e. Field Welds/Compromise Joints

AEP Texas' Opening Evidence included the costs of materials used to weld rail joints as the rail is laid, as well as the costs for compromise welds that are needed at locations where the rail changes from 115-pound to 136-pound rail. AEP Texas Opening Nar. at III-F-62.

As quarter-mile sections of rail are laid on the ties, they must be welded together to provide continuous welded rail—*i.e.,* rail without joints. If the joints are not welded, they quickly become battered and chipped, which could result in broken rails in heavy tonnage areas.

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[170] BNSF.RP.WP.III.F-0503.

[171] AEP Texas Opening Workpaper Vol. 21, p. 10804.

[172] BNSF's critique of the Windgate quote for labor costs over the entire TNR is contained in Section III.F.3.j.

[173] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "TOTAL COST."

AEP Texas included field welds based on a rail length of 1,440 feet and used a material unit cost taken from six BNSF AFEs of { } per weld kit.[174] Although all of the BNSF AFEs, which included 2002 and 2003 costs, had a unit cost of { }, four of these AFEs reflected 2002 costs. Nonetheless, AEP Texas indexed the unit cost from 2003 using RS Means. BNSF Engineering Consultants accepted AEP Texas' material unit cost of ${ } and indexed it from 2002 to 2000 for a final unit cost of $50.71.[175]

Where AEP Texas' specifications called for the rail to change from 115-pound to 136-pound rail, AEP Texas included compromise welds to join the two different rail sections. However, the difference between a 115-pound and a 136-pound rail is too large to be corrected for with a simple compromise weld. The appropriate method of joining these two rails is with a compromise bar configuration.[176] AEP Texas used a unit cost from a for welds from a Southern Tier Extension Railroad Authority bid schedule, as shown in its workpapers in Volume 21 at p. 10800. This bid also includes the cost of supplying and installing a pair of compromise bars, which BNSF Engineering Consultants have used.

BNSF Engineering Consultants have also determined that AEP Texas understated the quantity of welds because of an error in its calculations, applying only four welds per FED site, rather than the necessary eight (each end of the setouts require two welds). BNSF Engineering Consultants have restated the total quantity of setout welds required.[177]

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[174] AEP Texas Opening Workpaper Vol. 21, pp. 10780-10785.

[175] BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "TOTAL COST."

[176] BNSF.RP.WP.III.F-0503A.

[177] BNSF.RP.WP.III.F-0504 to 0510.

f. Insulated Joints

Insulated joints are discussed in Section III.F.6 Signals and Communications.

g. Switches (Turnouts)

(1) Turnout Specifications

AEP Texas proposed a mixture of standard AREMA design turnouts for use on the TNR. A No. 10 turnout was used for setout tracks and many of the slow speed areas within yards and terminals. For many of the lighter density mainline segments, interchanges, and yards where speeds are moderate, they specified No. 14 turnouts. For mainlines on the heavier density segments, No. 20 turnouts were proposed. The No. 14 and No. 20 turnouts were either hand throw or electric, depending on the track signals used at the location. BNSF Engineering Consultants agree with AEP Texas' selection of the turnouts for the TNR.

(2) Quantities

AEP Texas determined the amount of turnouts needed on the TNR by reference to its track diagrams (AEP Texas Opening Exhibit III-B-1). AEP Texas Opening Nar. at III-F-63. BNSF Engineering Consultants have determined that the TNR requires more turnouts than AEP Texas included in its initial design as a result of the changes made to the configuration of the TNR, as described in Section III.B.

(3) Unit Costs

AEP Texas' pricing for each size turnout is shown in Opening Workpaper Volume 21, at page 10793. The prices were developed from a quote by Koppers Industries including transportation to Pueblo, Colorado, Vernon, Texas and Gillette, Wyoming. AEP Texas developed a separate cost for labor from the Windgate Constructors installation quote.[178] BNSF

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[178] AEP Texas Opening Workpaper Vol. 21, p. 10739.

Engineering Consultants accept the material and labor costs, and have determined that AEP Texas provided for transportation costs covering delivery to a sufficient number of locations along the TNR.

(4) Additional Turnout Components

AEP Texas provided switch heaters for all mainline switches that are found on the TNR lines above Pueblo, Colorado.[179] AEP Texas developed the material price from an independent quote from the Railway Equipment Company located in Delano, Minnesota.[180] BNSF Engineering Consultants accept the unit cost for the switch heater, as well as the cost for basic installation provided by Windgate Construction, however they have included the additional costs of integrating the device into the signals system. The total cost for the material and installation for a switch heater is $8,565.64.

AEP Texas developed a unit cost for a propane tank to fuel switch heaters, and included one propane tank for each switch heater it placed along the TNR. AEP Texas' unit price for propane tanks was based on a quote from Elkhorn Propane, which BNSF Engineering Consultants accept.[181]

(5) Switch Stands

AEP Texas' Opening Narrative did not contain any discussion of switch stands, though AEP Texas did include costs for low target switch stands on all No. 10 turnouts and developed a unit cost for power switch stands without applying a quantity to it. As described in III.F.6.a, BNSF agrees with the power switch stand unit cost and applies the cost to the powered switches,

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[179] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls," worksheet "Track Quantities."

[180] AEP Texas Opening Workpaper Vol. 21, p. 10807.

[181] AEP Texas Opening Workpaper Vol. 21, p. 10808.

but disagrees with using all low target switch stands for No. 10 turnouts outside the TNR yards.[182] BNSF Engineering Consultants have installed high target switch stands on all non-electric turnouts on mainline and sidings and low target switch stands on turnouts in the TNR yards, which is consistent with BNSF's practice of not placing low target switch stands anywhere on its mainline.[183] The main reason for BNSF's practice of placing high target stands on its mainline is visibility—low target switch stands are easily obstructed by brush or snow accumulating on the side of mainline tracks (which is less likely to occur in yards given the presence of finished inspection roads and more regular maintenance). BNSF even utilizes high target switch stands in yards. However, BNSF Engineering Consultants accept AEP Texas' placement of low stands in yard as feasible, but place high target switches at all mainline locations.

AEP Texas included quotes received from various suppliers for various types of switch stands, including solar and electric stands for power turnouts, as well as high and low target stands. BNSF Engineering Consultants generally accept AEP Texas' unit costs for the power, low and high target switch stands, although they have made adjustments to transportation costs to reflect additional railheads.

AEP Texas also received a quote for the target and target mast for the switch stands but does not include this cost.[184] BNSF Engineering Consultants accept these unit costs and have added the target cost to the low and high switch stands where they have been placed along the

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[182] The costs for powered switch stands are included in III.F.6.a Signals, while hand-thrown switch stand costs are included in the Section III.F.3 totals.

[183] BNSF.RP.WP.III.F-0511 to 0514.

[184] AEP Texas Opening Workpaper Vol. 21, p. 11026.

TNR. The target and post are essential components of both low and high switch stands, as demonstrated by BNSF specifications.[185]

Table III.F.3-2
Comparison Of BNSF's Turnout Costs With
AEP Texas' Turnout Costs

ITEM	BNSF (000s)	AEP Texas (000s)	Difference (000s)
No. 20 Turnout (Electric)	$23,022	$22,850	$172
No. 14 Turnout (Electric)	$3,485	$3,013	$472
No. 10 Turnouts (Manual)	$16,116	$16,079	$37
Switch Heaters	$1,515	$1,544	$29
Propane Tank	$256	$261	$5
Switch Stands Low Target	$123	$255	-$132
Switch Stands High Target	$180	$0	$180
Diamonds-60 Degree (RR at grade crossings)	$216	$0	$180
TOTAL	**$44,913**	**$44,003**	**$909**

Source: AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls"; BNSF Exh. III.F-1.

h. Other Track Materials (OTM)

(1) Rail Lubricators

As AEP Texas acknowledged, rail lubrication is commonly and widely used throughout the industry to reduce rail wear in curved track areas. AEP Texas Opening Nar. at III-F-64. AEP Texas placed rail lubricators on curves of four degrees or more—however, they have not placed them on every curve in reliance on a manufacturer's "rule of thumb" comment that the train movement will spread the grease three miles. *Id.* BNSF's own experience, however, suggests a different "rule of thumb." As can be seen on BNSF's track charts at Crawford Hill, an area with large repeating curves with approximately one mile between them, BNSF has placed

[185] BNSF.RP.WP.III.F-0511 to 0514.

rail lubricators on each curve that is over three degrees.[186] As a result of BNSF's experience on this and other track sections, BNSF Engineering Consultants place them on each appropriate curve along the TNR, regardless of its proximity to another curve. AEP Texas also excluded lubricators for all curves except those that reach four degrees, which excludes numerous curves that are 3 degrees 45' (or 3.75 degrees), which is a nearly identical curve for lubrication purposes. Given the lack of substantial difference between a four degree and a practically four degree curve, and BNSF's own approach of placing lubricators on every three degree curve, BNSF Engineering Consultants conservatively place the lubricators on every curve that is 3.75 degrees and more.

AEP Texas' unit cost is based on a rail lubricator quote from A&K which BNSF Engineering Consultants assume is for a single track lubricator.[187] An installation cost was added to this material cost, based on a BNSF AFE produced in discovery, for a total cost of { } per lubricator. BNSF Engineering Consultants accept this single track lubricator unit price, after making minor transportation adjustments. As a result of BNSF's more appropriate placement methodology, BNSF witnesses have found 74 (compared to AEP Texas' 53) places on the TNR where a rail lubricator is necessary, and have restated the total costs for this component to account for all these locations.

(2) Tie Plates, Clips, Spikes and Anchors

(a) Specifications

AEP Texas provided for the following combinations of plates, spikes, clips and anchors on TNR ties and rails. On areas of track with curves greater than three degrees, AEP Texas

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[186] BNSF.RP.WP.III.F-0515.

[187] AEP Texas Opening Workpaper Vol. 21, p. 10805.

specified Pandrol plates and clip, with four screws per plate, for a total of eight screws per tie. For all other track segments, including curves up to three degrees, AEP Texas used a 14-inch tie plate and only two spikes per plate, for a total of only four spikes per tie. AEP Texas Opening Nar. at III-F-64 to 65. As discussed below, BNSF's minimum spiking standard is three spikes per plate.[188] AEP Texas defends its position by reference to four photographs of locations where BNSF track ties have tie plates with only two spikes (all on the Boise City Subdivision).[189] However, included right next to those photos in AEP Texas' Workpaper Volume 21 are pictures of locations with three or more spikes per tie plate (10813-10819). Additionally, a survey of the photos that AEP Texas has included in it evidence, but has not cited, show that the photographs do not bear out AEP Texas' assertion that BNSF uses a two spikes per plate pattern. For example, of the 84 photos taken on the Angora Subdivision, the photo that AEP Texas chose to include in the OTM Section is the only one that shows two spikes per tie plate.[190] In the other 170-plus photos where the fastening system can be seen, it is clear that the majority were taken of wood ties with either three or four spikes per tie plate, or Pandrol plates, clips and screw spikes on tangent and curved track, or concrete ties with clips—all of which have greater fastening properties than the fastening system AEP Texas has provided for the entire TNR. Where BNSF lines are constructed with wood ties, the overwhelming majority of ties have three to four spikes per plate, including when the tracks are in tangent. Although there may be some occasional instances where only two spikes remain in a plate, that is the exception, not the norm, and certainly not a solid basis for establishing a construction standard for a high density railroad.

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[188] BNSF.RP.WP.III.F-0516 to 0518.

[189] AEP Texas Opening Workpaper Vol. 21, 10825-10828.

[190] These photographs are included with AEP Texas' Opening electronic workpapers, and can be found in folder "III-F." subfolder "Photos."

BNSF Engineering Consultants have used the BNSF standard spiking patterns—three spikes per tie plate on tangent sections and curves up to one degree, four spikes per tie plate on curves between one and three degrees, and Pandrol plates with four screws per plate on curves greater than three degrees. Two spikes per tie plate is an acceptable pattern only for yard and setout tracks.

AEP Texas also used box anchors on both sides of every other tie on mainline and branch lines where the curvature does not exceed three degrees. It also stated that anchors were placed on both sides of every tie for 200 feet on either side of a crossing or turnout. AEP Texas Opening Nar. at III-F-65. In yards and on setout tracks, AEP Texas placed anchors on every fifth tie. *Id.* BNSF Engineering Consultants agree with the specifications that AEP Texas spelled out in its Opening Narrative. However, contrary to its assessment in the Narrative, AEP Texas did not box anchor every other tie in yards and on setouts, and did not place anchors at at-grade crossing approaches when it developed its total costs. BNSF Engineering Consultants have fixed the calculation for yard and setout anchors and has included those anchors on every tie for the 200 feet of track preceding and following each crossing.

(b) Unit Costs

The unit costs for spikes, clips, plates and anchors come from a series of quotes AEP Texas obtained from various suppliers. BNSF Engineering Consultants generally accept the material unit costs listed in the workpapers.[191] BNSF Engineering Consultants have made adjustments to the transportation costs associated with these materials, which the exception of anchors and tie plates which already include delivery to a sufficient number of TNR locations.

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[191] AEP Texas Opening Workpaper Vol. 21 at pp. 10802-4.

The restated unit costs for all these materials are stated in BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "TOTAL COSTS."

(3) Derails and Wheel Stops

Two additional track items that have been used by railroads in the past and are typically used today by any railroad operating in the United States are derails and wheel stops. AEP Texas provided for derails at all turnouts leading to setouts in close proximity to FEDs, and at turnouts in the Alliance Yard where railcars are stored for maintenance purposes. AEP Texas Opening Nar. at III-F-66. BNSF Engineering Consultants accept AEP Texas' use of RS Means to determine the price of derails and installation.

It is also standard railroad practice to use steel wheel stops at the end of each stub-ended track to keep rail cars from rolling off the end of the rail. Steel wheel stops are either bolted directly to the rail on which they sit or they are attached using a set of self-tightening wedges that grab tighter when a car wheel rolls against the wheel stop. BNSF Engineering Consultants agree with AEP Texas' placement of a pair of fixed wheel stops on each stub-ended track, as well as its use of RS Means to develop a unit cost, including installation.

i. Materials Transportation

(1) Off-Line Transportation

Off-line materials transportation is an important component of track construction. It involves moving a considerable quantity of track materials from the various suppliers' sources across the country to where the railroad is situated, and represents a significant expense for a construction project the size of the TNR. AEP Texas stated in its Narrative that material transportation costs had been addressed in the costs for individual materials, either as a component of a total unit cost (where RS Means was used or where the supplier had included the

transportation in its quote) or as an additive that AEP Texas calculated and applied to the material unit cost. AEP Texas Opening Nar. at III-F-66.

Off-line transportation costs cover the often substantial expense associated with delivery of a track material from the supplier to one of several strategically located railheads from which track construction simultaneously originates from. The smaller counterpart to this off-line transportation is on-line transportation, which is the transportation of track materials from where they are locally deposited to the nearby construction site, or in the case of railroad construction, from the strategically located railhead along the newly built track as construction advances away from that point. According to AEP Texas' construction schedule, the TNR project would be broken into 11 track packages. AEP Texas Opening Nar. at III-F-113. AEP Texas' off-line transportation costs for the various track materials should then reflect the placement of sufficient railheads along the TNR to supply the materials needed to complete these 11 track packages. However, AEP Texas' Opening Evidence did not disclose the railhead locations it envisioned. Even without the benefit of knowing where AEP Texas intended to place its railheads (or assuming that the ten locations to which AEP Texas procured ballast delivery represent its railheads) for every track material, BNSF Engineering Consultants have analyzed AEP Texas' transportation costs and have found that where the transportation has been included in material bids, those costs would not cover transportation to a sufficient number of TNR locations to support simultaneous construction of 11 track packages. This is largely a result of the inconsistent manner in which AEP Texas obtained transportation costs from material suppliers—some materials are delivered to one railhead, while other materials are delivered to two or three. In the case of ballast, however, transportation to ten locations was secured, while rail lubricators are delivered to a single TNR location. This sporadic delivery has no discernible correlation to

the sequence of AEP Texas' track laying schedule. BNSF Engineering Consultants have concluded that the transportation costs included with a majority of material unit costs are insufficient to cover delivery to a sufficient number of locations along the TNR.[192]

BNSF Consulting Engineers then independently analyzed the potential placement of railheads along the TNR in conjunction with the very aggressive construction schedule that AEP Texas set for track construction. AEP Texas' construction schedule allows only 12 months for Windgate Constructors to lay track for the entire TNR. Assuming a six day work week, and using AEP Texas' estimate that the Windgate team would be able to lay 0.5 miles of track per day using two track laying machines (one in each direction), BNSF Consulting Engineers have determined that railheads need to be situated approximately every 313 miles.[193] According to this calculation, the TNR would require a total of between six and seven railheads, depending on a particular track material's point of origin. Because the transportation of materials for constructing the TNR will be primarily by rail due to the large quantity of material required and the cost compared to other transportation, BNSF witnesses have located those railheads at locations that are served by existing railroad lines, not including the BNSF line being replicated by the TNR, for reasons addressed below. Based on these new railhead locations, dictated by AEP Texas' 12 month track laying schedule, BNSF Engineering Consultants have separately critiqued the transportation costs for each individual track material that is required for the TNR. They have only adjusted the transportation component of certain track material unit costs to reflect additional railhead placement where necessary.

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[192] BNSF Engineering Consultants have determined that the transportation costs that AEP Texas included were sufficient for the following materials addressed in Section III.F.3—turnouts, rail anchors and tie plates.

[193] AEP Texas discussed the construction schedule and its assumption of 0.5 miles of track a day in the Opening Narrative at p. III-F-113.

AEP Texas will likely argue on rebuttal that it should not incur additional transportation costs because materials have been delivered to a handful of locations on the TNR route, or even a single location, and will be transported along the TNR by the company that is providing track installation. However, this is clearly an unreasonable assertion. AEP Texas has obtained a quote from Windgate Construction Inc., which covers "loading and unloading and *transportation of the materials at the jobsite.*"[194] AEP Texas' transportation costs, however, are clearly based on an assumption that Windgate would provide more than jobsite transportation, and would provide transportation, in certain cases, across South Dakota, Wyoming, Nebraska, Colorado, Oklahoma and Texas. For instance, AEP Texas obtained a cost for rail lubricators that included transportation to a single location, Pueblo, Colorado. AEP Texas does not provide for the additional transportation expense of distributing this material to any other locations along the more than 1,100 miles of the TNR.

Aside from the fact that it is irrational to assume that "jobsite transportation" might include multistate travel over the 1,100-plus miles of the TNR, transportation of certain materials over these distances requires substantial expense and planning that simply is not reflected in the price quote obtained from Windgate. The fact that AEP Texas has obtained varying levels of transportation cost coverage for different materials (in the case of ballast, to a substantial number of locations, and in the case of rail lubricators, to a single location) is not reflected in the Windgate quote. There are no statements reflecting the fact that Windgate planned on providing very substantial and expensive transportation in one instance, and more traditional and limited on-line transportation in another. Additionally, the Windgate quote also displays no sign of consideration of the extensive logistical planning that would be required to move the individual

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[194] AEP Texas Opening Workpaper Vol. 21, p. 10738 (emphasis added).

items, either by rail or truck (if even feasible) to the various TNR railheads before construction of the line was to begin—an exercise that is even further complicated by the fact that AEP Texas was entirely inconsistent regarding the locations and the number of locations to which materials are delivered by individual suppliers. Moreover, the fact that AEP Texas calculated and included in its ballast cost the considerable expense of transporting ballast to ten locations along the TNR is entirely inconsistent with the idea that the Windgate quote reflects the expense of transporting all track materials along the entire length of the TNR.

If AEP Texas were taking the six-plus years it would require to build the TNR as a single continuous strand, it *might* be defensible to leave transportation to a builder who would be able to bring the supplies along the line behind it using the newly constructed railroad. However, AEP Texas settled on an incredibly aggressive construction schedule that envisions constructing multiple sections of the TNR independently and simultaneously, which it estimated would require simultaneous construction from 11 separate origins along the TNR. Construction from 11 locations simultaneously requires the placement of sufficient track components at each point of origination. AEP Texas has not provided for the delivery of materials to anywhere near the sufficient number of locations to support the independent construction of these TNR segments, and instead leaves this monstrous task to the Windgate team, who demonstrate no signs of having taken it on. Clearly this is not what is contemplated under the Windgate quote's "transportation at the jobsite."

It should also be reiterated that because of the extremely accelerated manner in which AEP Texas planned the construction schedule, with simultaneous construction, it could not use the yet-to-be-built TNR mainline to transport the materials to the various construction sites. Additionally, even if AEP Texas had included the necessary costs (and it has not), the

complainant should not be able to rely on the residual incumbent lines that the SARR is replacing to transport materials to the railheads. While, in the hypothetical SAC world, complainants may assume that the SARR and the residual incumbent co-exist with respect to splitting the incumbent's traffic base, such an assumption with respect to the development of construction costs is untenable. In developing road property investment costs, the SARR is permitted to build its railroad "on top of" the incumbent, in essence "replacing" the incumbent. This allows the SARR to avoid numerous large cost items. Most important, it allows the SARR to assume that the right-of-way is already clear of housing developments, commercial property and other encumbrances that would make it very difficult and prohibitively expensive today to select and develop a 1,100 mile right-of-way. Any other route selected by the SARR would likely require much higher road property costs associated with purchasing improved properties and then converting those properties for use as a railroad right-of-way. These costs are avoided because of the assumption that the ASRR replaces the incumbent.

Because it is assumed to have replaced the incumbent, the SARR can also assume it will have sufficient space for yards, tunnels, passageways through narrow gorges, and other areas that in reality can accommodate only one railroad. Moreover, the SARR is allowed to assume away any costs that would arise from the continued presence of the incumbent—such as, for example, the numerous crossovers between the SARR and the incumbent that would have to be constructed if the two railroads did in fact run parallel to each other for more than a thousand miles encountering each others' yards, branch lines and industrial tracks along the way. Because the TNR's costs are greatly reduced as a result of the hypothetical *replacement* of the incumbent, it should not be allowed to proffer simultaneously the physical and geographical *co-existence* of

that same incumbent in order to garner even more benefits by avoiding the cost of transporting materials to the railroad during construction.

The off-line transportation mileages, therefore, must be calculated without reliance on the lines being replicated. Accordingly, in calculating the off-line transportation costs for each material, BNSF Engineering Consultants have done so without reliance on the BNSF lines that are being replicated by the TNR.[195] A breakdown of the BNSF changes made to the transportation component of the each individual track materials, which utilizes the methodology developed by AEP Texas in determining the average transportation cost for ballast, is found in BNSF Reply electronic workpaper "III F TNR Construction.xls," worksheet "RAIL UNIT COST."

(2) On-Line Transportation

The second important, though traditionally more limited, aspect of material transportation costing has already been mentioned above—the on-line transportation of materials from the delivery point at the local railheads along the progressing TNR track, or "jobsite." AEP Texas has obtained a single quote from Windgate Constructors which covers "loading, unloading and transportation at the jobsite"—traditional on-line transportation.[196] As described above, BNSF Engineering Consultants disagree with AEP Texas' attempts to re-cast traditional off-line transportation as on-line transportation, and avoid incurring the costs of transporting track materials to TNR railheads. However, because BNSF has adjusted the railheads to accommodate AEP Texas' construction schedule and rate of track laying and has provided for material delivery to these multiple railheads, it is reasonable to believe that a single contractor, Windgate, would

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[195] BNSF.RP.WP.III.F-0519 to 0581.

[196] AEP Texas Opening Workpaper Vol. 21, p. 10738.

provide on-line transportation from the local railhead (and construction point of origin) along the section of the track it was building, bringing the building materials up along the new track as the construction progressed. Given the adjustments made to off-line transportation costs and to the placement of railheads, BNSF Engineering Consultants accept AEP Texas' assertions that this quote would cover this limited on-line transportation.

j. Track Labor and Equipment

One particularly central aspect of track construction costs is the expense for labor and rental of equipment used during track laying. AEP Texas relied on the quote from Windgate Constructors to cover all these labor expenses.[197] The quote lists 14 unit costs for installation activities and states that these prices include "labor and equipment only," "all overhead, taxes, insurance, and profit," and "loading and unloading and transportation of materials at the job site."[198] According to AEP Texas, Windgate will provide beginning-to-end track installation for the entire TNR line. AEP Texas Opening Nar. at III-F-66 to 67. According to AEP Texas' Narrative, Windgate's all-inclusive per mile costs include "placing and compacting ballast and subballast, laying, fastening and welding of all track, and related items such as rail lubricators,[199] insulated joints and switching devises." AEP Texas Opening Nar. at III-F-66. BNSF Engineering Consultants accept AEP Texas' track laying unit costs based on this Windgate

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[197] AEP Texas Opening Workpaper Vol. 21, pp. 10738-9.

[198] *Id.*

[199] While AEP Texas claimed that the installation cost for rail lubricators was included under Windgate's quote, there is no mention in the actual quote of rail lubricator installation and, consistent with the quote, AEP Texas independently obtained installation of these items. BNSF Engineering Consultants agree that this expense is not included in the Windgate quote and that AEP Texas was right to include installation in its unit cost.

quote, and have applied them to their final track mile count for a total labor cost of $272.6 million.

As described in Section III.F.3.b.(3) above, AEP Texas omitted certain costs associated with 21 miles of branch and spur tracks, including the per mile labor costs for laying the subballast and for laying the ballast and track. BNSF Engineering Consultants have corrected this error and include the labor costs for these track segments.

The Windgate quote includes a unit cost for placing and compacting a six - inch layer of subballast (Item No. 13), and BNSF Engineering Consultants have applied that indexed installation cost of $36,820.22 per track mile to yard track quantities to cover the cost of installing the subballast layer that they have determined is required there.

BNSF Engineering Consultants' restatement of total track labor costs is included in BNSF's TNR track construction totals, which are contained in Reply electronic workpaper "III F TNR Construction.xls," worksheet "TOTAL COSTS."

4. Tunnels

There are no traditional tunnels located on the TNR. There is, however, a structure located on the Spanish Peaks Subdivision at milepost 122.11 that is characterized as a "super span" and serves a function very similar to that of a tunnel. The Spanish Peak "super span," which can alternatively be described as a very large structural plate pipe or culvert, allows BNSF trains to travel for 130 feet under the Bessemer Irrigation Ditch which crosses the line there.[200] BNSF Engineering Consultants have included pictures in the Reply workpapers showing this

[200] BNSF.RP.WP.III.F-0583.

"tunnel."[201] While this structure appears on BNSF's track charts as a tunnel, AEP Texas has not mentioned it, nor has it included the costs for building the super span culvert or any other structure at this location.

Because the irrigation ditch travels above the railroad, the culvert cannot be replaced with a bridge. Therefore, BNSF Engineering Consultants have determined the cost of this 130 LF super span culvert by applying the RS Means per pound unit cost for structural multi-plate pipe.[202] They determined the weight of the super span structure by consulting materials from Lane Enterprises, the same company used by AEP Texas to determine its CMP culvert unit costs.[203] They calculated the excavation, bedding and backfill quantities from BNSF's Gillette North specifications, and applied the unit costs that BNSF Engineering Consultants developed for standard culverts, as described in Section III.F.2.d.[204] The total cost for this structure, $218,528, is included with the TNR costs for culverts, in BNSF Reply electronic workpaper "III F TNR Construction.xls" worksheet "CULVERT COSTS."

5. Bridges

According to AEP Texas' Opening Narrative, the TNR requires a total of 456 railroad bridges over natural barriers with a total length of 54,875 linear feet, and an additional 19 bridges with a total length of 2,337 linear feet, crossing over roadways or other railroads. AEP Texas has determined a total cost for TNR bridges of $167.5 million. AEP Texas Opening Nar. at III-F-67.

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[201] BNSF.RP.WP.III.F-0584; an electronic version of the photographs of the super span are included in the BNSF Reply electronic workpapers as part of the III.F Workpapers subfolder.

[202] BNSF.RP.WP.III.F-0585.

[203] BNSF.RP.WP.III.F-0586 to 0587.

[204] BNSF.RP.WP.III.F-0588.

BNSF witness Gouger has analyzed AEP Texas' Opening Narrative, two Errata, quantity calculations, spreadsheets and unit cost materials and has determined that AEP Texas' overall methodology for developing bridge costs is acceptable; however, AEP Texas has intermingled information from bridges with span lengths ranging from 14 feet to 60 feet in a way that understates costs associated with building longer span bridges. Additionally, AEP Texas' actual cost development contains several errors and omissions that further understate bridge investment costs for the TNR. Based on a thorough analysis of the bridge requirements along the proposed TNR route, Ms. Gouger determined that the total bridge investment required for the TNR is $196 million.

a. Bridge Inventory

AEP Texas stated that it developed its bridge investment relying on BNSF real-world bridge information produced by the railroad in the course of discovery. AEP Texas Opening Nar. at III-F-67 to 69. AEP Texas assumed that the TNR would have bridges in all the locations where they appear on BNSF lines, and they developed their bridge inventory based on BNSF line segment data. *Id.* This TNR bridge inventory appears in AEP Texas' Opening electronic workpaper "TNR Bridge List.xls," and includes segment and milepost locations, structure type, span numbers, and total length and height, developed from current BNSF bridge locations and designs. Nonetheless, AEP Texas' final bridge inventory understated the quantity of bridges that AEP Texas would need to construct along the TNR in the following ways:

- AEP Texas omitted 15 bridges (along with 106 culverts) on the Pikes Peak Subdivision between mileposts 52.0 and 78.75;
- AEP Texas neglected to include Bridge 121.08, near Pueblo, New Mexico;
- AEP Texas did not include the South Platte River bridge near milepost 3.5 on the Arapahoe spur;

- AEP Texas neglected to construct two bridges on the Hereford Subdivision at the Amarillo Connection;
- AEP Texas did not include existing BNSF bridges built across roadways, except in areas of recent construction.

BNSF Consulting Engineer Gouger has assessed AEP Texas' oversights and omissions in the development of its TNR inventory.

First, AEP Texas failed to include 15 bridges (and 106 culverts) that are found on the Pikes Peak Subdivision between mileposts 52.0 to 78.75.[205] These bridges would not be listed on the inventory of BNSF bridges that AEP Texas requested in discovery as this particular line segment of the TNR is replicating a Union Pacific line. However, these bridges are found on the BNSF track charts, and AEP Texas, in choosing to replicate these lines, necessarily incurred the cost of constructing these bridges. BNSF Engineering Consultants have included these structures in its restatement of the TNR bridge inventory based on the information contained in the BNSF track charts produced in discovery.

Second, AEP Texas omitted Bridge 121.08, which does appear on the Pikes Peak Subdivision section of the BNSF bridge inventory. AEP Texas gave no justification for excluding this structure, which is built over a natural barrier and is also identified on the BNSF track charts. BNSF Engineering Consultants have included this bridge in its restatement of the TNR bridge inventory.

Third, AEP Texas neglected to include costs for a bridge crossing the South Platte River on the Arapahoe spur, which is located near milepost 3.5 and also appears on BNSF's track charts. BNSF Consulting Engineers have replicated the design for the bridge that AEP Texas

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[205] Two of the 106 culverts were longer than 20 feet and, consistent with AEP Texas' approach, BNSF Engineering Consultants have constructed them as bridges.

constructed at another site where the TNR crosses the South Platte River, at milepost 540.09 on the Brush Subdivision. There, AEP Texas adjusted the existing BNSF structure, constructing the structure for TNR purposes as an over-water bridge with four spans with a maximum span length of 100 feet and a total length of 314 feet.[206] BNSF Engineering Consultants followed AEP Texas' approach to the Brush Subdivision bridge in costing out the omitted Arapahoe bridge.[207]

Fourth, while AEP Texas included track at the Amarillo connection on the Hereford Subdivision mirroring BNSF's current configuration, they neglected to account for the number of tracks that cross over the replicated line at that connection. The plans for this structure, produced by BNSF in discovery, clearly show that two tracks pass over the line at that location. AEP Texas would incur the costs for building structures to allow both tracks to overpass, though AEP Texas only provided for a single track.[208] BNSF Engineering Consultants have included two bridges that replicate the length of the current BNSF structure at that location.[209]

Additionally, AEP Texas included the construction costs for bridges that are currently found along the TNR route only when they have been built across natural barriers or across a senior railroad. It based its exclusion of 50 bridges crossing over roadways (or approximately 5,310 bridge feet) on its claim that BNSF or its predecessors had constructed their lines in these areas prior to the placement of roads and, therefore, would not have incurred the cost of building

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[206] AEP Texas Opening electronic workpaper "TNR Bridge List.xls," worksheet "Bridge Costs," Rows 169 and 170.

[207] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs."

[208] BNSF.RP.WP.III.F-0221.

[209] AEP Texas has not constructed any bridges with multiple tracking, and instead constructs a new stand-alone bridge for each additional track. *See* AEP Texas Opening electronic workpaper "TNR Bridge List.xls," worksheet "Bridge Costs."

bridges crossings over these roadways.[210] AEP Texas Opening Nar. at III-F-67. Despite the fact that complainants have the burden of proving that the railroad did not incur any construction costs for these bridges, the Board appears to have accepted this argument in *TMPA*.[211] The Board did concede, however, that it is likely that BNSF and its predecessors have, over time, incurred replacement and maintenance costs for bridges that cross over roads, but dismissed these construction and repair expenses as a maintenance issue. AEP Texas did not, however, add up-keep costs for these excluded bridges in its TNR maintenance-of-way costs.

As the Board acknowledged in *TMPA*, BNSF has incurred costs to maintain and replace these bridges. The inclusion of actual construction costs for bridges crossing over roads is also supported by the ICC Engineering Reports, which identify a number of early railroad bridges as "over highway" or as crossing over specific streets.[212] Failure to include any cost for these bridges—either as capital investment or maintenance-of-way expense—will understate stand-alone costs.

BNSF has included the cost of constructing a number of the bridges excluded by AEP Texas where the following circumstances are present: (1) where the ICC reports show that the roads crossed predated rail construction by BNSF's predecessors; or (2) where BNSF records show that the bridge has been constructed at BNSF's expense (*i.e.*, bridges that BNSF built in the course of capacity improvements over the last 20 to 30 years).

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[210] On the basis of this theory, AEP Texas does include costs for bridges over roadways on the more recently constructed sections of the railroad. AEP Texas Opening Nar. at III-F-67.

[211] *TMPA*, slip op. at 140.

[212] Copies of the ICC Engineering Reports are included in the BNSF III.F electronic workpapers in subfolder "ICC Valuation Reports."

As a result of their review of the ICC Reports, BNSF Engineering Consultants have determined that BNSF's predecessor incurred a portion of the construction expense for two roadway bridges that AEP Texas excluded from its TNR inventory. BNSF's predecessor incurred 50 percent of the expense for building Bridge 76.11 and 33.3 percent of the expense for Bridge 76.18.[213] BNSF Engineering Consultants have included that percentage of the expenses for these bridges in their restatement of TNR bridge investment.

Additionally, AEP Texas assumed that the TNR would incur the costs for at-grade road crossings between Amarillo and Las Animas, but it then excluded the costs for bridges crossing over roads along the same line segment, stating that "the TNR is not building grade-separated crossings in this territory as grade-separated crossings were very unusual in the 1930s." AEP Texas Opening Nar. at III-F-99. However, of the five bridges found along this line, four were built in 1930, and one was built in 1936, during the period when the line was originally constructed.[214] Therefore, BNSF Engineering Consultants have included these five bridges in their restatement of the TNR inventory.

In reviewing BNSF data for bridge expenses incurred in capacity improvements over the last 20 years, BNSF Engineering Consultants did not find any instances of omitted bridges. However, they did find an omitted 12' x 12' box culvert at milepost 443.89 of the Butte Subdivision that AEP Texas neglected to include. Despite its size, BNSF has observed AEP Texas' criteria for adjusting structures and have left this as a culvert, including it in the BNSF restatement of culvert costs discussed in Section III.F.2.d.

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[213] *Id.* These bridges, crossing over the Tejon and Nevada roads, are found in Account 6, val. section BRG-2-ABCD-CO.

[214] These dates appear in the BNSF bridge inventory that was produced in discovery and relied on by AEP Texas in their Opening Evidence. AEP Texas Opening Nar. at III-F-67.

b. Bridge Design

AEP Texas made several adjustments to the design of bridges that BNSF has built and maintained along lines being replicated by the TNR. First, AEP Texas departed from the existing BNSF bridge inventory and replaced, with culverts, bridges that BNSF has built over natural barriers that span 20 feet or less. BNSF Engineering Consultants accept this departure and have included costs for these structures in their restatement of culvert costs.

AEP Texas also made numerous changes to the combination of span lengths found in existing BNSF bridges being replicated on the TNR. According to its Narrative, AEP Texas made adjustments to the individual span lengths in order to design the most "economical" bridge. AEP Texas Opening Nar. at III-F-69 to 70. AEP Texas set out the following three criteria for making these adjustments to the number and lengths of spans: (1) if the existing bridge is ten feet high or less, the existing span configuration was used; (2) if the existing bridge were taller than ten feet, the span configuration was adjusted to make it more "economical;" and (3) if the existing bridge was constructed with multiple spans, it would not be redesigned as a single span bridge. *Id.*

Throughout its inventory of TNR bridges, AEP Texas generally made changes to bridge span numbers and lengths in an erratic manner that defies explanation. For example, AEP Texas did not make any span adjustments to any bridges on the Campbell, Black Hills, Angora, and Butte Subdivisions. Then, starting with the Brush subdivision and continuing with the Pikes Peak, La Junta, Boise City and Red River Valley Subdivisions, AEP Texas made changes to most of the span lengths.[215] Nonetheless, BNSF Consulting Engineers accept the three standards

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[215] AEP Texas Opening electronic workpaper "TNRR Bridge List.xls," worksheet "Bridge Costs."

that AEP Texas sets out in the Narrative for making adjustments, and accept AEP Texas' adjustments to the spans of TNR bridges that are consistent with those criteria. However, AEP Texas did not follow its own first rule of only adjusting spans on bridges that are over ten feet tall. In 97 instances, AEP Texas made adjustments to the span lengths on bridges that are less than ten feet high.[216] BNSF Consulting Engineers have corrected for all of these instances by conforming these TNR structures to AEP Texas' Opening Narrative criteria.

Additionally, AEP Texas departed from BNSF design specifications and changed all TNR bridges with metal spans to concrete spans.[217] For all TNR bridges under 50 feet, pre-stressed concrete spans were used, and for bridges with spans longer than 50 feet, a cast-in-place deck with pre-cast beams was used. BNSF Engineering Consultants accept this change with one caveat—when bridges are constructed with concrete spans instead of metal spans, the total bridge length typically is increased to account for a resulting lower chord and/or increased pier widths. The low chord is the elevation of the bottom of the span or girder. The rise of this girder is decreased with the use of concrete spans as more of the structure occupies the space underneath the track surface. Put another way, when a bridge is constructed with steel truss and through plate spans, the track is, to a varying extent, surrounded by the supporting metal

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[216] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs." The cells for the 97 bridges that are under ten feet tall where AEP Texas has made adjustments have been highlighted.

[217] AEP Texas Opening electronic workpaper. "TNRR Bridge List.xls," worksheet "Bridge Costs."

structure, rather than sitting on top of the entire structure, as it does with concrete.[218] A similar loss of volume occurs where changes have been made to span lengths, requiring an increase in the size of the piers that are being constructed, therefore decreasing the flow area available underneath the superstructure.

As a result of the decreased flow area accompanying the change to a concrete superstructure, the bridge would be constructed with additional length, moving the abutments back and constructing a deeper bridge deck to compensate for the decrease in flow area. Maintaining the flow area is important in light of Federal Emergency Management Agency (FEMA) guidelines on preparing for flood events—specifically the requirement that no backwater (0.00 feet) be present during the 100 year flood event, which is a hypothetical flood scenario used to determine sound engineering practices.[219] AEP Texas' own workpapers contain evidence on the need to build in more flow area when structure changes reduce the available volume for water to occupy. For example, AEP Texas relied extensively in its Opening Evidence on information gleaned from the Jennison paper, a conference report by a BNSF employee on the construction of Bridge 412.1 over the South Canadian River. This paper comments on the fact that the bridge was constructed with additional length (approximately 100 feet) because of the switch to a concrete superstructure, and the fact that "more flow area would be needed because of the greater total pier width in the design."[220]

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[218] Examples of through plate girder bridge structures are included in BNSF's Reply workpapers at BNSF.RP.WP.III.F-0591 to 0595; the decrease in the low chord when these span types are replaced with concrete beams is apparent when these samples are compared to a concrete girder, as shown in the plans for BNSF Bridge 483.2. The plans for Bridge 483.2 is included in the BNSF Reply workpapers at BNSF.RP.WP.III.F-0596 to 0608, and was obtained by Ms. Gouger from TranSystems Corp., which performed design work on that project.

[219] BNSF.RP.WP.III.F-0609 to 0613.

[220] AEP Texas Opening Workpaper Vol. 21, p. 10935.

AEP Texas did not take this length change into account when redesigning the BNSF bridges with concrete rather than steel spans. BNSF Engineering Consultants make this adjustment to bridges that have been converted from steel spans by using a factor developed from three BNSF through plate girder bridges where BNSF has located an adjacent second mainline bridge that has been constructed with concrete spans. Three of the bridges used were BNSF bridges included among the 21 bridges that AEP Texas used in developing its Model Bridge Costs (Bridges 465.0, 468.7 and 483.2). The fourth bridge used was Bridge 412.1 from the Jennison paper, described above. BNSF Engineering Consultants determined the average percentage increase in length for all four bridges—seven percent.[221] They have applied this percentage increase in length to only those BNSF bridges that are through plate or truss spans and were redesigned by AEP Texas with concrete spans. In total, BNSF has adjusted the lengths on 13 bridges.

c. Costing Methodology

According to AEP Texas' Opening Narrative, basic bridge design and costs were developed directly from BNSF's own bridge data, produced in discovery. AEP Texas Opening Nar. at III-F-68 to 69. As a first step, AEP Texas developed its "Model Bridge Costs," or standardized unit costs, for the superstructure (*i.e.*, girders and deck), piers, abutments and labor to apply to each bridge in the TNR inventory. In developing these average standardized Model Bridge Costs, AEP Texas relied on bid contracts for 21 recent BNSF bridge projects that were produced in discovery, as well as the Jennison paper, mentioned above. AEP Texas Opening Nar. at III-F-68. The result was a "model algorithm" or averaged unit costs for standard bridge components, including the cost of a pair of uniform, average abutments, the cost of an average-

[221] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Model Costs."

sized column, and a per LF labor and material additive. AEP Texas' second step was to take these standardized costs and determine a base-level cost for each of the individual bridges AEP Texas placed along the TNR line. The base cost or applied algorithm for each bridge in AEP Texas' inventory was included in AEP Texas' Opening electronic workpaper "TNR Bridge List.xls," worksheet "Bridge Costs." The base cost for each bridge included the cost of a pair of uniform abutments, the cost of a uniform (13.8-foot tall) column multiplied by the number of columns planned for the bridge, and a per LF labor and material additive that is multiplied by the total length of the bridge. The third step was to review, bridge by bridge, for three additional unique components that might apply to a TNR bridge and, where present, add the additional costs associated with each of these components. AEP Texas limited its categories of additional unique characteristics to deck spans over 50 feet, column heights over 30 feet, and over-water crossings (*i.e.*, requiring cofferdams, special foundations and installation techniques).

BNSF Engineering Consultants have analyzed each of AEP Texas' steps in determining bridge investment for the TNR and have discovered a number of design and costing understatements and miscalculations. The shortcomings of AEP Texas' bridge investment statement, as well as BNSF Engineering Consultants' corrective adjustments, are discussed below.

(1) Step One: Model Bridge Cost Deficiencies

In reviewing AEP Texas' first step, the development of its Model Bridge Costs, BNSF Engineering Consultant Gouger discovered several oversights and calculation errors that resulted in the significant understatement of bridge investment for the TNR.[222] These shortcomings in

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[222] AEP Texas' statement of the Model Bridge Cost was contained in Opening electronic workpaper "Model Bridge Costs.xls;" the supporting workpapers are found in Workpaper Vol. 21, pp. 10910-77.

methodology and execution, as well as BNSF Engineering Consultant Gouger's adjustments to AEP Texas' Model Bridge Costs, are discussed below.

The most fundamental shortcoming of AEP Texas' Model Cost determinations stems from the fact that AEP Texas has not taken into consideration the differences in bridges that result from the variations in span length—*i.e.*, the impact of a long, heavier span/superstructure on the substructure that supports it. In determining its Model Bridge Costs, AEP Texas averaged the various span lengths of 21 BNSF bridges to determine a single algorithm, or collection of average component costs, to apply to all bridges in the TNR inventory. BNSF Engineering Consultants do not agree with this methodology. The 21 bridges that AEP Texas used for their average included 18 bridges with average length spans ranging from 14 to 34 feet, and then three bridges that have 60-foot spans. By including just these three bridges with significantly larger spans in determining a single average to apply to all bridges regardless of their size, AEP Texas minimizes the impact of a larger superstructure on the sizes of abutments and piers. Moreover, AEP Texas did not sufficiently account for these differences with the limited categories of additives it provided (which only allowed for the extra expense of using cast-in-place concrete on larger spans).

To correct for this, BNSF Engineering Consultants have created two separate algorithms for expressing model bridge costs—one that applies to bridges with spans less than 50 feet, and one that applies to bridges with spans greater than 50 feet. They have done this by removing the three larger bridges (Bridges 465.0, 468.7 and 483.2) from AEP Texas' Model Bridge workpaper, and creating final bridge costs that only reflect the characteristics of the 18 shorter bridges. They have created a second algorithm of model bridge costs from the three longer bridges that AEP Texas used in determining its base costs, that serves as a more sophisticated

and accurate representation of the costs associated with building bridges with longer spans, making it a more appropriate costing tool to apply the longer span bridges found on the TNR.[223]

BNSF Engineering Consultants have also found several other errors in AEP Texas' methodology and calculations, which are listed below; the steps they have taken to correct for these apply to both the BNSF algorithm for bridges over 50 feet and for bridges under 50 feet. First, in costing the components for its Model Bridge Costs, AEP Texas excluded a number of essential bridge materials. AEP Texas relied predominantly on BNSF bridge construction contracts awarded to independent contractors, produced in discovery, to determine the materials required for the TNR bridges. These BNSF bid contracts and specifications were drafted in the planning stages of the project and only addressed costs and specifications associated with the installation work to be performed by the biding contractor. These documents would not be expected to, and do not, contain a complete or final inventory of all the materials that BNSF supplied to the contractor performing the installation, and thus are not appropriate as the exclusive source for determining the materials required in bridge construction. AEP Texas, however, relied on a single general list of bridge components that BNSF specified that it would provide to a contractor for a particular project. AEP Texas Opening Nar. at III-F-75. An examination of the seven general materials listed in the BNSF project specifications readily demonstrates that this list was in no way meant to serve as a complete inventory—among the seven items, the list includes "precast concrete members" and "hardware."[224] In relying on this single bid sheet for the components that it would provide for in its bridge investment evidence, AEP Texas ignored items that *are* included in the general lists for other bridge projects. The

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[223] BNSF Reply electronic workpaper, "III F 5 Bridges.xls," worksheet "Model Costs."

[224] This general list of materials appears in AEP Texas' Opening Evidence in Volume 21, p. 10951.

materials for two of the bridges that AEP Texas has averaged into its model bridge costs (Bridges 444.7 and 448.9) contain plan sheets that list additional items that BNSF would acquire and deliver to the construction site, including wingwalls, bearing pads, deck expansion joints, and miscellaneous steel (which includes connecting deck plates, washers, and brackets).[225] BNSF witness Gouger has included these items in her restatement of the TNR bridge costs.[226] The development of the unit costs for these materials is discussed in Section III.F.5.c.(a) below.

Additionally, in generating its Model Bridge Cost algorithm, AEP Texas proceeded under the assumption that the same number of piles are required for two abutments as are required for one pier. In fact, the same number of piles used in a single abutment are used in a single pier, as reflected in the bridge plans produced by BNSF.[227] BNSF Engineering Consultants have adjusted the Model Bridge costs to reflect the correct number of piles for abutments and piers.[228]

According to its workpapers, AEP Texas included costs for the placement of walkways and handrails along both sides of all TNR bridges.[229] BNSF Engineering Consultants accept this specification, as well as AEP Texas' design for the support structure under the walkways and the unit costs for these items.

BNSF Engineering Consultants have discovered that AEP Texas incorrectly used a concrete collar cost in determining the pile costs for abutments and piers, therefore overstating the total costs for these two items. A concrete collar is constructed around the piles for

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[225] These plan sheet were produced by BNSF in discovery as BNSF/AEPTX 03756 and 03769; they are reproduced as Reply workpapers, at BNSF.RP.WP.III.F-0641 and 0646.

[226] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs."

[227] AEP Texas Opening Workpaper Vol. 21, p. 10952.

[228] BNSF Reply electronic workpaper "III F 5 Bridges.xls."

[229] AEP Texas Opening Workpaper Vol. 21, p. 10961.

additional support when longer bridge spans are being used. For instance, the bid tabs for Bridges 465.01, 468.7 and 483.18 show the use of concrete collars, but these bridges are built with 60-foot pre-cast girder I-beam spans.[230] Accordingly, BNSF Engineering Consultants have removed the costs for collars where AEP Texas applied them to abutments and pier quantities.

However, BNSF Engineering Consultants have provided for concrete collars where AEP Texas constructed bridges with spans of 50 feet or more, which is the appropriate place to construct concrete collars to provide extra pile support. BNSF Engineering Consultants accept the unit cost for concrete collar material that AEP Texas extracted from the bid data, and has included this cost in the algorithm they have developed for larger span bridges on the TNR.[231]

(a) Unit Costs

With the exception of three categories—the linear foot costs of pile material and of pre-cast beam material, and the average pile cap cost—AEP Texas developed the TNR Model Bridge Costs (including installation) using bid data produced by BNSF in discovery and the Jennison conference paper. AEP Texas Opening Nar. at III-F-73. BNSF Consulting Engineers accept generally these bid data unit costs—however, as described in subsequent sections of III.F.5, BNSF Engineering Consultants have discovered errors in AEP Texas' costs for transportation of these materials and its indexing of the final unit costs.

As described above, AEP Texas incorrectly used a concrete collar cost in determining the piles cap costs for both abutments and piers. Because the BNSF bid data does not contain a unit cost for standard pre-cast abutment and pier caps, BNSF Engineering Consultants developed the cost for those items from a price quote by Hanson-Wilson, Inc., the company responsible for the

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[230] BNSF Engineering Consultants have included bridge plans from Bridge 483.2 showing the use of a bridge collar in its workpapers at BNSF.RP.WP.III.F-0596.

[231] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Model Costs."

design of several of the bridge projects that AEP Texas used in developing its own evidence. The Hanson-Wilson quoted abutment cap material cost is $4,337, not including transportation. The pier cap cost of $3,713.50 was developed by averaging the two material-only quotes from Hanson-Wilson for pier caps.[232] BNSF Engineering Consultants have incorporated these costs in their two restated model bridge algorithms, after making adjustments to reflect transportation costs and indexing, as described below. For the larger span bridges (50 feet or greater), BNSF Engineering Consultants analyzed the plans for Bridge 483.2 (which is one of the AEP Texas' 21 model bridges) and determined that the pier and abutment caps for 60-foot spans were twice the size of the pier and abutment caps for smaller span bridges (14 to 34 feet).[233] BNSF developed a cost for abutments and pier caps in the Model Bridge Costs for the larger span bridges by doubling the Hanson-Wilson prefabricated unit cost.

AEP Texas also independently developed the linear foot costs of pile material and of pre-cast beam material. AEP Texas Opening Nar. at III-F-73. The cost of pile material was taken from RS Means and BNSF Engineering Consultants accept this, although they have included the O&P expenses associated with the materials, for a unit cost of $25.19 per LF. AEP Texas developed the cost of pre-cast beam material from the Jennison paper's account of the Canadian River Bridge project, near Purcell, Oklahoma. BNSF accepts this unit cost.

BNSF Consulting Engineers also developed material unit costs for essential bridge components that AEP Texas did not include. These materials are wingwalls, bearing pads, miscellaneous steel (including connecting deck plates, washers, and brackets), and deck expansion joints. Because unit cost information for these materials was not included in the

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[232] Hanson-Wilson's materials quote is found at BNSF.RP.WP.III.F-0647.

[233] BNSF.RP.WP.III.F-0596 to 0608.

BNSF bid information relied on by AEP Texas, BNSF Engineering Consultants turned to other sources in developing unit costs for these bridge components. For wingwalls, BNSF Engineering Consultants obtained a bid from Hanson Wilson, listing a 2003 material unit cost of $575 per abutment—a total cost of $2,300 per bridge.[234] These costs have been indexed and added to the abutment component of the two model bridge algorithms. For all other materials, BNSF has developed unit costs from the 2000 RS Means. From RS Means, BNSF Engineering Consultants developed a $36.88 per LF cost for miscellaneous steel, which includes signs, bearing pads, joint filler, connecting deck plates, washers, and brackets.[235]

BNSF Engineering Consultants have included these cost in BNSF's restatement of AEP Texas' Model Bridge Costs for bridges under and for bridges over 50 feet, found in BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Model Costs." These costs are applied to all the bridges in the restated inventory for the TNR.

(b) Transportation

For all items which BNSF Engineering Consultants have developed unit costs for, they determined the necessary transportation expense using the methodology that AEP Texas applied in determining ballast transportation costs, as described in III.F.3.b. BNSF first grouped the bridges into logical geographical sets, and placed railheads along the TNR route to serve these bridge groups. They then determined the cost of transportation for each component from the supplier to each of the various railheads. For instance, for the pre-cast materials—girders, pier caps, abutment caps, and wingwalls—BNSF witnesses located plants where the pre-casting

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[234] BNSF.RP.WP.III.F-0647.

[235] BNSF.RP.WP.III.F-0648 to 0650.

would be done, and then developed and averaged the transportation costs to the various railheads that have been selected on the basis of bridge sites.

For bridge materials that AEP Texas included in its Model Bridge Costs, BNSF Engineering Consultants have determined that the transportation costs are insufficient in one case and non-existent in all others. AEP Texas included the costs of transporting pre-cast concrete beams to BNSF Bridge 412.1, a distance of about 139 miles, as described in the Jennison paper.[236] This delivery cost, based on a single bridge in a specific location, does not reflect any of the challenges that arise in transporting this material to the construction site of more than 450 bridge construction sites across six states. This is the only transportation that AEP Texas has provided for any bridge item.[237]

Therefore, BNSF Engineering Consultants have assessed transportation costs for each item based on the weight of the pre-cast and other (*i.e.*, miscellaneous steel) items and the distance these items would need to travel from various origins to bridge locations.[238] To develop adequate transportation costs, they utilized the two bridge plans that were provided in discovery and relied upon by AEP Texas in developing their bridge costs, added the weights of all bridge components for each bridge, and developed a per bridge foot cost of transportation.[239] They utilized all the local bridge fabricators—Albuquerque, New Mexico; Denver, Colorado; Tulsa, Oklahoma; and Omaha, Nebraska—to provide bridge components, with an average distance for

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[236] AEP Texas Opening Workpaper Vol. 21, p. 10936.

[237] AEP Texas Opening Workpaper Vol. 21, p. 10960.

[238] BNSF Engineering Consultants' discussion of the addition of railheads and development of bridge material transportation costs is in BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs."

[239] BNSF.RP.WP.III.F-0639 to 0646.

delivery of 478 miles.[240] For the pre-cast deck, which AEP Texas has included insufficient delivery for, BNSF Engineering Consultants subtracted the 139 miles that was included in the AEP Texas transportation cost and applied additional costs for 339 miles of delivery to reflect the additional railheads. The result was an average transportation cost of $68.33 per linear bridge foot. BNSF applied this to all the bridges included in the restated TNR inventory (with the exception of bridges requiring cast-in-place decks).

BNSF Engineering Consultants have made these additions and adjustments to the algorithms that they developed to represent standard bridge costs for long and for short spanned bridges, as reflected in BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Model Costs."

(2) Step Two: Application Of Model Costs To Bridge Inventory

BNSF Engineering Consultants accept AEP Texas' methodology for applying their Model Bridge Costs to the bridges in the TNR inventory. However, as described above, BNSF Engineering Consultants have made several changes to AEP Texas' inventory of TNR bridges and created a second bridge algorithm for larger span bridges, and therefore apply their revised model bridge costs to their revised bridge inventory of TNR bridges.[241]

(3) Step Three: Accounting For Unique Bridge Characteristics That Drive Bridge Costs

AEP Texas' third and final step in developing its bridge investment for the TNR was to account for, bridge by bridge, the additional, unique cost items that are involved in that particular construction project. AEP Texas used the existing BNSF bridges that would be replicated on the

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[240] BNSF.RP.WP.III.F-0651 to 0685.

[241] BNSF Reply electronic workpaper. "III F 5 Bridges.xls," worksheet "Bridge Costs."

TNR line to pinpoint when certain circumstances existed that would require additional material and/or installation costs. Upon reviewing AEP Texas' evidence on these additional costs, BNSF Engineering Consultants have discovered the following shortcomings.

AEP Texas separated out only three unique bridge characteristics for which it added costs: (1) where deck spans are over 50 feet long; (2) where columns are over 30 feet; and (3) where bridges are built over bodies of water. BNSF Engineering Consultants have found AEP Texas' criteria too limited. As a result, AEP Texas understated costs by ignoring important bridge characteristics that drive bridge costs.

AEP Texas adjusted the individual span length found on the BNSF real world bridges to decrease bridge costs. Where AEP Texas, despite its tinkering, still had bridge spans that were over 50 feet long, it applied an additional cost to reflect the need for cast-in-place deck spans.[242] However, AEP Texas did not include the cost for waterproofing that must be performed independently when installing cast-in-place concrete (unlike pre-cast concrete where waterproofing occurs at the plant). BNSF Consulting Engineers have taken the cost for waterproofing from the BNSF contract plans for Bridges 465.0, 468.7 and 483.2, the three bridges that AEP Texas used to extract a price for the concrete decks and the deck reinforcing, ignoring the waterproofing listed there as well.[243] The 2003 unit cost for cast-in-place deck and waterproofing of $621.29 per linear foot was indexed to 2Q00 for a restated total additive for cast-in-place spans of $644.17 per LF, which AEP Texas applied to TNR bridges with spans over 50 feet long.

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[242] AEP Texas Opening Workpaper Vol. 21, p. 10964.

[243] AEP Texas Opening Workpaper Vol. 21, pp. 10916 and 10925.

AEP Texas also applied an additional cost to bridges where they exceed heights of 30 feet.[244] BNSF Engineering Consultants agree with the need to include costs that reflect the construction challenges presented by tall bridges. However, they disagree with the manner in which AEP Texas applied these additional costs. The Complainant's Model Bridge Costs included a cost for bridge columns that is a flat fee based on a 13.8-foot column. When that cost was applied to the bridges in the TNR inventory, it was multiplied by the number of columns. When a bridge's height exceeds 30 feet, AEP Texas applied a percentage increase to the cost reflecting the additional height of the bridge above 30 feet. This means that all of the bridges that are 30 feet or under are constructed with a 13.8 foot column. By way of illustration, there are well over 200 bridges that are taller than 13.8 feet but shorter than 30 feet—AEP Texas only includes costs for 13.8-foot piers for those bridges. The result of this cut-off is the significant understatement of costs for this imposing number of bridges. While AEP Texas argued in their Narrative that their analysis of their model bridges shows that there is no correlation between bridge height and bridge substructure costs, they would not be able to adequately determine this based on the methodology they employed there. AEP Texas Opening Nar. at III-F-70. First of all, the tallest bridge among AEP Texas' 21 model bridges was only 23 feet. Additionally, AEP Texas assumed a constant abutment cost regardless of the height of the bridge, so the only variable in the calculation was the amount of piling, which creates a false comparison. Finally, AEP Texas' methodology and conclusions clearly go against logic which dictates that a larger and higher bridge span would undoubtedly exert a heavier load, requiring more substantial abutments and piers, as well as pilings.

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[244] AEP Texas Opening Workpaper Vol. 21, pp. 10965-6.

Accordingly, BNSF Engineering Consultants have applied the height adjustment factor that AEP Texas developed to all TNR bridges that fall outside the height range reflected in the AEP Texas average. Because the tallest bridge among the 21 model bridges was only 23 feet, BNSF applies the height factor to all bridges taller than that (compared to AEP Texas's 30 foot cut-off) to more accurately recreate the real costs associated with building these taller structures.

AEP Texas also applied an adjustment factor to bridges that cross bodies of water to reflect the additional costs for cofferdams, special foundations and installation techniques.[245] BNSF accepts this factor generally, but has made adjustments to reflect the changes in abutment, pier, deck and labor costs, as described above, which AEP Texas built into its equation, or "bridge logarithm" for determining the over-water additive.[246]

(4) Indexing Errors

AEP Texas indexed bridge material and labor costs in a convoluted and incorrect manner that resulted in an understatement of the unit costs for bridge components. Under AEP Texas' approach, all costs are adjusted to 2003 Texas levels, and then readjusted to Year 2000 (National) level, and then readjusted again to according to TNR zip codes. For example, for steel pile material costs, AEP Texas first adjusts the 2003 RS Means costs to Lubbock, Texas, 2003 prices. It then adjusts the costs to the 2000 National level, and adjusts it a third time to various zip codes along the TNR. BNSF Engineering Consultants adopt a more logical approach, starting with the 2000 Means cost, therefore avoiding application of the 2000 National historical factor. They also take the location factor from the RS Means Site Construction Index, applying an index based on the nearest city. This location factor is more appropriate than

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[245] AEP Texas Opening Workpaper Vol. 21, pp. 10967-8.

[246] BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs."

applying a zip code factor from the Total Weighted Average Index which applies to masonry, metals, wood and plastics, doors and windows, finishes, mechanical, and electrical items—none of which represent items involved in bridge construction. BNSF Engineering Consultants' reindexing is reflected in their final bridge investment costs, which are found in BNSF Reply electronic workpaper "III F 5 Bridges.xls," worksheet "Bridge Costs."

6. Signals and Communications

a. Signals

BNSF Engineering Consultants reviewed AEP Texas' evidence on signal costs and concluded that AEP Texas' costs were incomplete and understated. In addition to certain calculation errors, AEP Texas failed to include switch circuit controllers at mainline non-powered switches, omitted equipment bungalows at intermediate signals, neglected to include EOS packages on wye switches, incorrectly calculated labor costs, used inappropriate costs for power drops and ignored costs incurred by BNSF to upgrade motion equipment at grade crossings. The table below summarizes the differences between AEP Texas' costs for signals and BNSF's restated costs.

Table III.F.6-1
Comparison of BNSF and AEP Texas Estimates of Signal Costs

Item	BNSF (millions)	AEP Texas (millions)	Difference (millions)
CTC	$129.8	$108.7	$21.1
FEDS[1]	$2.5	$2.3	$0.2
Hot Air Blowers	Included in Track Cost	Included in Track Cost	Included in Track Cost
Power Switch Stands	$1.5	$0.0	$1.5
Upgrade Active Warning Devices	$4.3	$0.0	$4.3
TOTAL	**$138.1**	**$111.1**	**$27.0**

Source: BNSF Reply electronic workpaper "III.F.6 Signals.xls" worksheet "Summary Signal Costs." AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls."

The differences are discussed below.

(1) Centralized Traffic Control

AEP Texas has equipped the TNR with a Centralized Traffic Control (CTC) System on all of its mainline tracks, as well as on the Campbell, Orin and Reno Subdivisions.[247] AEP

[247] AEP Texas Opening Nar. at III-F-75.

Texas' estimate for the cost of the CTC system is $108.7 million.[248] As discussed in detail in the subheadings below, AEP Texas' CTC cost is inadequate because (a) AEP Texas' statement of costs does not include all necessary components of a CTC system and (b) there were a number of errors in AEP Texas' calculations. These errors include (1) the failure to include the appropriate labor costs for installation of the control points and bungalows; (2) the inadvertent installation of single face intermediate signals for the signals required at the End of Siding (EOS) resulting in a double count of signals; and (3) the failure to include EOS packages on the wye switches. BNSF corrected each of these errors.

(a) Control Points

AEP Texas developed the following complete signal control point unit costs:[249]

- Single Track Intermediate Automatic Signal $24,371
- Double Track Intermediate Automatic Signal $26,938
- End of Siding Control Point with dual control power operated switch $133,706
- Single Crossover Control Point with dual control operated switches $195,557
- Double Crossover Control Point with dual control power operated switches $419,133

AEP Texas installed single face signals at power switches of sidings, double face signals for intermediate signals, end of siding control points at power switches to sidings and wyes,

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[248] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls" and Opening electronic workpaper "CTC System & Signals.xls."

[249] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls" worksheet "Material Unit Costs."

single crossover control points at the single crossovers and double crossover control points at the double crossovers.[250] BNSF takes exception to a few of these placements.

First, AEP Texas erred in installing single face signals at power switches of sidings because such signals are already included as a part of the EOS control unit. AEP Texas' inclusion of these signals resulted in an overstatement of the quantity of signals on the TNR. There should be no single face signals on the TNR. In its restatement of signal costs, BNSF has adjusted the signal quantities to remove the single face signals.

Second, AEP Texas did not include any switch circuit controllers (SWCC) at the non-powered switches on the mainline. BNSF agrees that the non-powered switches would not require electric locks, but they do need to be equipped to inform the nearest signal of the direction the switch is facing as per FRA rule 236.60.[251] Therefore, a hand throw switch and a SWCC with layout, battery, AC power drop, and case (not a bungalow) are required. Sending switch status information from the switch controller to the nearest signal requires either the installation of a cable between the controller and the signal or the installation of a Phased Shift Overlay (PSO). A PSO transmits the information through the encoded circuitry in the rail, thus avoiding the need for cable installation. Depending on the location of the non-powered switch, the cost of installing a cable can be much higher than the $990 cost for a PSO (uninstalled). Based on BNSF AFE A9900451,[252] BNSF Engineering Consultants used a complete unit cost of $9,000 for a switch circuit controller (with PSO or cable) for each non-powered switch on the

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[250] AEP Texas Opening workpaper pp. 10979 to 11024.

[251] BNSF.RP.WP.III.F-0688.

[252] BNSF.RP.WP.III.F-0689 to 0695.

TNR's mainline. That cost covers only the materials -- additional costs were added for power drops and seven days' labor costs for installation.

Third, AEP Texas failed to install bungalows at the intermediate signals, but gave no reason for not doing so. Intermediate signals, just like other control points, would need bungalows to house all the accompanying electronics, although the bungalows at these sites would not be as large as the ones for the single and double crossovers. AEP Texas' workpapers included quotes for intermediate signal bungalows from two suppliers.[253] BNSF used the lower quote -- $25,000 – from Signal Masters. No radios are required at intermediate signals.

AEP Texas also neglected to include EOS packages on wye switches. Power switches are required on the inside switches of the wye tracks going in and out of the mines. BNSF Engineering Consultants included an additional nine EOS packages in their restatement of the AEP Texas EOS count.

AEP Texas derived its unit costs for control points from quotes obtained from Alstom Transportation, Safetran and L & W Industries[254] for various individual components of the control points including control point equipment, track circuitry, pre-wired bungalows, batteries, solar power drop, and auxiliary power (generators).[255] BNSF accepts AEP Texas' unit costs for the control point equipment, pre-wired bungalows, batteries, and – after correcting for errors – control point installation. The following subsections discuss areas of disagreement with AEP Texas' costs as well as items that AEP Texas neglected.

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[253] AEP Texas Opening workpaper pp. 11040 and 11041-11042.

[254] AEP Texas Opening workpaper pp. 11032 to 11042.

[255] AEP Texas Opening electronic workpaper "CTC System & Signals.xls" worksheet "Individual Cost Calcs."

(b) Control Point Installation

AEP Texas developed a labor cost for the installation of control points based on RS Means R-9 crew costs. However, AEP Texas used only the bare labor costs for the R-9 crew and failed to include the overhead and profit (O&P) component of the cost. BNSF added O&P to AEP Texas' R-9 crew cost.

In its workpapers, AEP Texas also developed a labor cost for installation of the bungalows based on the costs for an RS Means R-11 crew working five days.[256] However, AEP Texas neglected to include that cost in the development of its total control point costs. BNSF corrected that calculation error.

(c) Control Point Batteries

As AEP Texas notes on its workpaper 11037, 24-volt batteries are required for switch machines and 12-volt batteries are used to power the signals. AEP Texas, however, includes costs for a 24V battery with a 12V charger for all control points.[257] There are two problems with this set up. First, it simply will not work because the proper charger is not being used for the battery size. A 24V battery requires a 24V charger. Therefore, where a 24V battery is used, BNSF included the cost for a 24V charger. The second problem with AEP Texas' proposed arrangement of batteries and chargers is that AEP places the larger 24V batteries with the intermediate signals, although its own workpapers state that the signals use 12V batteries. While it is not impossible to place 24V batteries at intermediate signals, it would be more cost effective to use the appropriate 12V battery and 12V charger at these locations. In its restatement of costs,

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[256] AEP Texas Opening electronic workpaper "CTC System & Signals.xls" worksheet "Individual Cost Calcs." cells E7, E12 and E17.

[257] AEP Texas Opening workpaper pp. 11036 and 11037 and electronic workpaper "CTC System & Signals.xls" worksheet "Individual Cost Calcs." cells F46, F48 and F50.

BNSF uses the 24V battery/24V charger costs at power switch locations and the 12V battery/12 V charger costs at the intermediate signals. A combination of the 24V and 12V batteries and chargers are used at the EOS and crossover locations because those locations are equipped with both switch machines and signals.

(d) Cables

AEP Texas did not include any additional costs to account for the cable that would be required to connect the pre-wired bungalows to the various components of the control point. The costs for cable vary per control point. BNSF Engineering Consultants have used the BNSF schematics of an end of siding layout to estimate the amount of cable required, and have applied a unit cost for the cable based on BNSF supplied data.[258] Costs for installation of the cable are included in the separately calculated crew costs.[259]

(e) Control Point Protection

In addition to the components integral to the signal machines, railroads install other equipment designed to protect the signal control points, including hot air blowers. Automatic remotely-activated hot air blowers keep snow and ice from accumulating and interfering with the devices.

AEP Texas alleges that its costs for hot air blowers include both the material and the installation costs. However, the low total cost suggests that AEP Texas' materials cost did not include the costs for the material and installation of cables, which comprise a significant portion of the complete hot air blower cost. BNSF has included the material and installation cost of the

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[258] BNSF.RP.WP.IIII-F-0696 to 0716.

[259] BNSF Reply electronic workpaper "III F 6 CTC Systems & Signals.xls" worksheet "Individual Cost Calcs."

hot air blower (switch heater) in its track costs in Section III.F.3, but has added the costs for the cables to integrate the heaters into the signal system in the signals costs.

AEP Texas also states that backup power is provided by propane driven generators[260] and purports in its electronic workpapers to include material and installation costs for 20KW and 35KW generators.[261] In AEP Texas' electronic workpaper "CTC System & Signals.xls" worksheet "Individual Cost Calculations," AEP Texas includes in its calculation of the control point unit costs a cost for Auxiliary Power (generators), with a notation that installation is included. However, in its electronic workpaper "IIIFTOTAL.xls" worksheet "Materials Unit Costs," AEP Texas developed the generator costs using material costs estimates from Interstate Power Systems[262] to which it added labor and equipment costs (without O&P) from RS Means.[263] Despite having made this calculation, the costs that AEP Texas actually included under the heading "Auxiliary Power" in its signal costs include only the indexed materials costs from Interstate Power Systems without the additional RS Means cost for installation. AEP Texas offers no explanation for this omission. AEP Texas includes in its workpapers an estimate from CSX of the time required to install a signal and interlocking, but AEP cannot rely on that estimate as covering the installation of the generator also. There is nothing in the CSX time estimate to suggest that hot air blowers and generators were taken into consideration in developing that estimate.[264] Therefore, BNSF has added to the AEP Texas materials costs for

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[260] AEP Texas Opening Nar. at III-F-76-77.

[261] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls."

[262] AEP Texas Opening workpaper pp. 11051 and 11058.

[263] AEP Texas Opening workpaper p. 11064 and Second Errata electronic workpaper "IIFTotal.xls" worksheet "Material Unit Costs."

[264] AEP Texas Opening workpaper p. 11065.

20KW and 35KW generators the RS Means installation costs from AEP Texas' own workpaper 11064, corrected to include O&P.

(f) Switch Layout (Switch Stands)

AEP Texas included a quantity for switch layouts (powered switch stands) in its "IIIFTOTAL.xls" spreadsheet under track materials, but did not include any costs for these items either there or in its total signal costs. BNSF accepts the quotes that AEP Texas received from A & K for the power switch stand and applied it to the number of power switches on the TNR. The non-powered switch stands are discussed in Section III.F.3.

(2) Power to Signals

AEP Texas states that power to signals is provided either from overhead power drops or from solar panels.[265] It further states that for "simplicity, the AEP Texas engineers have used the same cost for either supply." At the same time, AEP Texas acknowledges that the cost for solar panels is "significantly less than for overhead connections."[266] While there is nothing in AEP Texas' workpapers indicating what the cost is for an overhead power drop or even that AEP Texas' experts attempted to obtain a quote for such service, it is clear from AEP Texas' own assertion that it has no grounds for assuming that the $2,000 quote for a solar panel is a reasonable substitute for an overhead power drop cost. BNSF's evidence shows that the cost for an overhead power drop is $6,966.57.[267] This unit cost for a power drop was developed by averaging various costs that BNSF has paid for power drops within the states traversed by the TNR. The costs were taken from a BNSF March 2004 invoice from TranSystems Corporation.

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[265] AEP Texas Opening Nar. at III-F-76.

[266] *Id.*

[267] BNSF Reply electronic workpaper "III F 6 CTC System & Signals.xls" worksheet "Power Drops." BNSF.RP.WP.III.F-0717 to 0735.

The invoice identifies the item being electrified by each power drop and the amount paid to the power company for that service. BNSF Engineering Consultants separately averaged the costs for power drops to signal locations (control points, intermediate signals, and FEDs) and for power drops to road crossings on the assumption that power is likely closer to road crossings than to other parts of the railroad such as switches, intermediate signals and FEDs. BNSF Engineering Consultants applied the resulting unit cost for power to signal locations to each control point on the TNR.

Power drops are required on the TNR because, as the quote for solar power panels that AEP Texas includes in its workpapers specifically notes, "[t]he solar panel can only power the switch machine, nothing else."[268] That is because the solar panel can only power one component of the control point. Where there are additional components such as hot air blowers and signals, an additional power source is required. BNSF therefore added power drops to all power switch locations. BNSF used the solar power panels alone at the intermediate signals because the solar panel is sufficient to power just the signal, and maintaining continuous power at an intermediate signal is not as critical as having a switch powered continuously on a CTC system.

BNSF Engineering Consultants agree on AEP Texas' counts for control points other than the removal of single signals but have adjusted the quantities of control points according to Messrs. Mueller and Wheeler's operating recommendations.[269]

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[268] AEP Texas Opening workpaper p. 11025.

[269] BNSF.RP.WP.III.F-0736 to 0740.

(3) Dispatch Center

AEP Texas included $1.144 million for the TNR dispatch center based on a quote from Alstom for a typical mainline railroad CTC office equipment and software[270] and an installation costs based on RS Means R-9 crew costs.[271] BNSF accepts these costs.

(4) Detectors

To prevent damage to trains and track as a result of equipment failures, railroads install detectors along the route to identify and remove problem equipment before any damage occurs. Hot bearing detectors (HBDs) notify the crew when roller bearings are overheated. Dragging equipment detectors (DEDs) alert the train crew to defective and/or dragging equipment that could cause the train to derail or cause damage to the track, bridge or tunnel structures. Combined HBD/DED detectors are referred to as Failed Equipment Detectors (FEDs).

AEP Texas included 31 single-track and 13 double-track automatic roll-by FEDs along the mainline spaced every 25 miles, or generally where they are placed on the existing lines.[272] AEP Texas based its costs for the FEDs on quotes from GE Transportation Systems.[273] BNSF Engineering Consultants agree with the FED counts, but take issue with AEP Texas' development of the unit costs. The unit costs that AEP Texas uses for the material and installation of the FEDs are acceptable, but BNSF does not agree with the AC service cost that AEP Texas included in its total cost. AEP Texas' own workpaper 11029 indicates that the AC power cost provided by GE Transportation covered only Meter Service from within 200 feet of

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[270] AEP Texas Opening Nar. at III-F-78 and AEP Texas Opening workpaper p. 11038.

[271] AEP Texas Opening electronic workpaper "CTC System & Signals.xls" worksheet "Individual Cost Calculations."

[272] AEP Texas Opening Nar. at III-F-78.

[273] AEP Texas Opening workpaper pp. 11029 to 11031.

the point of installation. As the FEDs are not within 200 feet of a power source, a power drop would be required. BNSF applied the same power drop cost for the FEDs as it used for control points.

(5) Crossing Signals

AEP Texas included costs for road crossing devices on the Campbell Subdivision, Orin Subdivision, Reno Subdivision and Boise City Subdivision between Las Animas Jct. and Amarillo. AEP Texas acknowledges that on those line segments roads pre-date BNSF. Therefore it also acknowledges that BNSF as the junior tenant (and TNR stepping into the shoes of BNSF) would be responsible for 100 percent of the cost of installing crossing devices on those line segments.[274]

AEP Texas excluded the costs of installing crossing devices on all other line segments on the ground that there was no proof that BNSF or its predecessors initially paid for any crossings or any of the related devices on those line segments.[275] That assumption is incorrect. In the 1980s, BNRR upgraded a significant portion of its track from the DC track circuits (pole line) to electronic coded track, which required also upgrading the motion equipment devices at crossings. As the state does not pay for that kind of upgrade to the crossing devices, BNRR was required to incur the full costs.

Over the years, BNSF or its predecessors have upgraded the crossing control equipment on all the line segments that are currently equipped with CTC to make the equipment compatible with electronic coded track circuits. Those costs should be incurred by the TNR as well. Based on BNSF Engineering Consultants' discussions with BNSF's VP for Signals, half of the active

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[274] AEP Texas Opening Nar. at III-F-97.

[275] AEP Texas Opening Nar. at III-F-98.

warning devices on the TNR segment (other than the newly constructed segments) required the motion equipment upgrade from track circuits that were commonly in place on those segments before 1980.[276] In addition, AEP Texas is installing CTC on trackage where BNSF does not currently have CTC installed. The timetables for the Angora, Brush, Pikes Peak, Pueblo and Red River Valley Subdivisions show that over 200 miles of the route from Sterling to Oklaunion (minus the Boise City Subdivision) currently are not operated by CTC system.[277] This evidence, together with the fact that BNSF has been slowly upgrading portions of its system to CTC, provides further support that BNSF has incurred costs for upgrading the at-grade crossings with active warning devices. Therefore, BNSF Engineering Consultants included the costs for upgrading active warning devices on 50 percent of the crossings on these TNR line segments. A unit cost of $60,000 for each upgrade was derived from BNSF AFE A990451.[278]

b. Communications System

(1) TNR Microwave Radio System

In its Opening evidence, AEP Texas includes $10.8 million for the TNR communications system.[279] This system, as configured by AEP Texas, includes microwave towers, microwave base stations, microwave antennas, microwave network management system, Land Mobile Radio (LMR) base stations and multiplexors.[280]

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[276] BNSF.RP.WP.III.F-0741.

[277] BNSF.RP.WP.III.F-0742 to 0745.

[278] BNSF.RP.WP.III.F-0689 to 0695.

[279] AEP Texas "IIIFTOTAL.xls."

[280] AEP Texas Opening Nar. at III-F-81.

The backbone of this communications network is 41 microwave towers that AEP Texas assumes will generally be placed in close proximity to those of BNSF on the replicated lines. Some towers, however, will be placed at new locations where "the BNSF microwave site locations did not facilitate adequate coverage for the radio system backbone."[281] Microwave towers are spaced at approximately 25 miles,[282] and towers are designed for a height of 200 feet.[283]

AEP Texas developed the costs for the components of its network from a variety of sources, including the MTS Wireless Components Guide and the Colorado Order Guide.[284] AEP Texas selects the Alcatel MDR-8606 microwave base station as the primary technology, which is a six GHz, high capacity radio that facilitates transmission capacity of three x DS3 (2,016 voice channels). The LMR base station selected by AEP Texas is a Motorola MTR2000 that will operate in VHF mode for transmitting and receiving.[285]

BNSF Engineering Consultants reviewed AEP Texas' communications system evidence and concluded that the conceptual configuration proposed by AEP Texas suffers from a number of shortcomings that will render the system inadequate for a railroad the size of the TNR. In under-designing the communications network, AEP Texas has come up short on both the quality and quantity of key system components. In addition, certain of the unit costs selected by AEP Texas are understated.

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[281] *Id.*

[282] AEP Texas Opening Nar. at III-F-82.

[283] AEP Texas Opening Nar. at III-F-83.

[284] AEP Texas OP. electronic workpaper "TNR Radio System Cost Model.xls."

[285] AEP Texas Opening Nar. at III-F-84-85.

Specifically, AEP Texas has understated costs related to antenna cables, tower steel, grounding grids and communications sheds. It has also selected the wrong type of microwave radio and has failed to provide for necessary dehydration equipment and for spare parts. Overall, these errors and omissions by AEP Texas result in a $6.4 million understatement of TNR microwave system costs.

(a) Antenna Cable

AEP Texas states that "the antennas are connected to the microwave base station with radio guide universal (RG-8a/u) superflex coaxial cable."[286] The signal loss in the coaxial cable selected by AEP Texas is approximately ten decibels per 100 feet of cable. The standard connection between the type of radio (Alcatel MDR-8606) and the antenna (Hutton 8' parabola with feed horn) specified by AEP Texas[287] is waveguide[288] rather than coaxial cable, which has a signal loss rate of only 1.2 db per 100 feet. AEP Texas apparently recognizes that waveguide cable is required because its TNR radio system diagram depicted in AEP Texas' work paper 11073 states explicitly that waveguide connectors will be used. The signal losses attributable to coaxial cable actually priced by AEP Texas would result in a signal that was too weak to span the 25-mile tower spacing assumed by AEP Texas. BNSF Engineering Consultants included in their restatement costs for waveguide using the price schedule set forth in AEP Texas' work paper 11265.

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[286] AEP Texas Opening Nar. at III-F-85.

[287] AEP Texas Opening Nar. at III-F-85.

[288] Waveguide is an evacuated (hollow) rectangular copper pipe that carries electromagnetic waves from one place to another without significant loss and is the standard for microwave antennas. BNSF.RP.WP.III.F-0747 to 0748.

AEP Texas also assumes that the RG-8a/u coaxial cable would be used with the LMR radios. Although the use of this smaller cable is technically feasible, it is a substandard cable for the VHF or LMR radios and will result in unacceptable signal loss. The standard connection between the LMR base and the antenna is the larger 7/8ths inch coaxial cable because of the reduced loss incurred.

The use of the larger WMR 137 wave guide and 7/8ths inch coaxial cable will require an increase in the number of cable hangers to ten packages for a typical waveguide installation and nine packages for the 7/8ths inch coaxial installation. Four connectors for each waveguide should be included at a cost of $200 each and three grounding kits for each of the four waveguides and two coax runs are also required. The costs for the larger cable and additional hardware have been incorporated into the BNSF Engineering Consultant's restatement of TNR construction costs.

(b) Tower Steel

AEP Texas sizes its tower steel based on an assumption of two eight-foot dishes at the 200 foot level, arriving at a steel cost per tower of $25,050. In order to obtain network availability figures that support the reliability demanded from a system of this type, space diversity will be required for each of the 25 mile paths. Space diversity is a method of transmission or reception, or both, in which the effects of fading are minimized by the simultaneous use of two or more physically separated antennas, ideally separated by one or more wavelengths. Space diversity is accomplished by mounting two antennas that are spatially separated and feed into one receive end of the link.[289] This will require two dishes at the 200

[289] BNSF.RP.WP.III.F-0749 to 0754.

foot level as AEP Texas proposes and two more dishes at the 170 foot level. The quantity of dish mounts also must be increased to four each to accommodate the additional dishes.

(c) Ground Grid

Microwave tower installations require a substantial ground grid to protect the tower and radio equipment from damage caused by lightning strikes. The site components identified by AEP Texas omit this extensive ground grid for the equipment shed and the tower. Specifically, AEP Texas provides for only two ground rods at each microwave site. With this level of protection, the TNR will likely be replacing burned out radio components after almost every thunderstorm. The standard ground grid design for a shed housing communications electronics consists of seventeen ground rods and very heavy connecting wire to form a grid within the site. The cost of installation would need to be added to the site construction and tower installation costs. BNSF Engineering Consultants have included the grid cost with the cost for the communications shed, both of which costs are based on a BNSF invoice for the total communications shed package.[290]

(d) Communications Shed

In addition to failing to provide adequate ground protection, AEP Texas' proposed unit cost of $20,000 for a communications shed and fence is far too low. A communications "shed" is actually a shelter, the cost of which typically includes a concrete hardened building, generator, transfer switch, redundant heaters and air conditioners, and surge arrestors, as well as the cost of a power drop from the local utility. Because it houses expensive radio equipment the shed is also protected by a fence and lockable gate. AEP Texas provides no support for its $20,000 communications shed cost. In their restatement of TNR communications investment cost, the

[290] BNSF.RP.WP.III.F-0755.

BNSF Engineering Consultants based the cost for communications sheds on the recent experience of BNSF as set forth in two BNSF invoices, one showing the components and cost for the communication shed and the other showing the site costs for the shed.[291]

(e) Microwave Base Station

The microwave base station selected by AEP Texas, the Alcatel MDR-8606-135-31, is a terminal radio that is not capable of repeating a signal for further transmission along the microwave backbone. BNSF Engineering Consultants contacted Alcatel about the use of this model and Alcatel confirmed that the radio did not have repeater capabilities and therefore two radios back-to-back would be necessary.[292] A microwave radio station at the end of a path is referred to as a terminal station, with only one signal path to the next tower. Backbone microwave stations, on the other hand, can require many paths. Based on the linear design of the TNR microwave backbone network, the backbone microwave stations will each have two signal paths – one north toward Gillette and a second south toward Oklaunion. As such, each backbone microwave site will require two radios. Thus, the cost of the microwave base station and the microwave radio antennae are understated by approximately half.

(f) Dehydration Equipment

Dehydration and pressurization equipment is required in the communication sheds to prevent damaging condensation from occurring during temperature changes. AEP Texas is aware that such equipment is required because it is listed as a separate category on the antenna price quote it relies upon. AEP Texas simply ignores this needed equipment.[293] The BNSF

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[291] BNSF.RP.WP.III.F-0755 to 0758.

[292] BNSF.RP.WP.III.F-0759 to 0760.

[293] BNSF.RP.WP.III.F-0761 to 0767.

Engineering Consultants have included costs for dehydration and pressurization equipment based on the prices in the AEP Texas quote.

The table below summarizes the differences between AEP Texas' costs for the TNR Radio System and BNSF's restated costs.

(2) Other Communication Investment Costs

AEP has understated the radio counts because it has provided only hand held radios -- rather than mobile radios -- to the TNR train crews, operating managers, MOW employees and six inspection teams. The remaining operating personnel were not provided any radios. Hand held radios operate on only three to five watts, which means that they have a very limited range. They are not the kind of reliable equipment that would be required for trains crews and maintenance workers traveling over the railroad significant distances away from the control center. Train crews relying solely on hand held radios would repeatedly lose contact with the dispatcher, in violation of FRA rules that require operating crews to be in contact with the dispatcher at all times.[294] Roadway workers are also required to maintain reliable radio communications, which are integral to the immediate and efficient handling of maintenance problems as they arise anywhere on the TNR system. Track and signal workers and any other personnel traveling by hi-rail at any distance from the dispatch center would be unable to communicate with the control center if they were equipped with only hand held radios. BNSF Engineering Consultants therefore provided mobile radios to all operating and maintenance

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[294] FRA regulations require that railroad employees be equipped with "working radios." 49 CFR § 220. A "working radio" is defined as a radio that can communicate with the control center of the railroad from any location within the rail system. 49 CFR § 220.5. Train crews must be equipped with a working radio both in the controlling locomotive and on at least one other locomotive in the consist in order to provide redundancy. 49 CFR § 220.9. Roadway workers also must have "immediate access to a working radio." 49 CFR § 220.11(b). BNSF.RP.WP.III.F-0768 to 0776.

personnel working on or over the tracks. Hand held radios are provided for employees whose jobs do not require them to be out in the field.

Although it did not include any mobile radios in its costs, AEP Texas did include a unit cost for the radios in its workpapers. BNSF Engineering Consultants, however, relied on BNSF data for the unit cost as the equipment costed by AEP Texas did not provide the functionality needed for railroad communications.

AEP Texas' costs for the hand held radios were included in its operating costs. BNSF has included the costs for radios in its restatement of communications investment costs because the radios are an integral part of the initial investment in a communications system.

A detailed narrative description of the requirements for a Class I railroad communications system is set forth in BNSF Reply Exh. III.F-3.

(3) Summary

The table below summarizes BNSF's total communications cost. Details of the equipment selected and the unit costs for the equipment are included in BNSF workpapers.[295]

Table III.F. 6-2
Comparison of BNSF and AEP Texas
TNR Communications Costs

Description	BNSF $million	AEP Tex $million	Difference $million
Microwave System	$15.4	$10.8	$4.6
Radios[1]	$1.8	$0.03	$1.7
TOTAL	**$17.2**	**$10.9**	**$6.3**

Source: BNSF Reply electronic workpaper "III F 6 Microwave System.xls," worksheet "Costs Summary." [1]AEP Texas First Errata TNR_OP_EXP.xls."

[295] BNSF Reply electronic workpaper "III F 6 Radio System Cost Model.xls" worksheet "Costs Summary" and BNSF.R>WP.III.F-0777 to 0779.

7. Buildings and Facilities

This section presents BNSF's response to AEP Texas' Opening Evidence with respect to the cost of construction of the following buildings:

- Headquarters Building
- Locomotive Fueling Facilities
- Locomotive Shop
- Car Repair Shop
- Crew Change and Yard Office Buildings
- Maintenance of Way Buildings
- Wastewater Treatment Facilities
- Yard Air and Yard Lighting

In its opening evidence, AEP Texas presents a summary of the general purpose, interior functional arrangement, and locations of buildings and facilities necessary for the operation of the TNR.[296] However, AEP Texas does not provide specific information with respect to the methods and materials to be used in the construction of these buildings and facilities. In fact, AEP Texas' opening evidence (as supplemented by its First and Second Errata) and workpapers are riddled with errors, omissions, inconsistencies, contradictions, and misstatements.

Some of these discrepancies are minor, such as misstating the area of the Office I floor plan on the schematic in AEP Texas' workpaper (the area should be 180 square feet, not 100 square feet).[297] Others are major -- for example (1) AEP Texas conveniently ignored caveats and exclusions in RS Means and other pricing documentation that, if factored into AEP Texas' cost calculations, would result in building costs greater than those shown in AEP Texas' evidence, and (2) AEP Texas provided costs for facilities for which it failed to develop even a conceptual design (*e.g.,* the Alliance locomotive fueling facility). These numerous errors, omissions,

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[296] AEP Texas Opening Nar. at III-F-88 through III-F-95.

[297] AEP Texas Opening workpaper p. 11483.

inconsistencies, contradictions, and misstatements substantially undermine the credibility of AEP Texas' building designs and construction costs.

In order to present a comprehensive accounting of the facilities needed to operate the TNR, BNSF Engineering Consultant James Primm performed the following tasks:

- Headquarters Building. Construction costs were re-calculated based on constructing the building with glass and metal curtain exterior walls and steel structural frame. Costs of building systems required by fire, life safety, and building codes, but omitted by AEP Texas in its cost calculations, were included in the cost re-calculation. Costs for additional areas for a lunch room and data processing center are also included in the cost re-calculation.

- Locomotive Fueling Facilities. A conceptual design was created for the fueling facility at Alliance based on the general description of the facility presented in AEP Texas' opening evidence (III-F-89). However, the eight single-track platforms were replaced with four double-track platforms. Facilities necessary for the full and complete operation of the fueling facility that were omitted in AEP Texas' opening evidence and workpapers, were added. Errors and omissions in AEP Texas' construction costs were corrected. Unit prices for similar facilities were multiplied by the quantities of construction materials and equipment to develop the cost of this fueling facility. These unit prices were adjusted to calendar year 2000.

  A mainline fueling facility was added at Amarillo, Texas. This facility replaces the fueling operation proposed by AEP Texas at Las Animas, Texas. This facility includes four platforms and all support facilities and equipment necessary to fuel the unit coal trains operating on the TNR. Unit prices for similar facilities were multiplied by the quantities of construction materials and equipment to develop the cost of this fueling facility. These unit prices were adjusted to calendar year 2000.

  For the locomotive fueling facilities at locations where helper locomotives are based, a conceptual design was created based on fueling locomotives from a tank truck. A containment structure, small oil/water separator, pump, and storage tank are provided at these locations to contain fluid spills. Unit prices for similar facilities were multiplied by the quantities of construction materials and equipment to develop the cost of these fueling facilities. These unit prices were adjusted to calendar year 2000.

- Locomotive Maintenance Shop. A conceptual shop design was created that corrects the deficiencies and omissions in shop facility and equipment proposed by AEP Texas. The revised conceptual design is in accordance with design criteria of the American Railway Engineering and Maintenance-of-Way Association (AREMA) for locomotive shops and complies with locomotive maintenance concepts commonly accepted in the railroad industry. The revised conceptual design is based on the shop area provided by AEP Texas (Page III-F-90 and Workpaper 11518). The revised design incorporates design concepts included in locomotive maintenance facilities designed for the BNSF Railroad at North Kansas City, Missouri; Chicago, Illinois; Topeka, Kansas; Barstow, California; Commerce, California, and the Union Pacific Railroad at Hermiston, Oregon. Construction costs for the locomotive maintenance shop were developed using a combination of unit prices from the cost estimates prepared at the time each facility was designed, current budget quotations from equipment manufactures, and where applicable, RS Means unit prices. These costs were then multiplied by estimates of quantities of construction materials and equipment needed to build the facility. Some of these quantities were taken from design drawings of the facilities. Other quantities were estimated based on AEP Texas' floor plan of its proposed locomotive shop (WP 11518). These quantities were used to develop a detailed construction cost estimate for the TNR locomotive shop. This detailed construction cost estimate includes all support facilities necessary for a fully functional shop. Where necessary, construction prices were adjusted to 2000 by using RS Means construction price indices.

- Railcar Maintenance Facilities. Shops to repair railcars were added at Alliance and Amarillo. Conceptual designs were created based on design criteria published by the AREMA in its publication, "Design Criteria for Spot Car Repair Shops – 1997."

- Crew Change and Yard Office Buildings, and MOW Buildings. Costs were re-calculated based on use of pre-engineered metal buildings instead of modular buildings.

- Wastewater Treatment Plant. A dissolved air flotation system was added to the wastewater treatment plants that will serve the mechanical facilities. For other locations where crew change and yard office and MOW buildings are to be constructed, costs were developed for either a connection to the publicly owned treatment works or septic disposal system. Construction costs were developed by using cost estimates prepared at the time the model facility was designed escalated to 2000 unit prices per cost indices from RS Means multiplied by detailed estimates of quantities of

construction materials and equipment. The model for the wastewater treatment plant is the wastewater treatment plant built with the Hinkle Locomotive Repair Facility.[298]

In each of the following subsections, BNSF Consultant Primm critiques AEP Texas' design and costing of the particular building or facilities and restates the costs based on design and capacity changes recommended by BNSF's operating and capacity witnesses.

The table below summarizes BNSF's restatement of costs for buildings and facilities on the TNR.

Table III.F.7-1
Comparison Of BNSF's Estimated Of Facilities Cost
To AEP Texas' Opening Estimate ($Millions)

	BNSF (millions)	AEP Texas (millions)	Difference (millions)
Fueling Facilities	$30.0	$7.8	$22.2
Wastewater Treatment Plants	$1.2	$.6	$.6
Locomotive Shop	$16.8	$13.1	$3.7
Car Repair Facilities	$6.4	$0.0	$6.4
Headquarters/Yards	$2.3	$1.6	$.7
MOW/Roadway Buildings	$12.9	$3.4	$9.5
Yard Sites	Inc. in bldg. cost	$13.7	($13.7)
Yard Inspection Roadways		$6.9	($6.9)
TOTAL*	**$69.8**	**$47.1**	**$22.7**

* The totals may not represent the sum of the parts due to rounding.
Source: BNSF Reply electronic workpaper "III F 7 Buildings.xls" worksheet "Summary." AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls."

a. Headquarters Building

(1) Size

AEP Texas states that its headquarters facility at Alliance will accommodate its operating, supervisory, clerical and dispatching staff; the CTC control center; and the general

[298] Mr. Primm prepared the conceptual design and supervised the detailed design of the Hinkle Locomotive Repair Facility at Hermiston, Oregon.

and administrative staff, all in a facility of approximately 16,000 square feet in area. However, AEP Texas has not provided all of the building area necessary to fully accommodate the functions of the staff. For example, AEP Texas has not accounted for either a lunchroom for its employees or a data processing center for computer equipment necessary to support general accounting, payroll, and inventory functions. A reasonably sized lunchroom including areas for vending machines would be 1,300 square feet in area. A data processing center capable of accommodating computers, storage devices, printers, plotters, and staff offices for the TNR would be 2,000 square feet. It should be noted that AEP Texas omitted the positions of Chief Information Officer and data processing staff from its space allocation calculations on Workpapers 11477 and 11478.

The American Railway Engineering and Maintenance-of-Way Association (AREMA) in its publication titled, "Design Criteria for Railway Office Buildings," recommends that a range of 250 to 350 square feet be used for executive and 120 to 200 square feet be used for other offices as a design tool in lieu of specific corporate standards or otherwise dictated by economics.[299] According to these criteria, AEP Texas has under-sized the following office areas and restrooms:

> Office II. AEP Texas proposes an office of 100 square feet.[300] BNSF proposes to use 120 square feet in accordance with the AREMA recommendation.
>
> Office III (cubicles). AEP Texas proposes a cubicle size of 68 square feet.[301] BNSF proposes to use 100 square feet in accordance with the AREMA recommendation.
>
> Restrooms. AEP Texas proposes a size of 144 square feet for both men's and women's restrooms.[302] AEP Texas' restroom design, however, omits privacy screens at the

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[299] BNSF.RP.WP.III.F-0787 and generally 0782 to 0797.

[300] AEP Texas Opening workpaper p. 11483.

[301] AEP Texas Opening workpaper p. 11483.

entrances to the restrooms, thus allowing passersby to have a clear view inside the restrooms. This is an unacceptable privacy invasion and an example of poor space planning. BNSF proposes to use 168 square feet, which will provide space to accommodate the screens.

Incorporating the above changes into AEP Texas' building calculations would increase its headquarters building from 15,650 square feet to 21,316 square feet.

(2) Unit Cost for Construction of Headquarters Building

AEP Texas computes an average construction cost per square foot for its headquarters building by adding the costs of two different exterior wall and frame construction methods (glass and metal curtain wall with steel frame [108.80 $/square foot] and wood siding with wood frame [92.10 $/square foot]) and dividing the result by two.[303] In the spreadsheet, the unit costs for both types of exterior wall and building frame construction are indexed to 2Q00 and the average unit cost is then further reduced by subtracting $6.88 or seven percent (representing the engineering and architectural design costs) to calculate the final building cost per square foot ($91.50). Then, on electronic spreadsheet "Bldgcst2.xls" this average unit cost per square foot ($91.50) is multiplied by the total square foot area of the headquarters building to compute the total cost of the building ($1,431,954.95).[304]

Although BNSF Engineering Consultant Primm accepts the use of RS Means construction cost pricing in this instance, and the removal of engineering and architectural design fees, he does not accept the use of the costs of two different exterior wall and frame construction techniques to compute a fictitious average cost per square foot for the headquarters building.

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[302] AEP Texas Opening workpaper p. 11485.

[303] AEP Texas Opening workpaper p. 11479 and Opening electronic workpaper "All Buildings.xls." worksheet "Type 4 Building."

[304] AEP Texas Second Errata electronic workpaper "Bldgcst2.xls."

First, the methodology absurdly implies that half of the headquarters building will be constructed with a wood frame and wood siding and the other half will be constructed with a glass and metal curtain wall and steel frame. An office building is typically constructed with one type of exterior wall treatment and frame unless there are two or more separate occupancies or uses. The headquarters building, as described by AEP Texas, will be exclusively a Class "B" occupancy, which is defined by the Uniform Building Code (UBC) as occupancies for the storage of records and accounts and business occupancies, including but not limited to civic administration and professional service. Office buildings used for general administrative purposes would fall into this occupancy.[305]

The construction costs presented in the tables of square foot construction costs in RS Means represent only the summation of the costs of the specific individual construction assumptions and techniques used in preparation of the costs. Any change in the individual construction methods and techniques used to calculate the construction costs will directly change the square foot construction costs of the building. Therefore, each construction cost presented in the tables of square foot construction costs in RS Means should be viewed as a representative example of one possible construction cost based on the specific assumptions used in calculation of the square foot construction cost. The square foot construction costs are only comparable within each table based on different exterior wall and frame construction and building size.[306] Thus, far from making the costs "more accurate" as AEP Texas implies, AEP Texas' proposed methodology merely creates a fictitious average cost per square foot for a building that would never be constructed.

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[305] BNSF.RP.WP.III.F-0798 to 0809.

[306] AEP Texas Opening workpaper pp. 11479 and 11519.

Second, AEP Texas' cost calculation is based on a building with an area of 15,650 square feet,[307] which as discussed above is significantly undersized. If AEP Texas had used appropriate area allocations for offices and restrooms and had not omitted area allocations for a lunch room and data processing center, the area of the building would be 21,316 square feet. This increase in floor space is significant because the Uniform Building Code – 1997 Edition (UBC) (the most current edition) does not allow the use of wood framing or siding in a multi-story building exceeding 18,000 square feet in area.[308] The use of wood for structural framing or siding in a multi-story building of 21,316 square feet is therefore prohibited by the UBC.

The UBC is the most widely adopted model building code in the United States and provides performance-based regulations for design standards and construction practices. The requirements contained in the UBC are adopted by governmental agencies charged with enforcement of building regulations. The UBC defines the permissible sizes of buildings based on the degree of fire resistance of the structure. The greater the fire resistance of the materials used in a building's structure, the larger the building can be. The UBC also defines the allowable area of a building based on its occupancy class.

The 1997 Edition of the UBC has been adopted by most of the major cities along the TNR: Donkey Creek/South Logan, Edgemont, Alliance, Sidney, Denver (with city-sponsored amendments), Las Animas, and Amarillo. A competing but similar building code sponsored by the Building Officials and Code Administrators International (BOCA) is used by Boise City, Oklahoma.[309]

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[307] AEP Texas Second Errata electronic workpaper "Bldgcst2.xls."

[308] BNSF.RP.WP.III.F-0802.

[309] BNSF.RP.WP.III.F-0810 to 0817.

The 1997 Edition of the UBC states in Table 5-B (Page 1-59)[310] that the maximum allowable area of a multi-story building with a "B" occupancy classification using Type I (fire resistive) construction is unlimited. Type II-N.R. construction is limited to 39,900 square feet. Types I and II-N.R. construction require the structural elements of the building to be of steel, iron, concrete, or masonry. Wood framing is not allowed.

The UBC does allow wood to be used for structural elements of a building under its Type III (one-hour resistance), Type IV (Heavy Timber), and Type V (one-hour resistance) construction categories, but the AEP Texas headquarters when properly sized does not fit within the size limitations for such construction. The maximum area of a multi-story building of Type III and Type III-N (no fire resistance) is 18,000 and 12,000 square feet, respectively. The maximum area of a multi-story building of Type IV is 18,000 square feet. The maximum area of a multi-story building of Type V and Type V-N (no fire resistance) is 14,000 and 8,000 square feet, respectively.[311]

Therefore, AEP Texas would not meet the requirements of the UBC if wood were used to construct the structural frame and exterior siding of a 21,316 square-foot multi-story headquarters building. The City of Alliance would not permit construction of a building that does not meet the requirements of the UBC.

(3) Costs for Common Additives

AEP Texas also does not incorporate into its building cost calculations any of the pricing for common additives shown on the RS Means summary page.[312] Many of these common

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[310] BNSF.RP.WP.III.F-0802.

[311] BNSF.RP.WP.III.F-0802.

[312] AEP Texas Opening workpaper p. 11479.

additives are required by building, fire, and safety codes so a building not including these items would not be permitted by the local building code authority.[313]

Specifically, AEP Texas omits the following costs from its calculations of costs for the headquarters building:

1. Clock systems
2. Security systems including access control and closed-circuit television monitoring
3. Emergency lighting (UBC Section 403.8)
4. Smoke detectors (UBC Section 403.4)
5. Public address system
6. Fire sprinklers and alarms (UBC Sections 403.2 and 403.5)
7. Elevator (required for access in accordance with the Americans with Disabilities Act)
8. Emergency generator with fuel storage tank for support of critical functions (computers, dispatch center) (UBC Section 403.8)
9. Utility connections (natural gas, water, electricity, sewer).

(4) Location Factors

AEP Texas erred by failing to use location factors contained in RS Means to adjust its pricing for the headquarters building. Prices contained in RS Means cost data publications are based on national averages for materials and installation. To adjust these costs to a specific location, the base cost must be multiplied by the location factor for that city. The location factor for Alliance, Nebraska is 0.72.

(5) Yard Lighting for Headquarters Building

BNSF Engineering Consultants accept AEP Texas' methodology and pricing for calculation of costs of site grading, drainage, and parking lots and use the unit costs in their calculations for these construction items.

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[313] BNSF.RP.WP.III.F-0799 to 0801.

However, as discussed in more detail in Section III.F.7.h, Mr. Primm takes issue with AEP Texas' costs for site lighting because the unit prices contained in AEP Texas' workpapers[314] cannot be reconciled with the lighting costs presented on AEP Texas' electronic spreadsheet.[315] Furthermore, AEP Texas has omitted essential components of the poles and has used inappropriate materials.

Finally, four light poles are not sufficient to adequately illuminate the 100-car parking lot and provide necessary illumination levels for safety and security. BNSF has therefore added four additional 40-foot light poles. Because of the inconsistencies in AEP Texas' evidence on lighting costs, BNSF has completely re-calculated the costs, as documented in its electronic workpapers.[316]

AEP Texas also failed to adjust the costs by the RS Means location factor.

(6) BNSF's Re-calculation of Headquarter Costs

To correct the errors and omissions discussed in the preceding subsections, BNSF Engineering Consultant Primm has re-calculated the unit cost for the headquarters building by eliminating the use of the costs associated with wood frame and wood siding and exclusively using the costs of the glass and metal curtain wall with steel frame. Steel framing was used in order to be more representative of the construction techniques presently used by BNSF for its general-purpose buildings and to match construction techniques of the other structures at Alliance. He has also added in the common additives using the RS Means costs in AEP Texas' workpaper and has included the appropriate location factors from RS Means in the cost

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[314] AEP Texas Opening workpapers pp. 11568 to 11571.

[315] AEP Texas Second Errata electronic workpaper "Buildingsites.xls."

[316] BNSF Reply electronic workpaper "III F 7 Buildings.xls" worksheet "Building Costs."

calculation for the building. Finally, Mr. Primm has resized the building not only to include the lunch room, data center area and larger offices and restrooms that AEP Texas omitted, but also to accommodate the administrative, operating and MOW staffing requirements for the TNR determined by BNSF witnesses McCarren, Mueller and Albin.

Therefore, Mr. Primm based the construction cost calculations on a 28,800 square foot building based on BNSF witnesses' determinations of the appropriate staffing. The estimated construction cost of the headquarters building is shown in BNSF's electronic workpapers.[317]

b. Fueling Facilities

In its opening evidence, AEP Texas states that, "...fueling facilities at Alliance are not located on the main tracks, but rather on dedicated yard tracks for fueling, sanding and inspecting locomotives."[318] AEP Texas proposes fueling facilities consisting of eight two-crane platforms, "capable of fueling 16 locomotives every 20 minutes (assuming positioning and other activities). At that rate, the Alliance facility can fuel 1,152 locomotives every 24 hours."[319] AEP Texas equips the Alliance fueling facility with two 1,000,000 gallon storage tanks for diesel fuel and a 10,000 gallon storage tank for lube oil.[320] AEP Texas asserts that "The AEP Texas engineers have also included pumping facilities in the event tanker trucks or tank cars deliver fuel. Double wall piping is provided to transfer the fuel from the pumps to the storage tanks and

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[317] BNSF.RP.WP.III.F-0818 to 0879, 0880 to 0885, and 0886 to 0959 and BNSF Reply electronic workpaper "III F 7 Buildings.xls."

[318] AEP Texas Opening Nar. at III-F-89.

[319] AEP Texas Opening Nar. at III-F-89.

[320] *Id.* at III-F-89.

from the storage tanks to the fuel racks."[321] The Alliance facility is also equipped with eight sand towers. One tower with two hoses will be provided at each fueling station to accommodate 16 locomotives."[322]

As discussed in detail in the subsections below, AEP Texas' evidence on fueling facilities suffers from the following errors and omissions:

- AEP Texas failed to develop a design for the locomotive fueling facility.
- AEP Texas' electronic spreadsheet "fuel storage 1.xls" contains multiple errors.
- AEP Texas uses budgetary pricing from an e-mail by Hanson-Wilson for fueling platform costs that are not applicable to the fueling platform arrangement proposed by AEP Texas at Alliance.
- AEP Texas omits numerous items of necessary equipment from its costs of the Alliance locomotive fueling facility.
- AEP Texas uses overly optimistic estimates of locomotive fueling rates to unreasonably inflate the capacity of the Alliance locomotive fueling facility.
- AEP Texas proposes a pump house 1,200 square feet in area. This building is too small to accommodate all of the maintenance fluid distribution pumps, water softening equipment and radiator water injection equipment. A pump house designed to accommodate all of the diesel fuel and maintenance fluid pumps for the Union Pacific Railroad was 3,600 square feet in size.[323]
- AEP Texas proposes a lump sum cost of $400,000 for pumps and equipment but does not provide documentation of the basis for that cost.

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[321] *Id.* at 89-90, *citing* AEP Texas Opening workpaper pp. 11598 to 11612 and AEP Texas Opening electronic workpapers "fuel storage 1.xls."

[322] AEP Texas Opening Nar. at III-F-90.

[323] BNSF.RP.WP.III.F-0961.

- AEP Texas fails to provide spill containment at locations at its Las Animas yard where locomotives will be fueled by tank truck.

(1) Critique of AEP Texas' Design

The description quoted above from AEP Texas' Opening Narrative is the sole extent of the design effort expended by AEP Texas with respect to describing the fueling facility. In its response to a request for workpapers showing the conceptual design of the fueling facility upon which it based its costs, AEP Texas admitted that it had not created a fueling facility design.[324]

Moreover, there does not appear to be any operational basis for the eight fueling platforms as proposed by AEP Texas. This arrangement suggests that AEP Texas intends to bring the two locomotives from the head end of each empty coal train directly to a fueling track. This appears to be the only reason to limit the length of each fueling platform to two locomotives. However this scheme does not take into consideration the need to remove DPU locomotives from each train and move them to the fueling facility. There do not appear to be any tracks that would allow storage of DPU locomotives until a sufficient number are ready to be shuttled to the fueling facility. It should be also be pointed out that if more than two DPU locomotives arrive at the fueling facility, the consist will have to be broken up because only two locomotives can be accommodated on each fueling track; a time-consuming operation.

Although the AEP Texas' locomotive count for the TNR is only 368 locomotives, it inexplicably asserts that the Alliance fueling facility theoretically can fuel 1,152 locomotives every 24 hours.[325] This capacity estimate is unrealistically optimistic. It relies on the unlikely assumptions that every locomotive will arrive requiring less than a half tank of fuel, that the fueling time per locomotive will always be exactly six minutes, that all fueling equipment will

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[324] BNSF.RP.WP.III.F-0963.

[325] AEP Texas Opening Nar. at III-F-89.

operate all of the time, and that all of the necessary "positioning activities" can be performed in twenty minutes.[326]

The first assumption is inconsistent with AEP Texas' fueling proposal. According to AEP Texas, Alliance will fuel only empty trains, replacing the trains' arriving locomotive consist with fully fueled locomotives. This means that the locomotives will operate from Alliance to the train's loading point in the Powder River Basin, pass through Alliance without fueling on their way to destination, and continue to Las Animas. At Las Animas they would be refueled by tank truck and would continue on to destination and then return to Alliance. Since the locomotives were last fueled at Las Animas, the fuel tanks would be near empty by the time they reached Alliance.

An SD-70MAC locomotive has a fuel tank capacity of 4,900 gallons. BNSF uses a standard fueling rate of 400 gallons-per-minute (gpm) at its locomotive fueling facilities. Assuming that a locomotive arrives with only 900 gallons of fuel remaining in its tank, it would take 10 minutes just to fuel the locomotive from the time the valve of the nozzle is opened until it automatically trips closed.

AEP Texas states that it can fuel a locomotive in six minutes. At BNSF's fuel delivery rate that means that the maximum amount of fuel that AEP Texas could put into each locomotive is 2,400 gallons, or less than half the capacity of the locomotive's fuel tank.

In order to place 4,000 gallons of fuel into the locomotives within the six minute fueling time assumption underlying AEP Texas' calculations, the fueling rate would have to be increased to 667 gpm, which would require larger pumps and piping. As AEP Texas provided no design for its fueling facilities there is no way of knowing whether these larger pumps and piping are

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[326] AEP Texas Opening Nar. at III-F-89.

included in its equipment costs. Absent evidence to the contrary, it is reasonable to assume that they are relying on a standard rate of 400 gpm and have not attempted to accommodate a greater fueling rate.

The second assumption is also unrealistically optimistic because all of the fueling equipment will not operate continuously without the need for periodic maintenance. Any piece of equipment eventually will fail or require maintenance.

It is also unrealistic to assume that twenty minutes will always suffice to complete all of the necessary positioning activities. For example, the AEP Texas proposed sanding arrangement requires that the locomotive consist be moved at least once to reach both sand boxes of both locomotives. In addition, a Federal Railroad Administration mandated daily inspection must be performed. Lubricating oil and coolant levels must be checked and replenished if necessary. The operating cab must be cleaned, windows washed, toilet serviced, and retention tank emptied. Additional service activities may be dictated by the condition of the locomotive when it arrives on the fueling track. The locomotive then has to be moved off of the fueling track to either storage tracks to await its next assignment or to the locomotive maintenance shop for inspection or repair.

In sum, AEP Texas' gratuitous statements concerning the capacity of its fueling facilities are nonsense and an obvious red herring to deflect criticism of the adequacy of its facilities. Indeed, if the TNR actually were required to fuel 1,152 locomotives per day, it would have to substantially increase its fuel storage tanks as well (to well over 4.6 million gallons).

AEP Texas proposes a two million gallon diesel fuel storage capacity at Alliance, which is adequate to fuel the 368 locomotives in its proposed TNR fleet. As BNSF's restated locomotive fleet is not significantly different from AEP Texas' fleet, no adjustment was needed

to the fuel storage capacity at Alliance. However, in order to ensure that there is no disruption should the fuel tank need to be shut down, Mr. Primm has designed the facility with two 1,000,000 gallon tanks.

Because BNSF operating witness Mueller determined that AEP Texas' plan to fuel locomotives at Las Animas by tank trucks should be replaced with mainline fueling facilities at Amarillo, additional fuel storage was necessary at Amarillo. Therefore, Mr. Primm designed the Amarillo facility with two 750,000 gallon diesel fuel storage tanks.[327]

AEP Texas also provides a 10,000-gallon storage tank for lubricating oil. However, it omits tanks for journal oil, air compressor oil, waste oil, toilet chemical and soap. Nor is there any mention in AEP Texas' workpapers of pumps and piping to convey these fluids between the tanks and fueling platforms. BNSF Engineering Consultant Primm has added the following equipment to the Alliance fueling facility:

- Journal oil storage tank, containment structure, distribution piping and pumps
- Waste oil storage tank, containment structure, distribution piping and pumps
- Air compressor oil storage tank, containment structure, distribution piping and pumps
- Toilet chemical storage tank, containment structure, distribution piping and pumps
- Soap storage tank, containment structure, distribution piping and pumps
- Radiator water dispensing nozzles, distribution piping and pumps
- Sanitary sewage dump station and sewer

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[327] BNSF.RP.WP.III.F-0964 to 0966.

- Support building with small warehouse, toilet/shower/locker rooms, lunch room and office for personnel working at the fueling facility
- Delivery structures including spill containment, piping and track for tank car receipt of diesel fuel (providing only pumps is not enough)
- Delivery apron including spill containment for tank truck delivery of diesel fuel and maintenance fluids (providing only pumps is not enough).

BNSF's critique of the wastewater collection and treatment system at the fueling facility is included in its discussion of the AEP Texas' system wastewater treatment design in Section III.F.7.g.

(2) Fuel Facilities Costs

(a) Fueling Platforms

The lack of a design for the fueling facilities is particularly troubling because AEP Texas depends solely on costs provided by Hanson-Wilson Company[328] to develop costs for the fueling platforms. The Hanson-Wilson Company e-mail clearly states that its budgetary costs are for construction of a "typical two-track fueling facility." In other words one fueling platform is located between and services locomotives on two tracks.

AEP Texas' reliance on the costs from the Hanson-Wilson e-mail is inappropriate because the fueling facility arrangement that AEP Texas describes in its opening evidence associates one platform per track. The fueling platform arrangement described by Hanson-Wilson incorporates significant cost savings to be realized from using common pipe headers to distribute fuel and maintenance fluids to dispensing stations serving two tracks. In AEP Texas' arrangement, a separate set of pipe headers must be provided at each platform.

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[328] AEP Texas Opening workpaper p. 11599.

(b) Errors in Spreadsheet

AEP Texas' Opening electronic spreadsheet "fuel storage 1.xls" contains multiple errors. The following paragraphs describe those errors in detail.

The spreadsheet contains a table entitled, "Piping Tanks to Racks" that contains multiple errors. For the primary and secondary containment pipe, AEP Texas uses costs for fiberglass reinforced pipe (FRP) from RS Means.[329] FRP is commonly used for distribution and secondary containment piping at gas stations where flow rates and distribution pressures are low. FRP is not acceptable for use as piping at locomotive fueling facilities because of the high pressures and flow rates. Moreover, PSI Company and Smith Fiberglass Products, distributor and manufacturer respectively of FRP, confirmed that the FRP is Underwriter's Laboratory (UL) rated only for use at gasoline stations and thus its use at a locomotive fueling facility is inappropriate.[330] They also confirmed that the maximum FRP product pipe is four inches in diameter and therefore could not even be used for secondary containment pipe.[331] Therefore, BNSF Engineering Consultants do not accept the use of FRP for the diesel fuel distribution piping.

Mr. Primm also disagrees with AEP Texas' use of four-inch diameter pipe (with six-inch secondary containment pipe) for carrying diesel fuel from the diesel fuel storage tanks to the fuel platforms because the pipe size is inadequate to provide the diesel fuel flows required to support the fueling rates proposed by AEP Texas. The pipe size also does not account for head (pressure) loss in three miles of pipe.

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[329] AEP Texas Opening workpaper p. 11611.

[330] BNSF.RP.WP.III.F-0968.

[331] BNSF.RP.WP.III.F-0967.

AEP Texas has proposed a fueling facility with sixteen diesel fuel dispensing nozzles with all of these nozzles being supplied from one four-inch diameter pipe. For comparison, the Union Pacific locomotive fueling facility at Hermiston, Oregon has seven fueling nozzles and is supplied by a ten-inch diameter pipe that is approximately 700 feet long.[332] It is not feasible for a pipe 40 percent of the diameter and over 20 times as long as the ten-inch diameter pipe serving the Hermiston locomotive fueling facility to serve a locomotive fueling facility with over twice the number of diesel fuel dispensing stations.

In his restatement, Mr. Primm has replaced AEP Texas' four-inch diameter diesel fuel supply line with a ten-inch line. He also replaced costs for FRP with costs for steel pipe for the reasons stated above.

There is a major error in AEP Texas' computation of diesel fuel piping costs. AEP Texas calculated a unit cost for pipe fittings based on its assumption that the cost for the fitting would be ten percent of the total pipe cost, but in its spreadsheet it erred by not multiplying its fitting allowance by the length of the pipe. AEP Texas further erred by not appropriately accounting for the true cost of the couplings as shown on AEP Texas' own workpaper 11611.[333] For example, if the total length of pipe (15,840 ft) is divided by the length of each section of pipe (25 ft), then the result is 633.6 (use 634) sections of pipe. Using the lowest installed price for a four-inch diameter fitting ($93.00) the total cost of four-inch pipe fittings would be $58,962 (assuming one fitting per piece of pipe). For six-inch diameter pipe, the lowest cost six-inch fitting is $254.00 so the total cost of six-inch fittings would be $161,036. Therefore the total cost of all fittings would be $219,998. AEP Texas inexplicably shows the total cost for all pipe

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[332] Mr. Primm has personal knowledge of this as he designed the facility at Hermiston. BNSF.RP.WP.III.F-0961.

[333] AEP Texas Opening workpaper p. 11611.

fittings as $2.19 on its spreadsheet.[334] It should be noted that the fitting prices above (totaling $219,998) still do not reflect accurately the true cost of fittings for the pipeline because they assume that the pipeline is laid in a three-mile straight line. In reality, it would contain elbows, tees and other fittings that are more expensive than the couplings that were used to develop the above prices.

(3) BNSF's Design

(a) Alliance Fueling Facility

In order to correct the errors and omissions contained in AEP Texas' pricing of the Alliance locomotive fueling facility, BNSF Consultant Primm developed a conceptual design[335] based on the TNR requirements as determined by BNSF operating witnesses and meeting the recommended practices of AREMA.[336] Specifically, whereas AEP Texas proposed eight single-track fueling platforms, each long enough to accommodate two locomotives, Mr. Primm designed the facility with four fueling platforms serving eight tracks. Each platform is long enough to accommodate two locomotives. This platform design is consistent with the platform pricing set forth in the Hanson-Wilson quotation that AEP Texas relied upon for its fueling platform prices. BNSF accepts the Hanson-Wilson quotation for the items that it covers.

The Hanson-Wilson quote for a fueling facility included the costs for two-track fueling platforms and sanding towers, but did not include all of the necessary components involved in construction of fueling facilities. A fully functioning fueling facility requires the following:

1. Site utilities including sanitary and industrial wastewater sewers, storm water collection, water, natural gas, and electrical service, including an electrical substation
2. Connections to utilities

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[334] AEP Texas Opening electronic workpaper "fuel storage 1.xls" cell K47.

[335] BNSF.RP.WP.III.F-0969 to 0970.

[336] BNSF.RP.WP.III.F-0971 to 0992.

- Sanitary sewer
- Wastewater sewer
- Water
- Natural gas
- Electricity

3. Grading for the fueling facility
4. Parking areas for personnel or maintenance vehicles
5. Support building for locomotive service personnel and material storage, including office, lunch room, restrooms and warehouse
6. Lubricating oil, air compressor oil, journal oil, toilet chemical, and soap unloading facility
7. Waste oil loading facility
8. Fire suppression system at diesel fuel storage tank
9. Storage tanks for lubricating oil, air compressor oil, journal oil, waste oil, toilet chemical, and soap
10. Concrete containment structure enclosing storage tanks holding locomotive lubricating oil, journal oil, air compressor oil, waste oil, soap, and toilet chemical
11. Pump house for distribution of fuel, locomotive lubricating oil, journal oil, air compressor oil, waste oil, radiator water, soap, and toilet chemical from unloading facility to storage tanks and fueling platforms. Pump House encloses locomotive radiator water preparation equipment
12. Diesel fuel, lubricating oil, journal oil, air compressor oil, waste oil collection, compressed air, soap, and toilet chemical dispensing lines at fueling platforms.
13. Sand unloading facility
14. Industrial wastewater treatment plant and connection to existing publicly-owned sewer system
15. Sanitary waste collection and treatment and discharge to existing publicly-owned sewer system
16. Storm water retention and treatment or discharge to existing publicly-owned sewer system.

In his restatement correcting AEP Texas' errors and omissions, BNSF witness Primm re-calculated the costs of the locomotive fueling facilities. He accepted the Hanson-Wilson estimated construction costs of $320,000 per fuel crane for calculating the cost of the fueling platform with respect to the components listed in the Hanson-Wilson e-mail. These components include:

- Reinforced concrete fueling platform
- Platform pipe trenches
- Diesel fuel, lubricating oil, air compressor oil, and water piping on platform
- Diesel fuel dispensing stations on platform
- Lubricating oil dispensing stations on platform

- Air compressor oil dispensing stations on platform
- Water hydrants on platform
- Platform electrical power distribution system
- Pump and electrical control system on platform
- Direct rail fixation to concrete track structure for full length of fueling platform.[337]

He also accepted the Hanson-Wilson estimate of $100,000 per gravity sand tower. Conceptual designs for the fueling facilities were based on the general arrangement of a locomotive fueling facility designed for the UPRR at Hermiston, Oregon in 1996 and constructed during 1997.[338] Unit prices from the Hermiston fueling facility were escalated to 2000 using cost indices from RS Means[339] and then multiplied by the quantities of construction materials and equipment to develop the cost of the facilities. The result was then multiplied by the RS Means location factors for Alliance, Nebraska.

The Hermiston locomotive fueling facility complies with all federal, state, and local storm water discharge and treatment regulations. The costs for the facility include fuel spill containment at locomotive fueling tracks, fuel delivery tracks, tank truck delivery areas, storage tanks, sanding equipment, fuel dispensing equipment, lubricant and engine combustion additive dispensing systems, and storm and wastewater collection and treatment facilities. These costs are shown on BNSF electronic workpaper "III F 7 Buildings.xls" worksheet "Fueling - Alliance."

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[337] AEP Texas Opening workpaper p. 11599.

[338] BNSF.RPWP.III.F-0993 to 1002.

[339] BNSF Reply electronic workpaper "III F 7 Buildings.xls" worksheets "Fueling -."

(b) Amarillo Fueling Facilities

BNSF operating and capacity witnesses have determined that AEP Texas' proposed fueling of locomotives at Las Animas using tank trucks is not feasible for the reasons set forth in Section III.D.3 supra. Instead, they have determined that the TNR requires a three-track mainline fueling facility at Amarillo, Texas. This facility will completely replace the truck-based fueling facility proposed by AEP Texas at Las Animas, Colorado.

The Amarillo facility will include four fueling platforms each with four diesel fuel dispensing stations and all of the support facilities and equipment described for the Alliance facility. The four platforms will be located approximately 8,500 feet apart between three mainline tracks. The facility will have the ability to fuel simultaneously three trains heading in the same direction. Unit prices for similar facilities were multiplied by the quantities of construction material and equipment to develop the cost for this facility. The unit prices were adjusted to 2Q00 and by the RS Means location factor for Amarillo, Texas.

(c) Helper Fueling Facilities

Locomotive fueling facilities also were added at locations where helper locomotives are used. Mr. Primm created a conceptual design based on fueling locomotives from a tank truck. The design provides for spill containment at all locations where helper locomotives are fueled by tank truck. This structure includes spill containment, sump, oil/water separator and parking area with lighting. The sump will be periodically emptied by a vacuum truck.

c. Locomotive Maintenance Facility

AEP Texas proposes to construct a 118,000 square foot shop enclosing six tracks. AEP Texas states that the shop will perform 92-day and other inspections, general repairs, and

overhauls. The shop will also have a wheel truing machine for re-profiling wheels and a drop table for removing traction motor/wheelset combos from the locomotive.[340]

Mr. Primm accepts the overall size of the building, the need for a drop table, and a wheel truing machine, and the need to provide tracks to perform periodic maintenance and Federal Railroad Administration (FRA) mandated inspections. He also accepts that AEP Texas intends to "overhaul" its locomotives with the following caveat.

Historically, railroads were entirely self-contained entities and owned all of the facilities necessary to completely rebuild their locomotives. This applied to steam locomotives from the inception of railroads in the 1840s through their replacement by diesel locomotives in the 1950s. With the advent of diesel locomotives, the railroads converted the substantial maintenance facilities built to repair steam locomotives for use to repair diesel locomotives. These facilities included blacksmith shops, boiler shops, air brake shops, electric shops, paint shops and erecting halls.

After diesel locomotives replaced steam locomotives, railroads, in conjunction with the locomotive manufacturers, developed maintenance plans that dictated replacement intervals for components based on either time or mileage. These maintenance plans also incorporated federal locomotive inspection requirements that dictated safety inspections be performed at monthly, semi-annual, annual and biannual intervals. Because railroads did not have sophisticated computer systems to track mean time between failures of specific locomotive components, most set a mileage limit for locomotive overhauls. This was typically at 2,000,000 miles representing approximately five years of locomotive operation.

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[340] AEP Texas Opening Nar. at III-F-90-91.

The overhaul would involve completely disassembling the locomotive down to its structural frame; disassembling, repairing, and reconditioning all components and sub-components; reassembling all of the components back on the locomotive's frame; and finally performance testing and repainting the locomotive. All of this was done in railroad-owned facilities.

With the passage of the Staggers Act in 1980, railroads were relieved of much of the Interstate Commerce Commission's (ICC) rate regulation. Railroads began looking for ways to reduce their operating and maintenance costs. One way to do this was to sub-contract out repairs of locomotive components. This trend began to slowly develop in the mid –1980s with rotating electrical components such as traction motors and main generators and main alternators being the first components to be sent to subcontractors for repair or remanufacture. The trend gained momentum through the 1990s with more sub-components being sent to subcontractors for repair or remanufacture. In the 2000s it is not uncommon for a locomotive to be shipped to a subcontractor for overhaul and returned to the railroad when the work is complete.

It is surprising that AEP Texas is considering overhauling its locomotives in its own shop. As AEP Texas does not define what it considers to be the scope of its overhaul, the point of the preceding discussion is to explain what is traditionally considered an overhaul of a locomotive.

It would be unreasonable for BNSF to expect AEP Texas to construct all of the shops necessary to completely rebuild locomotive components in its own facilities. Therefore, for the purposes of the following discussion, BNSF presumes that AEP Texas' overhaul will only involve the removal and replacement of major components (engines, turbocharger, main alternator, trucks, traction motors, fans, dynamic brake grids, air compressor, air brakes, traction

rectifier/invertor assemblies, etc.) on the locomotive. Once these components are removed, they will be shipped to a subcontractor for repair, refurbishment or remanufacture. The components will be then shipped back to the TNR and installed on the locomotive. The locomotive will be performance tested at the TNR shop. Any repainting of the locomotive, other than in limited small areas, will be performed by subcontractors.

(1) AEP Texas' Errors and Omissions

(a) Building Structure.

AEP Texas misapplies the construction costs for an aircraft hangar from RS Means as the basis for its costs for the locomotive shop building.[341] The cost basis for the aircraft hangar includes a six-inch thick flat concrete slab floor, steel overhead and sliding doors representing 30 percent of wall area, and minimal electrical service (200 ampere).

(i) Superstructure

The aircraft hangar is designed to enclose a large volume of unobstructed space, high enough to accommodate the vertical stabilizer of the airplane and wide enough to accommodate the wingspan of the airplane. The structure of the aircraft hangar is only designed to support itself and minimal lighting, heating, and ventilating equipment. Access to the airplane is generally by use of rolling platforms

A locomotive shop need be only has high as necessary to accommodate the lift plus equipment headroom of cranes and hoists. On Page III-F-91 of its opening evidence and on Workpaper 11516, AEP Texas states that it will provide three top running rail overhead bridge cranes. AEP Texas specifies the capacities of only two bridge cranes: a 25-ton and a 10-ton

[341] AEP Texas Opening workpaper p. 11519.

leaving BNSF to speculate on the capacity and location of the third crane. AEP Texas does not specify over which tracks these bridge cranes will operate in the shop.

In its workpaper setting forth the assumptions for the locomotive shop, AEP Texas engineering consultants, Stone Consulting and Design, Inc. states that "Since the building design and SF price includes the ability to add an overhead crane, the building will be furnished with three top running rail overhead bridge cranes."[342] This is a completely false statement and is contradicted by the assumptions used by RS Means in its calculation of building costs for an aircraft hangar.[343] RS Means shows no costs under Part 7.0, Conveying Systems. Therefore RS Means did not include in its cost calculation the necessary reinforcement of the building structure to support the runways for the bridge cranes or a separate free-standing craneway support structure.

In AEP Texas' present design there are no interior columns. This means that if AEP Texas' assertion that the building superstructure is designed to support bridge cranes is true, then the bridge crane runways would have to be supported by the exterior building columns meaning that the bridge cranes would have to span 330 feet, which even if technically feasible would be cost prohibitive.

(ii) Locomotive Shop Floors

Locomotive shop floors, especially at tracks dedicated to running repairs and periodic maintenance functions, are multi-level, not flat. Locomotive shops have pits for wheel truing machines and drop tables. As a result, the floors and foundations of a locomotive shop are more

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[342] AEP Texas Opening workpaper p. 11516.

[343] AEP Texas Opening workpaper p. 11520.

complex and therefore more expensive than the floor of an aircraft hangar. RS Means provides a cost of $4.87 for a 6" flat reinforced concrete floor.

AEP Texas attempts to compensate for the complexity of the floor of the locomotive maintenance shop by adding costs for pit structures in its electronic spreadsheet "All Buildings.xls." However, this methodology is not acceptable because it does not result in a correct cost due to errors in the pit depth assumptions used by AEP Texas.

> Drop Table Pit. In its opening evidence (pp. III-F-91 and WP 11516) AEP Texas states that all pits are 5 feet deep. This statement is not correct. According to Workpaper 11543, which shows a section of the pit for the A. T. Moeller drop table, the depth of the pit is 18'-3" from top of rail to the top of the pit floor. This dimension does not include the thickness of the pit floor. The pit floor would be approximately 18 inches thick. So the total pit depth would be 19'-6". The A. T. Moeller drawings also show the pit width as 27'-3" and its length as 49'-6." AEP Texas states on Page III-F-91 of its opening evidence and its Workpaper 11516 that the drop table pit is 25 feet wide by 44 feet long. Therefore, AEP Texas understates the size and correspondingly the cost of the drop table pit. AEP Texas shows a cost of $85,000 for the drop table pit without providing documentation to support its pricing.[344]
>
> Wheel Truing Machine Pit. AEP Texas proposes to install a Simmons underfloor wheel lathe. AEP Texas states on Page III-F-91 of its opening evidence and its Workpaper 11516 that the wheel truing machine pit size is 25' wide by 25' long. This does not agree with the detailed construction drawings provided by Simmons Machine Tool Company for installation of one of its underfloor wheel lathes at Union Pacific Railroad's Hinkle Locomotive Shop. The pit dimensions provided by Simmons were 26'-4" long by 27'-10" wide by 12'-1" deep. Therefore, AEP Texas understates the size and correspondingly the cost of the wheel truing machine table pit. AEP Texas shows a cost of $85,000 for the wheel truing machine pit without providing documentation to support its pricing.[345]
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> Inspection Pits. AEP Texas proposes that all inspection pits are 5 feet deep as indicated by pit dimensions shown on Workpapers 11528 and 11530. AEP Texas takes 11 bid prices for "concrete embedded track" (WP 11524 through

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[344] AEP Texas Opening electronic workpaper "All Buildings.xls" worksheet "Type3pit&emb. track & equip."

[345] *Id.*

> WP 11527) from a bid tabulation for a project for Duferco Farrel Corporation and averages them together to obtain an average price of $214.40 per lineal foot for "embedded track" and $904.49 per lineal foot for "pit." BNSF accepts the averaging methodology in this case. These costs are repeated on the "All Buildings.xls" electronic spreadsheet. But AEP Texas does not tie the drawing sections of locomotive maintenance pits (WP 11528 through 11530) directly to the Duferco Farrel (a steel products manufacturer) project so it is impossible to determine the actual design basis for the costs that AEP Texas presents.
>
> The Gage Pit design shown on Workpapers 11528 and 11529 is substantially different than the Open Pit design shown on Workpaper 11530. The Gage Pit design shows rail fixed to the floor of the shop, a pit width of 3'-8" and what we presume are two 1'-8" reinforced jacking pads. Workpaper 11529 shows concrete access stairs to the Gage Pit.
>
> The Open Pit design shown on Workpaper 11530 shows a pit 12 feet wide with steel I-beams and steel columns. It is not clear how two completely dissimilar designs can be constructed for the same average construction cost.

Mr. Primm objects to any design that places rail above the level of the finished floor because it creates a barrier to operation of wheeled material handling vehicles and because it presents an obvious tripping hazard to personnel working in the shop. Safety considerations alone dictate that rail be embedded in the shop floor so that the top of the rail head is slightly above the elevation of the finished floor.

He also objects to this design because it fails to provide the floor levels necessary for safe access to the locomotive and requires that maintenance personnel walk to either end of the pit to enter or exit the pit. AREMA's Design Criteria for Diesel Repair Facilities[346] states that the depth of inspection pits should be a minimum of 4 feet deep (4'-9" being a typical dimension) and have adjacent depressed floors from 2'6" to 3'-0" below top of rail at the inspection pit to place the maintenance worker at the proper height to repair locomotive trucks, brake systems,

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[346] BNSF.RP.WP.III.F-1005 to 1026; also BNSF.RP.WP.III.F-1004.

and other underframe-mounted components.[347] AEP Texas' design does not provide the depressed floor.

AEP Texas' design requires mechanics to walk to either end of the pit to enter or exit the pit. This is inefficient and time consuming. In order to improve access and efficiency, the rail (132- to 136-pound per yard) would be supported by steel columns along the pit. The rail acts as a beam so no additional beam support is required. This allows a mechanic a path to enter or exit the pit by passing between the columns to the depressed floor.

Another issue is that AEP Texas uses the Open Pit design on the track dedicated to locomotive overhauls (Track "C"). The SD-70MAC and SD-40-2 locomotives are approximately 10'-3" wide. This leaves a gap of 10-1/2 inches between the edge of the pit and the side of the locomotive. AEP Texas fails to show how it will provide access to the locomotive to bridge this gap.

Additionally a locomotive undergoing overhaul typically has its trucks removed for repair. This requires that the locomotive frame be supported by jack stands until the trucks are replaced. AEP Texas does not provide reinforced jacking pads with its Open Pit design. Perhaps the jacking pads shown with the Gage Pit design should have instead been included with the Open Pit design. Jacking pads are not required on tracks dedicated to light maintenance and periodic inspections because there is no reason to lift the locomotive off of its trucks during these procedures.

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[347] BNSF.RP.WP.III.F-1017 to 1018.

(iii) Exterior Doors

RS Means pricing for the aircraft hangar includes the costs of large sliding steel doors that are not used or needed at a locomotive maintenance facility.

(iv) Electrical Service

RS Means includes the cost of a 200-ampere electrical service in its building cost. This is a minimal electrical service appropriate for general lighting and powering minimal ventilation equipment. It is severely undersized for the requirements of a locomotive maintenance facility that includes large maintenance equipment such as drop tables, wheel lathes, bridge cranes, etc. For example, the electrical service to Union Pacific's locomotive maintenance shop at Hermiston, Oregon (45,000 square feet of maintenance space) requires a 1,500 KVA service and a 2,000-ampere (at 480 volt) distribution panel.[348] AEP Texas provides no additional costs to provide suitably-sized electrical service.

(v) Platforms

In its opening evidence, AEP Texas states that it will provide work platforms on both sides of four (4) tracks.[349] On AEP Texas' electronic spreadsheet "All Buildings.xls," AEP Texas shows a cost of $1,080,000 for 2,160 lineal feet of platform.[350] Mr. Primm does not accept this cost because AEP Texas has failed to provide any designs to fully describe the materials and configuration used for these platforms.

Platforms along tracks used for inspections and maintenance are generally concrete slabs supported on either a steel framework or by concrete columns. The platforms are reached by

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[348] BNSF.RP.WP.III.F-0961.

[349] AEP Texas Opening Nar. at III-F-92.

[350] AEP Texas Opening electronic workpaper "All Buildings.xls" worksheet "Type3pit&emb. track & equip." cell F30.

stairs and ramps. The ramps are designed to allow forklifts to bring maintenance supplies and parts to the locomotives. The platforms are the same height as the locomotive's running board to allow easy access to the locomotive by mechanics and electricians. The platforms also support dispensing stations for maintenance fluids.

(vi) Underfloor Wheel Lathe

AEP Texas proposes to purchase a remanufactured underfloor wheel lathe for $1,045,700 instead of a new wheel lathe for $1,320,200.[351] Although BNSF does not object to purchasing a remanufactured wheel lathe per se, it is unlikely that TNR would be able to acquire a wheel lathe that would be a candidate for remanufacture. AEP Texas misinterpreted the Simmons' quotation. Simmons' quotations for remanufactured lathes cover only the remanufacture of the purchaser's existing lathe. The TNR, as a completely new entity, would be unlikely to have (or even find) a wheel lathe that could be sent to Simmons for remanufacture. AEP Texas also omits the cost of installation of the wheel lathe in its building costs.

(vii) Drop Table

AEP Texas omits the cost of installation of the drop table from the building cost for the locomotive shop.

(viii) Hoists and Cranes

AEP Texas in its opening evidence proposes to use 48 3-ton jib cranes, "equally spaced along Tracks "D", "E", and "F" to provide for lifting of smaller parts and components on all four corners of each of 12 locomotive spots."[352] Mr. Primm objects to the use of the jib cranes in this case because it is a fatally flawed arrangement that will prove to be unworkable in practical use.

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[351] AEP Texas Opening workpaper p. 11550.

[352] AEP Texas Opening Nar. at III-F-92 and AEP Texas Opening workpaper p. 11516.

As a threshold matter, RS Means does not provide costs for jib cranes in the publications used by AEP Texas. AEP Texas' use of the cost of a fixed hoist with a 15-foot lift as a cost for the jib crane[353] is unacceptable because a fixed hoist is not the same as a jib crane. A free-standing jib crane would include a foundation, vertical support column, and horizontal boom that is capable of swinging through almost a complete circle. A jib crane can also be mounted to a building column in which case the foundation and vertical column are not needed and the swing of the horizontal boom is limited to a semi-circle. In either of the above cases, a trolley and hoist must be added to the crane in order for it to be able to lift an item. The jib crane, trolley, and hoist can be manually operated or power-operated. A fixed hoist, in comparison, is attached to an existing building support beam and cannot move. It can only lift items vertically at one location.

Second, AEP Texas errs in the height of the jib cranes that it proposes to use. The SD-70MAC locomotive is 15'-8" tall over its roof-mounted cooling fans. The SD-40-2 locomotive is 15'-7-1/4" tall over its roof-mounted cooling fans. The fixed hoist that AEP Texas selected for its jib crane has a 15-foot lift. Obviously this crane does not have sufficient height to remove a component from the top of the locomotive and would hit the side of the locomotive instead. Including an allowance for the trolley and hoist, the crane would conservatively have to have at least 20 feet of lift.

Third, the arrangement of jib cranes proposed by AEP Texas is unworkable because the cranes would conflict with each other. The SD-70MAC is 74 feet long. To keep the jib cranes located at each corner of the maintenance position from colliding, the boom of the crane would have to be at slightly less than 37 feet long. This will prevent the crane from reaching engine

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[353] AEP Texas Opening workpaper p. 11521.

components located in the middle of the locomotive because the trolley and hoist will not reach the extreme end of the boom. In order to reach the center of the locomotive, the booms would have to be longer than 37 feet and would therefore overlap and hit one another before they rotated near enough to actually pick a part off of the locomotive. On the other side, the jib crane would not be able to move materials except in a very limited arc because track centers are 30 feet and the cranes along the adjacent maintenance track would collide if the cranes were moved simultaneously.

This design also erroneously assumes that it is feasible to purchase a jib crane with a 37 to 40-foot long boom and that the crane would be able to lift three tons with the hoist at the end of the boom. The maximum boom length of commercially-available jib cranes is twenty feet. Any boom length beyond twenty feet would require a custom designed and fabricated jib crane. Although it is technically feasible to construct a jib crane with a 40-foot long boom, the crane would require an enormous foundation to support it and prevent it from tipping over when lifting material. AEP Texas has not provided a cost for these large foundations in its workpapers.

AEP Texas' proposed design is an extremely poor arrangement and demonstrates why railroads use three-ton capacity bridge cranes over tracks used for periodic inspections, maintenance and repairs.

(ix) Maintenance Fluid Distribution System.

AEP Texas completely omits any costs for the distribution and dispensing of maintenance fluids about the shop. These fluids include engine lubricating oil, air compressor lubricating oil, journal oil, waste oil, radiator water, compressed air, soap, non-potable water, oxygen, and acetylene. The distribution of these fluids to the locations where the locomotives are being repaired is key to efficiently maintaining the locomotives. One dispensing station per locomotive repair spot (3 per platform) should be provided with hose reels and nozzles.

These facilities have been included in all new and renovated locomotive maintenance shops built since 1986.

AEP Texas states in its workpapers that, "A storage area with large containers to store new and used oil and lubricants will provide an area to keep all hazardous materials. This room will be 42' x 30'."[354] Both the workpaper describing the space (WP11517) and the arrangement drawing of the shop (WP11518) show an area open to the rest of the shop. It is highly unlikely that the TNR would be allowed to store hazardous materials in an open area of the locomotive shop.

Storage of hazardous materials is regulated by the Uniform Fire Code (UFC) and Uniform Building Code (UBC). Whether or not TNR can store quantities of hazardous materials in an open area of its shop will depend on the classification of the materials and the quantity of the materials. Most likely the UFC and UBC will require either construction of an area separation wall to segregate the hazardous materials from the rest of the building or storage of the hazardous materials in a separate building. Alternatively, AEP Texas could construct the entire building to conform to the code requirements for storage of the hazardous materials at a significantly greater cost than typically used to construct a locomotive maintenance shop. Also AEP Texas omits the cost of spill containment in its hazardous material storage area.

For these reasons, maintenance fluids typically are stored in tanks located outside the locomotive maintenance shop.

(x) Lighting

AEP Texas does not provide costs for lighting in its Open Pit design or under platforms. Nor does AEP Texas provide task lighting in any areas reserved for component repairs. The

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[354] AEP Texas Opening workpaper pp. 11517 and 11518.

only lighting costs included with the building are the high-bay fixtures included by RS Means in its cost estimate for the aircraft hangar, which does not provide the necessary lighting for specific task areas.

(xi) Personnel Areas

AEP Texas provides only 2,112 square feet of personnel space in the locomotive maintenance shop. On Workpaper 11517, AEP Texas states

> Locker room will provide lockers, showers, and rest rooms for shop personnel. The 12' x 30' basic configuration will accommodate up to 30 persons (10 max at any one time). The 2112 SF Office Space which includes the Locker room also provides 2 large Offices, a large Clerical Room, a lunchroom with 4 tables to seat 24 persons…This room (lunchroom) will also serve as a work room and a conference room. In addition, the Office Space has two large storage areas; one for file cabinets and one for office supplies. Also, an entry area will provide an area for a notice board and a restroom will provide an additional facility for female employees. This area will also have a closet for coats.[355]

These area allocations are inadequate to support the expected occupant load, which will include both employees of the TNR and its locomotive maintenance subcontractor charged with maintaining the SD-70MAC locomotives. Therefore, Mr. Primm increased the size of the personnel areas to accommodate the staffing levels required by the TNR as determined by BNSF operating witnesses.[356]

It should also be noted that restrooms for men and women are provided on a 50-50 split per the UBC.[357] Including a restroom at the entry area and saying it will function as an

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[355] AEP Texas Opening workpaper p. 11517.

[356] BNSF.RP.WP.III.F-1027 to 1028.

[357] BNSF.RP.WP.III.F-0808.

additional restroom for female employees is not allowed. AEP Texas will be required by building code to provide restrooms for both male and female employees at the entry.

(b) Maintenance Tools

To develop locomotive maintenance equipment costs, AEP Texas relied entirely on information from Omnitrax for maintenance of 14 locomotives for its Union Pacific Phoenix Project.[358] However, AEP Texas omits considerable quantities of tools necessary to maintain its locomotive fleet.

The maintenance tools equipment provided by Omnitrax are for locomotive types not used on the TNR. The maintenance equipment costs are based on tools needed to repair a small fleet of fourteen GP40-2 and GP38-2 locomotives. These are 4-axle locomotives with DC-traction motors. The GP40-2 is a 3,000 horsepower locomotive and the GP38-2 is a 2,000 horsepower locomotive. Both locomotives were introduced to railroad service in 1972. Both locomotives use 645-series diesel engines as prime movers. The GP40-2 uses a turbocharged 645E3 engine. The GP38-2 uses a roots blown 645E engine. The GP40-2 uses an AR10 alternator to generate AC current that is rectified to drive the direct current traction motors for propulsion. The GP38-2 uses a D32 generator to generate direct current that directly drives the locomotive's traction motors. The control system for both locomotives is based on circuit-card technology. These locomotives were designed when a 30-day inspection cycle was the norm.

The tools listed are fairly generic, however, and may be used to maintain any locomotive. BNSF presumes that AEP Texas intends to use these tools to maintain its SD-40-2 locomotives.

AEP Texas has stated that it will overhaul its locomotives and we presume that this includes only its SD-40-2 locomotives. In keeping with our presumption that AEP Texas will

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[358] AEP Texas Opening electronic workpaper "UP-Phoenix Maintenance Cost" worksheet "1 (5-28-02).xls."

only replace components, the following is a partial list of tools and maintenance tools and equipment required to maintain its locomotives that was omitted from AEP Texas' locomotive shop costs on its electronic spreadsheet, "All Buildings.xls."

- Truck Turnover Fixture – required to invert trucks so that wheelsets can be removed and truck frame positioned for repair.
- Truck Repair Stand – required to support and tram truck during repair operations.
- Traction Motor Stands – required to support traction motor during installation or removal of wheelsets.
- Traction Motor Gearcase Rack – required to transport traction motor gearcases to parts washer to cleanout gear lubricant.
- PROCECO Parts Washer – required to clean gear lubricant out of gearcases and clean other parts.
- Gear Gages – required to check wear of traction motor pinion and bull gears.
- Coupler Gages – required to check wear of couplers and yokes.
- Draft Gear Gages – required to check capacity of draft gear.
- Opacity Tester – required to check diesel engine exhaust.
- Load Box – required to provide electrical load to allow performance testing of locomotives such as the SD-40-2 not equipped with self-loading feature.
- Jacks and Jack Stands – required to lift locomotive off of its trucks and support underframe during overhaul. Jacks can be hydraulically- or electrically-powered.
- Engine Lifting Fixture – required to properly lift and move engine.
- Power Assembly Rack – required to store and protect power assemblies during transport.
- Slings, Straps, Chains – hardware required to lift parts with cranes.
- Repair Benches – required to support parts during inspection and repair.

- Air Brake Test Device – required to qualify operation of the locomotive's air brake system.
- Jib Cranes – required at repair stations to move parts onto and off repair stands and benches.

Supporting documentation for the tools, parts and equipment is included in BNSF's workpapers.[359]

Mr. Primm has provided prices for several of the specialized maintenance tools based on his experience and recollection of the costs of those tools purchased for several of the locomotive shops that he designed. This was necessary because the manufacturer of the SD-70MAC and SD-40-2 locomotives (Electro-Motive Division of General Motors Corporation) has a longstanding corporate policy of providing detailed information and pricing for its maintenance tools only to owners and operators of its locomotives and he was therefore unable to obtain current pricing for the tools. Mr. Primm also provided estimated costs for shop-made repair component stands.

(c) Wash House.

AEP Texas included a cost for a Wash House in its Second Errata workpapers, but did not provide a design that would allow review of the basis for the costs it developed. Subsequently, in response to BNSF's fifth request for workpapers, AEP Texas provided a written description of the assumptions it used to develop the costs for its wash house.[360] Mr. Primm objects to AEP Texas' assumptions because they result in an undersized facility. AEP Texas essentially drew a rectangle around the exterior dimensions of the SD-70MAC locomotive and called the resulting building footprint adequate. First, the wash house needs to have at least two

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[359] BNSF.RP.WP.III.F-1029 to 1042.

[360] BNSF.RP.WP.III.F-1044.

tracks so that it does not become an operational bottleneck to movement of locomotives into the locomotive shop. Second, five feet between the side of the locomotive and the building wall is plainly inadequate because it does not take into account the width of the building columns and foundations. The mechanic washing the locomotive needs at least five feet of clear access around the locomotive in order to pull hoses. Furthermore, Mr. Primm questions AEP Texas' statement that washing materials need to be removed from and stored away from the wash house. The whole point of having a wash house is to contain and segregate the locomotive washing activities from the locomotive shop.

(d) Other Errors.

The following additional errors were noted in AEP Texas' opening evidence and workpapers.

- Electronic Spreadsheet "All Buildings.xls". There is a discrepancy between the cost for the locomotive shop shown on electronic spreadsheet "All Buildings.xls"[361] and "Bldgcst2.xls."[362] On "All Buildings.xls" the cost of the building would be $58.16 per square foot multiplied by 117,958 square feet for a total of $6,860,437.28. On the "Bldgcst2.xls" spreadsheet the building cost is shown as $6,860,286.82 for an unaccounted for difference of $150.46. There is also a mathematical error in the extra perimeter calculation on the "All Buildings.xls" spreadsheet. AEP Texas erred by failing to apply the RS Means location factors and failing to adjust the prices for locomotive maintenance tools from 2002 to 2Q00.

- Electronic Spreadsheet "Buildingsites.xls."[363] This spreadsheet shows costs for site development. This spreadsheet shows only gravel areas for parking. Due to the weight of locomotive components and materials either asphalt or concrete driveways, parking areas, and material storage areas are customarily provided.

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[361] AEP Texas Opening electronic workpaper "All Buildings.xls."

[362] AEP Texas Second Errata electronic workpaper "Bldgcst2.xls."

[363] AEP Texas Second Errata electronic workpaper "Buildingsites.xls."

Placing heavy equipment such as engine blocks, traction alternators, and traction motors on gravel surfaces will result in them sinking into the ground. AEP Texas also failed to apply location factors to adjust its pricing for site materials.

- Workpaper 11516.[364] AEP Texas states that, "Tracks D, E, and F will be used for, "Annual and Semi-Annual Inspections "92-dayers." The Federal Railroad Administration (FRA) has not required Annual and Semi-Annual inspections since the locomotive inspection rules were changed on March 31, 1980. FRA inspections are done at 92-day, 368-day, and 736-day intervals. A Semi-Annual inspection is not required by the FRA and certainly is not at "92-dayer."

(2) BNSF's Restatement

In order to correct the errors, omissions, contradictions and deficiencies of AEP Texas' pricing of its locomotive shop, BNSF Engineering Consultant Primm has performed the following tasks:

- Wash House. Provided a conceptual design for a Wash House that meets AREMA design criteria and BNSF standards and meets the requirements of the TNR as determined by BNSF operating and engineering witnesses.

- Pump House. Provided a conceptual design for the Pump House that meets BNSF standards and the requirements of the TNR as determined by the BNSF witnesses. This building houses pumps for distribution of fuel, locomotive lubricating oil, journal oil, air compressor oil, waste oil, radiator water, soap, and toilet chemical throughout the shop, wash house, and fueling facility.

- Pipe Racks. Provided a conceptual design of support structures for the maintenance fluid distribution system. Burial of maintenance fluid piping makes detection of leaks difficult. Overhead installation allows visual detection of leaks. Pipes will include heat tracing and insulation.

- Storage Tank Containment Structure. Provided a concrete structure enclosing storage tanks holding locomotive lubricating oil, journal oil, air compressor oil, waste oil, soap, and toilet chemical.

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[364] AEP Texas Opening workpaper p. 11516.

- Shop Tracks. Provided tracks for the inbound and outbound storage of locomotives. Provided a 100-foot long track on which to performance test locomotives. Inbound and outbound lead tracks to the shop will be a minimum of 200 feet long to accommodate two locomotives.

- Provided concrete drip pans (200 feet long) on all inbound and outbound shop tracks.

- Provided concrete walkways around shop to provide safe access to the locomotive for maintenance personnel.

- Provided a minimum ten-foot wide drive way and an apron at each end of the shop for materials management vehicles to enter and exit the shop.

- Provided locomotive maintenance fluid distribution piping and dispensing stations in the shop.

- Provided multi-level floor, pit, and platform arrangement for access to locomotives.

- Provided fire-sprinklers on the building ceiling and under platforms.

- Provided a 5-ton bridge crane over Tracks "A" and "B".

- Provided a 3-ton bridge crane over Tracks "D", "E", and "F."

- Provided craneway support structure and electrification for all bridge cranes.

- Provided jib cranes at locations where locomotive components are inspected and repaired.

- Provided blue flag, blue light, and derail protection on all lead tracks.

- Provided concrete pad with security fencing for outside material storage.

- Provided connections to the following utilities:

    1. Sanitary sewer
    2. Wastewater sewer
    3. Water

4. Natural gas
5. Electricity.

- Provided suitably-sized electrical substation for shop.

Details of BNSF's restatement of locomotive shop costs are included in its electronic workpapers.[365]

d. Car Repair Shops

AEP Texas states in its opening narrative that its car maintenance contractor is responsible for providing all necessary shops.[366] AEP Texas therefore did not provide a facility in which the contractors could perform the needed repairs.

AEP Texas is silent on how it intends to repair railcars set out along the TNR. Association of American Railroad (AAR) Interchange Rules require that railcars with safety defects not be accepted in interchange between railroads and not moved until repairs are completed.[367] Therefore, the TNR must provide some type of mobile maintenance system to allow repair crews to reach and repair railcars located along its route. BNSF presumes that repair crews will be based at the railcar repair shops and travel to the locations of the defective railcars. BNSF Engineering Consultants have not added any capital costs to the facilities to accommodate the mobile repair crews.

BNSF operating witnesses have determined that the TNR would need to have some facilities for repairing interchange cars. Therefore, BNSF Engineering Consultant Primm

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[365] BNSF Reply Electronic workpaper "III F 7 Buildings.xls" worksheet "Locomotive Shop."

[366] AEP Texas Opening Nar. at III-F-93.

[367] BNSF.RP.WP.III.F-1048 to 1051.

prepared construction cost estimates for two railcar repair facilities for the TNR. The first facility is located at Alliance and the second is located at Amarillo.

The Alliance facility is designed to repair 30 cars per day. The Amarillo facility is designed to repair two cars per day. The design of these facilities has been adapted from the conceptual railcar maintenance facility designs that Mr. Primm prepared in 2002. The 2002 prices were indexed to 2000 prices using the appropriate RS Means indices.[368]

Because most contemporary unit train coal car designs extensively use aluminum for carbody construction, provisions must be made to allow repair of these car types. Welding requirements contained in AAR Interchange Rules are referenced to the standards and procedures contained in the American Welding Society's (AWS), Railroad Welding Specification D15.1. AWS D15.1 requires that all welding of aluminum must be done at temperatures above 50° Fahrenheit. In consideration of winter weather in the TNR's service area, an enclosed maintenance facility for railcars is required if repairs to railcars (especially aluminum-bodied railcars) are to be performed. Also, automated bottom-discharge hopper cars require periodic maintenance of their door operating mechanisms. An enclosed shop provides a safe working environment and facility for making the necessary adjustments to door operating linkages.

A conceptual design for a two-track and a single-track one-spot railcar maintenance facility has been prepared using AREMA Design Criteria for Spot Car Repair Shops, dated 1994 and based on a railcar maintenance facility at Harvey, Illinois.[369] This design also included maintenance features contained in a railcar maintenance shop at Springville, Utah. The

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[368] BNSF Reply Electronic workpaper "III F 7 Buildings.xls" worksheet "Locomotive Shop."

[369] BNSF.RP.WP.III.F-1052 to 1067, 1046 to 1047.

Springville, Utah shop was expressly designed to maintain a fleet of aluminum-bodied automated discharge hopper cars.

The shops would have tracks for general maintenance and repair of railcars and a track with a pit to inspect and maintain the operating mechanisms of automated bottom discharge hoppers. This model facility is appropriately sized to maintain the volumes of interchange traffic proposed by AEP Texas.

Each shop would be a pre-engineered metal building with insulated metal side panels and a steel frame and contain office and warehouse space for the railcar maintenance staff. The Alliance shop would have two tracks and be approximately 250 feet long by 110 feet wide. The shop at Amarillo would also be a pre-engineered metal building with insulated metal side panels and a steel frame. The building would be 250 feet long by 60 feet wide. A concrete-surfaced outside storage area for larger railcar components would also be provided.

Maintenance equipment would include the following:

- Inbound and outbound car puller on each maintenance track
- Blue lights, blue flags, and derails on each lead track
- Two (2) jib cranes with mare posts on each general maintenance track. Each jib crane would be equipped with three (3) one-ton hoists.
- Hose reels for water, compressed air, oxygen-acetylene, work light, and electric arc welding (ferrous and aluminum)
- One hydraulically-operated jacking arrangement consisting of two outboard and one center jack at each maintenance track
- Hydraulic power unit, swaging, and cutting tools for installing and removing mechanical fasteners
- Pit for inspection of hopper door mechanisms. Reinforced concrete jacking pads would be provided along each side of the track.

The costs for the car progression system, jacks, jib cranes, and hose reels were provided by PORTEC, Incorporated.[370]

Details of BNSF's costs for the two car repair facilities are included in its workpapers.[371]

e. Crew Change Facilities and Yard Offices

BNSF Engineering Consultants do not accept AEP Texas' construction costs for its crew change facilities and yard offices because numerous inconsistencies among AEP Texas' opening evidence, workpapers, and electronic spreadsheets make it impossible to determine exactly what is the correct price for the structures proposed by AEP Texas. AEP Texas' Opening Narrative on crew change facilities and yard offices consisted of one paragraph covering less than half a page.[372] Nearly every statement in that paragraph was inconsistent with the workpapers. The following inconsistencies were noted:

1. In its opening evidence at III-F-93, AEP Texas states that the crew change points at Donkey Creek/West Campbell, South Logan, Denver, Amarillo, and Oklaunion will have small buildings (for a total of five small buildings). AEP Texas' spreadsheet "Bldgare3.xls"[373] shows only one small building (at Oklaunion).[374]
2. In its opening evidence, AEP Texas states that the crew change at Las Animas Yard will be "larger" to accommodate train crews and car inspectors. We assume that this would be the medium size crew change building described on AEP Texas' "All Buildings.xls" spreadsheet. However, AEP Texas shows five locations for "medium" crew change buildings on its "Bldgare3.xls" spreadsheet.[375]

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[370] BNSF.RP.WP.III.F-1068 to 1069.

[371] BNSF Reply Electronic workpaper "III F 7 Buildings.xls." worksheet "Car Repair Shop."

[372] AEP Texas Opening Nar. at III-F-93.

[373] AEP Texas Second Errata electronic workpaper "Bldgare3.xls."

[374] *Id.*

[375] *Id.*

3. In its opening evidence, AEP Texas states that the crew change building at Alliance Yard will house yard staff, train crews, switch crews, and car inspectors. We assume that this would be the large crew change building described on AEP Texas' "All Buildings.xls" spreadsheet. However there are two buildings listed under the large crew change building heading on AEP Texas' "Bldgare3.xls" spreadsheet.[376]
4. In its opening evidence, AEP Texas states that crew change buildings at Alliance and Las Animas have garages for inspection vehicles. However the costs of these garages are omitted on AEP Texas' "Bldgare3.xls" spreadsheet.
5. On AEP Texas' "Bldgare3.xls" spreadsheet three large buildings are priced even though only two locations are listed (Donkey Creek and Alliance).
6. On AEP Texas' "Bldgare3.xls" spreadsheet five locations (Donkey Creek, Alliance, Englewood, Las Animas, and Amarillo) are shown for medium crew change buildings. However, two locations (Donkey Creek and Alliance) have already been accounted for under the large building heading.
7. On AEP Texas' "Bldgare3.xls" spreadsheet AEP Texas incorrectly adds a 20 percent allowance for building area. Because AEP Texas has proposed to use pre-fabricated modular buildings[377] it must specify the exact dimensions of the buildings before they are manufactured. There are no allowances for additional areas after the modules are fabricated.
8. On AEP Texas' "All Buildings.xls" spreadsheet, AEP Texas calculates an average cost for crew change buildings based upon quotation for "Speed Space" modular buildings from the R. A Greig Equipment Company[378] (WP 11489) for two building complexes (a complex crew change unit and a complex MOW unit). However, the price quotation does not state the size of the crew change complex. It appears that AEP Texas took the total price of the complex, including shipping ($65,105) and divided it by the area of its proposed small crew change building (947 square feet) to develop a cost of $68.75 per square foot for the crew change building. The same thing was done for the MOW buildings ($47,720/705 SF = $67.69/SF). These prices per square foot were then de-escalated to Year 2000 prices and an average cost per square foot of $69.00 was calculated. This average cost includes the cost of setting up the building and was rounded up by AEP Texas from the actual average cost of $67.43 to, "incorporate minor changes on SF values for all

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[376] *Id.*

[377] AEP Texas Opening workpaper pp. 11492 to 11501 (cited in AEP Texas Opening Nar. at III-F-93.)

[378] AEP Texas Opening workpaper p. 11489.

M.O.W. and Crew Building Sizes." This average cost was then applied to buildings ranging in area from 705 square feet to 1,819 square feet.[379]

9. According to AEP Texas' Workpaper 11491 that documents a telephone call between R. A. Greig Equipment Company and Stone Consulting and Design, the set-up costs for a complete building typically range from $1,800 to $2,500 with the average cost being $2,150 per complete building.[380] On AEP Texas' "AllBuildings.xls" spreadsheet, AEP Texas shows a unit cost of $1.50 per square foot for set up of an average building. This cost is incorrect and understates the true cost of setting up a building.

   If the average set-up cost of $2,150 per building is divided by the size of AEP Texas' small crew change building, the set-up fee (on a square foot basis) would be ($2,150/947 S.F.) or $2.27 per square foot. For the MOW office the cost would be ($2,150/705 S.F.) or $3.05 per square foot. These set-up costs are substantially higher than the $1.50 per square foot used by AEP Texas. Using the low range of the set-up costs provided by R. A. Greig results in set-up costs of $1.90 and 2.55.

   So using the mid range set-up cost of $2,150, the average set-up cost on a square foot basis would be [($2.27+$3.05)/2] or $2.66. For the low range set-up cost of $1,800, the average set-up cost on a square foot basis would be [($1.90+$2.55)/2] or $2.23. In either case, the resulting set-up fee is substantially more than the $1.50 used by AEP Texas in the computation of its average building cost.

   More to the point, it appears that AEP Texas ignored the information from R.A. Greig concerning the application of the set-up fee. The fee is a lump sum per building and is not prorated on the basis of area. Therefore the cost of each crew change and yard office and MOW building proposed by AEP Texas should include a lump sum set-up charge of $2,150.

In addition to the inconsistencies in AEP Texas' evidence, AEP Texas' proposal to use modular buildings manufactured by Commercial Structures Corporation (CSC) under the trade name "Speed Space" is also infeasible. Based on AEP Texas' workpapers, the large crew

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[379] AEP Texas Opening electronic workpaper "All Buildings.xls."

[380] AEP Texas Opening workpaper p. 11491.

change building would be 1,516 square feet,[381] the medium crew change building would be 1,182 square feet,[382] and the small crew change building would be 947 square feet.[383]

Because AEP Texas proposes using modules to construct its buildings, using average construction costs to price buildings ranging from 705 square feet to 1,819 square feet is inappropriate. With modules, space is added in discrete increments depending on the sizes of modules offered by the manufacturer. Therefore, cost is also added in discrete increments.

Mr. Primm contacted CSC, manufacturer of "Speed Space" buildings to inquire about how large a building could reasonably be constructed by arranging its modules into complexes. The factory representative responded that the modules were suitable for use for complexes less than 1,200 square feet in size.[384]

This building size limitation is in part due to the costs of assembling many modules into a large building. For example, the smallest "Speed Space" module is its SS-46 (24 square feet) and its largest module is its SS-1220 (240 square feet). It would take five SS-1220 modules to construct a 1,200 square foot building.

Given CSC's criteria, only AEP Texas' medium and small crew change buildings would be candidates for use of "Speed Space" modules.

Mr. Primm also contacted BNSF Vice President Engineering Mr. Robert Boileau with respect to BNSF's experience with modular buildings. Mr. Boileau did not have any recollection of using the Speed Space brand, but reported that in BNSF's experience modular buildings do

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[381] AEP Texas Opening workpaper p. 11514.

[382] AEP Texas Opening workpaper p. 11512.

[383] AEP Texas Opening workpaper p. 11509.

[384] BNSF.RP.WP.III.F-1071, 1072 to 1074.

not have the durability to withstand the constant use by railroad forces and generally need to be replaced after ten years. He further stated that the modular buildings purchased by BNSF were for use in remote locations where only a few employees were based and that those buildings represent a very small percentage of all of the buildings owned by the railroad.[385] Neither BNSF nor CSC could provide any information about the end use of the modular buildings allegedly purchased by the Burlington Northern Railroad.[386]

Based on information from BNSF operating witnesses, Mr. Primm designed buildings of from 2,400 to 5,575 square feet to accommodate the TNR train crews at home crew change locations and 1,279 square feet for the away crew change building at Oklaunion.

Based on the BNSF's space requirements, it would not be appropriate or cost-effective to construct the crew change and yard office buildings using "Speed Space" modules. Therefore, Mr. Primm used unit costs from RS Means to develop the cost of the crew change and yard office buildings.

Details of the costs are included in BNSF's Reply workpapers.[387]

f. Maintenance-of-Way Buildings

BNSF Engineering Consultants do not accept AEP Texas' construction costs for its MOW buildings because the quantity and arrangement of the MOW buildings do not meet the requirements of the BNSF Railway. They also do not accept the use of a non-insulated pole barn as an appropriate structure to house and maintain MOW vehicles.

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[385] BNSF.RP.WP.III.F-1075.

[386] *See* AEP Texas Opening workpaper p. 11493; BNSF.RP.WP.III.F-1072 and 1075.

[387] BNSF Reply Electronic workpaper "III F 7 Buildings.xls."

AEP Texas, in its opening evidence, states that there are six major MOW districts that are subdivided into 18 field MOW crew districts on the TNR.[388] AEP Texas develops pricing for 18 small buildings (947 square feet) each with an associated garage of 1,740 square feet.[389]

BNSF's MOW witness Mr. Albin has determined that the TNR will require eight major MOW buildings and 18 smaller MOW buildings.[390] The large MOW buildings range in size from 15,298 square feet at Alliance to 7,505 square feet at Edgemont and Boise City. All of these buildings include a 2,640 square foot garage. Train operations supervisors will be housed in section buildings at Converse, Brush and Pueblo. The fifteen small section buildings are approximately 1,400 square feet.[391]

Mr. Primm therefore has provided MOW buildings meeting these requirements based on use of pre-engineered metal buildings. All of his objections to the use of "Speed Space" buildings described in the preceding section apply to their use for MOW buildings as well.

It should be noted that AEP Texas did not include any costs for heating or air conditioning in its cost calculations for the MOW garage even though AEP Texas' garage floor plan shows a workshop and storage area. Nor did it include costs for any tools or utilities such as compressed air in its cost for the garage. The building is not insulated and would provide an uncomfortable, and therefore inefficient, working environment for the TNR if only ventilated as proposed by AEP Texas.

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[388] AEP Texas Opening Nar. at III-F-94.

[389] AEP Texas Opening Electronic workpaper "All Buildings.xls."

[390] BNSF.RP.WP.III.F-1076 to 1079.

[391] BNSF Reply electronic workpaper "III F 7 Buildings.xls" worksheets "MOW-."

BNSF has included the appropriate ventilation, tools and insulation. Details of BNSF's restatement of costs for TNR MOW buildings are included in BNSF's workpapers.[392]

g. Wastewater Treatment Plants

AEP Texas states in its opening evidence that it is providing two 5,000 gallon per day (gpd) wastewater treatment plants to serve the north and south ends of the Alliance Yard and another plant at the locomotive fueling facility. A third plant will serve the Donkey Creek crew and maintenance-of-way facilities.[393] AEP Texas' electronic spreadsheet "Waste Water Treatment Plants.xls"[394] contains costs for the wastewater treatment plants. Although the worksheet states that the oil separator system will only be installed at the locomotive fueling facility,[395] AEP Texas' total cost ($176,482.33) shown on the electronic spreadsheet which includes the oil-water separator is transferred to AEP Texas electronic spreadsheet "Bldgcst2.xls"[396] and multiplied by three to present the total cost for all of the 5,000-gpd wastewater plants on TNR. This results in the cost of the oil-water separator being included in all of the wastewater treatment plants, as is appropriate.

Mr. Primm also objects to the costs developed for these plants because they do not fully account for all costs associated with pre-treatment of both industrial and sanitary wastes. AEP Texas' workpaper 11595 is a page from RS Means that shows the cost for a 5,000 gpd sanitary

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[392] BNSF Reply electronic workpapers "III F 7 Buildings.xls" worksheets "MOW-." Supporting documentation is in BNSF workpapers BNSF.RP.WP.III.F-0782 to 0797, 0818 to 0959.

[393] AEP Texas Opening Nar. at III-F-94.

[394] See also AEP Texas Opening workpaper pp. 11591 and 11592.

[395] AEP Texas Opening workpaper p. 11590.

[396] AEP Texas Second Errata electronic workpaper "Bldgcst2.xls."

treatment plant. The RS Means costs do not include costs for constructing an industrial wastewater treatment plant. Therefore AEP Texas' misuse of the RS Means costs substantially understates the costs of providing comprehensive industrial and sanitary treatment.

All industrial wastewater treatment plants should have, at a minimum, an oil-water separator. However, for the effluent generated by the locomotive maintenance facility, freight car repair shop, and locomotive fueling facility, an oil-water separator is not sufficient to adequately pre-treat the effluent before it is discharged into a publicly-owned treatment works. This is because the use of soaps for normal housekeeping activities when combined with petroleum-based products (spill or leakage from locomotives) will create emulsions that act to suspend the petroleum products. A gravity oil-water separator will not trap these emulsions. Therefore additional pre-treatment is necessary to break the emulsions. This requires the use of a device such as a dissolved air flotation unit (DAF).

AEP Texas relies on a price quotation from Tenco-Hydro, Incorporated[397] for its pricing of the oil/water separator, bar screen, equalization tank, control panel and pump station. The price quotation contains no technical information so it is difficult to evaluate whether the proposed equipment is adequate to treat all effluent from the train yard and mechanical facilities.

Once again, because AEP Texas has failed to produce even a conceptual design of the facility, there is no basis for assuming that the price quotations it uses in its opening evidence are suitable.

Mr. Primm also objects to AEP Texas' method of calculating fencing costs for the wastewater treatment plant. AEP Texas uses pricing from RS Means for calculating fencing costs, but the costs it included in its spreadsheet are inappropriate. AEP Texas inexplicably uses

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[397] AEP Texas Opening workpaper p. 11590.

the prices for residential fencing for an industrial installation.[398] AEP Texas also failed to apply location factors to adjust its pricing for the wastewater treatment plant building and site.

Mr. Primm therefore has redesigned a wastewater treatment plant to incorporate a DAF and its associated pumps and piping to properly pre-treat effluent from the mechanical maintenance and locomotive fueling facilities. The facility will include an oil/water separator, metering station, industrial wastewater treatment, industrial and sanitary collection sumps and pumps, and discharge structure to a publicly owned treatment works (POTW). The model for the wastewater treatment plant is the design provided for Union Pacific Railroad's Hermiston Locomotive Maintenance and Fueling Facility.[399]

AEP Texas states that it will provide a 400 gpd waste water treatment facility for each of its small to medium MOW and crew change facilities.[400] BNSF accepts the use of a septic system and leach field only at locations where connections to a POTW are unavailable. At other locations the sanitary sewer must be tied into sewer lines to the POTW.

Details of BNSF's restatement of costs for waste water treatments plants are included in its workpapers.[401]

h. Yard Air and Yard Lighting

BNSF Engineering Consultants do not accept AEP Texas' costs for site lighting because the unit prices contained in AEP Texas' workpapers[402] cannot be reconciled with the lighting

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[398] AEP Texas Opening electronic workpaper "Waste Water Treatment Plants.xls."

[399] BNSF.RP.WP.III.F-1002.

[400] AEP Texas Opening Nar. at III-F-94.

[401] BNSF Reply Electronic workpaper "III F 7 Buildings.xls" worksheets "WWTP."

[402] AEP Texas Opening workpaper pp. 11568 to 11571.

costs presented on AEP Texas' "Buildingsites.xls" spreadsheet.[403] It appears that costs for light pole foundation have been omitted from the lighting costs. AEP Texas workpaper 11570 shows the cost for the replacement ballast for a 250-watt high-pressure sodium fixture, but this cost is not accounted for in AEP Texas' "Buildingsites.xls" spreadsheet. Similarly, the cost for the 250-watt high-pressure sodium lighting fixture is not contained in any of AEP Texas' workpapers.

Mr. Primm also disagrees with AEP Texas' use of fiberglass light poles because fiberglass is too fragile a material to withstand accidental impacts by railroad maintenance and inspection vehicles. AEP Texas has not provided any bollards to protect the light poles from vehicle impacts. Therefore, BNSF has substituted aluminum poles in its pricing.

AEP Texas also failed to apply location factors to adjust its pricing for the lighting costs.

Because of the inconsistencies in AEP Texas' evidence on lighting costs, BNSF has completely re-calculated the costs, as documented in its electronic workpapers.[404]

8. Public Improvements

a. Fences

AEP Texas states that it determined the right-of-way fencing requirements for the TNR Campbell and Orin Subdivisions based on past STB Decisions, citing *TMPA,* and based on its experts' inspection of the lines for the remaining TNR segments.[405] This results in 90 percent of the Campbell line, 103 percent of the Orin line and 25 percent of the remaining TNR being fenced. AEP Texas does not cost out gates, panels, brace panels and cattle guards. Nor does AEP Texas mention in its narrative or in its calculations that snow fence is required on the TNR.

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[403] AEP Texas Second Errata electronic workpaper "Buildingsites.xls."

[404] BNSF Reply Electronic workpaper "III F 7 Buildings.xls" worksheet "Site."

[405] AEP Texas Opening Nar. at III-F-95.

BNSF Engineering Consultants accept AEP Texas' fencing percentages for the Orin line segments but do not accept the 25 percent that AEP Texas uses for the remaining TNR. Although AEP Texas relies on the *TMPA* decision for fencing on the Campbell and Orin lines, it neglects to follow that decision relative to the rest of the TNR. In *TMPA,* the Board found that TMPA had not proven its assertion that only 20 percent of the right of way was fenced[406] and therefore accepted quantities of fencing for the remaining line segments based on the fence quantities in the ICC Reports prorated per mile and applied to the SARR.[407] In this case, AEP Texas attempts to support its estimate of fencing on 25 percent of the right of way by citing photographs and observations made by its experts on an inspection trip. The experts asserted that "fences were frequently composed of different types of fence posts with different fencing configurations" which led them to conclude that the owners constructed the fence rather than BNSF.[408]

Neither the photographs nor the fencing variations support AEP Texas' conclusion. Some of AEP Texas' photographs that note "No Fencing" actually show fence. In fact, of the 26 pictures where AEP Texas asserts there is no fencing, the fencing actually can be seen in four of those photographs. And, despite AEP Texas' "No Fencing" notation, one of the photos clearly shows cows in the adjacent field. AEP Texas would have the Board believe that cattle are roaming free on the railroad's ROW. Thirty-seven of their photographs show fencing on both

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[406] *Id.*

[407] *TMPA* at 152.

[408] AEP Texas Opening Nar. at III-F-96.

sides of the right of way and 174 show fencing on one side.[409] This does not support a conclusion that only 25 percent of the right of way is fenced.

AEP Texas is also incorrect that BNSF only constructs a specific type of fence and fence posts or that the owners must use the same type of fence on their perpendicular property lines. BNSF provides various types of fence depending on the use of adjacent land and the landowners' preferences. BNSF's current fence types, as well as the types constructed on the original Orin Line, are shown in the workpapers to demonstrate the diversity of fencing materials used on a railroad right of way.[410]

Finally, other than the cited photographs and the comment in the Narrative that AEP Texas witnesses Bastow, Ellison and Swanson "inspected all of the lines being replicated by the TNR"[411] there is no formal report or documentation of the trip in AEP Texas' workpapers. Indeed, their observations are contradicted by those of BNSF experts' own observation trip, in which they noted by subdivision, the fencing that was in place. They observed 100 percent fencing on the Orin Subdivision (of which 30 percent was sheep fencing); 90 percent on the Black Hill and Butte Subdivisions (with about 20 percent sheep fencing); 80 percent fencing on the Angora Subdivision; 20 percent on the Brush Subdivision; 50 percent on the Pikes Peak Subdivision; 80 percent on the Pueblo Subdivision; and 90 percent on the La Junta, Boise City and Red River Valley Subdivisions. They also observed cattle guards, which AEP Texas omitted from its costs.[412] BNSF Engineering Consultants compared the percentage of fence viewed on

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[409] BNSF.RP.WP.III.F-1062 to 1295.

[410] BNSF.RP.WP.III.F-1296 to 1298.

[411] AEP Texas Opening Nar. at III-F-95-96.

[412] BNSF.RP.WP.III.F-0002 to 0007.

the inspection trip with the percentages developed using the fence quantities from the ICC Reports. The ICC Reports resulted in 9.2 million feet of fence on the line segments for which there were reports. Applying the percentages from the BNSF experts' inspection notes resulted in 8.19 million feet of fence.

The data from the ICC Reports confirm the validity of the BNSF experts' observations. Because the Board in recent cases has expressed its preference for the more recent data, BNSF Engineering Consultants have based the fencing quantities in their restatement on the documented inspection trip observations of BNSF's experts.

To determine the quantities for cattle guards, BNSF Engineering Consultants used the methodology accepted by the Board in *TMPA* and prorated the cattle guard quantities from the ICC Engineering Report data, just as AEP Texas has done for the earthwork quantities. Based on this methodology, BNSF included 1,283 cattle guards.

AEP Texas uses 2002 and 2003 right-of-way fence costs from BNSF AFEs produced in discovery to derive an average unit cost per linear foot. BNSF Engineering Consultants assume that AEP Texas did not include costs for gates, panels, and brace panels because it correctly assumes that those costs would be included in the linear foot costs taken from the AFEs. On one of the AFEs, however, - AFE A031140 -- there are separate costs listed for gates.[413] Therefore, these special line item gates need to be included in determining the average.

BNSF accepts AEP Texas' methodology of averaging the fence costs from AFE documents produced by BNSF in discovery but adds additional AFEs from discovery into the averaging mix because AEP Texas neglected to include AFEs that showed higher fencing

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[413] AEP Texas Opening workpaper p. 11623.

costs.[414] It is inappropriate to cherry pick only the lowest costs as that does not reflect accurately the fencing that is in place. BNSF indexed the 2002 and 2003 costs to 2000. For the cattle guards, BNSF Engineering Consultants use cattle guard costs from Wyoming DOT bid prices and apply them to the various types that are constructed on the TNR.[415] BNSF's total cost for right-of-way fence is $32,397,876.

In addition to the right-of-way fencing, BNSF Engineering Consultants included 1,328 LF of snow fence on the Orin Subdivision at MP 67.4 (656 LF) and MP 68.4 (672 LF) as well as 43,569 LF from ICC data. BNSF Engineering Consultants constructed snow fences at the locations on the Orin Subdivision where they currently exist and prorated areas from the ICC data to determine the quantities of snow fence on the remaining line segments. AREMA § 6.8.2.6.3[416] provides a standard for the "Wyoming Type" snow fence that is consistent with the type costed in the Wyoming DOT bid tabs. Therefore, BNSF Engineering Consultants use the 2000 WYDOT average bid price for 10' Wood Snow Fence, which is $13.64/LF. The AREMA standards and specifications for snow fencing are included in BNSF's workpapers.[417] Total investment for snow fencing is $592,468.

BNSF's calculations for fencing costs are included in its electronic workpapers.[418]

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[414] BNSF.RP.WP.III.F-1299 to 1338; Calculations are shown in BNSF Reply electronic workpaper "III F 8 Fencing.xls" worksheet "Fence Unit Cost.".

[415] BNSF.RP.WP.III.F-1340.

[416] AREMA § 6.8.2.6.3; BNSF.RP.WP.III.F-1341.

[417] BNSF.RP.WP.III.F-1342 to 1345.

[418] BNSF Reply electronic workpaper "III F 8 Fencing.xls."

b. Roadway Signs

(1) Types and Quantities

AEP Texas includes 2,803 roadway signs, including milepost, whistle posts,[419] and advance warning signs at the crossings that AEP Texas builds. It should be noted that in its narrative, AEP Texas states that it did not include advance warning signs,[420] but it nonetheless included costs for these signs at crossings. BNSF agrees with the use of these types of signs. Milepost signs inform the engineer where he is on the line at all times. Whistle posts are required at public crossings for advance warning for the public. However, BNSF does not agree with AEP Texas' placement of advance warning signs.

AEP Texas placed advance warning signs on all of the at-grade crossings that it chose to build. BNSF Engineering Consultants do not believe that these signs are necessary as the whistle posts and crossbucks AEP Texas provides at these crossings should be sufficient. BNSF therefore corrected the placement of the advance warning signs along the route and installed them in advance of the corresponding speed restriction and resume speed signs.[421]

AEP Texas omitted entirely all speed restriction and yard limit signs, most advance warning signs, and all crossing signs, claiming they were unnecessary as they can be accounted for in the timetables.[422] This is incorrect. FRA regulation 218.35 specifically mandates the use of Yard Limit signs *in addition to the notification in the timetable.* It says

After August 1, 1977, yard limits must be designated by –

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[419] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls."

[420] AEP Texas Opening Nar. at III-F-97.

[421] BNSF Reply electronic workpaper "III F TNR Construction.xls" worksheet "Signs."

[422] AEP Texas Opening Nar. at III-F-97.

(1) Yard limit signs, and

(2) Timetable, train orders, or special instructions.[423]

The General Code of Operating Rules that has been adopted by all Western Class 1 and 83 short line railroads, require the placement of advance warning signs, speed signs and resume speed signs. No exceptions are made for having the information in the timetables.[424]

AEP Texas cites the NORAC Operating Rules, adopted by Eastern railroads for the proposition that the signs are not required if the information is in the timetables.[425] The provisions cited and included in AEP Texas' electronic workpapers provide that an employee coming on duty must familiarize himself with General Orders, Bulletin Orders and division notices. These provisions have nothing to do with the requirement for signs, and in any event the NORAC rules are applicable only to the eastern railroads that have adopted them and certainly do not supercede the General Code adopted by the western carriers. The point of adopting general operating rules is to have railroads within the same territories operate under similar rules. Since the TNR will be operating in the West, it is only reasonable that it would adopt the rules by which other railroads in that territory operate.

Station and yard limit signs, in addition to the mileposts, inform the engineer where he is on the TNR. Advance warning, speed restriction and resume speed signs put locomotive engineers on notice that they are about to enter or leave a restricted speed zone so that they can maintain a safe and efficient train speed. Without these signs, the engineer cannot know

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[423] 49 CFR § 218.35. BNSF.RP.WP.III.F-1347.

[424] General Code of Operating Rules, Third Edition, effective April 10, 1994. Copies of the pertinent pages of the Code are included in BNSF.RP.WP.III.F-1348 to 1350.

[425] AEP Texas Opening Nar. at III-F-97.

precisely where he is and adjust his speed appropriately to pull into sidings, yards or mines. BNSF, therefore, has included all of these signs in its restatement of sign costs.

Flanger signs are used in heavy snowfall areas, such as the territory through which the TNR will move. These signs warn snowplow operators to raise the plow to avoid damaging the rails at turnouts, inner guard rails on bridges, crossing planks, failed equipment detectors, and rail lubricators. AEP Texas did not include any flanger signs on the TNR even though they received a quote for them.[426] BNSF placed them at turnouts, crossing planks, failed equipment detectors, and rail lubricators north of Pueblo.

In addition to the above, BNSF Engineering Consultants recommended other signs that are used on railroads for safety and regulatory reasons. These include the following:

Danger – Keep off Bridge: At each bridge location four warning signs should be used to keep trespassers and others away from the structure. Even with walkways there is limited clearance for walking when there is a moving train. These sign costs are included in the bridge costs.

FRA required 1-800 signs at crossings: The FRA requires that each grade crossing have a posted identification number and contact telephone number to call in case of an emergency. Each crossing would have a minimum of two signs that could be mounted either on active protection equipment or on a separate post. The costs for these signs are included in the crossing costs.

(2) Unit Costs

AEP Texas uses various quotes for its signs and RS Means unit costs for posts and for installation for each sign. BNSF accepts these unit costs, except that it adds overhead and profit

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[426] AEP Texas Opening workpaper p. 11644.

to the installation cost from Means, and applied them to its quantities of all the TNR signs. Table III.F.8-1 demonstrates the difference in the parties' quantities of roadway signs. The total cost for roadway signs on the TNR is $374,934.

Table III.F.8-1
Comparison of BNSF and AEP Texas
Quantities of Roadway Signs

Sign Type	BNSF	AEP Texas	Difference
Milepost	1,511	1,459	52
Whistle Post	887	672	215
Flanger, Station, Yard Limit	1,727	0	1,727
Advanced Warning	537	672	(135)
Total Signs	**4,662**	**2,803**	**1,859**
Sign Posts	4,662	2,803	1,859

Source: AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls"; BNSF Reply electronic workpaper "III F TNR Construction.xls" worksheet "Signs"

c. Crossings

AEP Texas excludes costs for at-grade crossings on any portion of the route other than on the Orin, Campbell and Reno Subdivisions and between Las Animas Jct. and Amarillo, claiming that since BNSF predecessor lines were in place before automobile highways were constructed, inclusion of these costs constitutes an entry barrier. AEP Texas excludes all overhead crossings on the TNR.[427]

(1) At-Grade Crossings

Although AEP Texas contends that it should not have to construct at-grade road crossings because there were no roads when the lines were built, the ICC Engineering Reports provide evidence to the contrary. The ICC Engineering Reports for several of the valuation sections specifically noted the number of crossings in existence at the time. These sections include

[427] AEP Texas Opening Nar. at III-F-98-99.

Amarillo to Childress (FWD-3-TX) (106 crossings), Childress to Wichita Falls (FWD-2-TX) (171 crossings) and Pueblo to Minnequa Jct. (CS-8-Co) (19 crossings). While the other valuation sections did not specifically identify the number of crossings, they did provide quantities of materials under Account #15 for crossings. BNSF consultant Gouger summarized the information in the ICC Reports and determined that there was sufficient material for the equivalent of 1,501 crossings. BNSF then determined the percent of route miles in each valuation section that are on the TNR and applied that percentage of the crossing quantity to the crossings on the corresponding TNR line segments where AEP Texas did not build any crossings.

AEP Texas does not discuss in its Opening Narrative what crossing material it intended to use, other than in the discussion of operating costs on page III-D-106 where it mentions asphalt under Crossing Paving and in its MOW narrative where AEP Texas provides asphalt for maintenance purposes at crossings. However, AEP Texas derives two unit costs for crossing materials. The first is a $205.31 unit cost for what AEP Texas characterizes as "Asphalt Crossing with Rubber Rail Seal" based on a quote from Duferco Farrell Corporation.[428] The other is a $731.42 unit cost for a concrete panel crossing based on a contract bid for rehabilitation of a crossing in Westmoreland County (prepared by Stone Consulting & Design).[429] AEP Texas selected the asphalt/rubber crossing for all crossings that it built.[430] Asphalt is not a proper material for high density crossings because it requires continual replacement. Indeed, in order to handle the rail and vehicular traffic, modern railroads build or

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[428] AEP Texas Opening workpaper pp. 11658 to 11661.

[429] AEP Texas Opening workpaper pp. 11662 to 11683.

[430] AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls" Lines 44, 45 and 120.

replace most crossings today with a concrete panel because concrete is a much more durable material[431] and the concrete panels can be removed and replaced easily during maintenance. A truly least cost, most efficient railroad would construct its railroad using concrete panels on its high density lines. Therefore, BNSF rejects AEP Texas' specification for asphalt materials at all crossings. However, recognizing that BNSF has not yet replaced all of its crossings with concrete, BNSF Engineering Consultants conservatively used the crossing material that BNSF actually has in place today for each crossing. This includes rubber crossings, concrete crossings and timber crossings. BNSF accepts AEP Texas' unit costs for concrete crossings. For the rubber and timber crossings, BNSF Engineering Consultants use the 2001 unit costs that BNSF provided in discovery, indexed to 2000. As discussed in Section III.F.3, geotextile costs were added to the timber crossings.[432]

The decisions in *WPL* and *WTU,* upon which AEP Texas relies, eliminated road crossings and the associated road crossing warning devices on other than new line segments only because there was *no evidence* presented to demonstrate that the railroads actually incurred costs for road crossings on those segments. However, the Engineering Reports show that there were more at-grade road crossings in place than exist today and that the railroad did in fact incur costs associated with those roads.[433] Therefore, BNSF's inclusion of the grade crossing materials

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[431] BNSF.RP.WP.III.F-1391, 1393 to 1394, 1405, 1408 and generally 1388 to 1417.

[432] BNSF.RP.WP.III.F-1418.

[433] It is not really surprising that there are fewer at-grade crossings today given BNSF's aggressive participation with state and local governmental agencies in programs to eliminate such crossings. The railroad is fully responsible for maintaining and replacing at-grade crossings and incurs substantial amount each year in costs for crossings and crossing warning devices, as shown in BNSF AFEs produced in discovery. BNSF.RP.WP.III.F-1299 to 1339.

identified in the Engineering Reports in its restatement of crossing costs[434] is consistent with the Board's ruling in *TMPA* accepting the Engineering Report quantities as evidence that "BNSF's predecessor railroads incurred investment for a substantial amount of at-grade crossing materials." *TMPA* at 154.

AEP Texas constructs active warning devices on the newly constructed segments, using unit costs from suppliers. AEP Texas obtained a unit cost for flashers from DJR Signal Service.[435] BNSF Engineering Consultants agree with AEP Texas' development of the unit cost for the flashing light, but do not agree with its labeling the cost as a unit cost for "flashers and gates" and applying that cost to all active warning devices on the crossings it builds. BNSF provided in discovery cost data for all types of active warning devices. BNSF Engineering Consultants used those data to determine the amount to be added to the AEP Texas "flasher" quote for the additional cost of the gates.[436] BNSF applied the appropriate unit cost (flashers, gates, or flashers/gates) to the types of active warning devices that are on the existing BNSF system. BNSF Engineering Consultants have also added the full costs for seven active warning devices at crossings on lines where AEP Texas added double or triple track to the existing BNSF network, as these additional capacity improvements constitute new construction.[437] For segments other than the Orin, Campbell and Reno Subdivisions, the Las Animas to Amarillo Line, and the new capacity improvements, BNSF Engineering Consultants included five (5%) percent of the cost of all active warning devices. This amount is consistent with BNSF's average

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[434] BNSF Reply electronic workpaper "III F 8 Grade Crossings.xls."

[435] AEP Texas Opening workpaper pp. 11646 to 11648.

[436] BNSF.RP.WP.III.F.-1418 to 1419.

[437] BNSF.RP.WP.III.F-1420 to 1458.

level of initial assessment for active crossing warning devices, although in many instances, the railroad must incur a much larger percentage. Inclusion of these costs is consistent with the Board's ruling in *TMPA.*[438] BNSF also included costs for the FRA-required 1-800 signs at crossings.

BNSF disagrees with AEP Texas' exclusion of costs for the FRA required 1-800 signs and passive warning devices on the segments other than new construction segments. Based on the crossings identified from the ICC Engineering Reports, BNSF included the full cost for signs and crossbucks for 100 percent of those crossings. BNSF Engineering Consultants have used the sign costs for public and private crossings produced by BNSF in discovery.[439]

(2) Highway Overpasses

AEP Texas constructs the railroad bridges that traverse roadways on the portion of the TNR that replicates the Orin, Campbell, Reno Subdivisions, some of the major roadways in the Boise City Subdivision, as well as a few crossings on various other subdivisions,[440] but it does not construct any of the highway bridges over the railroad on any of the subdivisions.

Based on their inspection of the lines and BNSF inventories, BNSF engineers identified the highway overpasses on the Orin, Campbell and Reno Subdivisions constructed in more recent years, as well as certain additional overpasses on the remaining line segments of the TNR. These include all overpasses identified in the ICC Reports as well as overpasses located on the TNR double and triple track that AEP Texas added to the existing BNSF network. BNSF Engineering Consultants added three overpasses as a result of the TNR capacity improvements -

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[438] *TMPA* at 155.

[439] BNSF.RP.WP.III.F-1418.

[440] Railroad bridges over highways are discussed in Section III.F.5.

one over state highway 16 at MP 546.2 on the Black Hills Subdivision in TNR double track territory and two crossing the triple track segments at Crawford Hill. The ICC Engineering Reports identified seven overpasses on the remaining line segments, and for some of them gave the actual percentage of cost -- ranging from nine percent to 100 percent -- that was contributed by the railroad. In its restatement, BNSF included costs for overpasses based on the percentages given in the ICC Reports.[441] For the overpasses for which no percentage was given, BNSF included 10 percent of the cost for an overpass. BNSF developed its unit cost per overpass using a 1999 Colorado Department of Transportation bid for a highway overpass project in Sterling, Colorado and applied that cost or the appropriate percentage of that cost to each of the overpasses it identified.[442]

Table III.F.8-2 summarizes the differences between BNSF's restatement and AEP Texas' opening evidence on crossing costs.

Table III.F.8-2
Comparison Of BNSF's Estimate Of Cost Of Crossing To AEP Texas' Estimate In Opening Evidence (Millions)

Crossings Materials At Grade Crossing	BNSF	AEP Texas	Difference
Crossings			
Timber	$3.3	$0.0	$3.3
Asphalt/Rubber	$0.2	$5.0	($4.8)
Concrete	$4.3	$0.0	$4.3
Other	$5.5		$5.5
Warning Devices			
Signs and Crossbucks	$1.5	$0.1	$1.4
Gates/Flashers-	$3.1	$1.9	$1.2

[441] BNSF Reply electronic workpaper "ICC Valuation Reports.pdf" worksheet "Account 15 - Overgrade Crossings."

[442] BNSF.RP.WP.III.F-1459 to 1463 and BNSF Reply electronic workpaper "III F 8 Grade Crossings.xls" worksheet "Built Up Overpass Cost."

Crossings Materials At Grade Crossing	BNSF	AEP Texas	Difference
Overpasses	$25.1	$0.0	$25.1
TOTAL	**$43.0**	**$6.9**	**$36.1**

Source: BNSF Reply electronic workpaper "III F 8 Grade Crossings.xls" and "III F TNR Construction.xls;" AEP Texas Second Errata electronic workpaper "IIIFTOTAL.xls."

9. Mobilization

Mobilization plays a significant role in a project that involves the construction of more than eleven hundred miles of railroad and includes the construction of both roadbed and structures. It takes a tremendous effort to coordinate and transport personnel, equipment, materials and supplies to the project sites and to establish temporary offices and other support facilities needed at the various construction sites both before and during the project. A similar effort is also required to dismantle the temporary facilities and return heavy construction equipment to the contractors' storage areas.

The STB has recognized the legitimacy of this cost in the past, approving factors of 2.2 percent in *PPL*,[443] 2.4 percent in *FMC* and most recently 2.5 percent in *Duke/NS* [444] and 2.6 percent in *CP&L*.[445] Nonetheless, AEP Texas argues here for a one percent factor. This is clearly inconsistent with precedent and completely unwarranted.

a. Critique of AEP Texas' Position

AEP Texas' argument for a low mobilization cost is riddled with inconsistency. On the one hand, AEP Texas begins its argument by pulling, out of context, a percentage for

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[443] This is the percentage the Board cited in *CP&L* for just the mobilization portion in *PPL*. *CP&L* at 106.

[444] *Duke/NS* at 122; *also Duke/CSX* at 106 (In its Feb. 2004 decision in *Duke/CSX,* the Board accepted a 2.7 percent factor for mobilization and noted that even higher percentages had been accepted in *Arizona* (2.8 percent) and in the earlier decision in this case (*WTU - 3.2%)*).

[445] *CP&L* at 107.

mobilization of 2.4 percent from the STB decision in *WPL*. While creating the appearance that it is accepting *WPL* as a starting point, AEP Texas is ignoring the fact that in the same decision, the Board found that performance bonds and demobilization are legitimate components of the overall mobilization cost.[446] In fact, the Board accepted a 2.6 percent mobilization cost (including performance bonds and demobilization) in *WPL*. AEP Texas then turns and ignores even the mobilization percentage the Board accepted in *WPL* and urges the Board to reduce that to a mere one percent on meritless grounds that are discussed more fully below in Section III.F.9.a.(1).

Since AEP Texas chose to rely on previous STB decisions as its starting point, it is legitimate to assess how their proposed mobilization costs compare with recent STB precedent. The STB summarized this information in its recent decision in *CP&L* where it noted the mobilization costs that had been accepted as set forth in the table below.

Table III.F.9-1
Summary of ICC/STB Approved Mobilization in Recent Cases

Case	Mobilization Percentage
FMC (STB 05/00 Decision)	2.4%
WPL (STB 09/01 Decision)	2.6%
PPL (STB 08/02 Decision)	2.2%
TMPA (STB 03/03 Decision)	2.0%
Duke (STB 11/03 Decision)	2.5%
CP&L (STB 12/03 Decision)	2.6%
Average of STB Decisions	**2.4%**

Source: *CP&L* at 107.

[446] This is the percentage cited in the Board's decision in *CP&L*.

Thus, while AEP Texas wishes to create the illusion that it is following STB precedent, it is in fact asserting mobilization costs that are less than half those repeatedly accepted by the Board. Based solely upon AEP Texas' preferred rationale of relying upon previous STB precedents, it is far more appropriate to compute mobilization as a minimum of 2.4 percent.

AEP Texas' unfounded arguments for a lower mobilization factor are discussed below under the subheadings Mobilization, Demobilization and Performance Bond.

(1) Mobilization

AEP Texas offers no analysis to support its argument for a mobilization cost of one percent of the estimated construction cost of some items. AEP Texas simply offers three generalized arguments advocating lowering mobilization from its 2.4 percent starting point to one percent. These arguments have recently been rejected by the STB in *Duke/NS*.[447] Each of these arguments is without merit:

1. AEP Texas asserts that "mobilization is basically a fixed cost for a project... [and]... the larger the project, the less significant the mobilization factor becomes." [448] In *WPL*, the STB determined the total construction cost of the stand-alone railroad to be $2.94 billion. In the present case, AEP Texas estimates the construction cost of the TNR to be $2.02 billion. AEP Texas is arguing that the larger the railroad, the lower the mobilization costs (as a percentage of the construction cost). Conversely, the smaller the railroad, the higher the mobilization costs. Since the TNR is smaller than the stand-alone railroad in *WPL*, then by its own logic, AEP Texas should be arguing that the mobilization for the TNR should be greater, not less than the 2.4 percent adopted by the STB in *WPL*.
2. AEP Texas asserts that "AEP Texas' engineering experts have obtained actual construction and material bids... [and]... these bids include mobilization (and demobilization)."[449] This is simply incorrect on several counts. First, many of the prices used by AEP Texas come from Means, not construction bids.

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[447] *Duke/NS* at 122.

[448] AEP Texas Opening Nar. at III-F-99-100.

[449] AEP Texas Opening Nar. at III-F-100.

Second, the prices AEP Texas uses from contractors are best characterized as telephone conversations based upon sketchy, incomplete information. They clearly are not equivalent to bonded bid prices based upon detailed drawings, specifications and construction contract documents. As pointed out elsewhere, it is questionable whether many of AEP Texas' prices include the basic components necessary to construct the project, let alone a relatively smaller item such as mobilization.

3. AEP Texas further argues that the Means "index lists only five places where mobilization is stated as a separate item" and further argues that because the mobilization costs are small, "it is obvious that mobilization costs are insignificant."[450] The number of listings in Means is irrelevant to the applicability of the cost to the TNR. Following this logic would lead to the conclusion that if an item isn't listed in Means, then it's not an appropriate cost. Within the five listings of mobilization in Means that AEP Texas cites are mobilization costs for nearly 20 different pieces of construction equipment. AEP Texas recites the mobilization costs for equipment from Means in an apparent attempt to portray the numbers as "small." However, AEP Texas fails to acknowledge that: (1) the costs are for a 50-mile mobilization trip which is clearly unrealistic given the specialized nature of the equipment required along the 1,168.38 mile route; (2) equipment will need to be re-mobilized to different sites as construction progresses; and (3) a large number of pieces of equipment will be required to meet the ambitious schedule put forth by AEP Texas.

AEP Texas also tries to make a "barrier to entry" argument alleging that because a contractor quoting a mobilization cost assumes "a substantial amount of equipment may have to move some distance," the cost therefore reflects a "relative scarcity of resources."[451] This is incorrect. Mobilization of resources over a project of this size always requires movement of equipment and TNR is not being charged any "premium" for this normal activity. As discussed above, the mobilization additive covers the costs incurred to obtain the equipment from equipment providers and have it available at the time and place needed.

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[450] *Id.* at III-F-101.

[451] AEP Texas Opening Nar. at III-F-100.

(2) Demobilization

AEP Texas argues that the TNR will incur zero demobilization costs and puts forth several arguments to support this contention. AEP Texas' arguments are flawed for the following reasons:

1. The STB has long recognized the validity of demobilization costs as evidenced in *WPL* (cited by AEP Texas), *FMC* and most recently, *Duke* and *CP&L*.

2. AEP Texas asserts the equipment "would probably not be returned to the contractor's base of operations [and the] equipment is generally disposed of at the end of the project ... by selling it to dealers or other contractors."[452] There is no evidence that AEP Texas made the necessary adjustments in the Means and other pricing it used to reflect this approach to equipment disposition at the end of the project. Therefore, AEP Texas forfeited its option to use this approach by failing to consistently apply this assumption elsewhere in its analysis. Further, AEP Texas offers no evidence that demobilization costs would be avoided by its suggested approach. Even if the equipment were sold at the end of the project, it would still have to be made "saleable," including cleaning, servicing and transporting it to a regional location for sale.

3. AEP Texas attempts to make a "scarcity of resources" argument by asserting the demobilization "charges are typically applied to construction work when there is no further immediate need for the equipment at another location."[453] AEP Texas then appears to characterize demobilization costs as some kind of "premium" that should be disallowed. The STB has clearly rejected this type of argument in previous cases. Demobilization costs are a legitimate expenditure on all construction projects as they reflect the orderly shutdown of a project so that the resources can continue to be productively employed on future projects. To assume otherwise would require an additional premium elsewhere in the estimate.

(3) Performance Bond

AEP Texas failed to include performance bonds in its costs for the TNR. The STB has established many precedents supporting the inclusion of performance bonds in the cost of the

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[452] AEP Texas Opening Nar. at III-F-102.

[453] AEP Texas Opening Nar. at III-F-102.

stand-alone railroad, including its recent decision in *CP&L* and the decisions cited therein. In *CP&L,* the Board rejected the complainants' evidence advocating a one percent factor "because it ignores several cost elements (bridge mobilization, performance bonds and demobilization) accepted in prior cases." *CP&L at* 107.

b. BNSF's Arguments for Mobilization Costs

BNSF Engineering Consultants accept a 2.4 percent additive for mobilization, performance bond and demobilization based on the average of the Board's recent decisions. The subsections below show that the effort involved in mobilizing forces and equipment for a project of this magnitude justifies a mobilization additive at this level.

(1) Mobilization

As it is unrealistic to expect that all of the staff would be available locally for a construction project of this magnitude, mobilization costs realistically would be incurred for all staff and all equipment involved in constructing the project. A partial list of the mobilization requirements includes:

- Field Offices and Staging Areas
- Grading Equipment and Culverts
- Bridges
- Signals and Communications
- Buildings and Facilities
- Rail and Work Trains

(a) Field Offices and Staging Areas

The mobilization for field offices and staging areas involves preparing a site and setting up and operating the field offices that will be required for the Contractor, Construction Manager, Surveyor and Material Inspectors. In addition, graded and fenced material staging areas are required at the field office locations that function as railheads for the delivery of construction materials.

The total number of field offices and staging areas is generally dictated by the spacing and the associated driving time between facilities. Typically, field offices are spaced based on a one-hour drive, or approximately every 50 miles, while material staging areas are spaced for a two-hour drive, or approximately every 75 miles (taking into account the lower speeds for vehicles hauling heavy construction materials). This general rule of thumb however is more difficult to implement where movement is over relatively short distances along temporary construction roads along the right of way or along circuitous routes along the public highway network.

(b) Grading and Culvert Equipment

The equipment needed to perform earthwork and culvert activities for the TNR must be moved to multiple initial sites as construction begins on the various construction packages proposed by AEP Texas. In addition, it is typical for this equipment to be redeployed to different construction sites as sections are completed. The TNR is not a single, compact construction site (such as an office building) where equipment can be deployed and remain at the same location throughout the duration of construction. For construction projects spanning large geographic areas, the only way to economically construct the project is to constantly redeploy equipment to new construction locations as work is completed at the initial sites.

(c) Bridges

Bridge construction along the TNR route will require mobilization of specialized bridge construction equipment. These include pile drivers for foundations and cranes for lifting substructure and superstructure components. Because much of this equipment will be used on more than one bridge during the proposed bridge construction schedule, bridge pile drivers and cranes will also require redeployment along the TNR route. While AEP Texas' assertion that

"moving a crane to a site is a one-time cost, spread out over the entire project's scope"[454] may be true for a building site, it is decidedly not true for a linear construction project where equipment must be moved along temporary construction roads from one bridge site to the next.

Overall the TNR will require 474 bridges. The construction time for each bridge will vary based on the size of the bridge and the type of construction. Construction periods typically range from as little as three months for simple bridges to upwards of several years for larger, complex structures such as the bridge over the Canadian River in Texas. The BNSF witnesses have conservatively estimated an average construction time of just under five months for TNR bridges. Based on this assumption, the BNSF witnesses estimate that each piece of bridge construction equipment will be used, and need to re-mobilized, on an average of three TNR bridges.

(d) Signals and Communications

AEP Texas acknowledges that mobilization costs would be incurred for this construction.

(e) Buildings and Facilities

AEP Texas acknowledges that mobilization costs would be incurred for this construction.

(2) Performance Bond

Contractor performance bonds are a standard requirement in all large complex construction projects. They are a risk management tool used to provide assurance to the owner that funds will be available to complete the project in the event the contractor(s) default on their obligations to perform. The STB has consistently accepted the inclusion of costs for performance

[454] AEP Texas Opening Nar. at III-F-99.

bonds, including in its decision in *WPL*, where the Board noted that performance bond costs were contained in the contract documents for the construction of the Union Pacific's Western Railroad Properties, Inc. (WRPI) Line.

RS Means provides information on performance bonds for various types of projects:[455]

Performance Bonds (% of Construction Cost) – from Means

Project Type	**Min.**	**Max.**
Buildings	0.60%	1.50%
Highways, Bridges, Resurfacing	0.40%	0.94%

The mid-point of the Means Highways, Bridges and Resurfacing performance bond range is 0.67 percent and is applicable to all components of the TNR except facilities, communications and signals. For these, the mid-point of the Means range for buildings, 1.05 percent, is more appropriate. Facilities for the TNR include locomotive and car repair shops, fueling facilities and office buildings that fall directly into the Means building category. Signals and communications facilities by their nature include added complexity attributable to circuitry and system integration, along with the need for multiple, highly specialized contractors and thus are more closely associated with the category for performance bonds for Buildings.

(3) Demobilization

As described previously, demobilization costs are the costs of moving personnel and equipment from the work sites for future redeployment. Demobilization costs are documented in the same manner as mobilization costs and this data clearly indicates these costs apply to both mobilization and demobilization. These costs are described in Section 02305-250 of Means as:

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[455] BNSF.RP.WP.III. F-1465 to 1466.

"Mobilization ***OR*** Demobilization" *[emphasis added].*[456] Therefore, demobilization costs equal to mobilization costs are appropriate.

(4) Total Mobilization

AEP Texas has offered no compelling reason to deviate from the precedent established by the Board over past cases and summarized in *CP&L.* This body of evidence clearly supports mobilization (including demobilization and performance bonds) costs of *at least* 2.4 percent of the estimated construction cost based on the above analysis of the Board's *CP&L* decision. This is the percentage that BNSF has included in its calculation of total construction costs, although it should be noted that if the higher percentages (including that found acceptable in *WTU)* cited in the Board's most recent decision in *Duke/CSX* were included in the average of the percentages accepted in prior cases, the percentage would be even higher -- *i.e.,* 2.5 percent.

Applying the 2.4 percent to the estimated construction cost of the TNR of $2.5 billion results in a cost of $59.3 million for mobilization for the TNR.

10. Engineering

AEP Texas' estimate of an engineering cost additive for the TNR is inadequate and falls well below the level of engineering additives adopted by the STB in prior stand-alone cases. AEP Texas estimates a total additive for engineering for the TNR of 6.8 percent of construction costs, comprised of only 5.0 percent for basic services and 1.8 percent for resident inspection.[457] AEP Texas also includes a nominal amount, $1.38 million, for limited test borings and soil investigations.[458] AEP Texas ignores completely the cost of construction management that the

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[456] BNSF.RP.WP.III.F-1467 to 1468.

[457] AEP Texas Opening Nar. at III-F-106, III-F-110 and III-F-111.

[458] AEP Texas Opening Nar. at III-F-110.

STB has consistently recognized as a legitimate cost of building a stand-alone railroad.

AEP Texas' fundamental premise for its low engineering additive is its notion that as the size of a particular project increases, the percentage of the total that is applied to the engineering component declines. However, it is clear from both AEP Texas' own narrative and the detailed discussion of the individual components of the TNR construction in this narrative, that the TNR construction, while large in overall project scope, will actually commence as a series of hundreds of individual smaller projects along the over 1,168.38 mile length of the proposed route. As such, the TNR will require more, not less, of a management and engineering effort than a typical large-scale construction project.

The BNSF engineering witnesses explain that AEP Texas' 6.8 percent additive for engineering services (based on Pennsylvania only sources) is insufficient for the planning and design of the TNR railroad project and ignores completely the critical cost for construction management. This omission is particularly egregious given AEP Texas' implicit assumption that the construction of the TNR will be broken into small segments with work mostly done simultaneously on a fast track schedule. Such an ambitious schedule requires diligent and constant construction management in addition to material and quality control inspections, which AEP Texas' estimate simply does not provide.

a. Critique of AEP Texas' Evidence

AEP Texas consistently misrepresents and misinterprets its own sources in an attempt to justify its low engineering costs. Further investigation of each of AEP Texas' sources reveals not only the shortcomings of AEP Texas' interpretation, but also that, when correctly analyzed, these sources in fact support higher levels of engineering costs.

(1) AEP Texas' First Source – Standards of Practice of Consulting Engineers for Pennsylvania

AEP Texas' first source is the out-dated, state-specific *Manual A of the Standards of Practice of Consulting Engineers* (1975) for Pennsylvania. The engineering cost curves cited by AEP Texas are for "basic services" only. By definition, basic services do not include all of the planning, design and construction management services that will be required to engineer the TNR railroad. AEP Texas acknowledges that the Pennsylvania data "[does] not include surveys and resident inspection."[459] This involves design surveys, construction stakeout, construction management and material testing during construction. A further review of this manual indicates that geotechnical subsurface investigations and feasibility studies are also not included.

AEP Texas does note in citing this cost curve that the TNR is a project of above average complexity and therefore subject to a higher design fee.[460]

The most current nationwide version of the cost curves (*i.e.* engineering cost as a percentage of construction cost), that is not restricted to Pennsylvania is the American Society of Civil Engineers (ASCE) cost curves from their 1981 *ASCE Manual 45.* AEP Texas cites the ASCE Manual as its fifth source and it is discussed in greater detail below. Since it is more current and national in scope, it further diminishes the relevance of the Pennsylvania data to this project.

(2) AEP Texas' Second Source – Means

AEP Texas' mischaracterization of its second source, the *R.S. Means Building Construction Cost Data* (Means) is particularly egregious. By suggesting that the engineering fees listed in Means for individual project components are directly comparable to the overall

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[459] AEP Texas Opening Nar. at III-F-105.

[460] AEP Texas Opening Nar. at III-F-104.

engineering additive for the TNR, AEP Texas would have the STB believe that engineering fees as low as one percent are appropriate.[461] Clearly this is not a correct interpretation, as evidenced by the fact that Means indicates that the fees for Architectural and Structural Engineering services are expressed as a percentage of the total Project cost, while fees for specialized disciplines are a percentage of the cost of construction Contract for elements of that discipline only. To render the Means data cited by AEP Texas even remotely comparable to an overall TNR engineering additive, additives for all required engineering disciplines would have to be aggregated. Design services for a typical building project include architectural, electrical, landscape and site development, mechanical and structural disciplines enumerated by Means.[462] This would result in a range of fees for professional design services as follows:

	Discipline	**Range**			**Unit**
	Architectural	**4.9%**	-	**16.0%**	Project
PLUS					
	Structural	**1.0%**	-	**2.5%**	Project
PLUS					
	Electrical	4.1%	-	**10.1%**	Contract
-or-					
	Landscape and Site Development	**2.5%**	-	6.0%	Contract
-or-					
	Mechanical	4.1%	-	10.1%	Contract
TOTAL FEES FOR ANY ELEMENT		**8.4%**	-	**28.6%**	

Thus, the proper interpretation of this source cited by AEP Texas yields an engineering design fee of 8.4 percent to 28.6 percent of the estimated building construction cost, depending

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[461] AEP Texas Opening Nar. at III-F-105.

[462] BNSF.RP.WP.III.F-1470 to 1471.

upon the discipline being considered.

(3) AEP Texas' Third Source – USDAg Rural Utilities Service Data

AEP Texas' third source, which it advertises as "more current and inclusive"[463] is cost data from the U.S. Department of Agriculture Rural Utilities Service (RUS) division. The RUS data addresses rural water and sewer projects, which are certainly less complex than major transportation projects crossing hundreds of miles. Engineering for rural water and sewer lines are essentially a surveying exercise to lay lines along existing drainage features or roadways. Construction typically entails costs for trenching and pipe laying. Railroads, on the other hand, require a precise, complex geometric layout, extensive grading and roadbed preparation, sophisticated signaling and communications systems, bridges designed to carry heavy loads, buildings and complex fueling facilities and pose far more complex right-of-way issues.

AEP Texas further asserts, without support, that water and wastewater projects are as prone to unforeseen complexities as rail projects.[464] AEP Texas lists similarities between water and sewer projects and railroads as requiring aerial survey information and establishing a horizontal and vertical alignment and the calculation of cuts and fills. AEP Texas also asserts that complex designs for pumping stations, waste water and water treatment facilities, the crossing of rivers and other obstructions and the requirements for subsurface investigations for water and sewer projects render them closely parallel in complexity to railroad design projects.[465] AEP Texas offers no evidence beyond these anecdotal suggestions that the components of the basic engineering services for the types of rural water and sewer projects designed under the

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[463] AEP Texas Opening Nar. at III-F-105.

[464] AEP Texas Opening Nar. at III-F-105.

[465] AEP Texas Opening Nar. at III-F-105.

RUS are comparable to the design and construction of the rail line infrastructure and facilities for an over 1,168.38 mile railroad, or that the engineering for water and sewer projects is as or more complex than for railroad projects. In fact, as described in more detail below, the documents produced by AEP Texas suggest just the opposite.

AEP Texas first cites the Texas RUS engineering cost data and then contradicts its own evidence by asserting that basic services "[includes] preliminary study, topographic surveys, preliminary design, final design and construction observation]."[466] In fact, AEP Texas' workpapers and electronic workpapers clearly indicate that the Texas RUS documents call for the following services to be paid for separately because they are not included in basic services:

- Preliminary investigations, drawings and cost estimates
- Site surveys
- Laboratory tests, borings, geological, and soils studies
- Property surveys
- Detailed staking necessary for construction
- Resident inspection during construction.[467]

AEP Texas' assertion that "Colorado RUS sets a minimum fee of 5 percent for large projects,"[468] which they support with cryptic notes from a purported conversation with Colorado RUS indicating "min. 5% - max. 10%,"[469] stands in stark contrast to the e-mail the BNSF engineering witnesses received from the state RUS engineer in Colorado that states:

> Once again I will say that we at RD have no such curve …
> Engineering fees … are negotiated by the firms themselves with

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[466] AEP Texas Opening Nar. at III-F-106.

[467] AEP Texas Opening workpaper pp. 11701 to 11707 and Opening electronic workpapers "SW-16.jpg to– SW-19.jpg" all reproduced as BNSF.RP.WP.III .F-1472 to 1482.

[468] AEP Texas Opening Nar. at III-F-106.

[469] AEP.OP.WP.11708.

> the entity itself... I review each proposal on an individual basis and generally do not permit total fees, including construction inspection, administration and design to exceed 16% – 18% of total construction costs.[470]

AEP Texas' attempt to cast the TNR as somehow equivalent to a rural water and sewer project, while dubious at best, is made more suspect by AEP Texas' continual misrepresentation and misinterpretation of its own sources.

(4) AEP Texas' Fourth Source - Farmers Home Administration

Midway through its discussion of the RUS data, AEP Texas introduces yet another source that it ultimately relies upon for its argument - a purported Farmers Home Administration (FHmA) cost curve for Pennsylvania.[471] This is troubling for several reasons:

- While grouped in the workpapers with many pages of information from its other sources, the FmHA cost curve is a single sheet, of unknown origin, with no supporting explanation.

- The FHmA cost curve is specifically for Pennsylvania. The TNR does not touch any part of the Commonwealth of Pennsylvania. AEP Texas' first source is also a Pennsylvania-only recommended practice published by the Pennsylvania Society of Land Surveyors, the Pennsylvania Society of Professional Engineers and the American Consulting Engineers Councils of Pennsylvania and Greater Pittsburgh in 1975. Reliance on Pennsylvania practices have no bearing on the construction of a railroad in the Western part of the country.

Clearly, the single FHmA cost curve from which AEP Texas derives its 6.8 percent engineering costs is not supported by a careful review of AEP Texas' own documentation.

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[470] BNSF.RP.WP.III.F-1483.

[471] AEP Texas electronic workpapers "SW-15.jpg" reproduced at BNSF.RP.WP.III.F-1484.

(5) AEP Texas' Fifth Source – ASCE Manual 45

AEP Texas' fifth source consists of a combination of the 1975 and what appears to be the 1996 edition of the American Society of Civil Engineers (ASCE) *Manual 45: A Guide for the Engagement of Engineering Services.* The ASCE Manual is a more widely accepted source than the other sources cited by AEP Texas. Unfortunately, AEP Texas persists in its mischaracterization of this data as well. As with other sources, the ASCE Manual lists the phases of a project (*i.e.*, what needs to be done) and then classifies these services into "basic" services and "special" services. All "special" services are paid for outside the cost guidelines for "basic" services. AEP Texas attempts to lead the STB down the path of equating the list of phases of the project to a description of "basic" services. As described in more detail below, this is clearly contrary to what the ASCE Manual 45 says.

AEP Texas has included excerpts from the 1975 and the 1996 editions of ASCE Manual 45. While all editions of Manual 45 convey a consistent message relative to basic and special services, the BNSF engineering witnesses have included the 1981 edition in the workpapers because the 1981 edition was the last one to include "cost curves" for engineering services. (As explained in subsequent editions of Manual 45, ASCE has since abandoned the practice of publishing cost curves).

In assessing Manual 45, it is extremely important to read and understand the terminology being used to describe and classify the various engineering services required for a project. AEP Texas has confused this issue by failing to categorize properly the engineering services required for the TNR. A complete copy of this section of Manual 45 is included in the BNSF Reply workpapers.[472] This section of Manual 45 begins by indicating that "engineering service … can

[472] BNSF.RP.WP.III.F-1485 to 1492.

... be grouped into two broad categories: (1) Consultations, investigations and reports; and (2) Services for design-type projects." Manual 45 further explains that the second category, "engineering services for design-type projects are differentiated into two separate categories, *i.e.*, Basic Services and Special Services." Whereas AEP Texas has attempted to cast the listing of services in Manual 45 as indicative that they are included under basic services, it is clear that the listing in Manual 45 places services in three different categories:

Category	Basic or Special Services
Consultations, Investigations, Reports	Special
Design-type projects	Basic
Design-type projects	Special

Manual 45 clearly contradicts AEP Texas' continued assertion that most of the engineering costs required for the TNR are included in the percentages it cites.

(6) AEP Texas Omits Construction Management

AEP Texas maintains that the STB has erred by including construction management in its previous decisions. The need for construction management is clear when considering AEP Texas' assumptions about the proposed TNR construction. Although AEP Texas does not bother to even identify the construction railheads or geographic areas covered by the various construction packages it refers to in its narrative, it is clear from AEP Texas' description of its proposed construction schedule that the construction of the TNR will be segregated into a number of mini-projects. AEP Texas proposes eleven grading packages, eleven track packages, 25 bridge packages, 15 building packages and additional signal and communication and structural packages. AEP Texas explains that when the project is "about sixty percent through the design phase, the multiple grading and bridge packages are initiated with special focus on

access to critical sites and establishment of staging areas."[473] AEP Texas further asserts that, shortly thereafter, multiple bridge and structural contracts would start at their readily accessible locations.[474] Such an aggressive schedule imposes a heavy burden on construction management because overseeing, coordinating and inspecting construction on multiple simultaneous projects requires rigorous management. Thus, the construction management portion of engineering costs, which AEP Texas completely ignores, will inevitably be substantial.

AEP Texas' persistent insistence that the full range of engineering services required for the TNR are included in the cost curves it presents is simply not supported by its own evidence. Clearly, AEP Texas has not interpreted the sources from which it derives its TNR engineering additive correctly, nor has it established that many of its sources are representative of the TNR construction. Therefore, AEP Texas' arguments should be rejected by the STB.

b. BNSF's Development of Engineering Services

Based upon the activities required for a project of this magnitude, the BNSF engineering witnesses developed separate estimates for basic and special services from relevant authoritative industry publications for the planning, design, bid and construction phases of the project. In developing their estimate, the BNSF engineering witnesses take into consideration the construction schedule established by AEP Texas, the engineering tasks that would have to be undertaken, and the corresponding labor, expenses and equipment costs.

Adequate engineering services are essential to the success of a project of the magnitude, complexity and fast-track construction schedule as the TNR. All of the appropriate steps in the engineering process must be addressed, especially if the least cost construction option is going to

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[473] AEP Texas Opening Nar. at III-F-112.

[474] AEP Texas Opening Nar. at III-F-112.

be realized.

Applying this to the explicit listing of services contained in ASCE Manual 45[475] results in a classification of engineering services by phase of the project and as basic vs. special services as set forth in the following table.

Table III.F.10-1
Classification of Engineering Services by Planning Phase and Type

Phase	Basic Services	Special Services
Planning Studies	• <none>	• Feasibility Investigations • Cost Studies • Planning Studies
Design Phase	• Preliminary Design • Final Design • Specifications • Contract Documents	• Surveying • Geotechnical Investigations
Bid Phase	• Assistance to the Owner	• <none>
Construction Phase	• Office Consultation • Shop Drawings • Periodic Site Visits	• Construction Stakeout • Construction Management • Material Testing

Source: ASCE Manual 45.

The engineering services described below are the necessary steps in putting forth a plan that has reasonable levels of resources and reasonable estimates of the tasks required, as well as the appropriate duration and sequencing of tasks.

(1) Planning Studies – Special Services

In more recent times, much greater emphasis and work effort has been placed upon Planning Studies for transportation projects. The importance of adequate planning is widely

[475] BNSF.RP.WP.III.F-1486 to 1488.

recognized as a necessary and cost-effective expenditure within the transportation industry and the AREMA guidelines.[476]

The cost of performing Planning Studies can vary widely, depending upon the level of detail and number of options to be considered. The number of routes and analysis required to find the least cost option along the over 1,168.38 mile TNR is substantial. Several factors suggest the TNR costs for Planning Studies will be on the mid-to upper end of the range:

- The SARR is intended to be the least cost, most efficient option. To arrive at this option requires an extensive amount of study to consider the vast array of options available. Not only does the basic route itself have to be assessed, but also the resulting construction techniques and costs need to be assessed for each alternative route.

- The TNR is following existing routes. These routes reflect not only the original planning that went into the route, but also refinements that are the results of years of operational experience and "tinkering" with the layout of the railroad.

All of the information on the existing route came at a cost to the railroad in the form of alternative route studies, design and construction experience, operational adjustments, maintenance experience, analysis associated with acquisitions and just plain trial and error. This knowledge should not be a "free" starting point for the TNR.

Fortunately, the TNR will be able to employ more modern, cost effective techniques to evaluate these options than those available to the railroad or its predecessors. Aerial reconnaissance and computer modeling will be far cheaper than the field reconnaissance methods available to engineers when the lines were originally evaluated.

Means offers some guidance in the area of planning and feasibility studies. Means

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[476] BNSF.RP.WP.III.F-1493 to 1495.

indicates a range of 0.5 percent to 2.5 percent of total project cost for educational planning consultant services.[477] Because of the size and broad geographic scope of this project, the TNR warrants consideration of costs in the mid to upper level of this range. Nonetheless, the BNSF engineering witnesses have taken a conservative approach and used the low end of this range, which is 0.5 percent. Applying this 0.5 percent to the estimated cost of the TNR of $2.5 billion results in a cost of $12.3 million for the Planning Studies.[478]

Typically, planning for a multi-billion dollar project would stretch over years. While the TNR is allowed to assume this can be done within a limited time, that does not mean that it does not incur the costs for planning. It simply means that these services are assumed to be accelerated. The low end of the Means range is conservative and is used here to eliminate the effect of any planning costs that might be associated with regulatory, environmental or litigation matters that could be considered entry barriers.

(2) Design Phase / Bid Phase / Construction Phase – Basic Services

ASCE's 1981 Manual 45 contains a cost curve for basic services of 5.7 percent for projects of above average complexity.[479] While ordinary railroad track construction is generally characterizes as average complexity, the construction of an entire railroad system with 1,168.38 route miles is above average complexity because of the magnitude of the project, which involves construction of extensive facilities other than track laying, including fueling facilities, wastewater treatment plants, 474 bridges including several large bridges, office buildings, grade

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[477] BNSF.RP.WP.III.F-1496 to 1497.

[478] BNSF Reply electronic workpaper "III F TNR Construction.xls" worksheet "Total Cost" cell K141.

[479] BNSF.RP.WP.III.F-1498 to 1499.

separations, pumping stations and sewer systems at rail yards, an 1,168.38 mile communications and microwave system, and its fast track construction schedule. This is also consistent with the first source cited by AEP Texas that is a cost curve for projects of above average complexity.

Applying this 5.7 percent to the estimated cost of the TNR of $2.5 billion results in a cost of $140.7 million for the Basic Services for the Design, Bid and Construction Phases of the TNR.[480]

(3) Design Phase – Special Services

Special services required for the TNR during the Design Phase that are not included in the basic services described above include Surveying and Geotechnical Subsurface Investigations. The BNSF engineering witnesses employ a thorough, detailed analysis to arrive at the costs for these services for this particular project.

(a) Surveys

Location and design surveys are required to provide survey information on existing conditions upon which the design can be based. While dated, limited accuracy mapping may be sufficient for rural water and sewer projects and corresponding easements, more detailed surveys are clearly required for the complex geometric requirements of railroads and their corresponding right-of-way property purchases.

AEP Texas will have the advantage of using modern, lower cost aerial mapping techniques to obtain this information. This contrasts with the technology available to the railroad, at the time of original construction of the lines, which consisted of an extensive number of field survey crews working on the ground through rugged terrain.

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[480] BNSF Reply electronic workpaper "III F TNR Construction.xls" worksheet "Total Cost" cell K141.

The per acre unit cost for location and design surveys was developed using Means.[481] This unit cost was then applied to twice the total number of acres of right of way and easements to be acquired for the TNR. Use of twice the acreage is required to account for the need for survey information beyond the proposed right-of-way line to:

- account for the fact that airplanes fly in straight lines to obtain this information
- provide data for the design of access roads
- provide data to assess drainage features
- provide data so engineers can assess the implications of slight alignment shifts during the design process.

As detailed in the workpapers,[482] the total cost for location and design surveys for the TNR is $5.7 million.

(b) Geotechnical Subsurface Investigations.

Geotechnical Subsurface Investigations (*i.e.*, borings, sampling and testing) of existing conditions are required to provide adequate data upon which the design can be based. Sufficient up-front geotechnical investigations during the design phase are required to avoid subsequent construction schedule delays due to unknown foundation conditions being encountered and increased unit bid prices as contractors attempt to mitigate the risk of the unknown subsurface conditions.

AEP Texas claims to address the cost of geotechnical subsurface investigations by cobbling together a quote from a firm in Ohio, using a driller from Pennsylvania for an industrial development site. AEP Texas' analysis includes a nominal number of borings, of insufficient

[481] BNSF.RP.WP.III.F-1500 to 1501.

[482] BNSF Reply electronic workpaper "III F 10 Engineering.xls" worksheet "Survey."

depth for bridge sites only and totally omits borings at other key locations along the corridor as described below. Although AEP Texas purports to include testing costs in its estimate, its worksheet does not include these costs. Clearly, AEP Texas' attempt to use an easily accessible industrial site in the East is a poor indication of the cost required to conduct an adequate subsurface investigation program for an over 1,168.38 mile transportation corridor across undisturbed terrain.

Geotechnical Subsurface Investigations are conducted before the corridor has been cleared and graded, and are required in four primary areas:

1. Evaluation of foundation conditions at bridges ("Bridges")
2. Evaluation of slope stability in cuts ("Cut Slopes")
3. Evaluation of the suitability of excavated and borrow site material for use as embankment ("Embankment Material")
4. Evaluation of foundation conditions at culverts ("Culverts"),

The American Association of State Highway and Transportation Officials (AASHTO) is made up of representatives from state departments of transportation from across the country. AASHTO's 1988 Manual on Subsurface Investigations contains "Guidelines for Minimum Investigations" that state:

> Experienced geotechnical personnel in transportation agencies generally agree that about 0.7 to 1.0 percent of total construction costs should be allocated for an 'average-condition' project. For sites or alignments in areas which are underlain by poorer quality soil or rock units, or which may be impacted by geological constraints, an increased level of expenditure should be budgeted.[483]

The TNR passes through a wide range of difficult geological conditions. These

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[483] BNSF.RP.WP.III.F-1502 to 1504.

conditions clearly support a level of expenditure for geotechnical subsurface investigations toward the upper end of this range. Nonetheless, the BNSF engineering witnesses have taken a conservative approach and used the mid-point of this range, or 0.85 percent. Applying this 0.85 percent to the estimated cost of the TNR of $2.5 billion results in a cost of $21.0 million for the Geotechnical Subsurface Investigations.

To verify this cost, a second approach was utilized. This approach uses the unit costs for borings and testing contained in Means.[484] These unit costs were then applied to the total linear feet of borings and the total number of tests required for the TNR to develop a cost for the geotechnical subsurface investigation program.

The depth of borings required at the bridge sites is of particular importance. AEP Texas proposes a subsurface investigation program that is inconsistent with its proposed bridge design, engineering practice and the AREMA Guidelines. AEP Texas models its bridges on bridge designs and plans provided by BNSF in discovery that call for pile lengths ranging from 55 feet to 70 feet. AEP Texas' proposed subsurface investigation program is predicated on boring depths of only twenty feet. This is clearly inconsistent with the AREMA Guidelines which call for borings to extend at least ten feet below the bottom of the pile. [485] The BNSF engineering witnesses have conservatively used a pile length of 55 feet which requires a boring depth of 65 feet. Engineering practice and the AREMA Guidelines require boring depths over three times those used by AEP Texas.

As detailed in the workpapers,[486] the total cost for Geotechnical Subsurface

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[484] BNSF.RP.WP.III.F-1505 to 1509.

[485] BNSF.RP.WP.III.F-1510 to 1513.

[486] BNSF Reply electronic workpaper "III F 10 Engingeering.xls" worksheet "Geotech."

Investigations, using this second approach is $19.8 million.

Since the cost using the AASHTO criteria and the cost using the Means data are fairly close, the lower of these two numbers will be used and the total estimated cost of the Geotechnical Subsurface Investigations for the TNR is $19.8 million.

(4) Construction Phase – Special Services

Special services required for the TNR during the Construction Phase that are not included in the Basic Services described above include Construction Stakeout, Construction Management and Material Testing. AEP Texas purported to include all Construction Phase services in the 1.8 percent additive that is part of its overall 6.8 percent additive for engineering.[487] This approach significantly understates the costs required to adequately protect the Owner's interest during the construction of the TNR. The BNSF engineering witnesses employ a more thorough, detailed analysis to arrive at their costs.

(a) Construction Stakeout

Construction Stakeout is the means by which the information in the design and plans is transferred to the field so the project can be built. Either the Owner or the Contractor can hire the surveyors providing these services. Regardless of who hires the surveyors, these costs are incurred and must be incorporated into the cost estimate for the project.

The major elements of construction stakeout that will be required for the TNR are:

1. Staking construction access roads
2. Staking vegetation clearing limits
3. Staking the railway centerline
4. Slope staking in cut and fill areas
5. Staking the location of drainage structures

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[487] AEP Texas Opening Nar. at III-F-108 and 110.

6. Staking the location of bridge foundations
7. Re-staking the railway centerline after rough grading is complete
8. Setting finish grade stakes
9. Layout for bridge superstructures
10. Rail yard facilities layout
11. Layout for buildings
12. Layout for signal and communication systems
13. Track layout, including yards
14. As-built surveys

AEP Texas will have the advantage of using modern, lower cost electronic survey equipment to perform this task. This contrasts with the technology available to the railroads, at the time of original construction of the lines, which required extensive field survey crews working on the ground.

The unit cost, per day, for a construction stakeout survey crew was developed using Means.[488] This unit cost was then applied to the total number of survey crew-days required for the TNR to develop the cost for Construction Stakeout services.

As detailed in workpapers[489] the total cost for Construction Stakeout surveys for the TNR is $26.3 million.

(b) Construction Management

Construction of the TNR is truly a monumental undertaking that will require a professional staff to manage. Construction of over 1,168.38 miles of railroad with over 470 bridges, rail yards and rail facilities dwarfs any project in recent memory. Construction of such

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[488] BNSF.RP.WP.III.F-1514 to 1516.

[489] BNSF Reply electronic workpaper "III F 10 Engineering.xls" worksheet "Stakeout."

"mega projects" requires far greater oversight and management – a fact that is drawing increasing attention in the industry and Congress.[490] The staff and systems this requires are costly.

A vast array of suppliers, contractors, subcontractors and work crews must be choreographed to execute literally hundreds of smaller, individual projects in order to complete the TNR within its 27-month schedule. Any unexpected problem in the process will cost the TNR dearly in terms of both time and money. Thus, in order to construct a least cost railroad on an accelerated schedule with a very small allowance for contingencies, AEP Texas must account for adequate resources to manage the project during construction.

The BNSF engineering witnesses utilize three sources to develop a cost estimate for Construction Management. The first source is Means, which the STB has looked to in some previous cases for data on construction management fees.[491] The Means data indicate that construction management fees for building projects range from 2.50 percent to 4.00 percent.[492] In *FMC*, the STB used the average of this range, which is 3.25 percent.[493] However, there is evidence that using this midpoint understates the cost of construction management services because

- The Means data cited applies to building projects. Unfortunately, Means does not contain information for construction administration costs for transportation projects, such as the TNR. However, by using the BNSF engineering witnesses' second source

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[490] BNSF.RP.WP.III.F-1517.

[491] *FMC,* Appendix C, Article K.2 at 146. In *PPL,* the STB used the low end of the *Means* range, which is inappropriate for the reasons stated in this section.

[492] BNSF.RP.WP.III.F-1518 to 1519.

[493] *FMC* at 146.

(see below) this data can be correlated to transportation projects.

- The Means data is for a $5 million project. As previously discussed, construction management complexities, and costs, increase for "mega projects" such as the TNR.

Second, the BNSF engineering witnesses have considered a recent 2000 survey by the Construction Management Association of America (CMAA).[494] This survey indicates that construction management costs for transportation projects are higher than the 3.25 percent average cost indicated in the Means data for buildings. The CMAA survey supports the following construction management costs:

Overall average	4.6%
Private Sector average	4.8%
Transportation Projects average	6.6%
New Transportation Projects average	4.3%

The BNSF engineering witnesses adopt a conservative approach and use the 4.3 percent average cost for new transportation projects.

Fortunately, the CMAA survey cited above also provides data on building projects. This allows this CMAA data to be compared to the Means data to assess the legitimacy of using the CMAA data for transportation projects. The data in the CMAA study for a variety of building types indicates an average cost for construction administration for new building construction of 3.22 percent.[495] This compares favorably with the Means average of 3.25 percent for building projects. Since the CMAA data for buildings matches the Means data for buildings, it is reasonable to use the CMAA data (*i.e.*, 4.3 percent) for transportation projects. Applying this 4.3 percent to the estimated cost of the TNR of $2.5 billion results in a cost of $106.2 million for

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[494] BNSF.RP.WP.III.F-1520 to 1523.

[495] BNSF.RP.WP.III.F-1524 to 1531.

Construction Management for the TNR.

Finally, the BNSF engineering witnesses have undertaken a detailed estimate of the effort and costs required to adequately provide construction management services for the TNR project. This analysis takes into account the field and office staff and expenses that will be required to schedule and manage a construction workforce that will include:

1. Management of the overall construction project and the individual construction segments. This includes:
    a. Construction contract administration
    b. Materials management
    c. Scheduling
    d. Coordination of construction stakeout and material testing
2. Management, oversight and resolution of problems of construction activities in each of the specialized areas of construction:
    a. Clearing, grading, drainage and culverts
    b. Bridges
    c. Trackwork
    d. Yards and facilities
    e. Signals and communications

The construction management staff requirements are a function of the volume of work being performed and the construction schedule. AEP Texas has provided little guidance on their intent for organizing the construction, other than general indications that the TNR is divided into construction segments or contract packages (*e.g.*, grading and drainage, bridge construction, trackwork, and communications and signals).

The BNSF engineering witnesses used 50 miles (which results in approximately 23 construction segments) as a reasonable length for a construction segment for the following reasons:

- During the initial phases of construction, when access is via

temporary roads or circuitous detour routes, twenty five miles (*i.e.*, half of the 50 miles) is a reasonable one-hour drive for construction management personnel to access any place along the segment from the field office.

- The construction cost of each segment will be approximately $110 million, which is a large, but manageable size.

- Approximately 470 bridges along approximately twenty-three 50-mile segments results in approximately 21 bridges per construction segment, which is a reasonable number for a senior engineer, with appropriate support staff, to handle over the 14-month construction period.

The unit costs for the staff and expenses were developed using the Means[496] and PSMJ[497] data. PSMJ was used because Means lacks data on hourly rates for the engineering staff required for construction management. The *Professional Service Management Journal* (PSMJ) provides management services and publication to the Architectural and Engineering (A/E) communities. The data used is from their 2002 (17th edition) *A/E Fees and Pricing Survey*. These unit costs were then applied to the effort required for the TNR to develop the cost for Construction Management.

As detailed in workpapers,[498] the total cost for Construction Management for the TNR is $136.1 million.

Since the cost using the CMAA data and the detailed estimate using the Means and PSMJ data are similar, the CMAA data is used because the Board has expressed its preference for use

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[496] BNSF.RP.WP.III.F-1532 to 1534.

[497] BNSF.RP.WP.III.F-1535 to 1538.

[498] BNSF Reply electronic workpaper "III F 10 Engineering.xls" worksheet "Cons Mgmt."

of neutral percentages and it has accepted the CMAA percentage in *Duke* and *CP&L.*[499] The total estimated cost of the Construction Management for the TNR is $106.2 million.

(c) Material Testing During Construction

As with all major construction projects, the quality of the material used in the TNR must be verified and monitored. This is accomplished by a team of field technicians conducting a variety of tests on the material as construction progresses. These tests range from compaction tests of the earth fill and subgrade to concrete strength tests to inspection and verification of materials provided by fabrications shops. These services may be provided by the Contractor as part of a Quality Control program or by an independent firm hired by the TNR. Regardless, the testing costs are incurred and must be accounted for in the cost of the project.

The BNSF engineering witnesses' approach uses the unit costs for material testing technicians contained in Means.[500] Alternatively, Means provides costs for each of the multitude of tests that will be required. Since these per-test costs would yield significantly higher costs, the BNSF engineering witnesses chose the more conservative approach of using the per-staff cost. While this understates the cost of material testing because it doesn't include the cost of testing equipment and supplies, it is more indicative of how the work would actually be carried out on a project the size of the TNR.

This unit cost was then applied to the total number of days required for the TNR to develop the cost for Material Testing services.

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[499] *Duke/NS* at 125; *Duke/CSX* at 108; and *CP&L* at 108.

[500] BNSF.RP.WP.III.F-1539 to 1542.

As detailed in the workpapers,[501] the total cost for material testing during construction for the TNR is $49.0 million.

c. Summary

Table III.F.10-2 summarizes the engineering costs for the TNR:

Table III.F.10-2
SUMMARY OF ENGINEERING COSTS

Item	Cost
Planning Studies	12.3
Basic Services (Design, Bid, Construction)	140.7
Surveys	5.7
Geotechnical Subsurface Investigations	19.8
Construction Stakeout	26.3
Construction Management	106.2
Material Testing	49.0
TOTAL	**360.0**

These costs represent a conservative estimate of the engineering effort that would be required for the TNR to complete construction, particularly given the aggressive schedule that AEP Texas has proposed. These costs equate to 14.6 percent of the BNSF total costs of $2.5 billion, excluding land.

11. Contingencies

Relying on the Board's decisions in past SAC cases, AEP Texas has included in its construction cost estimate for the TNR a contingency factor of ten (10%) percent of total construction costs, excluding land.

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[501] BNSF Reply electronic workpaper "III F 10 Engineering.xls" worksheet "Matl Testing."

In the experience of BNSF engineering witnesses, contingency factors in excess of ten (10%) percent are not uncommon at the *final* design level of a project of this magnitude, and are substantially higher during the initial planning stages. As planning and design work progress, the project cost estimates become more site specific and precise, and contingencies are reduced accordingly.

As BNSF witness Mr. Baughman demonstrated in Table III.F.10-1, supra, there are distinct phases of project planning and engineering:

- the Planning Studies Phase,
- the Design Phase,
- the Bid Phase and
- the Construction Phase.

Each of these phases requires a different level of contingency, so it is important to characterize the cost estimate properly in order to determine the proper contingency level. The TNR cost estimate in this case is one that reflects a project in the rudimentary planning stages. It basically is an estimate of costs based on preliminary research into possible material suppliers, unit costs, design specifications, and a very sketchy outline of the tasks that would be involved in bringing the project to completion. All of AEP Texas' estimates are of the type that normally are prepared prior to the development of the detailed designs and specifications that would be used to obtain construction bids or to obtain financing. This is borne out throughout AEP Texas' supporting documentation. For example, as discussed in Section III.F.7.b, AEP Texas has acknowledged in response to workpaper requests that it had prepared no schematics or designs for its fueling facilities. Its locomotive repair facility is based on an RS Means cost for an airplane hangar without any thought to functional design for a working rail facility and its buildings costs are based on square foot costs without consideration of basic additives for

elevators, fire alarms, and other functional requirements. AEP Texas has no drawings, schematics or designs for the more than 460 bridges on the TNR route, but merely estimates its bridge costs based on model bridge components based on average span lengths and average pier sizes, as discussed in Section III.F.5. As discussed in Sections III.F.3 and III.F.6, the TNR track, signal and communications materials costs are based on telephone conversations with suppliers, who provide ball park estimates without recourse to design documents or specifications, and in some instances on information obtained from catalog or internet sources. Thus, the cost estimates for the TNR, like those for all SARRs in SAC cases, reflect those of a project in the conceptual planning phase.

There are several well-established and well-recognized authorities in the engineering and design field that discuss the relationship between the level of planning and the appropriate contingency. These sources support contingencies that decline from *a minimum* of twenty (20%) percent at the conceptual planning phase to ten to twenty (10-20%) percent as preliminary design progresses and to ten (10%) percent during the final design phase.

For example, BNSF witness William J. Rennicke of Mercer Management Consulting, Inc. noted in Mercer's "Commercial Analysis of AEP Texas Construction Schedule and Costs" BNSF Reply Exh. III.F-4, that the U.S. Department of Transportation's (DOT) Federal Transit Administration (FTA) has established specific guidelines that reflect this relationship.[502] The FTA table setting forth the guidelines is reproduced below. As the table shows, as a project progresses, the "probable accuracy" of the estimates rises, allowing a reduction in the contingency. By FTA standards, a contingency range of five to fifteen (5-15%) percent is appropriate only when a project reaches the "definitive" stage in which design is 75-100 percent

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[502] BNSF Reply Exh. III.F-4 at 9.

complete and detailed plans and specifications, as well as a working construction schedule, have been prepared. At this point, the "probable accuracy" of the cost estimates also falls within the five to fifteen percent range.[503]

Table III.F.11-1
FTA Recommended Contingency by Estimating Stage

Table A-1. Recommended Contingency by Estimating Stage

ESTIMATE STAGE	PROBABLE ACCURACY	DESIGN STAGE	PURPOSE	INFORMATION AVAILABLE	ESTIMATE METHODS	CONTINGENCY GUIDELINE
ORDER OF MAGNITUDE (CONCEPTUAL)	50% - 30%	Preliminary	Evaluation of projects or alternatives	100-scale alignment, facility descriptions, sketches, study reports	Parametric - Cost of a similar facility is adjusted to represent the new facility. Includes costing by SF, LF, or CF. Model - A typical design is used to develop quantities and costs for elements.	20% or higher
PRELIMINARY (BUDGET)	15% - 30%	Preliminary Design Report (25%)	Establish Control Budget	40-scale alignment, facility descriptions, sketches, study reports, cross sections, profiles, elevations, geotechnical data, staging plans, schedule, definition of temporary work	Quantity development of major commodities, pricing by database, manuals, quotes, bid results, or experience which may be adjusted for the conditions of the specific package. Rough estimates or allowances developed for immeasurable items.	10% - 20%
DEFINITIVE	15% - 5%	75% to 100% complete	Detailed Control Budget, Cost Control, and Reporting	Progress Plans and Specifications, working construction schedule	Takeoff of quantities from plans, representative pricing by database, manuals, quotes, bid results, or experience adjusted for the conditions of the specific package. Crewed approach to labor and equipment, percent approach to general conditions, overhead and profit, contingency, and escalation. Some allowances carried for immeasurable items.	5% - 15%
DETAILED (ENGINEER'S ESTIMATE)	±5%	PS&E	Check Estimate for Bids, Commit Funds	Complete Plans and Specifications for Bidding, Detailed Construction Schedule, Contract Terms and Conditions	Detailed takeoff of all measurable items, detailed review of specifications, detailed pricing including price quotes, crewed approach to labor and equipment, detailed estimate of general conditions, overhead & profit, and escalation. Consideration of construction schedule, work restrictions, shift requirements, and risk.	0% - 10%

[503] *Id.* at 10.

For projects at the initial "order of magnitude" or "conceptual" stage, the appropriate contingency rate is 20 percent or even higher. Even for this level of contingency, the FTA expects that a project sponsor would have "100-scale alignment, facility descriptions, sketches, [and] study reports" available to it, as well as a "cost of a similar facility" on which to base cost estimates for the new facility. The guidelines also assume that a "typical design is used to develop quantities and costs for elements."

A 100-scale alignment means that the plans are prepared at a scale of 1" = 100 ft. AEP Texas has no plans at this stage, and has not developed any mapping at this level. Although parties in SAC cases do use track charts, the track charts are not comparable to a "plan." Track charts are schematic representations of the track with useful physical and operational information compiled on them. In contrast, plans show detailed engineering information required to construct the railroad. AEP Texas is basing their "design" of the TNR off track charts which have an approximate scale of 1" = 2,800 feet and serve a totally different purpose than engineering plans.

The "preliminary (budget)" stage of development under the FTA guidelines requires a ten to twenty (10-20%) percent contingency. At that level, project sponsors are expected to have information available from a 40-scale alignment and in addition to facility descriptions, sketches, and study reports, information from "cross sections, profiles, elevations, geotechnical data, staging plans, schedule and definition of temporary work." It is also expected that at this stage at least 25 percent of the detailed plans are complete. The contingency rate assigned is based on the level of probable accuracy (15-30 percent) of the quantities and costs developed.

Other industry sources also provide guidance concerning the relationship of a contingency rate to the level of planning that is consistent with the FTA standards. RS Means

identifies a potential range of 20 percent to 3 percent, depending upon the stage of project development as follows:

Contingency for estimate at conceptual stage	20%
Schematic stage	15%
Preliminary working drawings stage (Design Dev.)	10%
Final working drawings stage	3%.[504]

The 1994 U.S. Army Corp of Engineers' policy for contingencies (Appendix D at page D-9) provides a "reasonable guide" for assigning contingency factors for projects with an estimated total construction cost of more than $10 million that, although using different terminology, follows the same concept as the preceding authorities. It recommends assigning contingencies as follows:

Reconnaissance/Feasibility	20%
Project/Feature Design	15%
Plans and Specifications	10%.[505]

AEP Texas' few sketches of buildings and facilities do not equate to plans or even design schematics drawn to scale and reflecting engineering details,[506] and they certainly are not working drawings -- no engineer, architect or contractor could possibly begin work based on such meager sketches.[507]

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[504] BNSF.RP.WP.III.F-1544 to 1545.

[505] BNSF.RP.WP.III.F-1546 to 1547.

[506] AEP Texas Opening workpaper pp. 11507 to 11530; BNSF Reply Nar. at Section III.F.7.

[507] For example, BNSF witness Mr. Primm prepared the conceptual design and oversaw the preparation of the functional design of the Hinkle Locomotive Shop in Hermiston, Oregon.

The TNR clearly has not advanced to the design phase because none of the design phase documents exist. There are no surveys, geotechnical investigations, detailed engineering drawings, specifications or contract documents. Although AEP Texas contends that they "have obtained actual construction and material bids for the construction,"[508] telephone responses based upon a verbal description of very limited and incomplete information is in no way comparable to a bonded bid price based upon the hundreds of sheets of detailed drawings and thousands of pages of detailed specifications that ultimately would be required for the TNR project. AEP Texas has done nothing more than what a prudent engineer would do to produce a preliminary cost estimate at the earliest stages of a project design.

Because the TNR project is in the conceptual planning phase, it must be assigned a contingency factor that is appropriate for a project in the early stages of development. Based upon industry practice and the industry sources described above, BNSF witness Baughman has concluded that the contingencies for this stage of planning should be set at a minimum of 20 percent.

BNSF also asked Mercer Management Consulting, Inc. to consider the adequacy of a 10 percent contingency factor from the perspective of a real-world commercial and financial analyst assessing the likelihood of success of the project as presented by AEP Texas. According to Mr. William J. Rennicke, a Managing Director of Mercer Management's Travel and Transportation

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The design drawings consist of thousands of pages of detail, which is in sharp contrast to the simple sketches used in SAC cases. As Mr. Primm points out in Section III.F.7, AEP Texas did not even prepare preliminary conceptual designs for its facilities.

[508] AEP Texas Nar. at III-F-100.

Group, "Accepted construction industry practice dictates that contingency rates are lowered only as a construction plan develops through stages of increasing specificity." [509]

Mr. Rennicke confirms that contingencies applied in the conceptual planning and the early design phases of a project are set much higher than at later points in the construction schedule to account for the risk of uncertainty at the preliminary design level. He notes in particular the inadequacy of AEP Texas' planning with respect to the construction schedule.

As discussed in Mr. Rennicke's report and in Section III.F.12, infra, AEP Texas' proposed construction schedule is devoid of any real description of the tasks associated with each construction stage, ignores the logical sequencing of tasks, and exhibits a lack of understanding of the linkage between its aggressive schedule and the resources needed to meet that schedule. In fact, Mr. Rennicke concludes that the level of planning in AEP Texas' schedule would likely justify a contingency of 30 to 35 percent.

> AEP Texas's proposal -- based upon a construction schedule so lacking in detail that it includes fewer than 20 discrete elements -- fails to meet even the rudimentary requirements for a "conceptual plan." Under even the most generous interpretation of FTA standards, the AEP Texas plan does not qualify for even a 20% contingency. Given that AEP Texas's plan is based upon literally hundreds of extremely optimistic assumptions, contains minimal detail, and relies on inappropriate or unsupported comparisons, I would expect the U.S. DOT-FTA, supported by the construction and financial communities, would insist on a contingency of 30-35% or even higher.[510]

Mr. Rennicke points out that the necessity of linking the stage of project planning with the contingency level is demonstrated by real-world experience with large construction projects. As Mr. Rennicke demonstrates, a subset of rail infrastructure projects from a study of 258

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[509] BNSF Reply Exh. III.F-4 at 9.

[510] *Id.* at 10.

worldwide transportation projects shows that only one in four projects were completed within 20 percent of the planned costs.[511] Of U.S. rail projects, only one of the ten projects reviewed was completed within ten percent of the originally estimated cost and the average cost overrun was 50 percent.[512] None of the ten projects was completed within the original time frame; schedule overruns ranged from 17 percent to 100 percent, with the average at 65 percent.[513]

Mr. Rennicke's report cites other large construction projects including joint construction of a line in the Powder River Basin, the Alameda Corridor, and the Syncrude Canada project where cost and schedule overruns have been substantial.[514] These data are even more compelling when considering that these comparisons are based upon budgets established at the end of the design phase. The likelihood that a project such as the TNR, which is in the conceptual planning phase, could meet a ten percent contingency is even more remote.

The justification for a 20 percent or higher contingency is further supported by AEP Texas' approach to construction scheduling and cost estimation. Mr. Rennicke's analysis of the planning details of the AEP Texas construction schedule demonstrates that the risk associated with AEP Texas' proposed TNR construction plan is extremely high because AEP Texas relies repeatedly on the most optimistic assumptions for its construction schedule activities, has failed to include key functions, and has proposed a sequencing of construction activities that ignores physical and staging constraints. While these items are discussed in greater detail in Section III.F.12, even a sampling of AEP Texas' scheduling errors emphasizes the need to apply a high

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[511] BNSF Reply Exh. III.F-4 at 12 and 13 (Fig. II-1).

[512] *Id.* at 13 and 14 (Fig. II-2).

[513] *Id.* at 15 (Fig. II-3).

[514] *Id.* at 15-18 and Figs. II-4, II-5 and II-6.

contingency. For example, AEP Texas assumes it can construct the railroad at a rate of 120 miles per month, whereas major railroad construction projects over the last 30 years have averaged only a tiny fraction of that rate.[515] This is just one example of its extremely short durations. In addition, AEP Texas has provided no time for pre-construction organization, planning and procurement activities that could add at least a year to its construction schedule. AEP Texas has also proposed simultaneously to commence projects that must be sequenced, such as proposing to commence bridge design at the same time it commences establishing its alignment (and 90 days before it gains ownership access to bridge sites in order to perform the geotechnical investigations necessary for bridge design.) As a result, each individual activity within its plan has a high risk factor. The cumulative effect of these high risk factors translates to no possibility that the project will be completed on time and at the costs anticipated by AEP Texas.[516]

Mr. Rennicke found nothing in AEP Texas' proposal to indicate that AEP recognizes the relationship between its aggressive schedule and the amount of construction resources required to meet the proposed schedule. AEP Texas has not increased its cost and resource estimates to match its accelerated schedule. In fact, AEP Texas' estimates of the overall total cost to construct the TNR are inconsistent with the actual experience of a wide range of rail construction projects.

AEP Texas' projections of total construction cost per mile are substantially lower than those found on similar railroad construction projects and lower than BNSF's own experience. Mr. Rennicke compared AEP Texas' proposed cost per track mile for the TNR ($1.5 million)

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[515] *Id.* at 19.

[516] *Id.* at 19-20 and 36 (Fig. III-3).

with that of actual construction costs for lines already completed or proposed by BNSF and other Class I railroads. Based on STB documents, Mr. Rennicke derived a cost per track mile of $6.0 million for the PRB joint line segment construction (in 2000 dollars). He also reviewed BNSF AFEs that BNSF produced to AEP Texas in discovery. Those AFEs were for recent BNSF line extensions and they yielded costs/track mile of $2.4 million, $3.6 million and $2.5 million (in 2000 dollars). International experience confirms Mr. Rennicke's view that AEP Texas' construction cost estimate is unrealistically low. In Australia, a country that closely parallels U.S. track and operating standards, the lowest bid to construct a new 60-mile narrow gauge coal railway in Central Queensland in 2003 was in excess of US$2.5 million per track mile in nominal dollars.[517] Mr Rennicke concluded that AEP Texas' total construction cost estimate yields a cost per track mile that has no basis in reality or, at best, is at the very extreme level of optimism.[518]

Mr. Rennicke's ultimate conclusions are that the level of detail underlying AEP Texas' schedule places this project in the conceptual planning stage and that the low level of planning would justify a contingency rate of "20 percent or higher" under the FTA and other authority standards discussed above. The low level of planning combined with the high risks associated with AEP Texas' overly optimistic projections of duration and costs in the real world would dictate a contingency rate of at least 30 to 35 percent.

For the reasons stated above, BNSF Engineering Consultants have included in their restatement of construction costs a contingency allowance of 20 percent -- which is the *minimum*

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[517] *Id.* at 40 and 43 (Fig. IV-2).

[518] *Id.* at 42.

level recommended under the authorities cited and extremely conservative from the viewpoint of a realistic commercial assessment of the AEP Texas evidence.

Although the Board in recent SAC cases has consistently applied a ten percent contingency factor, BNSF believes that it has done so in error without taking into consideration the proper characterization of the planning stage reflected in the evidence presented in SAC cases.

In *FMC*, the Board rejected UP's argument that the cost estimate in a SAC case reflects the early planning stages of the SARR project. Specifically, the Board disallowed a higher contingency fund to cover "changes between initial planning and final design" on grounds that "the SAC analysis includes funds for all aspects of design and planning."[519] This is wrong. The fact that the complainant provides *funds* for engineering in its cost estimate has no bearing on the level of accuracy of the construction cost actually presented in its SAC estimate. At the time the SAC evidence is presented, the engineering funds have not yet been expended so there are no final designs or detailed specifications underlying the construction cost estimate. It is simply a preliminary estimate.

The Board in *FMC* also held that UP had provided "no evidence showing that large-scale railroad projects require contingency percentages in excess of those shown in Means." The Board's decision in *FMC* as to the quality of the evidence presented in that case should not be the basis for an assumption that the cost estimates in a SAC case reflect a later planning stage. Nor should it be grounds to perpetuate a ten percent contingency. The evidence in this case supports a conclusion that AEP Texas' construction cost estimates reflect a project in the very early planning stage and further shows that several well-established authorities -- including

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[519] *FMC* at 147.

Means -- recommend that a contingency factor commensurate with that level of planning is 20 percent or higher. The evidence further shows that large-scale railroad projects do in fact require substantial contingency factors in light of the extremely large cost and time overruns experienced on real-world heavy rail projects. Thus a 20 percent contingency factor in this case is well-supported by current evidence in the record, respected authorities, and real-world experience.

Complainants have in prior cases attempted to persuade the Board that the estimates prepared in their SAC presentations are more than estimates because of the alleged "wealth of information available about the incumbent." The Board appropriately rejected that argument in *FMC,* citing its earlier decision in *McCarty Farms* that "it is inappropriate to assume that uncertainty would be removed because the hypothetical carrier would follow the route of the [incumbent, because the incumbent] enjoyed no such advantage."[520]

BNSF agrees that complainants in SAC cases should not be given a lower than normal contingency factor simply because they are reconstructing an already existing railroad. Contingencies are a normal part of construction projects and provide funds for the *unknown* events that typically occur during the construction of a project. But more important, just because the proponents of a SARR are building the same route as the existing route of the incumbent does not mean that the quantities and costs of materials and labor required for the project are already accurately identified. Even where there are records that purport to give actual quantities of items (such as the ICC Engineering Reports) or actual costs (such as recent AFEs for certain projects), these sources are not precise representations of the design and requirements

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[520] *McCarty Farms* at 52. (1997)

of the SARR. They are rather what the FTA standards refer to as parametric -- similar facilities used in the "order of magnitude/conceptual" stage.

For example, quantities of earthwork in the Engineering Reports are based to some extent on assumptions, contain quantities for entire valuation sections rather than just the lines being replicated, were prepared years after the actual construction took place, and rely on the record keeping practices (good or bad) of the railroads in years long before the advent of data management technology. In addition, parties in SAC cases often use alignments that have changed over the years, cost estimates based on the construction of other rail lines, the Board's acceptance of costs in other cases with substantially different circumstances, or costs based on telephone conversations with suppliers. They use average model bridge components to estimate bridge costs and rely on off-the-shelf microwave system components, "square foot" estimates for buildings, and rough footprints with no functional design for major rail facilities. These sources provide no guarantee that the cost and quantity estimates for those items are accurate assessments of the requirements of the proposed SARR.

Finally, the Board should recognize that it is standard engineering practice to link contingency and the aggressiveness of project schedule and cost projections. The Board has ruled that complainants have the opportunity to propose the shortest practical schedule and lowest practical construction cost. In so doing the Board should recognize that proposing the least cost option of necessity entails increasing the risk that the proposal is not feasible. Increasing the contingency to industry-recognized levels is an appropriate process to address these risks.

Because Board decisions in one case set precedents for future cases, it is important to reexamine from time to time the initial basis upon which the precedent was established to ensure

that an erroneous decision or faulty premise is not perpetuated merely for the sake of "precedent." The costs accepted by the Board in SAC cases should reflect the realities of the present day construction of the SARR. In today's world, large-scale rail transportation projects based on models and preliminary cost estimates such as those presented by AEP Texas for the TNR require high contingency rates of 20 percent and higher -- in many instances even up to two or three times higher. As Mr. Rennicke's study demonstrates, BNSF's inclusion of a 20 percent contingency factor is extremely conservative.

12. Schedule

a. Critical Flaws in AEP Texas' Construction Schedule Render It Infeasible

As part of its study of the overall feasibility of AEP Texas' estimates for the construction of the TNR, Mercer Management reviewed AEP Texas' proposed construction schedule and found it critically flawed. As Mr. Rennicke points out, the true test of feasibility is whether AEP Texas' overall construction schedule can be accomplished.[521] Mr. Rennicke concluded that while individual minor tasks conceivably could be completed within AEP Texas' aggressive timeline, "taken together it is virtually impossible that every task could be completed at that level."[522]

Mr. Rennicke addresses five critical flaws in AEP Texas' schedule: 1) the schedule does not identify all of the necessary activities; 2) it ignores the required sequencing of tasks; 3) projected durations for individual tasks are unreasonable; 4) it does not identify key construction realities; and 5) it makes no allowance for typical delays. Each of these flaws is discussed below.

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[521] BNSF Reply Exh. III.F-4 at 19.

[522] *Id.* at 19-20.

(1) Failure to Identify Necessary Activities

Mr. Rennicke describes AEP Texas' construction schedule as a "black box" that does not identify all of the necessary activities for individual tasks and clearly not for the entire project. In fact, it does not even properly identify the longest project, which is the basis upon which AEP Texas developed the TNR construction schedule. AEP Texas identified the 16-foot high Prairie Dog Fork Bridge as its longest project and estimated that it would take 14 months to construct. AEP Texas overlooked completely the 114-foot high Canadian River Bridge (Bridge 19.3) on the Boise City subdivision (not to be confused with Bridge 412.1 of the same name near Purcell, Oklahoma, which is much smaller and less complex). The Canadian River Bridge is much more complex than the Prairie Dog Fork Bridge because of its height and structure. Mercer Management developed a schedule for the Canadian River Bridge that incorporates more than 95 discrete and linked activities -- none of which is identified in AEP Texas' superficial schedule for the Prairie Dog Fork Bridge. In fact, the entire AEP Texas schedule for the TNR identifies only 16 activities.[523]

AEP Texas makes no mention or provision for essential work steps required prior to the surveying work that AEP Texas starts on Day 0. These include building and organizing the construction management team, completing legal documents, establishing procedures, developing procurement and contracting strategies, and contract negotiation and award. None of these represents an "entry barrier" and thus there is no reason they should be excluded. The potential impact of including these activities is a revised schedule of 42-48 months instead of the 30 months proposed by AEP Texas.[524]

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[523] *Id.* at 22-23.

[524] *Id.* at 22-25.

(2) Failure to Properly Sequence Tasks

AEP Texas ignored the required sequencing of individual construction tasks, making the overall schedule impossibly compressed. For example, AEP Texas proposes simultaneously to establish alignment and grades and right of way. It also proposes to design track layout and bridges, all starting on the same day, despite the fact that grading design and bridge design cannot commence until the ROW has been established and the property acquired. A bridge cannot be designed without first knowing the exact location and the composition of the material that must support it. Land acquisition also must start before surveying is allowed to proceed on the land. These and other examples in Mr. Rennicke's testimony show that AEP Texas has omitted the details of virtually all considerations of these fundamental and logical relationships between activities. He concludes that correcting the illogical sequencing would push the schedule out at least another ten months, bringing the revised schedule to 52-58 months (including the additional time required for "pre-Day 0" activities).[525]

(3) Failure to Propose Reasonable Durations for Individual Activities

Many of AEP's projected durations for individual activities are unreasonable. For example, the actual field work of surveying cannot be accomplished in the 90 days allowed by AEP Texas, but would more likely take an additional six months. Similarly, it is infeasible to complete the bidding and contracting for all of the work on the TNR within the two months allocated by AEP Texas. Bridge construction, which AEP Texas assumed to be 14 months, will be considerably longer. The construction of the Canadian River Bridge, which is more than 100 feet high and sits on massive concrete caissons and bridge piers, would require a duration of 25.8 months. The revised schedule taking into account the additional 12 months for the construction

[525] *Id.* at 25-27.

of the Canadian River Bridge, along with the corrections previously identified, is 64-70 months.[526]

(4) Failure to Account for Key Construction Realities

AEP Texas does not identify or account for key construction realities. Even excluding "entry barrier" challenges (which Mercer took into account in its analysis), AEP Texas must still propose a plan that takes logistics into consideration. For example, AEP Texas provides no insight into how it intends to transport 1,440-foot lengths of continuous welded rail from its limited rail junctions to its multiple job sites. AEP Texas also built its construction plan around a right-of-way width that is inconsistent with its selection of equipment in that it does not provide adequate turning space for key equipment. The limited turning space would significantly undercut the productivity of the machines. Correction of these oversights in addition to the preceding would result in increasing the schedule even above the 64-70 months.[527]

(5) Failure to Make Allowance For Expected Delays

AEP Texas has made no allowance for the types of expected delays that a project of this size and complexity inevitably will encounter. For example, standard construction management suggests that, at a minimum, AEP Texas should consider the inevitable risk of delay caused by scope changes, weather delays, equipment malfunctions, unforeseen geological problems, rework and failures during operation testing. Routine delays of this type are universally experienced on large-scale construction projects. The risk of delay, although not quantifiable,

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[526] *Id.* at 27-29.

[527] *Id.* at 29-30.

would push the schedule well past the 64-70 months required to account for the other deficiencies in AEP Texas' schedule.[528]

As a result of this analysis, Mr. Rennicke concluded that because of the many deficiencies in AEP Texas' plan, AEP Texas' overall start-to-finish construction schedule is neither reasonable nor feasible.[529]

b. Monte Carlo Risk Analysis Reveals the Unacceptably Low Probability That AEP Texas' Proposed Schedule Can Be Achieved

Mr. Rennicke applied a Monte Carlo simulation -- a commonly used project planning technique -- to assess the impact of risk in AEP Texas' construction schedule. To perform this analysis, he worked directly from AEP Texas' schedule, making no adjustments for Pre-Day 0 activities or the selection of the wrong "longest task," but adjusting the schedule to sequence properly the tasks as shown in Attachment II-2 to BNSF Reply Exh. III.F-4. Specifically, a probability distribution was applied to each of AEP Texas' activities. A Monte Carlo simulation was then performed to determine the probability that construction could be completed on any specific date. The outcome of the Monte Carlo simulation presented in Figure III-3 of the Mercer Report demonstrates the impact of simply properly sequencing the work activities and applying a time distribution around the duration times proposed by AEP Texas. Even ignoring all other issues, the probability that AEP Texas' proposed completion date could be met is

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[528] *Id.* at 30-31.

[529] *Id.* at 32.

virtually zero. Mr. Rennicke concludes that the construction and financial communities would dismiss the entire project as "infeasible."[530]

Mercer Management's Report shows the inadequacy of AEP Texas' aggressive schedule and concludes that the schedule in the real world would be, at the very least, more than double the 30 months proposed by AEP Texas.

BNSF recognizes that the Board and its predecessor have consistently accepted the limited construction schedule proposed in SAC cases, allowing the schedules to be determined on the basis of the estimated duration of the "longest project." BNSF's evidence clearly demonstrates that even under this standard -- which leaves out all of the other considerations discussed above -- AEP Texas' schedule would be increased by at least a year to reflect the actual construction time of the proper "longest project" -- the Canadian River Bridge on the Boise City Subdivision.

The fact that there is virtually no possibility that the TNR construction schedule as presented by AEP Texas can be met underscores the low level of planning for this project and thus the low "probable accuracy" of its construction cost estimate. As discussed in Section III.F.11, the BNSF Engineering Consultants have taken into consideration the high risk associated with this level of probability through the assignment of a twenty percent contingency -- the *minimum* contingency factor that would be assigned to a project reflecting this level of planning and accuracy.

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[530] *Id.* at 34 and 36 (Fig. III-3). Workpapers and documentation supporting the Mercer Report are included in BNSF workpapers BNSF.RP.WP.III.F-1548 to 1740 and BNSF Reply electronic workpapers in "Exhibit III.F-4 Workpapers."

G. DISCOUNTED CASH FLOW ANALYSIS

1. Cost of Capital

a. AEP Texas Refinancing

In its DCF analysis, AEP Texas applies the average industry cost of capital from 1998-2000 to compute interest during the SARR construction period and for the first two calendar years of the DCF period, 2000 and 2001.[1] In 2002, AEP Texas assumes that the SARR will "refinanc[e] debt and otherwise tak[e] advantage of opportunities to lower [its] capital carrying charges."[2] To reflect this assumption, AEP Texas applies the railroad industry 2002 cost of capital for the remaining DCF period, 2002-2020.[3] The use of a single year's cost of capital to estimate the SARR's cost of capital for future years has been squarely rejected by the ICC and the Board.

In the *WTU* decision, the Board made it clear that a DCF analysis must estimate the future cost of capital for a SARR based on the industry average cost of capital over a recent historical period. The Board addressed in that case the proper treatment of both the debt and equity portions of a SARR's cost of capital. As to debt, the Board specifically rejected the defendant's use of a single year's cost of debt to reflect debt costs over the 20-year DCF period. As the Board explained, "[u]se of the rail industry's 1992-1994 average cost of debt is preferable. . . . Indeed, averages, rather than single year data, are generally used to predict the

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[1] AEP Texas' DCF period actually begins June 16, 2000 and runs through the fourth quarter of 2020.

[2] AEP Texas Opening Nar. at III-G-5.

[3] Implementationally, AEP Texas truncates its first DCF as of the fourth quarter of 2001 (the version designated "FP") and carries the June 16, 2000 through 2001 cash flows over into a new model (the version designated "SP"). The new model is then run to produce cash flows for the 2002 through 2020 time period.

future."[4] While the Board noted the possibility that a SARR "could refinance and lower its debt if the opportunity provided itself in the future,"[5] such a massive refinancing could not occur overnight, as AEP Texas calculations imply, nor could a transaction of this magnitude occur without any refinancing fees. AEP Texas has provided no evidence that would support an assumption that the SARR would refinance its debt here. Rather, it simply asserts that a refinancing would occur. Debt rates have gone down, but AEP Texas has provided no information on the costs that would be incurred to refinance a debt of the magnitude of the SARR's construction costs and it has provided no evidence that lenders would be willing to refinance such an enormous debt at current low rates.

AEP Texas does assert that the public record is replete with examples of Class I railroads refinancing debt. However, to support its claim it produced only excerpts from two BNSF Form 10-K reports to the Securities and Exchange Commission from 2002 and 2003. Those documents do not support the wholesale refinancing that AEP Texas advocates in this proceeding. They reference only one interest rate swap on a notational amount of $100 million.[6] BNSF continues to use the Board's standard practice of applying a weighted average cost of debt during the construction period, weighted by the construction dollars expended in each year.

As to the equity portion of the SARR's cost of capital, the Board also made it clear that use of a single year's cost of equity would distort the SAC analysis:

> Because equity costs fluctuate from year-to-year, we estimate the cost of equity for future time periods using an average of a known historical period. Absent evidence projecting the cost of equity for the future, the cost of equity over several years provides a more

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[4] *WTU*, 1 S.T.B. at 712.

[5] *Id.*

[6] *See* AEP Texas Opening Workpaper 11717.

> reliable estimate of future equity costs. Using data for a single year increases the risk that the single period is aberrational.[7]

Therefore, AEP Texas' use of a single year's cost of equity for projecting the SARR's cost of capital over an 18-year future period must be rejected. Instead, BNSF applies standards that have been consistently applied in recent SAC cases. For periods of a SARR's operations where historical cost of equity information is available, it is appropriate to apply the historical cost of equity for that year. For projections of the cost of equity into future years, BNSF has used the industry average cost of equity over the 5 year period 1998 through 2002, consistent with Board precedent.[8]

b. TNR Cost of Equity Financing

As described in Section III.D.3.c.(4).(b), BNSF has included in the TNR investment significant fees that the TNR would be charged for floating equity. In past cases, plaintiffs have argued that inclusion of such fees is inappropriate. The Board rejected inclusion of such fees in *TMPA* because it found that the asserted costs were unsupported.[9] In this case, BNSF has offered additional support for the financing costs it posits. In addition, it is clear that such costs must be added because the current cost of capital for Class I railroads does not include them. No Class I railroad has raised new capital in the last three years by issuing new equity.

2. Inflation Indices

The prices of goods and services used by the TNR will change in future years, and it is necessary to reflect various rates of inflation for capital assets and operating expenses, over the useful life of the TNR, in order to recover properly those capital costs and operating expenses.

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[7] *WTU*, at 713.

[8] *See McCarty Farms*, slip op. at 54.

[9] *TMPA*, slip op. at 162.

Accordingly, forecasts of (1) operating expenses, (2) capital costs, and (3) land values are needed to run the 20-year DCF model and to compute overall stand-alone costs for the TNR.

a. Operating Expenses

In AEP Texas' Exhibit III-G-1, W. W. Whitehurst and Associates, Inc. argues that stand-alone operating expenses should be indexed in a manner that reflects an expectation that the TNR will experience productivity improvements beginning in year one and continuing throughout the 20-year DCF period. In recent cases, the Board has rejected complaining shippers' requests to index stand-alone operating expenses by the RCAF-A and has, instead, employed the RCAF-U for this purpose. In doing so, however, the STB has expressed concern that it is at least possible that a stand-alone railroad might achieve some level of productivity improvement at some point during the 20-year DCF (although it also expressed its expectation that "the potential impact of such improvements is far less than it would be for existing railroads").[10] AEP Texas' Exhibit III-G-1 is an effort to suggest what it implies is a "compromise" between use of the RCAF-A and the RCAF-U. As shown below, it is no such thing. AEP Texas seeks to reduce stand-alone operating expenses by the full measure of productivity improvement historically experienced by the existing railroads in handling coal movements, and to do so from day one of the TNR's existence.

The first half of AEP Texas' Exhibit III-G-1 is devoted to a discussion of the EIA's coal transportation rate index model, and the portion of that model that is designed to reflect improvements in rail productivity. AEP Texas argues that if the EIA forecast of rates is being used in the DCF analysis, then consistency requires that the productivity improvement implicit in the EIA index must also be used to adjust operating expenses in the SAC calculations over the

[10] *See CP&L/NS*, at 27-28.

DCF period.[11] Much of AEP Texas' analysis relies upon a paper entitled "Issues in Midterm Analysis and Forecasting 1997" that was published by the EIA in July, 1997 ("EIA 1997 Report"). AEP Texas includes that paper as Exhibit III-G-2 to its Opening Evidence.

There are three fundamental flaws in the logic of AEP Texas' evidence on this issue. First, the EIA analysis is not an explicit calculation of rail productivity associated with coal transportation by rail. Instead, it compares rail rate escalation to a measure of input price inflation, observes that changes in rail rates over the 1978 to 1995 time frame have not increased as rapidly as have measures of railroad input prices, and concludes that the difference between these two rates of change must reflect the historical level of improvements in productivity in transporting coal.[12] As BNSF discusses below, this assumption is overly simplistic, and tends to overstate railroad productivity.

Second, AEP Texas has misrepresented the way in which the EIA employs this historical relationship to forecast future coal transportation rates. Specifically, the EIA does not assume that the historical rate of "productivity improvement" implied by the difference between the rates of change in the input and output indexes will continue into the future, as AEP Texas suggests. Instead, EIA has adjusted this rate of "productivity improvement" downward, to reflect its expectation that future productivity improvements for existing railroads will be lower in the future than they have been in the past.

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[11] AEP Texas Opening Nar. at III-G-9, note 7.

[12] Based on a conversation with EIA, FTI has determined that the AEO 2003 relied upon by AEP Texas actually incorporates data for the time period 1978 through 1998, and the most recent AEO 2004, relied upon by BNSF, incorporates data for the time period 1978 through 2002 in its rate forecasting methodology.

Third, because AEP Texas' proposal to rely upon the EIA calculation of rail "productivity" improvement in handling coal reflects the historical experience of the existing railroads, it does nothing to address the Board's prior observation that:

> [w]hile it is difficult to imagine that there would not be some areas in which the [SARR] might realize productivity improvements over the course of the SAC analysis period, the potential impact of such improvements is far less than it would be for existing railroads, which make changes incrementally as older technology assets wear out or become obsolete.[13]

Thus, AEP Texas' proposal continues to ignore the fundamental difference between the existing railroads and a SARR with regard to the expectation of productivity improvement.[14]

The essence of the EIA methodology is captured in the following three paragraphs from the EIA 1997 Report:

> The PPI [for coal transportation] was incorporated into the methodology not only because it measures changes in the prices charged by railroads for the transportation of coal but also because it can be used to correlate transportation rate changes with other statistical measures in the industry, such as level of employment, revenue earnings, operating costs, and productivity. Many coal transportation rates are tied to coal transportation contracts that

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[13] *CP&L/NS*, at 27-28.

[14] AEP Texas invites the Board to infer that, because the EIA calculation of productivity is only 57% of the STB calculation of productivity, reducing the forecasts of overall railroad productivity by the historical relationship of EIA productivity to STB productivity is a way of assuming the SARR will experience some productivity, but not as much as is experienced by real-world railroads. Such a conclusion is not warranted by AEP Texas' evidence, however. The problem is that the EIA analysis focuses specifically on the transportation of coal, while the STB calculation looks at the rail industry as a whole. Thus, the difference between the EIA calculated productivity and the STB calculated productivity most likely reflects the fact that productivity improvements experienced by real-world railroads on unit train movements of coal has been lower than overall railroad productivity during the 1978 to present time frame. This is logical, because unit train movements of coal have, from their inception, been very efficient while rail transportation of other traffic has experienced more dramatic productivity improvement over this time period. Thus, what AEP Texas seeks to do is attribute to the SARR the full measure of productivity improvement experienced historically by existing railroads in handling coal movements. As the above quoted passage from the *CP&L/NS* decision makes clear, this overstates the productivity improvements that could be achieved by a SARR.

> have escalation clauses to provide for price adjustments. Thus, the PPI-based methodology is expected to provide proper adjustments to coal transportation rates across various scenarios.
>
> The methodology assumes that the statistical relationship between the PPI for coal transportation and railroad productivity gains will continue over the forecast horizon. Absent any improvement in productivity, the methodology assumes that increases in the prices of railroad transportation inputs will raise the price that shippers pay to transport coal and, conversely, that improvements in railroad productivity will reduce the price of transportation services.
>
> The methodology consists of a statistical regression model fitted to the historical PPI series obtained from the BLS. The key independent variables for this model are diesel fuel cost, transportation equipment cost, wage cost, and a time trend that is intended to capture changes in railroad productivity for coal transportation. The resulting output – the projected PPI or rate indexing factor – reflects both projected changes in input costs and growth in railroad productivity that is expected to result from increased fuel efficiency, technology improvements, more efficient capital equipment, reductions in the workforce, and reengineering of the railroad industry through cost-cutting means such as consolidations and greater use of unit trains.

As these paragraphs suggest, the historical rate of improvement in railroad productivity for coal transportation is *inferred*, by the EIA, by comparing historical changes in the PPI for coal transportation to the historical rate of change in input prices for fuel, equipment costs and wages. Differences between changes in the output price (*i.e.*, the coal transportation rate index) and changes in the input prices are presumed, by EIA, to reflect the level of railroad productivity improvement in transporting coal.

EIA's assumption fails to consider that factors other than improvements in productivity have served to hold down railroad rates. Competitive factors, such as Union Pacific's entry into the Powder River Basin and the practice employed by many electric utility companies of "bundling" competitive and non-competitive plants in a singe coal transportation contract, have likely led railroads to reduce rates in real terms, even when there has been no commensurate

improvement in productivity. Thus, the productivity improvement that EIA infers from a comparison of input price inflation and changes in rail rates for coal transportation most likely overstates the productivity improvement railroads have actually experienced in transporting coal.

Second, AEP Texas assumes that the average rate of productivity improvement derived from the EIA regression is what EIA uses in its rate projections.[15] But FTI's conversation with Dianne Kearney and Mike Melish of the EIA established that this is not the case. In fact, FTI was told that in the AEO 2003, the EIA assumed that the future rate of productivity improvement would be three standard deviations *below* the average historical rate of productivity improvement, and that in AEO 2004, the EIA assumed that the future rate of productivity improvement would be *two* standard deviations *below* the average historical rate of productivity improvement. These adjustments reflect EIA's judgment that the level of productivity improvement in the future for rail coal transportation would not be as high as they calculated it to be historically. To illustrate, if the EIA calculated the average historical rate of productivity improvement to be 2.5% annually, with a standard deviation of .3, its AEO 2004 forecast would assume a rate of productivity of only 1.9% annually (2.5% minus (2 X .3)). Thus, EIA has concluded that productivity improvements anticipated for *existing* railroads in handling coal shipments is going to be substantially less than these rail carriers experienced historically.

Of course, as discussed above, the third and most serious flaw in the approach advocated by AEP Texas is that it continues to extrapolate from the historical experience of real-world railroads to project productivity improvements that it alleges should be anticipated for the TNR – an approach that the Board already has rejected. Missing from AEP Texas' proposal to apply a productivity adjustment to TNR operating expenses is an acknowledgement that the TNR – as

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[15] *See* Exhibit III-G-1 at 8 and at Table 4 (pages 21-22).

configured by AEP Texas and as corrected by BNSF in its Reply Evidence – starts out substantially more efficient than existing railroads, such as the BNSF. In other words, much of the productivity improvement that might be anticipated for existing railroads generally -- and in the transportation of coal movements more specifically -- is reflected in the TNR operating expenses from the beginning. To quantify the amount of productivity already reflected in the TNR operating expenses, BNSF calculated the URCS-based fully allocated operating expenses attributable to the traffic moving over the TNR,[16] and compared those expenses to the base year stand-alone operating expenses (excluding the training costs that are anticipated for the TNR in year one) as calculated by BNSF. These calculations, which are summarized in the Table III.G-1 below, show that the TNR starts out 19 percent more productive as compared to existing BNSF operations.

Table III.G-1
Calculation of Productivity
Reflected in TNR Operating Expenses

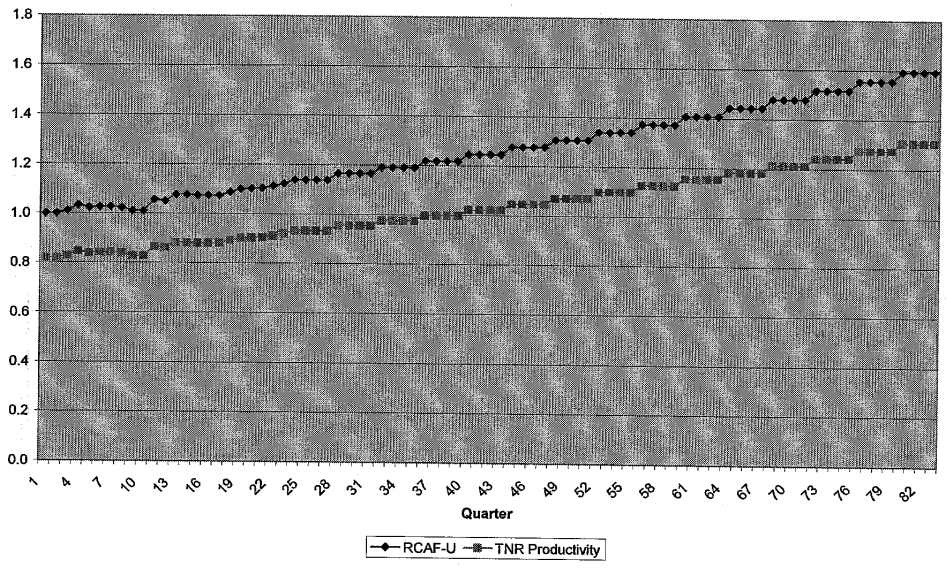
BNSF Fully Allocated Operating Expenses For on-SARR Portion of TNR Traffic Base	$460.0
TNR Base Year Operating Expenses (less year one training expenses)	$371.5
TNR Productivity	$88.5
Productivity Percentage	19%

All of this productivity occurs in the first year of TNR operations. Any attempt to incorporate additional productivity improvement as part of an annual operating expense inflation index, particularly in the early years of the TNR's operation, based on the historical experience of existing railroads would be illogical, as the Board already has acknowledged. Figure III.G-1

[16] URCS based fully allocated operating were calculated for the on-SARR portion of all TNR traffic based on 2002 URCS system average variable costs adjusted to remove depreciation and lease expenses and return of road property investment costs and converted to the full cost level using the URCS constant mark-up ratio of 1.37. These cost were then indexed to 2000 levels.

shows the RCAF-U projection employed by BNSF to index TNR stand-alone operating expenses, and compares that to an RCAF-U applied to a year one starting point that is 19 percent lower to illustrate that the superior efficiency of the TNR, as it begins operations, carries through the entire DCF period. Figure III.G-1 demonstrates that the TNR operating expenses – as BNSF has calculated them – reflect significant "productivity improvement" from the first day of operations.[17]

Figure III.G-1
The Benefits of TNR's Operating Efficiencies Continue Over the DCF Period

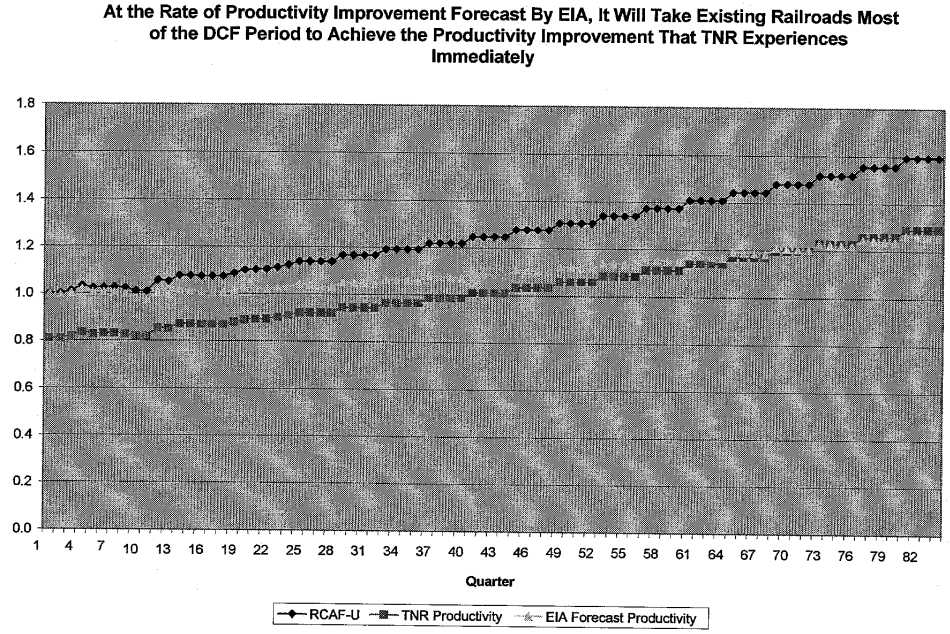


In fact, as the following figure indicates, the 19 percent improvement in efficiency attributed to the TNR by BNSF at its inception will take existing railroads nearly 20 years to achieve at the rate of improvement in the productivity of handling coal movements assumed by

[17] The "Day One" productivity improvement reflected in Figure III.G-1 is calculated based on BNSF's reply TNR operating expenses. If the Board were to reduce certain of BNSF's reply operating expenses, the base year productivity implicit in the TNR's starting point operations would be even higher.

the EIA. To illustrate this, Figure III.G-2 starts with the data from Figure III.G-1, and adds a line that shows how the un-modified RCAF-U would be affected by the EIA productivity forecast.

Figure III.G-2



This comparison shows that, at the rate of improvement in the productivity of handling coal developed by the EIA, it will take existing railroads approximately 18 years to achieve the level of operating expense efficiency that is attributed to the TNR from its inception. This is consistent with what is observed in the real world when a more efficient competitor enters a market – it is able to maintain its productivity edge for some period of time, but as the existing competitors change operations incrementally over time, the new entrant's margin of efficiency declines. By seeking to apply the full measure of EIA productivity, from the very beginning of the TNR's life, to a railroad that would start out substantially more efficient than the existing railroads, AEP Texas continues to advocate an extremely aggressive and unrealistic approach to

determining the extent to which a SARR might be expected to achieve further improvements in productivity. It is far from a compromise. Instead of merely *asserting*, as AEP Texas does, that the TNR will experience the same rate of productivity improvement as existing railroads from the beginning of its operation (which is, after all, what AEP Texas is supposed to prove), AEP Texas should have examined how the sources of existing industry-wide productivity improvement are likely to affect operating expenses incurred by the TNR. BNSF undertakes that analysis below.

As discussed above, the statistical regression model used by the EIA is intended to capture changes in input costs and railroad productivity associated with the following five areas:

1. Increased fuel efficiency;
2. Technology improvements;
3. More efficient capital equipment;
4. Reductions in workforce;
5. Reengineering of the railroad industry through cost cutting means such as consolidations and greater use of unit trains.

Of the five sources of productivity improvement identified, *none* would apply to the TNR in the early years of the DCF period, and only one – technology improvements – would potentially be available to the TNR as some of its assets are replaced with more efficient technology in the latter portions of the 20-year DCF period.

Increased fuel efficiency and more efficient capital equipment would have little effect on the TNR because the lease rate selected by AEP Texas for locomotives has a term that extends beyond the 20-year DCF period. By opting for the lower long term lease rate instead of a higher short term lease rate, the TNR has effectively locked in its locomotive technology for the DCF period. While it is plausible that a more efficient class of locomotives could become available at

some point during the DCF period, the TNR would not benefit from the technology without violating the financial terms of its long term lease.[18] If it did, the TNR would incur a monetary penalty (which AEP Texas takes no account of), just as BNSF would. The TNR would likely incur incremental capital expenditures to acquire these more efficient locomotives, which is also ignored in AEP Texas' DCF analysis.

The TNR is also unlikely to benefit from any reductions in workforce. The staffing levels of the TNR are based on least cost, most efficient stand-alone principles and reflect the minimum number of employees required to safely and efficiently operate the railroad. In addition, because the Board's SAC test is constrained to the data and configuration of the defendant railroad(s), no merger/consolidation benefits could occur unless the TNR merged with the residual BNSF -- which is a configuration that AEP Texas has explicitly rejected.

Finally, because the TNR is almost exclusively a unit-train operation, it cannot benefit from productivity related to the greater use of unit trains.

To address the Board's concerns raised in recent decisions that some level of productivity might occur on a SARR at some point during the 20-year DCF period, BNSF specifically evaluated each of the TNR operating expense categories to determine the likelihood of future productivity improvement in each category. Consistent with the EIA productivity category designations, and the Board's finding in *WPL* that future productivity gains could be realized as new technology develops, BNSF's review focused on the potential technological improvements that could increase productivity. Each expense category is discussed below.

Train & Engine Personnel – This expense category includes the wages and fringe benefits of TNR train and engine personnel, along with expenses for overnight layovers, meals and taxis.

[18] *See, e.g.*, 20444-20446, 20487-20494, included in BNSF's workpapers at leases.pdf.

Because the train and engine personnel counts in the base year are derived from an assumed annual number of crew starts per year that already reflects an extremely high level of utilization, there is little room for future productivity improvement. In addition, while there is some speculation within the industry that one-person crews might someday be possible in some circumstances, safety issues remain a primary impediment, and any effort to move in this direction would likely be opposed by labor groups and local governments. In short, a transition from two-person to one-person crews is too speculative at this time to be considered a realistic source of productivity improvement for the TNR.

Locomotive Lease Expense – This category includes the lease expenses for the TNR road and switching locomotives. The leased locomotive counts reflect the number of units required to efficiently handle the TNR unit-coal-train operations and the limited switching that will occur. As discussed above, AEP Texas' annual lease payments are based on a long-term, 22-year lease that would extend beyond the DCF period. Under the terms of the lease, the lessor is not required to upgrade the locomotives as more technologically advanced units become available, and if the TNR sought to return the locomotives before the end of the 22-year term of the lease -- in order to acquire more technologically advanced units -- it would pay a significant financial penalty. Thus, there is no opportunity for TNR productivity improvement in this category.

Locomotive Maintenance Expense – This category includes the annual maintenance costs for the TNR locomotive fleet. Although the maintenance of an SD70MAC is presently an efficient operation, BNSF concedes that it is possible that future improvements in productivity could occur on the TNR. These productivity improvements, however, could be offset by additional maintenance costs as the TNR locomotive fleet ages.

Locomotive Operating Expense – This cost -- which covers fuel and servicing the TNR locomotive fleet -- is driven primarily by the number of locomotive unit-miles and the gallons of diesel fuel consumed. Because the TNR traffic patterns remain relatively consistent over the 20-year DCF period and the locomotive fleet remains unchanged, there is only minimal opportunity for the TNR to increase the number of locomotive miles per unit, or to improve average locomotive fuel consumption. In fact, future environmental considerations could adversely affect such expenses, because compliance with newly proposed fuel emission standards for locomotives could result in higher fuel consumption rates. [19]

Railcar Lease & Per Diem Expense – These costs include coal car lease rates and general freight car per diem charges. Like locomotives, AEP Texas assumed that TNR cars are acquired on the basis of a long term lease. In addition, in developing its 2020 peak-year operating parameters, AEP Texas explicitly assumed that the loadings per car would be the same as those achieved today, indicating that the freight car fleet will remain homogenous over the 20-year DCF period. Per diem costs are based on the miles that foreign equipment travels over the TNR, which are not expected to change over the DCF period.

Material and Supplies Operating – This category includes vehicles, office furniture, radios, safety equipment, car inspection supplies and car parts inventory. BNSF concedes that it is possible that some technological improvement will occur in this category over the DCF period as these assets are replaced.

Ad Valorem Taxes – There is reason to expect productivity improvements related to ad valorem tax payments.

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[19] *See* "EPA Issuing Tough New Diesel Rules," Washington Post, May 11, 2004 at 3.

Trackage Rights – There is no reason to expect productivity improvements related to trackage rights payments.

Training and Startup – This category includes training costs for new TNR employees. It is possible that some technological improvements could occur in the training area, leading to improved productivity.

Operating Managers – Included in this category are salaries and wages for non-train operating personnel. Staffing for these positions on the TNR are based on a careful evaluation of each position's requirements, considering the safety standards of the TNR and taking into account all available efficiencies. Accordingly, there is little opportunity for additional productivity.

General and Administrative – This category includes all of the general and administrative staff, office buildings, materials and supplies, outside services, information technology and travel expenses. As explained in Section III.D.4, the TNR's expenses already reflect significant efficiency gains over the current general and administrative cost structure of the railroad industry. Information technology would likely benefit from technological improvements at some future point.

Loss and Damage -- There is no reason to expect productivity improvements related to loss and damage payments.

Insurance – There is no reason to expect productivity improvements related to insurance premium payments. However, because these costs are determined as a percentage of all other operating expenses, they will explicitly reflect productivity gains in all areas.

Maintenance of Way – This category includes all maintenance-of-way operating expenses including personnel, equipment, contract cost and miscellaneous materials. The

maintenance-of-way plan for the TNR is tailored to the TNR's specific track and traffic characteristics, and it already reflects state-of-the-art equipment and maintenance of way practices. There is, however, the potential that additional technological improvements over time could result in increased maintenance-of-way productivity.

Based on these category-specific evaluations, BNSF determined that there is a possibility that productivity improvements could occur in the future in some of the TNR operating expense categories, and that some small adjustment to the operating expense inflation index to reflect future productivity could be justified. Therefore, BNSF has adjusted the DCF model to apply the RCAF adjusted for productivity, beginning half-way through the DCF period, *i.e.* beginning in the eleventh full year, to the following categories:

- Locomotive Maintenance;
- Materials and Supplies Operating;
- Training Costs;
- General and Administrative (IT portion only); and
- Maintenance of Way.

The mid-point of the DCF period was selected to reflect the fact that TNR operating expenses are based on the Board's least cost, most efficient stand-alone cost standard and already include a substantial productivity adjustment downward from BNSF's fully allocated operating expenses. Year eleven of the DCF is also well in advance of the crossover point between TNR productivity and the productivity included in the EIA coal rate forecast. That crossover, as depicted in Figure III.G-2, shows TNR productivity equal to the EIA forecasted productivity in the seventeenth year of the DCF period.

The following table sets out the total TNR operating expenses developed by BNSF, based on the application of the EIA productivity adjustment to the above categories of operating

expenses beginning in year 11 of the DCF, compared to TNR operating expenses unadjusted for productivity.

Table III.G-2

Effect of Including EIA Productivity In Forecasting Certain Categories of TNR Operating Expenses

Full Year	BNSF's Calculation Assuming No Improvement In Productivity	TNR Operating Expenses Assuming Certain Categories of Expense Will Experience Improvements In Productivity Beginning in the Eleventh Full Year
1	389.7	389.7
2	386.2	386.2
3	394.8	394.8
4	398.4	398.4
5	392.5	392.5
6	406.1	406.1
7	419.2	419.2
8	429.6	429.6
9	447.2	447.2
10	459.4	459.4
11	472.8	471.7
12	489.5	485.7
13	504.9	498.6
14	519.3	509.9
15	533.8	521.2
16	550.5	534.5
17	565.9	546.5
18	578.8	556.0
19	596.0	569.4
20	613.0	582.7

Including these productivity improvements changes the DCF results by about one percent, demonstrating that the Board's prior reliance on the RCAF-U was appropriate.

The second half of AEP Texas' Exhibit III-G-1 is devoted to an analysis that AEP Texas conducted in an effort to demonstrate that the average age of TNR assets is not significantly different from the average age of Class I railroad assets.

In *Duke/NS*, the Board accepted defendant's argument that the productivity gains reflected in the RCAF-A were the result of acquisitions and improvements that existing railroads are able to deploy "incrementally as their older assets wear out."[20] The Board reasoned correctly that a SARR would not have an asset age profile comparable to the existing Class I carriers, thus making full application of the RCAF-A inappropriate. In this portion of its Exhibit III-G-1, AEP Texas attempts to demonstrate, based on an analysis of R-1 annual reports, that the average age of Class I railroad assets in service as of 2002 was only seven years and, thus, not significantly older that the TNR's "new" assets.

AEP Texas' reliance on R-1 annual report data to develop the average age of existing railroad assets is flawed, and it produces an average age that is too low. AEP Texas calculates the average age of assets from the R-1 by dividing the accumulated depreciation balance for each roadway account by the annual depreciation recorded for each account. In a simplistic world, such a calculation might yield a reasonable estimate of the average asset age. However, as AEP Texas' experts should be aware, the accounting for recent railroad mergers and changes in the treatment of removal costs have distorted the relationship between accumulated and annual depreciation, rendering efforts to calculate the average age of assets in place from these data source futile.

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[20] *Duke/NS*, slip op. at 37.

In its critique of the Board's recognition of the difference in asset profiles between a SARR and the incumbent Class I carriers, AEP Texas also asserts that railroads would not necessarily wait until assets reach the end of their accounting lives before replacing them, but rather would be expected to opt for the more productive asset whenever it determines that positive economic value would be realized as a result.[21]

In advancing its theory, AEP Texas asserts that less efficient assets could be sold or shifted to alternate use prior to the end of their accounting life and new, more efficient replacement assets purchased. The piece of the puzzle that AEP Texas misses is that the capital recovery in the DCF is patterned on the accounting life of each asset and implicitly assumes that each asset will be in service until the end of its account life. The sale of an asset prior to the end of the accounting life and the purchase of a new replacement would require an increase in the DCF capital recovery to ensure that sufficient funds are available for the replacement purchase.

AEP Texas asserts that properly functioning secondary markets will allow for a changeover to newer, more efficient technologies without impairing the remaining accounting lives of the disposed of assets. However, AEP Texas' assumption about the timing of the asset disposition and its assumption that the asset can be sold at its full book cost are inconsistent with the availability of a technologically superior alternative, which would almost certainly depress the value of the technologically inferior existing asset.

b. Road Property Assets Other than Land

The annual inflation forecast used by AEP Texas to calculate the value of the TNR's road property assets is based on a Global Insights September 2003 forecast for rail labor and rail

[21] AEP Texas Nar. at III-G-15.

materials and supplies. As AEP Texas points out, this is the same procedure utilized by the Board in *Duke/NS* and *CP&L*. BNSF accepts AEP Texas' procedure in this proceeding.

c. Land

In its Opening Evidence, AEP Texas used a composite index for all land owned by the TNR. In its reply, BNSF adopts AEP Texas's land inflation value.

3. Tax Liability

As did AEP Texas, BNSF has calculated federal taxes payable by the TNR in a manner consistent with the approaches approved by the Board in prior maximum rate cases. *See, e.g.*, *FMC* at 178-81; *WTU* at 714. The TNR is assumed to pay federal taxes at the corporate rate of 35%, with payments for debt interest, depreciation expense, and state income taxes treated as deductibles. The TNR also will be subject to income taxes in Wyoming, South Dakota, Nebraska, Colorado, Oklahoma and Texas. Consistent with the method adopted by the Board in *FMC* and *APS*, the taxes applicable to railroads in each of the states were weighted together based on the number of TNR route-miles in each state.

4. Other

a. Capital Cost Recovery

The Board's DCF methodology uses economic depreciation to calculate the capital recovery cost of the stand-alone entity's property. The value of an asset at any point in time thus equals the discounted present value of the earnings that it will produce over its remaining useful life. Although not mentioned at all in its Narrative, in this proceeding AEP Texas modified the Board's standard capital recovery procedures in a number of ways. These include:

- Bifurcating the DCF into two separate runs denoted as "FP" and "SP," presumably to accommodate its assumption of a complete refinancing of both debt and equity capital in year 2002 discussed above.

- Changing the DCF period from the Board's standard 20-years to a DCF that spans 83 quarters.
- Changing the Board's prior procedures that amortized debt over the DCF period to a term equal to the average life of the stand-alone road property assets.
- Converting the DCF model from Lotus to Excel.
- Inclusion of training expenses with road property investment.

BNSF's treatment of each change is described in the remainder of this section.

(1) Bifurcating the DCF

To accommodate its assumption of a complete refinancing of the TNR capital structure on January 1, 2002, AEP Texas splits the DCF period into two time periods. The first covers June 16, 2000 through December 31, 2001 and the second covers January 1, 2002 through December 31, 2020. AEP submits two separate DCF models, one designated as "Exhibit III-H-I FP" which is used to compute the cash flows for June 16, 2000 though December 31, 2001 and a second designated "Exhibit III-H-I SP" that begins with the cash flows from Exhibit III-H-I FP and hard coded values and computes the cash flows at the 2002 cost of capital through 2020. As discussed above, AEP Texas' proposed refinancing is inconsistent with prior Board findings relating to the proper forecasting for both debt and equity capital. In its Reply, BNSF modified AEP Texas Exhibit III-H-I FP file to cover the entire DCF period and eliminated the refinancing calculations.

(2) Changing the DCF Period

AEP Texas extends the DCF period to span 83 quarters instead of the Board's standard of 80 quarters. In its Narrative, AEP Texas explains that because the rates at issue in this proceeding were established as of the third quarter of 2000, the DCF period will extend for 20 years and six months, a total of 82 quarters. The actual DCF analyses produced by AEP Texas

begin in the second quarter of 2000, on June 16, and extend through 2020. BNSF accepts AEP Texas' 82-plus quarter DCF in this Reply.

(3) Change of the Board's Debt Amortization Procedures

It is the Board's standard practice since *Coal Trading* to amortize stand-alone debt over the 20-year DCF period.[22] Without any discussion, AEP Texas changes that long standing precedent to amortize the debt of the TNR over 212 months, which is described in a footnote to the DCF as the "weighted life of assets."[23] AEP has not demonstrated that financing could be obtained for the 53-year term it assumes, nor is it likely such financing could be arranged. In its Reply, BNSF amortizes TNR debt over the DCF period, consistent with the Board's prior practices.

(4) Conversion of the DCF to Excel

AEP Texas' conversion of the DCF from Lotus to Excel was complicated by its bifurcation of the DCF period and the requirement to truncate and retain the cash flows produced by the June 16, 2000 to December 31, 2001 run for use in the January 1, 2002 through 2020 run. Stripped of this complexity, the conversion from Lotus to Excel is straightforward. On Reply, BNSF accepts AEP Texas' conversion of the DCF to Excel, corrected to remove the bifurcation needed for the TNR's supposed refinancing.[24]

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[22] In *Nevada Power*, the DCF period extended for 25 years.

[23] *See* AEP Texas electronic work paper "Exhibit III-H-I FP.xls," Tab "Amortization, footnote 5.

[24] The Lotus version of the DCF used a macro to solve for the DCF starting revenue requirement. The Excel version uses a solver function which is an add-in features of the Excel software package.

(5) Inclusion of Training Expenses With Road Property Investment

AEP Texas adds to the TNR road property ownership costs the expenses related to training of the TNR employees. Training costs are a SARR operating expense and have been consistently treated by the Board as such. BNSF includes its training costs with the TNR operating expenses consistent with the Board's treatment in *TMPA, Duke/NS* and *CP&L*.

b. Reparations

BNSF's stand-alone cost evidence demonstrates that, when properly developed, the stand-alone costs of the TNR substantially exceed the revenues that would be generated by the TNR traffic group. Under such circumstances, the issue traffic rates are reasonable and no rate prescription is warranted.

5. Percentage Reduction Methodology

a. Stand-Alone Revenues Do Not Exceed Costs

AEP Texas contends that stand-alone revenues exceed costs over the DCF period and that therefore it is appropriate to prescribe maximum reasonable rates at levels lower than the challenged rates. However, BNSF's Reply Evidence demonstrates that when revenues and costs are calculated correctly, stand alone revenues do not exceed costs. *See* BNSF Reply Exhibit III.H-1. Therefore, no rate reduction is appropriate.

b. AEP Texas' Critique of the Percentage Reduction Method Is Not Relevant in this Case

AEP Texas proposes a modification to the Board's accepted percentage reduction method for determining maximum rates. As calculated by AEP Texas, the proposed modification would benefit AEP Texas by resulting in substantially lower SAC maximum rates than those determined according to the conventional method. The rationale for the introduction of this result oriented procedure is that the percentage reduction method is susceptible to "gaming" by

the defendant railroad. As described by the Board in its *CP&L* decision, "when a railroad expects a rate to be challenged, it can set the rate at a higher level than it expects to sustain, so that the resulting reduced rate is to its liking."[25]

(1) No "Gaming" by BNSF

AEP Texas repeatedly asserts that the rationale for departing from the percentage reduction method is to address the problem of "gaming" by the defendant railroad.[26] It claims that its proposed "generalize percentage reduction method" is a solution to the supposed gaming problem:

> In essence, the generalized percentage reduction method undoes what the attempt at gaming tries to accomplish. By contrast, because it applies the same percentage reduction to all traffic in the stand-alone group, the equal percentage reduction method does not sufficiently reduce rates subject to gaming.[27]

AEP Texas has proposed a solution to a problem that does not exist in this case. There has been no "gaming" by BNSF in the establishment of the rates at issue here; indeed, AEP Texas does not even allege "gaming" by BNSF. It could not logically do so because the rates that are subject to challenge here are presumptively reasonable. On both the Rawhide and the essentially identical non-Rawhide movements, BNSF has never charged a rate higher than the Board-determined SAC maximum reasonable rate for the Rawhide movement. The challenged rates and their relationship to the Board's SAC maximum rates as determined in the 1996 Decision are summarized in Table III.G-3 below:

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[25] *CP&L*, at 31.

[26] AEP Opening Nar. at III-G-25-26, 29-30.

[27] *Id.* at III-G-31.

Table III.G-3

YEAR	STB SAC RATE RAWHIDE	BNSF RATE RAWHIDE	BNSF RATE NON-RAWHIDE
2000	$15.78	$13.68	$15.78[28]
2001	$18.39	$13.68	$15.78
2002	$17.25	$13.68	$17.25[29]
2003	$18.04	$18.04[30]	$18.04[31]
2004	$18.83	$18.83	$18.83

The establishment of the challenged rates by BNSF in this case reflects an entirely different pattern of conduct from that presented in the *CP&L* case. In *CP&L* the common carrier rates were established by the carrier following the expiration of a prior transportation contract and the unsuccessful effort of the parties to negotiate new contract rates. The defendant railroad thereupon established a common carrier rate that was *significantly* higher than the expiring contract rate, giving rise to the shipper's allegation of gaming. With the rates at issue here, there was no expired contract, no failed negotiations, and no rate increases beyond the rate level authorized by the Board's prior SAC maximum rate determination on the Rawhide movement.

There is no issue of "gaming" on BNSF's part in this case and the predicate for AEP Texas' proposed modification to the Board's percentage reduction method is therefore invalid.

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[28] The non-Rawhide rate was $13.68 per ton until June 16, 2000 when the $15.78 rate per ton became effective

[29] The non-Rawhide rate was $15.78 per ton until August 22, 2002, when the rate of $17.25 per ton became effective.

[30] The Rawhide rate was $13.68 per ton until June 28, 2003, when the rate of $18.04 per ton became effective.

[31] The non-Rawhide rate was $17.25 per ton until May 13, 2003, when the rate of $18.04 became effective.

(2) AEP Texas Ignores the Possibility of "Gaming" on the Shipper's Part

AEP Texas discusses the possibility of "gaming" in the establishment of a rate by the defendant carrier, but it does not acknowledge that in its *CP&L* decision the Board recognized the possibility of "gaming" by the complaining shipper, nor does it discuss the implications of such gaming for purposes of determining a maximum reasonable rate. In *CP&L* the Board identified the possibility of "gaming" on the complaining shipper's side:

> Given a traffic group with sufficiently highly rated non-issue traffic, the percent reduction approach could brand any rate level established by a defendant railroad as unreasonable. . . . This potential could encourage a shipper to challenge an otherwise reasonable rate, or enable a shipper to obtain an inordinate rate reduction, simply by selecting a traffic group with much higher-rated traffic.[32]

The existence of gaming by the complaining shipper is very much present in this case and has two dimensions. The first dimension involves the impact on the SAC analysis of revenues generated by the non-issue traffic in AEP Texas' shipper group. AEP Texas inflates the revenues in its stand-alone shipper group by incorporating massive amounts of cross-over traffic in its shipper group and taking revenue divisions calculated under the MSP approach. It is these inflated cross-over revenues that allow AEP Texas to make the ludicrous claim that it is entitled to a reduction on rates set at levels that the Board has already determined to be reasonable.

Where the shipper's traffic group is dominated by cross-over movements, as in this case, and the shipper has claimed revenues without demonstrating coverage of off-line costs, the shipper has effectively "select[ed] a traffic group with much higher-rated traffic." The problem is acute when the issue traffic revenues are dwarfed by the total revenues in the stand-alone shipper group. In such instances, the rate reductions proposed by shippers are driven almost

[32] *CP&L*, at 31.

entirely by the divisions claimed on cross-over movements. The magnitude of the collective overages (group revenues in excess of SAC) has almost nothing to do with the level of the issue traffic rate; indeed, any rate would be found to exceed the SAC maximum, regardless of its level.

As explained in the Declaration of Richard S. Higgins and Fred S. McChesney, Exhibit III.G-1, shipper gaming of the rate determination process through reliance on cross-over traffic dissuades railroads from setting rates at Ramsey optimal levels, thereby undermining a key objective of the *Coal Rate Guidelines* and exacerbating the problem of revenue inadequacy.

The second dimension of gaming in this case involves the rate to which AEP Texas proposes to apply the reduction. AEP Texas seeks to apply its modified percentage reduction approach to rates that are presumptively reasonable under the Board's prior SAC determination. Indeed, the rates to which AEP Texas seeks to apply the reduction are rates that were calculated by applying a substantial percentage reduction to the rates challenged in the 1996 Decision. The process that AEP Texas asks the Board to endorse here is a continued ratcheting downward of the SAC maximum rate on the issue traffic.

In its March 19, 2004 order vacating the rate prescription on the Rawhide movement, the Board stated that vacation of a rate prescription on the shipper's request

> is appropriate to ensure that a captive shipper who prevails on its rate complaint in the first instance does not later end up in a worse position – by having to bear a higher rate than would be justified under a new SAC analysis – than if it had not earlier challenged the rate or had been unsuccessful in its earlier challenge. This is a particular concern given the long period of time covered by a SAC analysis (usually looking forward 20 years) and any resulting rate prescription. The economic and regulatory conditions reflected in the SAC analysis can change significantly over that time period.[33]

[33] March 19, 2004 Decision at 3.

If changed economic or regulatory conditions lead to a different result in a new SAC analysis from the result reached in the initial analysis (*e.g.*, a greater overage of revenues in excess of costs on a present value basis), the logical approach to setting the new maximum reasonable rate would be to apply the reduction to the rate that was challenged in the original decision that has now been superseded. In this case, the reduction would be applied to the "Tariff Rate" set out in Table 1 of the Board's May 29, 2003 decision correcting its SAC maximum rate prescription.[34] Applying the reduction to the already reduced rates that BNSF has been charging pursuant to the Board's prior prescription would penalize BNSF for complying with that prescription.

c. An Alternative Rate Reduction Approach that Would Address Shipper Gaming through Reliance on Cross-Over Traffic

In this case, it would be inappropriate for the Board to reduce the challenged rates through *any* methodology both because revenues do not exceed SAC and because the rates being challenged have at all times been set at levels that are presumptively reasonable. Nevertheless, in the interest of providing a balanced record on the issue, BNSF offers a suggested approach for addressing the issue of shipper gaming in the determination of a maximum reasonable rate.

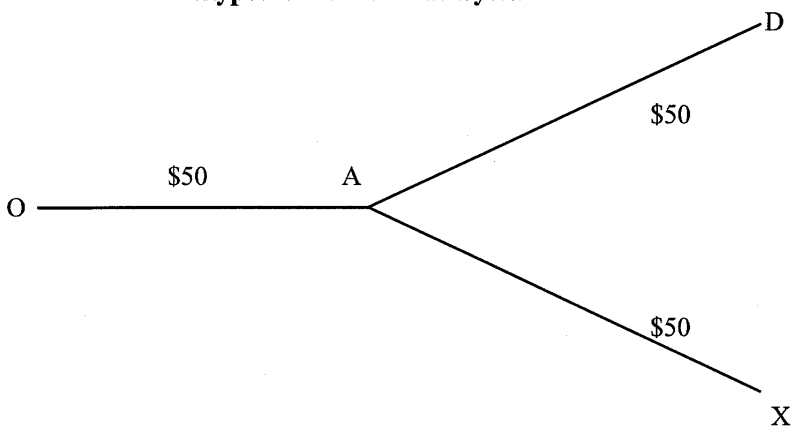
As discussed above, the principal source of distortion in SAC analyses, including the one that AEP Texas has proffered in this case, is the use of revenues on cross-over traffic. The game that shippers play is to take SAC revenues without accounting for costs. BNSF's alternative approach is based on the percentage reduction approach. It modifies the percentage reduction approach to mitigate the distorting effect of cross-over traffic in the SAC analysis.

[34] The tariff rate is $22.24 for 2000, $22.86 for 2001, $23.50 for 2002, $24.17 for 2003, and $24.84 for 2004. It increases to $32.78 in 2014, the last year of the DCF period in the 1996 Decision.

Under the percentage reduction methodology, the Board has traditionally calculated the reduction in the issue traffic rate as the present value of the amount by which revenues exceed SAC, divided by the present value of total stand-alone revenues in years in which revenues exceed SAC. This approach makes sense when the proponent of a stand-alone railroad builds all of the facilities to replace the incumbent railroad for all traffic included in the stand-alone traffic group, as was the case in *Coal Trading* at the time the percentage reduction methodology was first proposed. However, this approach gives undue weight to cross-over revenues, which are arbitrary revenue allocations. In BNSF's proposed modification, the numerator of the fraction used to calculate the percentage rate reduction is calculated in the same way that the Board currently calculates it, *i.e.*, revenues for the time period in question minus SAC for that period, calculated on a present value basis. However, the denominator of the fraction is calculated differently, so as to reflect the full revenues on cross-over movements. This approach reflects the reality that, if the complaining shipper could have realized greater net benefit from constructing facilities necessary to handle the cross-over movements on an end-to-end basis, it would have done so. The complainant's motivation in selecting cross-over traffic was to maximize the revenue contribution available from the movement in question.

To illustrate the mechanics of the proposed modification and the mitigating impact on the distortions caused by cross-over traffic, Figure III.A-1 from BNSF Reply Section III.A.1.a is reproduced below:

Figure III.A-1
Hypothetical Railroad System



In the prior example, it was demonstrated that if the OAD movement generated revenues of $90 and the OAX movement generated revenues of $60, then each movement covered its incremental cost and generated sufficient additional revenues to cover the $50 of common cost between O and A. It was also demonstrated that if the OAX movement were treated as cross-over traffic, with the residual incumbent presumed to handle the AX portion of the movement for an MSP-based revenue allocation of $30, use of cross-over traffic would suggest that revenues for the OAD segment of $120 exceed stand-alone costs of $100, implying that a 16.67% rate reduction would be appropriate in the issue traffic rate ($20/$120). This would reduce the $90 rate to $75 for the OAD issue traffic movement. Implicitly, this methodology also assumes that the OA portion of the OAX rate (*i.e.*, the $30 "division" calculated by applying MSP to the $60 through rate) should be reduced by the same percentage to $25.

As was demonstrated earlier, *no* reduction in either rate is actually warranted, because total revenues are just sufficient to offset total costs. The distortion caused by calculating the percentage reduction on the basis of only the $120 of OAD revenues that reflects an allocation of cross-over revenues is substantial. BNSF suggests that if the Board is going to permit cross-over

traffic, it should calculate the percentage reduction by determining the revenues in the denominator of the reduction fraction on the basis of the *total through revenues* for all traffic, including cross-over traffic, because use of the through traffic comes closer to replicating the results that would be achieved if the Board were to require shippers to forego use of cross-over traffic and, instead, to build all of the facilities required to replace the incumbent railroad for all traffic included in the stand-alone traffic group. The simplified example below illustrates this point.

Assume that the complainant relies on cross-over traffic and is permitted to build only the OAD segment and to allocate revenues for the OAX movement to the OAD SARR. As before, this would mean that $30 of revenue would be allocated from the OAX movement to the OAD SARR and, along with the $90 in OAD revenue, yield revenues of $120 -- $20 more than the $100 OAD SAC. Under BNSF's proposed rate reduction methodology, however, the reduction would be calculated not as $20/$120, but as $20/$150, *i.e.*, on a base that includes *all* of the through revenues for both the local and cross-over traffic handled by the railroad. Instead of a 16.67% reduction, this would result in a 13.33% reduction in the issue traffic rate. The result still represents a distortion as compared to a proper SAC analysis, but the magnitude of the distortion is reduced.

The following table summarizes similar comparisons for various alternative assumptions about the level of OAX revenues.

Table III.G-4

		Percentage Reduction In Issue Traffic Rate		
Assumed Level of OAX Revenues	Portion of OAX Revenues Allocated to AX Residual Incumbent	Assuming No Cross-Over Traffic	Assuming Cross-Over and Standard Percentage Reduction	Assuming Cross-Over and Proposed Percentage Reduction
$60	$30	0%	16.67%	13.33%
$70	$35	6.25%	20.00%	15.63%
$80	$40	11.76%	23.08%	17.65%
$90	$45	16.67%	25.93%	19.44%
$100	$50	21.05%	28.57%	21.05%

This table illustrates that as long as the amount of revenue allocated to the residual incumbent (in our hypothetical, to the AX segment) is less than the $50 cost of the AX segment, (1) use of cross-over traffic overstates the percentage reduction that would be calculated if the SARR were properly constructed to include all three segments of railroad necessary to fully replace the incumbent, and (2) the proposed percentage reduction method better approximates the results realized under a proper SAC analysis than does the existing percentage reduction method.

Note that in the last example where the portion of the OAX revenues allocated to the residual incumbent equals the cost of the AX segment ($50), the results of a correctly performed SAC analysis and the modified percentage reduction approach advanced by BNSF here are identical. This last example illustrates the point at which the complaining shipper should be indifferent as between (1) building the facilities necessary to handle the through movement and (2) purchasing the services of the residual incumbent to handle the traffic over the AX segment. If revenues in excess of the incremental costs of constructing the AX segment were available, the complaining shipper would logically build the segment. Thus, it is reasonable to assume that

whenever a complaining shipper elects to rely on cross-over traffic, it has made a judgment that the residual incumbent will receive a revenue allocation that is no greater than the full incremental costs of the facilities it provides to handle the cross-over movement, and quite probably less. The closer the Board's revenue allocation procedure comes to compensating the residual incumbent for the full incremental costs it incurs to handle the cross-over movement, the closer the Board will come under BNSF's rate reduction procedure to achieving a result comparable to that realized by a properly performed SAC analysis.

d. AEP Texas' Generalized Percentage Reduction Approach Does Not Implement Ramsey Principles

In addition to claiming that its modification to the Board's established rate reduction methodology can address the problem of "gaming" by defendant carriers -- a problem that does not exist here -- AEP Texas claims that its approach is "consistent with the 'second best' principles embodied in Ramsey pricing" and that "relief is allocated in the same manner as prices above marginal cost were set in the first place: the less elastic a shipper's demand, the greater the percentage change."[35]

AEP Texas' attempt to equate its rate reduction approach with the principles of Ramsey pricing is a ruse. Its premise is that the "relative markups" over marginal costs equate to "demand elasticities."[36] This is not the case.

In formulating the *Coal Rate Guidelines*, the ICC was guided by the economic principles underlying Ramsey pricing. It expected that application of CMP principles would induce

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[35] AEP Texas Opening Nar. at III-G-30.

[36] *Id.* at III-G-32 ("So long as all of the traffic group members' rates are measured against a consistent cost standard, these relative markups (and, thus, demand elasticities) can be determined and used as the basis for allocating the excess of SARR revenues over SAC.")

Ramsey prices in the freight rail industry.[37] But the ICC found it to be impractical to impose pure Ramsey pricing as the means for determining rate reasonableness. Ramsey pricing "requires both the marginal cost and the elasticity of demand to be quantified for every movement in the carrier's system. Thus, the amount of data and degree of analysis required seemed overwhelming. We concluded that while formal Ramsey pricing is useful as a theoretical guideline, it is too difficult and burdensome for universal application."[38]

AEP Texas claims to have found a shortcut that eliminates all the difficulties and burdens of calculating true Ramsey prices. As a logical matter, if calculation of Ramsey prices is not practical because it is too complex, the likelihood that they could be closely approximated through a shortcut is highly implausible.[39] In fact, neither the contribution margins nor the marginal costs used in AEP Texas' rate reduction calculation is a meaningful input for purposes of approximating demand elasticity.

(1) AEP Texas' Calculations Do Not Use Prices that Reflect Demand for Through Service

The contribution margins that AEP Texas calculates are a function of the rates charged to the shippers on the BNSF movements in AEP Texas' traffic group. The rate levels are thus presumed to be an indicator of relative demand elasticity. However, the vast majority of movements in the AEP Texas shipper group are cross-over movements and the revenues that

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[37] *Coal Rate Guidelines*, 1 I.C.C.2d at 534.

[38] *Id.* at 527.

[39] If it were appropriate to determine the Ramsey optimal prices for the subset of the defendant's system represented by the stand-alone shipper group, the way to determine them would be to calculate the revenue need for the stand-alone railroad (configured to handle the historical and projected volumes of the shipper group) and then set the rates for the shippers in the group based on their demand elasticity and marginal cost. The ICC's discussion of difficulties in implementing pure Ramsey pricing suggests that these calculations could not be feasibly made. If so, how could one legitimately assume that one could "back into" correct Ramsey prices for the subset of the defendant's system in the manner proposed by AEP Texas?

AEP Texas uses to develop its markup ratios are not the prices set in the real world for the through movement but allocations of revenue derived using the Modified Straight Mileage Prorate methodology. Thus, revenue factors used by AEP Texas are not prices for through service and they could not possibly reflect demand because there is no shipper demand for a portion of a through movement. What the shipper is paying for is through transportation from origin to destination. In the case of cross-over movements, there is no way of determining the shipper's willingness to pay for transportation to an imaginary interchange point.

(2) AEP Texas' Inconsistent Assumptions Regarding Volumes and Elasticities

AEP Texas derives a percentage rate reduction for a specific shipper based on the assumption that shipment volumes do not change in response to rate reductions. At the same time that this assumption is implicit in its derivations, AEP Texas also assumes that shipment demand elasticities are not zero. As explained in BNSF Reply Exhibit III.G-1, these two assumptions are mutually contradictory. As further noted in Exhibit III.G-1, given AEP Texas' assumption that volumes moving on the SARR remain unchanged after the rate reduction, the Board's existing proportional rate reduction approach is appropriate (with the modification described above to address cross-over issues).

(3) AEP Texas Has Not Determined Marginal Costs as Required for Purposes of Ramsey Price Calculations

AEP Texas' proxy for demand elasticities requires a calculation of marginal costs. AEP Texas' witness Whitehurst calculates marginal costs based on BNSF URCS costs. This is not consistent with the development of Ramsey prices. In the *Coal Rate Guidelines*, the ICC stated that both Rail Form A and URCS costs

> yield cost estimates which are based largely on system-wide averages. Ramsey pricing requires the use of economic costs rather than accounting costs. Although Rail Form A or URCS

> might be useful as a rough indicator of economic costs, we recognize that local factors and circumstances may cause the economic costs to differ greatly from accounting estimates. Such local factors might include, for example, where the movement is a backhaul or off-peak movement or whether the facilities involved are congested.[40]

These observations apply with full force to AEP Texas' supposed development of marginal costs.

AEP Texas' Opening Exhibit III-G-12 describes how W. W. Whitehurst & Associates, Inc. allegedly calculated "marginal costs for standard BNSF system-average unit coal train movements based on the Board's URCS costs for the year 2001" for use in the "generalized percentage reduction method" advocated by AEP Texas in Exhibit III-G-11.

As described in Exhibit III-G-12, AEP Texas started with standard URCS variable unit costs, and modified those costs as follows:

- eliminated the URCS general overhead rates;
- eliminated supervision and superintendence for maintenance-of-way ("MOW"), maintenance of equipment ("MOE") and transportation;
- eliminated fixed plant depreciation and lease rentals ("DLR") and fixed plant ("ROI");
- added current year replacement costs for track structure to maintenance-of-way operating expenses (i.e., the URCS gross ton-mile Table D1 unit costs); and
- eliminated certain CLOR costs that are not associated with coal unit train service.

These modified "system-average marginal costs" were then applied, using the URCS Phase III costing procedures, including the Ex Parte 270 trainload adjustments, to generate costs for movements of 300, 600, 900 and 1200 miles. These costs, and a series of "cost factors" that

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[40] *Guidelines*, 1 I.C.C.2d at 532 n.31.

AEP Texas alleges can be used to "approximate" movement costs for other lengths of haul (and differences in other shipment characteristics, such as termination vs. interchange and car ownership) are set forth in Tables 1 and 2 of AEP Texas' Opening Exhibit III-G-12.

The basic assumption of AEP Texas' approach – *i.e.,* that all movements with the same length of haul, same class of traffic and same car ownership characteristics will exhibit the same marginal cost – is seriously flawed. Economic theory requires that the marginal costs used in applying Ramsey prices must reflect all of the forward-looking economic costs associated with each particular movement. If a movement uses a portion of the railroad that is particularly congested, its marginal costs must reflect the costs of this congestion (*i.e.,* either the slower transit times and higher probability of crews outlawing on congested routes, or the investment costs that will be required to eliminate this congestion). On the other hand, if the movement uses a portion of the railroad where there is considerable available capacity, such costs would not be part of the marginal costs required to properly implement Ramsey pricing. Similarly, properly-developed marginal costs would reflect differences in the "risk-profile" of individual movements. Movements under contract are more certain than movements under common carrier rates; movements from or to solely-served locations are more certain than movements between competitively-served locations. As a result, investments in locomotives, freight cars and rights-of-way to handle some movements carry less risk than similar investments associated with other traffic. More mundane examples exist. AEP Texas assumes that all movements will load to 111 tons per car and move in trains of 110 cars, and require a system-average consist of system-average locomotive to move a system-average number of miles per day. The reality is, however, that the individual coal unit train movements included in the TNR stand-alone traffic group vary considerably in these dimensions.

Contract obligations differ from movement to movement and can impose significantly different costs on BNSF for movements of the same length of haul. Some contracts impose service standards on BNSF, while others do not; some impose obligations on BNSF to provide railroad-owned equipment or to move additional trainsets of coal at the shipper's request, while others do not. These sorts of requirements affect BNSF's marginal cost of handling these movements, but are not reflected in the URCS-based marginal costs developed by AEP Texas.

AEP Texas' "system-average" approach to developing marginal costs therefore distorts the rate/marginal cost relationships that AEP Texas seeks to rely upon to estimate relative demand elasticities. For example, all other things being equal, one would expect BNSF to charge a higher rate per ton for a movement where it has agreed to a service performance standard (with penalties when it fails to perform) than where it has no such obligation. The higher rate reflects the higher risk and, therefore, higher marginal cost to BNSF of handling this movement. Yet AEP Texas would calculate identical marginal costs for each movement and infer that the movement that involved the service performance standard is more demand inelastic than the movement that does not because the contribution ratio is higher. Similarly, when a movement makes substantial use of congested BNSF facilities, one would expect BNSF to assess a higher rate per ton – all other things being equal – to offset the costs associated with the congestion (or, alternatively, the costs of eliminating this congestion). AEP Texas' methodology would pick up the higher rate per ton, but fail to account for the higher costs, and lead it to conclude, generally, that movements over congested facilities are more demand inelastic.

In summary, even if one could infer relative demand elasticities from existing rate/marginal cost relationships (and, for the reasons discussed in this section, one cannot), the system-average approach to calculating marginal costs employed by AEP Texas would render

the numbers unreliable for purposes of a Ramsey analysis. The rate/marginal cost relationships relied upon by AEP Texas could not accurately reflect "true" relative demand elasticities.

e. AEP Texas Did Not Implement Its Rate Reduction Approach in the Manner that It Claimed

At page III-G-30 of its Opening Narrative, AEP Texas states:

> Following Ramsey principles, a rate reduction or rate relief allocation methodology should attempt to maintain price mark up ratios across the market in question. Herein, AEP Texas proposes and applies an alternative formula -- called the "generalized percentage reduction" rule -- that allocates relief *based on the maintenance of the ratios of price markups over marginal cost.*[41]

Examination of the workpapers that reflect AEP Texas' implementation of its generalized percentage reduction procedure reveals that AEP Texas has not in fact maintained the ratios of price markups over marginal cost.[42]

The way AEP Texas actually computed the rate reduction for the movements in its stand-alone traffic group, including the issue traffic, was to employ the following iterative process for each quarter of the DCF period:

1. Rank order the TNR traffic movements in each quarter by revenue-to-"marginal cost" ratios, highest to lowest;[43]

2. Determine the amount by which TNR revenues in the quarter must be reduced to ensure that overall stand-alone revenues are equal to overall stand-alone costs across the DCF period.

3. Begin the iterative process by reducing revenues for the movement with the highest revenue-to-"marginal cost" ratio until its revenue-to-"marginal cost" ratio just equals the revenue-to-"marginal cost" ratio for the movement rank ordered

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[41] AEP Opening Narr. at III-G-30, emphasis supplied.

[42] AEP Texas' application of the "generalized percentage reduction" rule to the TNR is reflected in AEP Texas' Opening electronic workpapers "2000-Q2 AARM.xls" through "2020-AARM.xls," and "Alternative Rate Reduction Rev Ton and Mile Inputs1.xls," "Final SAC Netting and Index.xls," and "AARM Template.xls."

[43] Marginal costs are those developed by the process described in AEP Texas' Exhibit III-G-12.

just below (*i.e.*, the movement with the second highest revenue-to-"marginal cost" ratio).

4. Check to see whether the resulting revenue reduction is sufficient to completely eliminate the quarter's excess revenues, as identified in step 2. If yes, go to step 7; if not, proceed to step 5.

5. Sequentially reduce the revenues for the movements with the highest *two* revenue-to-"marginal cost" ratios until their revenue-to-"marginal cost" ratios just equal the revenue-to-"marginal cost" ratio of the movement rank ordered 3.

6. Repeat steps 4 and 5, sequentially reducing the revenue-to-"marginal cost" ratios for each move above the iteration cut-off point down to the revenue-to-"marginal cost" ratio of the rank ordered move just below the iteration cut-off point until the cumulative revenue reductions are sufficient to eliminate the quarter's excess revenues, as identified in step 2.

7. The prescribed rate for the issue traffic is the revenue per ton shown for the issue traffic movement at the end of the *prior* iteration.

This approach does not come close to "maintaining the ratios of price markups over marginal costs," as AEP Texas claims that it does. Instead, all of the movements above the iteration cut-off point end up exhibiting *identical* ratios of revenue to "marginal costs," while *none* of the movements below the iteration cut-off point experience any rate reduction at all. The prescribed rates that AEP Texas calculates thus bear no resemblance to Ramsey prices.

H. RESULTS OF SAC ANALYSIS

As discussed in Section III.G, BNSF has calculated the TNR's cost of moving coal to AEP Texas's Oklaunion facility. The results of those calculations are summarized in the table at the end of this Section and set out in detail in Exhibit III.H-1. The following paragraphs describe the contents of Exhibit III.H-1.

1. Road Property Investment Values

The calculation of road property investment costs is based on construction cost as of June 16, 2000. This calculation is summarized in Table C. The investment cost incorporates the amount of investment the residual TNR would be required to incur for the procurement of equity financing.

2. Interest During Construction

Interest During Construction ("IDC") accrues on the assets of the TNR. Table D contains both the total IDC amount and the IDC amount that is debt-related. IDC is calculated based on the investment values in Table C, the composite cost of capital from Table A, and the length of finance period for each account. The construction schedule described in Section III.F determines the length of the finance period for each asset account. The amount of IDC that is debt-related is calculated by multiplying the investment by the length of the finance period, the TNR's percentage of debt, and the cost of debt. For tax purposes, the debt-related IDC is shown as an interest deduction during the construction period.

3. Amortization Schedule of Assets Purchased With Debt Capital

Table E is the amortization schedule for the debt-related portion of the TNR's investment. The debt principal is developed by multiplying the debt percentage from Table A – for the appropriate investment period – by the sum of the total investment and the interest during construction. The quarterly annuity payment is then calculated based on the principal, the debt

rate from Table A, and the DCF model life of 83 quarters. The amount of interest included in the quarterly payment is calculated by multiplying the beginning balance (*i.e.*, the principal in the first period) by the interest rate.

4. Present Value of Replacement Cost

Table F calculates the additional investment (on a present value basis) the TNR would have to make if the hypothetical railroad replaced each asset indefinitely at the end of each asset's life. This additional investment is added to the initial investment in Table I prior to determining the quarterly cash flows.

5. Tax Depreciation Schedules

Table G displays the tax depreciation required under the Federal Tax Code currently in effect.[1] Investment in communications (Account 26), signals and interlockers (Account 27), and the track accounts (Accounts 8-12) was depreciated over seven (7) years employing a 200 percent declining balance methodology switching to straight-line depreciation when the straight line percentage exceeds the declining balance percentage. Investment in bridges and culverts (Account 6), public improvements (Account 39), fences and roadway signs (Account 13), roadway buildings (Account 17), fuel stations (Account 19), shops and enginehouses (Account 20) and public improvements (Account 39) was depreciated over 15 years using a 150 percent declining balance method switching to straight-line depreciation. Investment in grading (Account 3) was amortized over 50 years using straight-line amortization. Engineering (Account 1) was amortized over five (5) years using straight line amortization.

[1] The mandatory method for depreciating most tangible property placed in service after December 31, 1986 is the Modified Accelerated Cost Recovery System ("MACRS").

6. Average Annual Inflation In Asset Prices

Table H calculates the average annual inflation rate that is applied to the capital recovery charge in Table I. The weighted average inflation rate was used because Table H calculates the required capital recovery necessary to return the investment. All road property accounts are indexed at the quarterly rates shown in Table B. The weighted average inflation rates are based on the inflation indexes discussed above in Section III.G.

7. Discounted Cash Flow

Table I displays the calculation of the capital carrying charge and associated flow of funds required to recover the total road property investment. Inputs to this spreadsheet were taken from the tables described above. The quarterly capital recovery stream reflects the tax benefits associated with interest on the investment financed with debt from Table E and the road property tax depreciation from Table G. The cash flow shown in Column (8) of Table I is the amount remaining each quarter after the payment of federal and state tax liabilities. This cash flow is used for payment of return on and return of total investment in the TNR. This quarterly figure is then discounted by the fourth root of the composite annual cost of capital from Table A, adjusted to reflect the asset being placed in service on July 1, 2000. The present value cash flow is then summed for each quarter along with the future cash flow and the total equals the total cost that must be recovered. The future cash flow is the residual value of the unconsumed assets of the TNR and serves to reflect the cash flow required to account for the value of the assets not consumed during the life of the DCF model.

The development of the quarterly levelized capital carrying charge requirement is a relatively simple calculation, *i.e.*, starting capital carrying charge requirement multiplied by the quarterly index factor from Table H that will recover total investment during the DCF model period. The starting capital carrying charge requirement that recovers the total investment is

developed through an iterative process in which an arbitrary starting cost per ton is adjusted upward or downward as necessary until the starting quarterly charge yields a cumulative present value cash flow that just equals the required investment.

8. Computation Of Tax Liability -- Taxable Income

Table J - Part 1 displays the calculation of the TNR federal tax liability. The procedures followed to develop the federal tax liability are those discussed in Section III.G.3. Table J - Part 2 displays the calculation of the TNR state income tax liability, as discussed in Section III.G.

9. Operating Expenses

Table K displays the operating expenses incurred in each year of the TNR's operation based on the traffic levels described earlier. BNSF corrected an apparent oversight by AEP Texas regarding the indexing of trackage rights charges for changes in annual traffic volumes. Trackage rights charges vary annually with changes in traffic volumes and should be indexed by annual tons.

Table K uses the annual operating costs, states them on a quarterly basis, and indexes them to reflect inflation over the life of the TNR based on the RCAF-U inflation adjusted for productivity that might be expected to be incurred by the TNR.

10. Summary of SAC

The total SAC for the TNR based on investment and operating costs is summarized in Table L of Exhibit III.H-1. The capital requirement from Table I and the annual operating expenses from Table K are presented and summed in Table L for each year the TNR operates. The following tables summarize these results.

Table III.H-1

Summary of Stand-Alone Cost Results - TNR
(All Figures in Millions of Dollars)

Year	Annual Revenue	Stand-Alone Cost	Difference
2000	$346.2	$445.5	($99.3)
2001	$654.6	$804.2	($149.7)
2002	$657.0	$809.5	($152.6)
2003	$629.8	$828.0	($198.2)
2004	$636.6	$843.0	($206.4)
2005	$615.9	$846.7	($230.8)
2006	$634.1	$869.7	($235.6)
2007	$649.9	$894.6	($244.6)
2008	$668.1	$916.6	($248.5)
2009	$687.2	$946.2	($259.0)
2010	$673.8	$970.8	($297.0)
2011	$690.9	$996.2	($305.3)
2012	$710.4	$1,023.6	($313.2)
2013	$726.3	$1,050.6	($324.3)
2014	$744.8	$1,076.6	($331.9)
2015	$761.6	$1,103.0	($341.5)
2016	$782.9	$1,131.9	($349.1)
2017	$800.2	$1,159.9	($359.7)
2018	$812.1	$1,185.8	($373.7)
2019	$833.8	$1,216.1	($382.4)
2020	$851.7	$1,246.7	($395.1)

As noted above, the full results of the SAC analysis are contained in Exhibit III.H-1.

IV. WITNESS VERIFICATIONS

1. Gerald G. Albin

BNSF's principal on maintenance of way witness is Gerald G. Albin of TranSystems Corporation. Mr. Albin has many years of experience constructing and maintaining rail lines subject to heavy tonnage and time-sensitive freight. From 1970 through 1980, he held the positions of Assistant Maintenance Engineer, Regional Engineer, and Maintenance Engineer for The Burlington Northern Railroad Company ("BN") (predecessor to BNSF). From 1980 to 1988, he held various staff positions (Director & Assistant Director Maintenance Planning) in St. Paul and Kansas City as well as working for four years as Chief Engineer of the BN Springfield Region. From 1988 to 1995, he held the positions of Director Engineering, Chief Engineer Field Operations, Superintendent Roadway Engineering, and Assistant Chief Engineer of Design/Construction for the Southern Region of BN. During that period, Mr. Albin was directly in charge of maintenance and engineering activities on the TNR route. He has managed the construction of coal track including the design and construction of the grading, drainage structures, track and signal work. Mr. Albin has extensive experience supervising maintenance activities, and is well acquainted with the practice and problems associated with maintenance on lines experiencing similar tonnages and traffic as AEP Texas proposes for TNR. Thus, he is well positioned and highly qualified to critique AEP Texas' evidence and opine on the actual maintenance requirements for these lines.

Mr. Albin sponsors evidence relating to maintenance-of-way costs set forth in Section III.D.4 in the Reply Evidence. Mr. Albin has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 19, 2004

Gerald G. Albin

2. Michael R. Baranowski

Michael R. Baranowski is a Senior Managing Director at FTI Consulting, Inc., an economic and financial consulting firm. His business address is 1201 Eye Street, N.W., Suite 400, Washington, DC 20005. Since 1980, Mr. Baranowski has been involved in many aspects of transportation consulting including operational analyses, terminal switching studies, facility and equipment valuation, liquidation studies, merger studies as well as a variety of cost studies including the development of both short and long run marginal cost, variable cost and stand-alone costs. He has been responsible for developing costs and working with the Board's discounted cash flow model in stand-alone cost proceedings since 1987 and has sponsored testimony in a number of those proceedings including the *APS, Potomac Elec. Power Co. v. CSX Transp., Inc, WPL, Duke Energy Co. v. CSX Transp. Co., Duke Energy Co. v. Norfolk Southern Ry. Co.*, and *Carolina Power & Light v. Norfolk Southern Ry. Co.* cases.

Mr. Baranowski received his Bachelor of Science in Accounting degree from Fairfield University in 1980. In 1988, he joined Klick, Kent & Allen, Inc. ("KK&A"), which was acquired by FTI Consulting in 1998. While with KK&A and FTI, Mr. Baranowski has conducted a wide range of studies in both the transportation and telecommunications industries and testified in proceedings before the Interstate Commerce Commission, Surface Transportation Board, Federal Communications Commission, and various State Utility Commissions.

Mr. Baranowski is sponsoring evidence relating to Section III.F.2 Roadbed Preparation and the Board's DCF model and SAC calculations contained in Sections III.G.1-4 and III.H. Mr. Baranowski has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 21, 2004

Michael R. Baranowski

3. Robert H. Baughman, P.E.

Robert H. Baughman is a Vice President and Project Manager at Ralph Whitehead Associates, an engineering consulting firm. His business address is 1000 West Morehead St., Charlotte, NC 28208. Mr. Baughman's duties include corporate management and administration, overseeing and directing all of Ralph Whitehead Associates' services to the railway industry, and project management, including the coordination and supervising the preparation of computations, plans, and specifications on many large transportation projects. These have included: the planning and design services for a two-mile trolley line along an abandoned railway corridor, the bridge structure for a 42-inch water line with cast-in-place retaining walls in a $24 million project, fifteen highway bridges in North Carolina, South Carolina and Georgia, four railway bridges in North Carolina, South Carolina, and Georgia, and retaining walls for the widening of I-75, and numerous railway track, bridge and facility projects under on-call agreements with Class I and shortline railroads.

Mr. Baughman is a 23 year veteran of the railroad industry. He received his Bachelor of Science degree in Civil Engineering from Ohio Northern University in 1979. He earned a Masters in Business Administration from the University of North Carolina at Charlotte in 1984. He holds licenses as a Registered Professional Engineer in Alabama, North Carolina, Ohio, and Kansas. He is also a member of the North Carolina Council of Engineering Companies, the American Society of Civil Engineers, and the National Society of Professional Engineers.

Mr. Baughman is sponsoring evidence relating to Sections III.F.9 Mobilization, III.F.10 Engineering/Construction Management and III.F.11 Contingencies. He has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 17, 2004

Robert H. Baughman, P.E.

4. Harry W. Bues III

Harry Bues is a Senior Consultant at FTI Consulting, Inc., an economic and financial consulting firm. His business address is 1201 Eye Street, N.W., Suite 400, Washington, DC 20005. With over forty years of experience working with the railroad industry, Mr. Bues is an expert at railroad regulatory cost analysis, return on investment analysis, cost benefit analysis, acquisitions and valuation services. Mr. Bues has provided expert testimony in over 100 rate and abandonment cases and merger proceedings before the Interstate Commerce Commission, Surface Transportation Board and state regulatory agencies, as well as on arbitration proceedings involving pricing, escalation clauses and operation rights for the major railroads in the United States and Canada.

Prior to joining FTI in 1998, Mr. Bues served as a Principal/Consultant for Klick Kent & Allen, which was acquired by FTI. There he measured costs and revenues for various service levels by segment and the contribution and developed PC-based processes for the allocation of total system expenses. Mr. Bues held senior level positions at Southern Railway Company, Amtrak, and Frank S. Harris & Associates. He served as a consultant for Snavely King & Associates for five years.

Mr. Bues holds a B.S. in Industrial Economics from Purdue University. He completed management programs from the American University and Northwestern University.

Mr. Bues sponsors evidence relating to the TNR's fuel consumption and costs set forth in Section III.D.1 in the Reply Evidence. Mr. Bues has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Harry S Bues, III

5. Anthony W. Deichert

Anthony W. Deichert is currently the General Superintendent Coal Operations for BNSF, a position he has held since 1998. His business address is 2650 Lou Menk Drive, Fort Worth, Texas 76131. In his position, Mr. Deichert is responsible for managing the operations of BNSF coal trains, including operations from the Powder River Basin. Mr. Deichert began his career in the railroad industry in 1975 as a Train Order Operator in the Powder River Basin with BNSF's predecessor, Burlington Northern ("BN"). He has held a variety of positions at BN and BNSF in the operations department -- all related to Powder River Basin coal operations. He served as Chief Dispatcher at Alliance, Nebraska, between 1977 and 1988; Transportation Manager at Denver, Colorado, from 1988 to 1991; Coal Superintendent in Denver and then Fort Worth, Texas from 1991 to 1996; and Corridor Superintendent from 1996 to 1998, when he assumed his current position.

Mr. Deichert is sponsoring evidence relating to the operations of BNSF coal trains. His evidence is incorporated in Sections II.A and III.A.3 of the Narrative. Mr. Deichert has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May ____, 2004

_____
Anthony Deichert

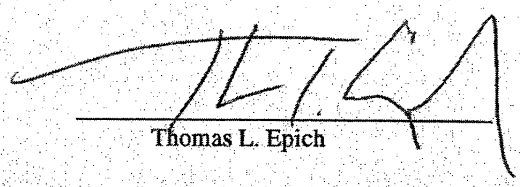
6. Tom Epich

Thomas L. Epich is a Director of Coal Marketing for BNSF. His business address is 2650 Lou Menk Drive, Fort Worth, Texas 76131-0051. He has been employed by BNSF since July 1995. In his present position of coal marketing director, he is responsible for managing utility and other coal consuming customers located in many states in eastern Missouri, the Southeast region of the of the United States and the state of Oklahoma including the account with Tennessee Valley Authority ("TVA"). Prior to joining BNSF in July 1995, he was employed by the Chicago and North Western Railway Company ("C&NW'). Mr. Epich started in C&NW's Coal Marketing Department in 1983 and his last position at C&NW was the Senior Manager-East of coal marketing. In this position, he performed similar functions to those that he currently performs at BNSF.

Mr. Epich is sponsoring evidence relating to one of his customers, TVA. His evidence is incorporated in Section III.A.3 of the Narrative. Mr. Epich has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 19, 2004



Thomas L. Epich

7. Benton V. Fisher

Benton V. Fisher is a Managing Director at FTI Consulting, Inc., an economic and financial consulting firm with offices located at 1201 Eye Street, N.W., Suite 400, Washington, DC, 20005. Since 1991, Mr. Fisher has been involved in various aspects of transportation consulting including economic studies involving costs and revenues, traffic and operating analyses, and work with performance measurement and financial reporting systems.

Mr. Fisher holds a Bachelor of Science in Engineering degree from Princeton University. In 1990, he served as the Deputy Controller for the Bill Bradley for U.S. Senate Campaign. In 1991, he joined Klick, Kent & Allen, Inc., which was acquired by FTI Consulting, Inc. in 1998. While with the firm Mr. Fisher has performed numerous analyses for and assisted in the preparation of expert testimony related to merger applications, rate reasonableness proceedings, contract disputes, and other regulatory costing issues before the Interstate Commerce Commission, Surface Transportation Board, Federal Energy Regulatory Commission, Postal Rate Commission, Federal Court, and State Utility Commissions.

Mr. Fisher is sponsoring evidence relating to the revenue divisions for cross-over traffic, locomotive operating expenses (other than fuel), railcar operating expense, road crew personnel, and T&E salaries for the TNR. His evidence is incorporated in Sections II.A, III.A. and III.D.1, D.2, and D.3 of the Narrative. Mr. Fisher has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Benton V. Fisher

Benton V. Fisher

8. Cassie M. Gouger, P.E.

Cassie M. Gouger is a Manager at FTI Consulting, Inc., an economic and financial consulting firm with offices located at 1201 Eye Street, N.W., Suite 400, Washington, DC, 20005. Ms. Gouger is a registered professional civil engineer in the states of Colorado, Illinois, and Wyoming. She has over eleven years experience working on track and yard construction projects for Class 1 railroads, and has assisted in the preparation of engineering testimony on numerous cases before the STB.

Ms. Gouger received a Bachelor of Science Degree in Civil Engineering from Purdue University in 1993, during which she worked for the major national engineering firm of DeLeuw Cather. In 1993 she joined DeLeuw Cather full-time and served as a Construction Inspector of an 18-mile railroad construction project as well as a Design Engineer on railroad capacity improvements. In 1996, Ms Gouger became a Project Manager and Railroad Engineer for TranSystems, Inc. where she designed over 110 miles of new single, double and triple mainline and spur tracks for Class I railroads, including over 20 miles of the Orin Line. She has also assisted in the design of yards and bridges, as well as track upgrading projects. She continued her work as a Transportation Engineer with Felsburg, Holt and Ullevig from 2001 to 2004, where she managed the design team in construction plans, specifications and construction management. She has recently joined FTI where she utilizes her engineering background to provide input for stand-alone cost construction studies.

Ms. Gouger is sponsoring evidence relating to track and bridge construction, as well as signals and communications, and public improvements. Her evidence is incorporated in Sections III.F.3, III.F.4, III.F.5, III.F.6 and III.F.8 of the Narrative. Ms. Gouger has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Cassie M. Gouger

Cassie M. Gouger

9. Richard S. Higgins, Ph.D.

Richard S, Higgins is a Director of LECG, LLC, an economic consulting firm. His business address is 1725 Eye Street, N.W., Suite 800, Washington D.C., 20006. He holds a Ph.D. in Economics from the University of Virginia, and a Bachelors of Arts Degree in Economics from Louisiana State University. In 1969, Dr. Higgins began an eleven year academic career teaching economics at the University of Georgia, followed by teaching positions at the University of Chicago and Auburn University.

In 1980, he joined the Federal Trade Commission as an Economist and before leaving in 1987 to pursue private practice, he served as Deputy Director for Competition and Antitrust, and supervised numerous merger and non-merger investigations, oversaw multiple economic and statistical analyses in administrative proceedings, as well theoretical and empirical studies on the economics of governmental regulation. In 1990, he joined Capital Economics, Ltd., an economic consulting firm, serving as President for three years. In 2002 he joined LECG as a Director, where he provides financial and economic consulting services, including serving as an economic expert in numerous court, agency and arbitration proceedings.

A copy of Dr. Higgins resume, including a list of his extensive publications as well as a statement of his relevant experience, accompany this verification.

Together with Fred S. McChesney, Dr. Higgins sponsors evidence relating to AEP Texas' rate reduction proposal in Section III.G.5 of BNSF's reply evidence. A joint Declaration by Dr. Higgins and Professor McChesney regarding the rate reduction issue is included in BNSF's Reply Evidence as Exhibit III.G-1. He has signed a verification of the truth of the statements contained therein. A copy of Dr. Higgins' verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 18, 2004

Richard S. Higgins

RICHARD S. HIGGINS, Ph.D.

OFFICE

LECG, LLC
1725 Eye Street, NW
Suite 800
Washington, DC 20006
Tel (202) 466-4422
Fax (202) 466-4487
Email rhiggins@lecg.com

EDUCATION

Ph.D.:	Economics, University of Virginia (1969).
B.A.:	Economics, Louisiana State University (1966).

EMPLOYMENT

Director; LECG, LLC, Washington, D.C. (2001 - Present).

President; Capital Economics, Washington, D.C. (1998-2001).

Senior Vice President; Capital Economics, Washington, D.C. (1990-1998).

Economist; Capital Economics, Washington, D.C. (1987-1990).

Deputy Director; Competition and Antitrust, Federal Trade Commission, Washington, D.C. (1986-1987).

Deputy Director; Consumer Protection and Regulatory Analysis, Federal Trade Commission, Washington, D.C. (1983-1985).

Associate Director of Evaluation, Federal Trade Commission, Washington, D.C. (1981-1982).

Economist; Federal Trade Commission, Washington, D.C. (1980-1981).

Visiting Scholar; Consumer Product Safety Commission, Washington, D.C. (1978-1979).

Associate Professor Economics; Auburn University (1976-1980).

Walgreen Post-Doctoral Fellow; University of Chicago (1975-1976).

Assistant Professor of Economics; University of Georgia (1969-1975).

RELEVANT EXPERIENCE

Antitrust

Supervised numerous merger and non-merger investigations while Deputy Director for Antitrust and Competition, Bureau of Economics, Federal Trade Commission. Supervised economic and statistical analysis in support of mergers investigated by the Federal Trade Commission and the Antitrust Division of the Department of Justice.

Regulation

As Deputy Director for Regulatory Analysis, Bureau of Economics, Federal Trade Commission, supervised several cost/benefit studies of government regulation, including CAFE standards, state territorial restrictions on auto dealerships, airport landing slot allocation, life insurance cost disclosure, the automobile VRA's and tariffs and quotas. Published several theoretical and empirical studies in the economics of regulation.

International Trade

As Deputy Director for Regulatory Analysis, Bureau of Economics, Federal Trade Commission, supervised several economic analyses in support of the Federal Trade Commission's briefs in cases before the International Trade Commission, including Escape Clause, Dumping and Subsidy cases.

Consumer Protection

As Deputy Director for Consumer Protection, Bureau of Economics, Federal Trade Commission, supervised economic analysis in rulemakings and administrative investigations, including the Credit Practices, Food and Used-Car Rules and false advertising, credit discrimination and auto defects cases. Published several theoretical and empirical analyses of advertising regulation and products liability.

TESTIMONY

Oral testimony given in arbitration on March 16, 2004 in the Superior Court of the State of Georgia, Baan v. Drs. Ratliff and Nulty.

Deposition testimony given on March 9, 2004 in the Superior Court of the State of Georgia, Baan v. Drs. Raliff and Nulty, Arbitration.

Expert Report given in January 2004 in the matter of Baan v. Drs. Ratliff and Nulty, Arbitration, in the Superior Court of the State of Georgia.

Deposition testimony given on April 8, 2002 in the U.S. District Court for the Eastern District of Louisiana, , Civil Action No. 99-0771 Section "C" Magistrate (1). Infusion resources, Inc. and Diabetes Resources, Inc. D/B/A Insulin Infusion Specialties v. Minimed, Inc.

Expert Report given in January 2002 in the matter of Federal Trade Commission v. First Alliance Mortgage Corporation.

Testimony in Administrative Hearing given in October 2001 in the matter of PDK Laboratories, Inc. v. Drug Enforcement Administration, U. S. Department of Justice.

Declaration in Administrative Hearing given in October 2001 in the matter of PDK Laboratories, Inc. v. Drug Enforcement Administration, U. S. Department of Justice.

Deposition testimony given on March 28, 2000 in the U.S. District Court for the Northern District of Georgia, Atlanta Division, Civil Action No. 1:97-CV: 1821 CAM. Penalty Kick Management, Ltd. v. The Coca-Cola Company.

Affidavit filed in January 2000 in the U.S. District Court for the Northern District of Georgia, Atlanta Division, Civil Action No. 1:97-CV: 1821 CAM. Penalty Kick Management, Ltd. v. The Coca-Cola Company.

- Expert Litigation: Aircraft engines; Report.
- Expert Litigation: Medical devices; Deposition.
- Expert Litigation: Medical devices; Report
- Expert Litigation: Department stores; Report
- Regulatory Testimony: Telecommunications; Report

- Regulatory Testimony: Cellular telecommunications; Report
- Expert Testimony: Construction; Report

PUBLICATIONS/PRESENTATIONS

Publications

"Spatial Competition and Merger," with P. Johnson and J. Sullivan, Topics in Economic Analysis & Policy: Vol. 4: No. 1, Article 3.

"An Economic Theory of Boycotts: A Role for Ideology," in Economic Policy in an Orderly Framework, Jurgen Backhaus, W. Heijmann, A. Nentjes and J. van Ophem (Eds.), Lit Verlag Muenster, 2003, pp. 212 – 222.

"The Mean Effect of Structural Change on the Dependent Variable is Accurately Measured by the Intercept Change Alone," with Paul Johnson, Economics Letters, 2003, pp. 255 - 259.

"A Short-run Welfare Analysis of FTC Antitrust Oversight of Patent Litigation Settlements under the Hatch-Waxman Act," Antitrust Bulletin, Winter 2002, 661 - 677.

"A Geometric Treatment of Discriminatory Pricing Among Spatially Competitive Suppliers, with Antitrust Applications," Managerial and Decision Economics, Volume 20, 1999, pp. 347-445.

"Competitive Vertical Foreclosure," Managerial and Decision Economics, Volume 20, 1999, pp. 229-237.

"The Causes and Consequences of the Aluminum MOU," with Mark Glueck, David Kaplan and Michael McDonald, in The Role of Economists in Antitrust Analysis, edited by Fred McChesney, John Wiley & Sons, 1998.

"Diagonal Merger," Review of Industrial Organization, August 1997, pp. 609-623.

"An Economic Theory of Leadership Choice in Stackelberg Models," Journal of Economic Studies, Volume 23, No. 5, 1996.

Deregulating Telecommunications, edited by Richard Higgins and Paul Rubin, John Wiley & Sons, London, 1995.

"Empirical Tests of RBOC Leveraging and Cross-Subsidization," with Michael J. McDonald, in Deregulating Telecommunications, John Wiley & Sons, London, 1995.

"The Cost and Benefits of the AT&T Antitrust Settlement," Managerial and Decision Economics, August 1995, pp. 1-7.

"Residual Demand Analysis of the Carbonated Soft Drink Industry," Empirica, with David Kaplan, Michael McDonald and Robert Tollison, 1995.

"Bureaucracy and Politics in FTC Merger Challenges," Journal of Law and Economics, with M. Coate and F. McChesney, October 1990. Reprinted in The Causes and Consequences of Antitrust, edited by Fred McChesney and William Shughart, University of Chicago Press, 1995.

Competition and Concentration: The Economics of the Carbonated Soft Drink Industry, with R. Tollison and David P. Kaplan, Lexington Books, D.C. Heath and Company, Lexington, Mass., 1990.

"Economics at the Track," Sportometrics, edited by B. Goff and R. Tollison, Texas A&M University Press, College Station, Texas, with R. Tollison, 1990.

"The Political Economy of Merger Between Regulated Utilities," Predicting Politics; Essays in Empirical Public Choice, edited by W. Mark Crain and R. Tollison, University of Michigan Press, Ann Arbor, Michigan, with W. Shughart and R. Tollison, 1990.

"Rational Self-Taxation: Complementary Inputs and Excise Taxation," Canadian Journal of Economics, with W. Shughart and R. Tollison, August 1987.

"Input Market Definition Under Department of Justice Merger Guidelines," Review of Industrial Organization, Vol. 4, with W. Shughart, 1989.

"Price Leadership with Incomplete Information," Journal of Economic Behavior and Organization, with W. Shughart and R. Tollison, 1989.

"Life Among the Triangles and Trapezoids," The Political Economy of Rent Seeking, with R. Tollison, edited by C. Rowley, R. Tollison and G. Tullock, Kluwer Academic Publishers, Boston, 1988.

"Free Entry and Efficient Rent Seeking," Public Choice, No. 3, with W. Shughart and R. Tollison, 1985; reprinted in The Political Economy of Rent Seeking, edited by C. Rowley, R. Tollison and G. Tullock, Kluwer Academic Publishers, Boston, 1988.

"Managerial Rents and Outside Recruitment in the Coasian Firm," American Economic Review, with R. Faith and R. Tollison, September, 1984; reprinted in The Political Economy of Rent Seeking, edited by C. Rowley, R. Tollison and G. Tullock, Kluwer Academic Publishers, Boston, 1988.

"Substantive Due Process and the Extent of Government Regulation," International Review of Law and Economics, with G. Anderson, December 1987.

"Truth and Consequences: The FTC's Ad Substantiation Program," International Journal of Law and Economics, with F. McChesney, December 1986; reprinted in The Political Economy of Regulation, edited by R. Mackay, J. Miller and B. Yandle, Hoover Institution Press, 1987.

"Dual Enforcement of the Antitrust Laws," The Political Economy of Regulation, edited by R. Mackay, J. Miller and B. Yandle, Hoover Institution Press, with W. Shughart and R. Tollison, 1987.

"Counterfeit Goods," Journal of Law and Economics, with P. Rubin, October 1986.

"The Behavior of Regulatory Activity Over the Business Cycle," Economic Enquiry, with R. Amacher, W. Shughart, and R. Tollison, January 1985.

"Warranty Tie-Ins and Efficient Insurance Contracts: A Theory and Three Case Studies," Research in Law and Economics, Vol. 6, with J. Eisenach and W. Shughart, 1984.

"Capital Fixity, Innovations, and Long-Term Contracting: An Intertemporal Economic Theory of Regulation," American Economic Review, with R. Ekelund, Jr., March 1982.

"Products Liability Insurance, Moral Hazard and Contributory Negligence," Journal of Legal Studies, January 1981.

"A Note on Input Variation Under Discriminating Monopsony," Southern Economic Journal, with R. Ekelund, Jr. and C. Smithson, January 1981.

"The Effect of Futures Trading on Price Variability in the Market for Onions," Atlantic Economic Journal, with R. Holcombe, July 1980.

"Empirical Estimation of the Household Demand for Product Safety," Journal of Behavioral Economic, with A. Link, Summer 1980.

"The Effect of Truth in Lending on Consumer Bankruptcy," Journal of Consumer Credit Management, with A. Link, 1980.

"Judicial Discretion," Journal of Legal Studies, with P. Rubin, January 1978.

"Producers' Liability and Product-Related Accidents," Journal of Legal Studies, June 1978.

"A Note on the Axioms of Classical Micro-Economic Models," Indian Journal of Economics, with C. Morrison, January 1974.

"A Note on Comparative Statics Analysis In (In) Equality Constrained Models," Southern Economic Journal, with C. Morrison, April 1973.

"A Further Note on Distributional Equality," Southern Economic Journal, with C. Morrison, January 1973.

"Microeconomic Foundations of Investment and Stock-Flow Analysis," Western Economic Journal, March 1972.

"Satiation in Consumer Preference and the Demand Law," Southern Economic Journal, 1972.

"On Distributional Equality," Southern Economic Journal, with C. Morrison, 1972.

Working Papers

"The New Learning: Carbonated Soft Drinks and the FTC," with David P. Kaplan and Robert Tollison, Center for the Study of Public Choice Working Paper, George Mason University, February 1992.

"Stock Options, Executive Compensation, and Stockholder Disclosure," with David P. Kaplan, April 1992.

"Capital-Goods Market Definition," Bureau of Economics Working Paper No. 156, FTC, October 1987.

HONORS/PROFESSIONAL AFFILIATIONS

Member, Phi Beta Kappa, University of Virginia, 1969.
Member, American Economic Association.
Associate Member, American Bar Association.

10. Lonnie Jarrell

Lonnie Jarrell is Director Fuel Logistics for BNSF. His business address is 2600 Lou Menk Drive, Fort Worth, TX 96131-2800. Mr. Jarrell is a 36-year railroad veteran. He served in various leadership capacities for BNSF and its predecessors in the Transportation, Operations, Sales & Service, Marketing, Intermodal, Finance & Administration and Operations Support departments before joining the Fuel Management Group in 1996. From 1996 to 2000, Mr. Jarrell held the position of Manager Fuel Logistics, and from 2000 to 2001, the position of Director Fuel Acquisition. He has been in his current position since 2001. As Director Fuel Logistics, Mr. Jarrell is responsible for fuel management capital planning, fuel systems technology design and development and direct-to-locomotive (DTL) planning and operations.

Mr. Jarrell sponsors evidence relating to the TNR's fuel sources and costs set forth in Section III.D.1 of the Reply Narrative. Mr. Jarrell has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Lonnie Jarrell

Lonnie Jarrell

11. Christopher D. Kent

Christopher D. Kent is Senior Managing Director of FTI Consulting, Inc., an economic and financial consulting firm. His business address is 1201 Eye Street, N.W., Suite 400, Washington, DC 20005. He holds a Bachelor of Arts degree from the University of Virginia. In 1970, he joined Western Electric, Inc. as a Management Trainee in its "High Risk-High Reward" program. During the next six years, he was promoted through various levels in the production, production scheduling, and costs and forecasting departments.

Since 1977, Mr. Kent has been involved in various aspects of transportation including traffic analyses, economic studies including costs and revenue analyses, railroad valuations, and the development of railroad operating plans, railroad facility plans and rolling stock requirements.

In 1977, Mr. Kent joined Conrail as Project Manager and worked primarily in assisting the Operating Department in optimizing fleet availability.

In 1978, Mr. Kent was employed by the United States Railway Association as Manager of Equipment and Facilities. He was subsequently appointed Chief, Equipment and Facilities, Rail Asset Valuation, in the Office of General Counsel. In this capacity, he supervised a staff of in-house professionals and outside consultants in developing the equipment, maintenance of way, and operating evidence submitted by the U.S. government in the valuation proceedings before the Special Court created under Sections 303(c) and 306 of the Regional Rail Reorganization Act.

In 1980, Mr. Kent formed Kent Associates, a consulting firm dealing with operating, transportation and marketing issues for various clients. Kent Associates was affiliated with the Washington Management Group, and Mr. Kent served as Vice President of that firm.

In 1984, Mr. Kent joined the economic consulting firm of Snavely, King & Associates, Inc. as a Senior Consultant. While with that firm, he participated in numerous studies related to Section 229 proceedings and anti-trust litigation.

In 1987, Mr. Kent founded Klick, Kent & Allen, Inc. ("KK&A"), an economic and financial consulting firm. He served as a Principal of KK&A until its acquisition by FTI Consulting, Inc. in June 1998.

Mr. Kent has presented testimony in the valuation proceedings before the Special Court, the House of Courts of Justice Committee of the Virginia General Assembly, various state courts and federal courts and the Interstate Commerce Commission and Surface Transportation Board.

Mr. Kent is sponsoring evidence relating to the calculation of operating costs, general and administrative expenses and real estate valuation contained in Section III.D and III.F.1. Mr. Kent has signed a verification of the truth of the statements contained therein. A copy of Mr. Kent's verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Christopher D. Kent

12. John C. Klick

John C. Klick is a Senior Managing Director of the economic and financial consulting firm of FTI Consulting, Inc. The firm's offices are located at 1201 Eye Street, N.W., Suite 400, Washington, DC 20005.

Mr. Klick graduated in 1970 from Bates College with a Bachelor of Science degree in Mathematics. He also has taken graduate courses in finance, accounting, and operations research. Since 1970, he has been involved continuously in cost-based economic and financial studies for a variety of industries.

Throughout Mr. Klick's career, he has organized and directed cost and economic studies for service providers, state governments, and other public bodies dealing with railroads, pipelines and other network industries. Examples of past studies that he has participated in include (1) organizing and directing traffic, operational, and cost analyses in connection with the valuation of northeastern rail property transferred to the Consolidated Rail Corporation, (2) calculation of stand-alone and long-run incremental costs for major segments of the nation's railroad industry, (3) estimation of the long-run incremental costs of providing various aspects of local telecommunications services, and (4) calculation of marginal, incremental and stand-alone costs for services performed by a major petroleum products pipeline company. Virtually all of these studies have involved the development and/or use of complex, computerized cost models that make extensive use of detailed engineering and operating input and incorporate sophisticated discounted cash flow techniques.

In addition, Mr. Klick has undertaken studies related to economic issues and analysis such as the effects of productivity and inflation on the costs of operations, forecasts of traffic volumes and corresponding resource requirements, and valuations of services and facilities.

The results of these studies frequently have been presented in both oral and written testimony before the Surface Transportation Board (and its predecessor, the Interstate Commerce Commission), the Federal Energy Regulatory Commission, state public utility commissions, arbitration panels, and the federal and state courts. This testimony has related to subjects such as the development of variable cost of service, marginal costs, incremental costs, stand-alone costs, economic principles related to the maximum and minimum level of rates, and procedures for implementing these maximum and minimum rate principles.

Mr. Klick is sponsoring evidence regarding flaws in AEP Texas' volume and revenue assumptions, AEP Texas' cross-over revenue divisions methodologies, including the conceptual flaws in AEP Texas' reliance on cross-over traffic, and revenue forecasts. He also sponsors evidence regarding BNSF's modified volume and revenue assumptions, including testimony regarding the development and implementation of BNSF's proposed density adjusted revenue allocation ("DARA") procedure. He also sponsors evidence relating to AEP Texas' productivity-adjusted inflation index and AEP Texas' proposed adjustment to the rate reduction methodology. That evidence was incorporated in Section III.A, III.G.2 and III.G.5 of the Narrative. Mr. Klick has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

John C. Klick

13. Thomas Kraemer

Thomas G. Kraemer is currently Group Vice President - Coal Marketing for BNSF, a position he has held since June 1999. His business address is 2650 Lou Menk Drive, Fort Worth, Texas 76131. In his position, Mr. Kraemer is responsible for all marketing activities associated with BNSF's sale of rail transportation services to shippers of coal, including AEP Texas North, and for developing forecasts of coal shipments and revenues and for tracking and evaluating competition. He began his career in the railroad industry in 1981 as a marketing manager with BNSF's predecessor, Burlington Northern ("BN"). He held a variety of positions at BN and BNSF in the marketing, operations, and strategic planning organizations before he assumed his current position in Fort Worth, Texas. He holds a Bachelor of Science degree from the University of Minnesota and an MBA degree from Mankato State University in Mankato, Minnesota.

Mr. Kraemer is sponsoring evidence relating to a study of recent BNSF coal contracts. His evidence is incorporated in Section III.A.3 of the Narrative. Mr. Kraemer has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 19, 2004

Thomas G. Kraemer

14. J. Reilly McCarren

J. Reilly McCarren is a railroad executive and engineer. His business address is 330 Abbotsford Road Kenilworth, Illinois 60043-1105. Mr. McCarren holds Bachelors and Masters Degrees in Civil Engineering from the Massachusetts Institute of Technology. Mr. McCarren is currently the Chairman of the Arkansas & Missouri Railroad Company ("A&M"), a transportation company that provides local railroad, trucking and logistics services in Northwest Arkansas and Southwest Missouri. Prior to his chairmanship at A&M, Mr. McCarren served as an executive at several railroads, including a term as President and Chief Executive Officer of the Wisconsin Central System, the largest integrated regional rail carrier in North America, with a 2,800 mile network in both the United States and Canada, and as President of the Gateway Western Railway and the Wheeling and Lake Erie Railway.

Mr. McCarren is sponsoring evidence relating to factors affecting General and Administrative, Information Technology and Insurance expenses and the level of work effort by Wisconsin Central T&E personnel. His evidence was contained in Section III.D. of the Narrative. Mr. McCarren has signed a verification of the truth of the statements contained therein. A copy of Mr. McCarren's verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 21, 2004

J. Reilly McCarren

15. Fred S. McChesney, Ph.D.

Fred S. McChesney is a Professor at Northwestern University, holding a joint appointment at the Northwestern University Law School and the Kellogg School of Business. He holds a Ph.D. in economics from the University of Virginia, a J.D. from the University of Miami and an A.B. in history from Holy Cross College.

Prior to assuming his position at Northwestern, Professor McChesney was a Professor at Cornell University Law School and a Professor of Law and Business at the Emory University School of Law. Before beginning his teaching career, he was an Associate Director for Policy and Evaluation at the Federal Trade Commission.

Professor McChesney has published widely on diverse topics in the fields of law and economics. A copy of his resume, including a list of his extensive publications, accompany this verification.

Together with Richard S. Higgins, Professor McChesney sponsors evidence relating to AEP Texas' rate reduction proposal in Section III.G.5 of BNSF's Reply Evidence. A joint Declaration by Dr. Higgins and Professor McChesney regarding the rate reduction issue is included in BNSF's Reply Evidence as Exhibit III.G-1. He has signed a verification of the truth of the statements contained therein. A copy of Professor McChesney's verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 18, 2004

Fred S. McChesney

CURRICULUM VITAE

FRED S. MCCHESNEY

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Northwestern University Law School
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Chicago, IL 60611

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Professor, Department of Management and Strategy
Kellogg School of Business
Northwestern University
Evanston, Illinois 60208

847-467-3363

EDUCATION:

Ph.D. (economics), University of Virginia, 1982.
J.D., *cum laude*, University of Miami, 1978. *University of Miami Law Review.*
A.B. (history), *magna cum laude*, Holy Cross College, 1970.

PRIOR PROFESSIONAL EXPERIENCE:

Clerk to Judge Alfred T. Goodwin, U. S. Court of Appeals for the Ninth Circuit, 1978-79.

Steptoe & Johnson, Associate, 1979-81.

Federal Trade Commission, Associate Director for Policy and Evaluation, 1981-83.

Emory University: Robert T. Thompson Professor of Law and Business, School of Law, 1987-97 (Assistant Professor, 1983-85; Associate Professor 1985-87); Professor of Economics, 1987-97.

Cornell University Law School, Professor, 1997-99.

BOOKS:

Property Rights: Cooperation, Conflict and Law (2003, Princeton University Press) (with T. Anderson).

Antitrust Law: *Interpretation and Implementation* (1998, Lexis/Michie) (with C. Goetz) (2d edition, 2002).

Teacher's Manual to *Antitrust Law*: *Interpretation and Implementation* (1st edition 1998; 2d edition 2002; also available at *www.gmantitrust.com*).

Economic Inputs, Legal Outputs: *The Role of Economists in Modern Antitrust* (1998, John Wiley & Sons) (editor).

Money for Nothing: *Politicians, Rent Extraction and Political Extortion* (1997, Harvard University Press).

Causes and Consequences of Antitrust: *The Public Choice Perspective* (University of Chicago Press, 1995) (with W. Shughart).

ARTICLES AND BOOK CHAPTERS:

"Antitrust," in *The Concise Encyclopedia of Economics* (D. Henderson, editor, forthcoming).

"Singing in the Shadows of Law: The *Three Tenors* Case," __ *Antitrust Bulletin* __ (forthcoming).

"The Way They Do the Things They Do: Materiality and Methodology in FTC Advertising Regulation," __ *Antitrust* __ (with R. Higgins) (forthcoming).

"Corruption: A Survey of the Economic Literature" (for the *Elgar Companion to Property Rights*) (with B. Benson) (forthcoming).

"Why Wonder Bread Lost No Dough: Materiality, Settlements and the FTC's Ad Substantiation Program" (with R. Higgins) (submitted for publication).

"Talking 'Bout My Antitrust Generation: Competition for and in the Field of Competition Law," 52 *Emory Law Journal* 1401 (2003).

"On Internal Contradiction in the Law of One Price" __ *Economic Inquiry* __ (with W. Shughart and D. Haddock) (forthcoming).

"Rent Extraction," in the *Kluwer Encyclopedia of Public Choice* (C. Rowley, ed., 2003).

"Government as Definer of Property Rights: Tragedy Exiting the Commons?" in *Property Rights: Cooperation, Conflict and Law* (T. Anderson & F. McChesney, eds., 2003).

"Public Choice and the Chicago School of Antitrust," in the *Kluwer Encyclopedia of Public Choice* (C. Rowley, ed., 2003).

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"A Bird in the Hand and Liability in the Bush: Why *Van Gorkom* Still Rankles, Probably," 96 *Northwestern Law Review* 631 (2002).

Several essays ("Smoke and Errors," "Enron's True Lesson: Political Opportunism," "Historic Self-Preservation," "Snow Jobs," "Good Timing: A Mutual Fund Scandal?") published 2001-2004 at www.econlib.org.

"Ever the Twain Shall Meet," 99 *University of Michigan Law Review* 1348 (2001) (review of S. Rose-Ackerman's *Corruption and Government*).

"Rent Seeking and Rent Extraction," in *The Elgar Companion to Public Choice* (W. Shughart II & L. Razzolini, eds.) (2001).

"The Practical Economics of 'Pay to Play' Politics," in Non-Profit Advocacy and the Policy Process, vol. I (Urban Institute, 2000).

"'Proper Purpose,' Fiduciary Duties and Shareholder-Raider Access to Corporate Information," 68 *University of Cincinnati Law Review* 1199 (2000).

"Antitrust and Property (Intellectual and Other)," 2000 *University of Chicago Legal Forum* 23 (2000).

"Statistics: The Language of Science" (Parts I and II), 9 *Kansas Journal of Law and Public Policy* 49-55 & 75-88 (1999).

"Economics *versus* Politics in Antitrust," 23 *Harvard Journal of Law and Public* 133 (1999).

"Manne, Mergers and the Market for Corporate Control," 50 *Case Western Reserve Law Review* 245 (1999).

"Why They Give at the Office: Shareholder Welfare and Corporate Philanthropy in the Contractual Theory of the Firm," 84 *Cornell Law Review* 1195 (1999) (with H. Butler), to be excerpted in *Corporate Governance: Law, Theory, and Policy* (Thomas Joo, ed., forthcoming).

"Tortious Interference *versus* Efficient-Breach of Contract: Theory and Statistical Evidence," 28 *Journal of Legal Studies* 131 (1999).

"Of Stranded Costs and Stranded Hopes: The Difficulties of Deregulation," 3 *The Independent Review* 485 (1999).

"Devaluing Deregulation," 8 *Journal des Économistes et des Études Humaines* 379 (1998).

"The Political Economy of Indian Wars," in *The Other Side of the Frontier*: *Economic Explorations into Native American History* (L. Barrington, ed., 1998) (with T. Anderson).

"Purchasing Political Inaction: How Regulators Use the Threat of Legal Reform to Extort Payoffs," 21 *Harvard Journal of Law and Public Policy* 211 (1998).

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"High Plains Drifters: Politicians' Lucrative Protection Racket," 48 *The Freeman* 4 (January 1998).

"Rent from Regulation," in *The Palgrave Dictionary of Economics and Law* (Peter Newman, ed., 1998).

"Legal Change and Non-Corporate Business Law," 1 *Journal of Small Business Law* 1 (1997).

"Back to 'Law and the Future,'" 17 *Mississippi College Law Review* 81 (1997) (part of symposium on Aaron Director and Edward Levi's "Law and the Future").

"De-*Bates* and Re-*Bates*: The Supreme Court's Latest Commercial Speech Cases," 5 *Supreme Court Economic Review* 81 (1997).

"An Introduction to Alchian's Principles of Professional Advancement," 34 *Economic Inquiry* 519 (1996).

"The Role of Economists in Modern Antitrust," 17 *Managerial and Decision Economics* 119 (1996).

"Empirical Tests of the Cross-Subsidy and Discriminatory Access Hypotheses in Vertically Integrated Telephony," 16 *Managerial and Decision Economics* 493 (1995); reprinted in *Deregulating Telecommunications*: *The Baby Bells' Case for Competition* (R. Higgins & P. Rubin eds., 1995)

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"Why Do Firms Contrive Shortages?: The Economics of Intentional Underpricing," 32 *Economic Inquiry* 39 (1994) (with D. Haddock).

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"Transaction Costs and Corporate Greenmail: Theory, Empirics, and a Mickey Mouse Case Study," 14 *Managerial and Decision Economics* 31 (1993).

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"Positive Economics and All That: Easterbrook and Fischel's *Economic Structure of Corporate Law*, 61 *George Washington Law Review* 272 (1992).

"Empirical Evidence on FTC Enforcement of the Merger Guidelines," 30 *Economic Inquiry* 277 (1992) (with M. Coate), reprinted in *Business and Government in America* (Robert F. Himmelberg, ed.).

"Deception, Trademark Infringement and the Lanham Act: A Property-Rights Reconciliation," 78 *Virginia Law Review* 49 (1992).

"Desperately Shunning Science," 71 *Boston University Law Review* 281 (1991).

"Rent Extraction and Interest-Group Organization in a Coasean Model of Regulation," 20 *Journal of Legal Studies* 73 (1991).

"Bargaining Costs, Bargaining Benefits and Compulsory Non-Bargaining Rules," 7 *Journal of Law, Economics, and Organization* 334 (1991) (with D. Haddock).

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"Antitrust and Regulation: Chicago's Contradictory Views," 10 *Cato Journal* 775 (1991), reprinted as "Be True to Your School: Chicago's Contradictory Views of Antitrust and Regulation," in *The Causes and Consequences of Antitrust: The Public Choice Perspective* (1995).

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"An Ordinary Economic Rationale for Extraordinary Legal Sanctions," 78 *California Law Review* 1 (1990) (with D. Haddock and M. Spiegel).

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"On the Decreasing Durability and Increasing Rate of Tax Reform," 71 *Minnesota Law Review* 913 (1987) (with R. Doernberg).

"Problems in Calculating and Awarding Compensatory Damages for Wrongful Death Under the Federal Tort Claims Act," 36 *Emory Law Journal* 149 (1987).

"Sensationalism, Newspaper Profits, and the Marginal Value of Watergate," 25 *Economic Inquiry* 135 (1987).

"Rent Extraction and Rent Creation in the Economic Theory of Regulation," 16 *Journal of Legal Studies* 101 (1987). Reprinted in *The Political Economy of Rent-Seeking* (C. Rowley, R. Tollison, and G. Tullock, eds., 1988); in *Public Choice Theory II* (C. Rowley, ed., 1993); in *The Foundations of Regulatory Economics* (R. Ekelund, ed.); in *Readings in Public Choice Economics* (J. Heckelman, ed., forthcoming).

"Assumptions, Empirical Evidence, and Social Science Method," 96 *Yale Law Journal* 339 (1986).

"Truth and Consequences: The FTC's Ad Substantiation Program," 6 *International Review of Law and Economics* 151 (1986) (with R. Higgins). Reprinted in *Public Choice and Regulation: An Inside View of the Federal Trade Commission* (R. Mackay, J. Miller, and B. Yandle, eds., 1987).

"Law's Honour Lost: The Plight of Antitrust," 31 *Antitrust Bulletin* 359 (1986).

"An Economic Analysis of the FTC's Advertising Substantiation Program," in *Empirical Approaches to Consumer Protection Economics* (1986) (with R. Higgins).

"Prohibitions on Volunteer Fire-Fighting in Nineteenth Century America: A Property Rights Perspective," 15 *Journal of Legal Studies* 69 (1986); reprinted in *The Foundations of Regulatory Economics* (R. Ekelund, ed.) (Edward Elgar 1998).

"A Theoretical Analysis of Corporate Greenmail," 95 *Yale Law Journal* 13 (1985) (with J. Macey).

"Defending the Failing-Firm Defense in Antitrust," 65 *Nebraska Law Review* 1 (1985).

"Commercial Speech in the Professions: The Supreme Court's Unanswered Questions and Questionable Answers," 134 *University of Pennsylvania Law Review* 45 (1985); reprinted at 10 *Advertising Law Anthology* 719 (1986).

"The Law and Economics of Professional Advertising: An Overview," in *Advertising by Health Care Professionals in the 80's* (1985).

"Toward a More Dynamic Economic Theory of Regulation," in *The Political Economy of Regulation: Private Interests in the Regulatory Process* (1984).

"Regulating Without Evidence: The FTC's 'Cooling-Off' Rule," *Journal of Contemporary Studies*, Winter 1984.

Review of *Revolt Against Regulation*, by Michael Pertschuk, 70 *Virginia Law Review* 339 (1984).

"Team Production, Monitoring, and Profit Sharing in Law Firms: An Alternative Hypothesis," 11 *Journal of Legal Studies* 379 (1982).

"On the Economics of Antitrust Enforcement," 68 *Georgetown Law Journal* 1103 (1980).

"The Effect of Advertising on the Quality of Legal Services," 65 *American Bar Association Journal* 1503 (1979) (with T. Muris).

"Advertising and the Price and Quality of Legal Services: The Case for Legal Clinics," 1979 *American Bar Foundation Research Journal* 179 (with T. Muris).

"On the Procedural Superiority of a Civil Law System," 30 *Kyklos* 507 (1977).

Various book reviews and articles in the *Journal of Economic Literature*, *Wall Street Journal*, *Public Choice*, *Southern Economic Journal*, *Miami Herald*, *Washington Star*, and *Atlanta Constitution*, 1976-present.

16. Loren E. Mueller

Loren E. Mueller is a railroad transportation consultant. His business address is 614 Regency Crossing, Southlake, TX 76092.

Mr. Mueller was employed by BNSF and its predecessors for 32 years. His management positions with the Burlington Northern Railroad began in 1975 as yardmaster at Lincoln, Nebraska. He held a number of positions with the railroad. From 1992 to 1994, Mr. Mueller was General Manager - Coal Operations, responsible for operations of the BN system coal business unit. During this time, he directed major construction and expansion of the BN's operations in the Powder River Basin ("PRB") of Wyoming to include coordination of the joint line with Chicago and North Western Railway Company ("CNW")/Union Pacific ("UP"). From 1995 through 1996, he was Vice President of Burlington Lines, responsible for the total transportation function for one-third of the BNSF Railroad, including major terminals, mechanical, engineering and operations. Mr. Mueller retired from BNSF in 1996. From May, 2000, through April 30, 2001, he held a one-year assignment as Vice President and Chief Operating Officer of the Alaska Railroad. He was responsible for all aspects of operation for the Alaska Railroad, including operations, engineering, mechanical, marketing and safety.

Mr. Mueller sponsored evidence relating to operations of the stand-alone railroad. His evidence was incorporated in Sections III.B, III.C and III.D of the Narrative. Mr. Mueller has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 18, 2004

Loren E. Mueller

17. Julie A. Murphy

Julie A. Murphy is a Director at FTI Consulting, Inc., an economic and financial consulting firm. Her business address is 1201 Eye Street, N.W., Suite 400, Washington, D.C. 20005. Ms. Murphy holds a Bachelor of Arts and a Master of Arts in Economics from Allegheny College and Pennsylvania State University. Since 1994, Ms. Murphy has been involved in various aspects of consulting for network industries including electric utilities, transportation and telecommunications firms. Her work has encompassed damages analysis, competition and antitrust analyses, asset valuations, pricing and costing analyses.

Ms. Murphy joined FTI Consulting in 2000. While with FTI, Ms. Murphy has provided technical support and filed testimony in several proceedings before the Surface Transportation Board, Federal Communications Commission, and the California State Utility Commission. She has been involved in developing traffic and revenue forecast in stand-alone cost proceedings since 2000 including the *WPL, TMPA, Duke Energy Co. v. CSX Transp. Co., Duke Energy Co. v. Norfolk Southern Ry, Co., and Carolina Power & Light v. Norfolk Southern Ry. Co.* cases.

Ms. Murphy is sponsoring evidence relating to coal traffic and revenues. Her evidence is incorporated in Section III.A of the Narrative. Ms. Murphy has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Julie A. Murphy

18. Deborah G. Newland

Deborah G. Newland is a Senior Consultant with FTI Consulting, Inc., an economic and financial consulting firm with offices located at 1201 Eye Street, N.W., Suite 400, Washington, DC, 20005. Since 2001, Ms. Newland has been involved in various aspects of transportation consulting, including detailed cost analyses for several of the country's largest railroads, studies of historic rail rates and long term coal traffic and revenue forecasts, and extensive statistical analysis, such as modeling fuel consumption variation with cycle times and evaluating historical changes in rail transportation rates.

Ms. Newland holds a Bachelor of Arts degree in Economics from Furman University, graduating *cum laude*. She has also received a Masters of Science degree in Economics from the University of North Carolina at Chapel Hill, and has also completed extensive econometric coursework at the doctoral level, covering such topics as measure-theoretic probability, statistical theory, and applied econometrics. Since joining FTI in 2001, Ms Newland has performed economic and financial consulting services to regulated and newly deregulated industries, including the transportation and postal sectors. Her focus is on costing and statistical analyses in support of expert testimony within regulatory proceedings, and she has assisted in the preparation of expert testimony in proceedings before the Surface Transportation Board and the Postal Rate Commission.

Ms. Newland is sponsoring evidence relating to BNSF's variable costs for the issue movement. Her evidence is contained in Section II.A of the Narrative. Ms. Newland has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Deborah G. Newland

19. Robert C. Phillips, P.E.

Robert C. Phillips is the Vice President of Rail for Ralph Whitehead Associates. His business address is 1000 West Morehead St., Charlotte, NC 28208. Mr. Phillips is responsible for overseeing and directing all of RWA's services to the railroad industry, as well as branch office management, construction management for fiber optic construction, and the general administration of construction inspection for railway projects. He has extensive experience in fiber optic construction management, railroad track and bridge construction, track maintenance and railroad operations. His special expertise is roadbed preparation, and his major project experience with RWA includes construction management at approximately ten sites.

Mr. Phillips is a 27 year veteran of the railroad industry. Mr. Phillips received his Bachelor of Science in Civil Engineering at Virginia Polytechnic Institute in 1975. He received his Masters in Business Administration from Averett College in 1992. Upon graduation he worked for Norfolk Southern Railroad as a Track Supervisor, where he inspected and maintained tracks, scheduled track maintenance, supervised track gangs, and maintained a successful safety program. He then worked for APAC-Virginia, Inc. as a project manager, which included cost estimating and analysis, as well as site engineering and development. He holds a license as a Registered Professional Engineer in Virginia.

Mr. Phillips is sponsoring evidence relating to Section III.F.2 Roadbed Preparation. Mr. Phillips has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 14, 2004

Robert C. Phillips, P.E.

20. Robert J. Plum, III

Robert J. Plum, III, is a Director of FTI Consulting, Inc. ("FTI"), with offices at 1201 Eye Street, N.W., Suite 400, Washington, DC 20005.

Mr. Plum holds a Bachelor's Degree in Accounting and an MBA degree with a concentration in finance. He began his career in 1979 with Wyer Dick & Company, a consulting firm that specialized in railroad costing issues. Since that time he has been involved continuously in analyzing accounting, cost, financial and engineering issues associated with railroad operations and pricing. He has conducted numerous variable and stand-alone cost studies, conducted and evaluated railroad contract provisions, field studies of railroad operations, and developed computer models to evaluate railroad engineering and operating requirements.

Mr. Plum is sponsoring evidence relating to route miles, transit times, the number of locomotives and locomotive unit miles, and TNR coal car requirements. His evidence was incorporated in Sections III.B.1, III.C and III.D of the Narrative. Mr. Plum has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Robert J. Plum, III

21. James Primm

James Primm specializes in all aspects of railroad engineering, specifically in the design of maintenance facilities for and the procurement of railcars and locomotives. He is currently working on subcontract for Ralph Whitehead Associates, an engineering consulting firm. His business address while on subcontract is 1000 West Morehead St., Charlotte, NC 28208. Mr. Primm has supervised the design of locomotive maintenance facility renovation projects and has helped procure over 1,300 unit train coal cars.

Among Mr. Primm's many engineering achievements are the direction of design and management of construction at Barstow Locomotive Facility in Barstow, California, Hinkle Locomotive Facilities in Hermiston, Oregon, and Topeka System Maintenance Terminal Renovation in Topeka, Kansas. He has also prepared conceptual designs for high speed train maintenance facilities.

Mr. Primm has authored numerous transportation studies, as well as undertaken geotechnical and environmental investigations. He received his Bachelor of Science in 1973 in Electrical Engineering from the University of Oklahoma. He is a member of the American Railway Engineering Association, the American Welding Society, the Locomotive Maintenance Officers Association, and the International Association of Railway Operating Officers.

Mr. Primm sponsored evidence relating to Section III.F.7 Buildings and Facilities. Mr. Primm has signed a verification of the truth of statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 15, 2004

James Prinhm

22. William J. Rennicke

William J. Rennicke is a Managing Director in the Travel and Transportation Group of Mercer Management Consulting, a corporate strategy and operations firm. His business address is: 200 Clarendon Street, 12th Floor, Boston, Massachusetts, 02116. Mr. Rennicke specializes in transportation strategic planning, management, economics and operational performance.

Mr. Rennicke holds a Masters of Business Administration from the University of Minnesota where he concentrated in transportation and logistics, and a Bachelor of Science in Business Administration from the School of Business Administration at Georgetown University. Mr. Rennicke held various senior management and operating positions at the Boston & Maine Railroad, before joining Mercer.

Mr. Rennicke has been extensively involved in restructuring and transaction-related activities for both private and government-owned transport operators and the development of strategic and financial planning, simulation, and control models for transportation companies. He has worked closely with equipment manufacturers and leasing companies, construction and engineering companies, and government transportation entities in many countries. Mr. Rennicke has served as an expert witness in litigation, regulatory and arbitration cases, and has provided expert testimony before the U.S. and Canadian legislatures. Mr. Rennicke has also spoken extensively at transportation industry conferences on the benefits of outsourcing and other means of private sector participation in the public transport sector. A more extensive statement of his qualifications and experience is contained in Exhibit III.D.4-2.

Mr. Rennicke is sponsoring evidence relating to BNSF Reply Exhibit III.D.4.-2 (Commercial Analysis of AEP Texas' Maintenance of Way Evidence") and BNSF Reply Exh. III.F-4 ("Commercial Analysis of AEP Texas' Construction Schedule and Costs"). Mr.

Rennicke has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 19, 2004

William Rennicke

23. Randall R. Reyff

Randall R. Reyff is currently a Director Coal Marketing for BNSF, a position he has held since late 1990. His business address is 2650 Lou Menk Drive, Fort Worth, Texas 76131. In his position, Mr. Reyff is responsible for the negotiation and administration of the BNSF's coal transportation contracts with various customers, including Tucson Electric Power Company ("TEP") and Springerville Unit 3 Holding, LLC. Mr. Reyff has been employed by BNSF or its predecessor, the Atchison Topeka & Santa Fe Railway Company ("Santa Fe") for the last 32 years. He has held a variety of positions at Santa Fe and BNSF in the marketing and executive departments. He holds a Bachelor of Marketing degree from Western Illinois University and Master of Management degree from the Massachusetts Institute of Technology.

Mr. Reyff is sponsoring evidence relating to TEP and Springerville Unit 3 Holding, LLC, two of his customers. His evidence is incorporated in Section III.A.3 of the Narrative. Mr. Reyff has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Randall R. Reyff

24. Arnold S. Tesh

Arnold S. Tesh is a real estate consultant and certified real property appraiser at FTI Consulting, Inc., an economic and financial consulting firm. His business address is 1201 Eye Street, N.W., Suite 400, Washington, DC 20005. He has been valuing real estate for more than thirty-seven years. He has spent twenty-five years performing property appraisals for use by railroads. He served as the Director of Real Estate in the Law Department of the United States Railway Association during the proceedings that resulted in the creation of Conrail. In that proceeding, he directed the valuation of nearly 24,000 miles of railroad in seventeen states, the District of Columbia, and two Canadian provinces, comprising the lines of Penn Central, Erie Lackawanna, Central of New Jersey, Ann Arbor, Lehigh Valley, Reading, and Delaware and Hudson railroads. The methodology that he developed in that case, and which formed the basis of his Special Court testimony under the Regional Rail Reorganization Act of 1973, employs the same valuation principles he uses here.

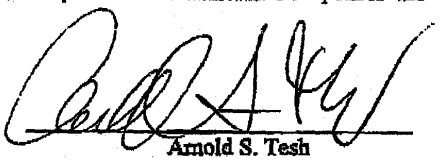
Mr. Tesh has also performed real property appraisals for railroad lines used by Amtrak, Union Pacific, Southern Pacific, Illinois Central Gulf, Santa Fe, Burlington Northern, CSX, and other railroads. His experience also includes appraising commercial, industrial, residential and agricultural properties located throughout the United States, as well in the Caribbean, Canada, Mexico, and Central America.

Mr. Tesh is a Counselor of Real Estate ("CRE") of the American Society of Real Estate Counselors and a Chairman of the Legislative and Regulatory subcommittee of the National Association of Realtors. Only about 1,100 real estate experts in the world have earned the CRE designation. He has his certification to appraise real estate in many states.

Mr. Tesh is sponsoring evidence relating to road property investment in land. His evidence was contained in Section III.F.1 of the Narrative. Mr. Tesh has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 22, 2004



Arnold S. Tesh

25. Heather Viola

Heather S. Viola is a Manager at FTI Consulting, Inc., an economic and financial consulting firm. Her business address is 1201 Eye Street, N.W., Suite 400, Washington, D.C. 20005. Ms. Viola holds a Bachelor of Arts degree in Economics from Wellesley College. Since 1997, Ms. Viola has worked with clients in the telecommunications, railroad, aerospace, electronics, home construction, and plastics industries. Her work has included damages analysis, market entry analysis, and pricing and costing analyses.

Ms. Viola joined FTI Consulting in 2001. While with FTI, Ms. Viola has provided technical support in several proceedings before the Surface Transportation Board, the Federal Communications Commission, and various State Utility Commissions. She has assisted in the preparation of expert testimony on maintenance of way expenses in six stand-alone cost proceedings since 2002.

Ms. Viola is responsible for the preparation of spreadsheets relating to Section III.D.4 Maintenance of Way. Her evidence is incorporated in Section III.D.4 of the Narrative. Ms. Viola has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 20, 2004

Heather Viola

26. David R. Wheeler

David R. Wheeler is the founder and President of Rail Network Analytics. His business address is 9222 Nottingham Way, Mason, OH 45040.

Mr. Wheeler received a Bachelor of Science degree in engineering and computer science from Merrimack College in 1985. He also received a Masters of Business Administration degree in finance and operations management from Miami University in 1992. He has training in Six Sigma methodology and holds a Six Sigma Blackbelt certification.

Throughout his career, Mr. Wheeler has focused on advanced analytical techniques for operational improvement and strategic planning. He has more than fifteen years experience in areas including rail operations analysis, capacity analysis, simulation, stand-alone rate case litigation, structured problem solving using the Six Sigma methodology, supply chain efficiency and mergers & acquisitions. Mr. Wheeler has experience not only in the simulation and analysis of railroads, but also in other high technology industries including cockpit simulation work on the F-16 and F-22 fighter aircraft.

Mr. Wheeler held a number of leadership positions within the Union Pacific Railroad Company (UP). During his tenure with UP, Mr. Wheeler led teams within Finance, Capacity Planning, Network & Capital Planning and Network Design & Integration. He has submitted testimony in previous stand-alone cost cases and presented research in a variety of forums. As General Director, Capacity Planning & Analysis, Mr. Wheeler was responsible for and led the capital planning function for UP's annual capital development and implementation. In this capacity, Mr. Wheeler analyzed and directed spending of more than $300 million for Powder River Basin coal traffic. Mr. Wheeler uses simulation tools on a regular basis and has conducted a number of simulation benchmarking studies to determine and lead vendors toward simulation improvements.

Mr. Wheeler has worked on a variety of projects in the railroad industry. Mr. Wheeler developed UP's Colorado/Utah coal capacity plan and guided the Intermodal growth capacity initiative from Chicago to Los Angeles across UP's Sunset and Tucumcari routes. He has worked on multiple projects for the BNSF, NS, CSX, CP and CN, as well as the many short lines that connect with the UP. Mr. Wheeler has also led teams working on proposals for new passenger service for Amtrak, various commuter agencies, and UP's Joint Facilities, Finance, Operations and Engineering groups.

Mr. Wheeler is sponsoring evidence relating to the TNR's capacity requirements and cycle times. His evidence is contained in Sections III.A.1, III.B and III.C.2 of the Narrative. Mr. Wheeler has signed a verification of the truth of the statements contained therein. A copy of that verification is attached hereto.

I declare under penalty of perjury that I have read the Reply Evidence that I have sponsored, as described in the foregoing Statement of Qualifications, and that the contents thereof are true and correct. Further, I certify that I am qualified and authorized to sponsor this testimony.

Executed on May 19, 2004

David R. Wheeler

PUBLIC VERSION



BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Docket No. 41191 (Sub-No. 1)

AEP TEXAS NORTH COMPANY
v.
THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY

Reply Evidence of
The Burlington Northern and Santa Fe Railway Company

EXHIBITS

Volume I of I

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May 24, 2004

II.A: Quantitative Market

BNSF Reply Exhibit II-A-1

Has Been Redacted

BNSF Reply Exhibit II-A-2

Has Been Redacted

BNSF Reply Exhibit II-A-3

Has Been Redacted

BNSF Reply Exhibit II-A-4

Has Been Redacted

III.A: Traffic Group

DECLARATION OF JANUSZ A. ORDOVER

I. INTRODUCTION AND THE PURPOSE OF THIS STATEMENT

My name is Janusz A. Ordover. I am a Professor of Economics at New York University and a former Deputy Assistant Attorney General for Economics in the Antitrust Division of the U.S. Department of Justice. For over 20 years I have been actively involved in numerous regulatory and deregulatory matters involving network industries, such as railroads, airlines, telecommunications, and electricity in the United States and other countries. My work on competition and regulatory standards for these industries has been relied upon by the Department of Transportation, the Federal Communications Commission, the Federal Energy Regulatory Commission, the World Bank, the OECD, and the Inter-American Development Bank. I am one of the economists who signed the verified statement of economists supporting the principles of Constrained Market Pricing in June, 1983 in the *Coal Rate Guidelines* proceeding.[1]

I have been asked by counsel for BNSF to examine the economic issues related to the inclusion of revenues from "cross-over traffic" in the stand-alone cost ("SAC") test for excessive rates. Whether use of cross-over traffic should be permitted at all – and, if so, what share of revenues should be allocated to the stand-alone railroad ("SARR") is perhaps the single most significant public policy issue faced by the Surface Transportation Board ("Board") in recent and pending stand-alone cost cases. In several proceedings currently before the Board, the claim that the complaining shipper's rate is above SAC turns largely on the amount of revenue that the complainant has attempted to allocate to the SARR from cross-over traffic. Of course, whether any particular rate is found to be excessive often depends on other factors, such as forecasts of SARR traffic volumes and revenues, and the appropriate level of operating expenses and

[1] A copy of that statement is attached to this declaration as Attachment 1.

construction costs, but the distorting impact of cross-over traffic revenues on the outcome of the SAC analysis requires that the Board gives it full and serious attention.

In this declaration, I shall conclude that the current treatment of cross-over traffic is contrary to the broad principles of Constrained Market Pricing that govern regulation of railroad rates in the post-Staggers Act era. Further, I conclude that as a practical matter, the inclusion of cross-over traffic as a component of SAC analysis opens the door to the manipulation by complainants of the stand-alone cost ceiling for railroad rates and, potentially, can be a vehicle for the very sort of "cross subsidy" that the Board seeks to prevent. Such manipulation can lead to unwarranted findings of unreasonable (excessive) rates to shippers whose demand is demonstrably inelastic and who, under CMP principles, should be required to pay rates significantly in excess of pertinent marginal costs. Put another way, economically unsound treatment of cross-over traffic that favors the proponent of a SARR can effectively vitiate the application of the principle of constrained (Ramsey) market pricing and can undermine achievement of the critical goal of revenue adequacy.

I will explain that, on the most fundamental level, inclusion of cross-over traffic revenues is at odds with the core principles of SAC because a hypothetical SARR that relies on revenues derived from interline traffic is not a genuine "stand-alone" railroad. The unavoidable conclusion is that a true SARR would not (and should not) benefit from the revenues generated by cross-over traffic as it would lack the necessary facilities to carry *all selected* traffic end-to-end. In principle, the complaining shipper should be required to build *all* the facilities needed to carry the traffic it selects. If it chooses not to build all the facilities, it should not be entitled to any net revenue contribution from traffic for which facilities have not been constructed.

Unless all relevant facilities are built, the comparison of stand-alone revenues and costs that is the core of SAC analysis is simply impossible. In the presence of cross-over traffic, the Board must rely on some arbitrary rule for allocating the (net) revenues from cross-over traffic between the SARR and the residual incumbent in order to calculate the total revenues of the proposed SARR. The inherent arbitrariness in constructing any rule for allocation of cross-over traffic revenues between the residual incumbent and the SARR stems from a simple and irreducible fact of railroad economics, which is that a substantial proportion of railroad costs is fixed as well as joint and common. An end-to-end rate that exceeds directly attributable costs of the movement makes a contribution to the recovery of any and all joint and common costs of the railroad. *Consequently, this contribution cannot be allocated to any particular subset of such joint and common costs or to any particular group of traffic.* This is not a problem when the railroad is integrated since an integrated railroad bears all of its costs and carries the responsibility for their recovery. When the SARR is permitted to include cross-over traffic, the "ownership" of these costs – and thus the responsibility for their recovery – is "split" between the two railroads, *viz.*, the SARR and the residual incumbent.

The split in ownership at a hypothetical interchange point creates the opportunity and incentive for the complaining shipper unilaterally to manipulate the allocation of revenues from cross-over traffic. I term this manipulation "strategic revenue shifting." In fact, the shipper may attempt to allocate to the SARR such share of the net revenues from the cross-over traffic as to potentially render the residual incumbent non-viable over the long run.[2] Such an allocation would be tantamount to an impermissible *strategic* "cross-subsidy" of the issue traffic in the

[2]At the minimum, such an allocation can render non-viable a portion of the residual incumbent's extant network.

shipper's SAC construct.[3] It is an inexorable conclusion that, since cross-over traffic does not impose any net costs on the SARR but generates net revenues by means of strategic revenue shifting, the Board may find the rate excessive *even if* such rate would not be found excessive either if cross-over revenues were excluded or if the SARR included all the required facilities for the claimed traffic.

Despite years of efforts by the nation's freight railroads to rationalize rates and routes, real-life incumbent railroads (such as BNSF) are revenue inadequate. Hence, in my view, any allocation rule that shifts contribution from cross-over traffic to the SARR from the incumbent is potentially not sustainable because it will further erode the financial viability of the incumbent. The revenue assumed to be transferred from the residual incumbent to the hypothetical SARR contributes to revenues in excess of SAC, thereby driving down the defendant's real world rate on the issue traffic. Thus, as a matter of public policy and sound economics, the Board should not accept any allocation rule that allows the shipper to construct a SARR that thrives only because it -- by fiat -- appropriates cross-over revenues from the residual incumbent. Indeed, if under such an allocation rule, the residual incumbent becomes even more revenue inadequate, the allocation rule effectuates a strategic "cross-subsidy" of the issue traffic.

The SAC methodology, as originally conceived, aimed to remove arbitrary allocations from rate calculations. It is thus a perversion of the letter and spirit of SAC methodology to implement regulatory policy that permits the finding of an excessive rate solely because of the shipper's reliance on arbitrary allocations of cross-over revenues. In brief, I urge the Board to insist on a true stand-alone methodology that disallows the use of cross-over traffic revenues in

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[3] In my terminology, strategic "cross subsidy" arises when the issue rate is not excessive when gauged using only stand-alone revenues but is found excessive when cross-over traffic is allowed and the residual incumbent is revenue inadequate.

the SAC test and thus eschews the arbitrary allocations necessitated by the inclusion of cross-over traffic.

I understand that the Board may not be willing to deny the SARR any contribution from cross-over traffic. Insofar as some allocations are permitted by the Board, the Board should accept the allocation procedure in an individual case that minimizes the distortions that result from reliance on cross over traffic. In this case, I conclude that the density adjusted revenue allocation rule ("DARA") proposed by BNSF is preferable to either of the mileage based allocation procedures used by Otter Tail. Otter Tail's mileage-based regression calculations and its modified mileage prorate ("MMP") both ignore the relationship between traffic densities and the ability of a railroad to defray its pertinent costs. DARA, on the other hand, recognizes the need for long-term cost recovery that is at the heart of the SAC test. Specifically, it recognizes that the residual incumbent must recover its "off-SARR" fixed costs if it is to remain a viable operation over the long run. Because DARA is responsive to differences in densities it is more likely to ensure the residual incumbent's long-term viability as compared to a density-insensitive rule. As such, DARA is consistent with the methodology underlying SAC, which relies on long-run costing principles. Indeed, the SAC test is predicated on the assumption that the SARR will carry the issue traffic and grouped traffic, including the cross-over traffic, over the long run. It is no defense against this argument that the residual incumbent can rely on other traffic from which to recoup the "off-SARR" costs. The fact of the matter is that if the residual incumbent is already revenue inadequate and if the application of the SAC test leads to a rate reduction, then the ability of the incumbent to recover the "off-SARR" costs is further undermined. It is also obvious that if the incumbent were in the position to earn higher revenues from the "off-SARR"

traffic it would have attempted to do so, which means that is has no ability to generate such newly-found (net) revenues.

Furthermore, BNSF's DARA proposal recognizes that in order to give both carriers an opportunity to recover the pertinent pools of fixed costs, a higher "mark up" per unit of traffic (e.g., a ton-mile) likely will be needed on low density routes, which are more likely to exist on the residual incumbent than on the SARR.[4] An allocation of the "quasi-rents" that *increases* with the length of haul on a railroad (as in MMP) and *decreases* with the density of traffic on the route is responsive both to the magnitude of the fixed costs and to the fact that the recovery of any given volume of fixed costs requires a higher average "mark-up" per ton-mile on lower density portions of each cross-over movement's route.

In the next section of this declaration, I briefly review the public policy rationale for the SAC test, including how it fits into an overarching goal of giving railroads a realistic opportunity to achieve revenue adequacy while protecting captive shippers from exercise of market power by the incumbent railroad. In Section III, I identify the key economic characteristics of cross-over traffic and show that they are inconsistent with the economic principles underlying Constrained Market Pricing ("CMP"). The final section of my declaration addresses Otter Tail's market-based rationale for its allocation procedures and lays out the rationale for DARA as a feasible allocation methodology that is consistent with the principles of railroad economics underlying CMP.

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[4] Since the complainant is granted considerable latitude in selecting its stand-alone traffic group and in designing its route network, it will be free to arrogate to itself those routes that experience high traffic density, leaving the residual incumbent with portions of the existing real world railroads with comparatively lower densities.

II. THE ECONOMIC AND PUBLIC POLICY RATIONALE FOR THE SAC TEST

It has long been recognized that for railroads to recover their efficiently incurred costs (both fixed and variable) some form of differential pricing must be permitted. *Coal Rate Guidelines* at 526-27. The logic behind this claim is now familiar and there is no need to rehash it at any great length. Because railroading is characterized by substantial fixed costs relative to variable (or marginal) costs, pricing rail services at marginal cost would generate insufficient revenues to defray the total forward-looking costs of the railroad.[5] Indeed, pricing at variable or marginal cost would condemn the railroad to revenue inadequacy and ultimately lead it to exit entirely from the market.

A second important feature of railroading as an economic activity is that it is characterized by joint and common costs. These are costs that are incurred on behalf of more than one shipper and, as such, can and should be recovered from more than one shipper.[6] The presence of these joint and common costs generates scope economies (defined as savings that are created by having one railroad serve more than one customer, as compared to a base case in which each customer is served by one railroad), which can potentially benefit all shippers. Because of these scope economies, it is generally efficient for a railroad to serve multiple shippers with its route structure. Furthermore, because of substantial fixed costs, railroads also

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[5] To illustrate, assume that the railroad needs to incur fixed costs of $10 million to construct the needed facilities and that the variable (marginal) cost per ton-mile is $1. Plainly, no matter how many ton-miles the railroad carries, it will not recover its full costs if the rate is capped at $1. Hence, a higher rate is required. Obviously, a railroad that has sunk the necessary $10 million can carry the traffic at the un-remunerative rate of $1 as long as it does not have to make another investment in the fixed facilities, but to be viable in the long run the rate must exceed $1 by enough to cover the full economic costs. The difference between the full costs of its operations and the total variable cost is the "quasi-rent."

[6] To continue with the example in footnote 5, assume that two shippers, A and B, use the pertinent facilities. In this case, the $10 MM can (and must) be recovered in some proportion from both.

can and often do exhibit economies of density whereby average costs per unit of traffic decrease as the number of units of traffic using particular facilities increases.[7]

At least since the Staggers Act, it has been widely recognized that cost recovery in the railroad industry cannot be achieved by requiring that each shipper pay the same mark-up per ton-mile or the same mark-up per dollar of variable cost. As has been demonstrated many times, such an approach to cost recovery is a prescription for inefficiency. It prevents socially profitable services from being offered, and it distorts shipping volumes by suppressing unduly the services utilized by those shippers whose demands are relatively more elastic, while "under-recovering" revenues from those shippers whose demands are relatively less elastic. The principle of Constrained Market Pricing recognizes that differential pricing conduces to economic efficiency.[8] CMP also recognizes that differential pricing can potentially lead to unduly elevated rates for some shippers. In order to protect against this eventuality, the current regulatory regime subjects market dominant railroad rates to the SAC test.[9]

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[7] Facilities congestion is the main reason why, once certain density is reached, per unit cost tends to increase.

[8] The familiar Ramsey pricing formula states that the price/cost margin earned on any given category of shipment should be inversely proportional to the elasticity of demand of that category with respect to rail rate. (A category of shipment can be defined narrowly as comprising shipments by or to a single customer over a period of time.) That is $L(i) = (p(i) - c(i))/(p(i) = k/E(i)$. In this formula, p(i) is the rail rate applicable to category "i", i=1, ...,N ; c(i) is the underlying marginal (variable) cost of the shipment; E(i) is the pertinent elasticity of demand; k is the so called "Ramsey" multiplier which takes on the value of k=0 when railroad is compelled to price at marginal cost; and k=1 when the railroad is allowed to act as a profit-maximizing monopolist. It is important to realize that the elasticity of demand facing a given railroad on a given shipment can reflect not only the usual reduction in "consumption" of railroad services from a price increase but also the presence of intermodal and intramodal competition, where such competition exists. (Modifications of the formula are needed in the presence of cross-elasticities of demand between different categories of shipments. I shall abstract from this complication here.)

[9] There is no general economic theorem showing that if the railroad is revenue inadequate, none of its rates can exceed SAC. However, it is plain that all of the rates taken

As originally intended, the SAC test was devised to ensure that no shipper was required to pay more than the full costs of the railroad facilities that it uses. A shipper who paid in excess of the full costs was said to be cross-subsidizing other shippers by paying for facilities from which it derived no benefit. Conceptually, this test is quite compelling and sound as a matter of economics and public policy. Indeed, if entry into railroading were unimpeded by entry barriers – *i.e.*, if the market for provision of railroad services were perfectly contestable, in the language of economics – a railroad seeking to collect from the shipper more than the long-run economic costs of the facilities used by the shipper would be replaced by an entrant that could attract that shipper by charging slightly lower rates, yet sufficient to cover its full economic costs. In this way, the SAC test mimics the operations of a perfectly contestable market *even though* railroading as an activity is hardly contestable because a huge share of the overall costs of each railroad is not only fixed but also sunk.[10]

As the name implies, and as initially conceived, the *stand-alone* cost test was designed to compare the costs incurred to build and operate a *stand-alone railroad* serving the needs of an individual shipper (or a group of shippers) with the revenues generated by that shipper (or a group of shippers) at the existing rate levels charged by the defendant railroad. The adoption of CMP, and in particular the application of the SAC test, obviated the need to examine whether the railroad's existing rates were consistent with the Ramsey pricing principles. The ICC considered this a significant regulatory advantage because calculating Ramsey prices requires information

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together cannot exceed SAC since the railroad *is* revenue inadequate. Hence, simple logic suggests that if the railroad is revenue inadequate, the likelihood that there are many rates in excess of properly developed SAC is low.

[10] Sunk costs are those costs that a firm cannot recover if it exits the relevant market (or industry). Thus, rail track may be sold for no more than its scrap value, which is much less than the cost of new rail track, and is thus substantially sunk. Sunk costs are generally regarded as a barrier to entry.

on demand elasticities that may not be readily available.[11] At the same time, recognition that differential pricing was desirable (when subjected to proper constraints) freed the railroads from inefficient pricing and increased the chances of revenue adequacy.

In light of the economies of scope and density discussed above, the ICC determined that complaining shippers should be permitted to design a SARR that could handle both the traffic of the complaining shipper (the "issue" traffic) and other "non-issue" traffic that shared facilities with the issue traffic. Furthermore, the ICC concluded that the complaining shipper would be permitted to define the traffic group and the railroad configuration in the first instance, because it had the incentive to design the most efficient operation that could feasibly handle the issue traffic and other non-issue traffic in the stand-alone traffic group. A complaining shipper has an incentive to group issue traffic with non-issue traffic in a way that, given the incumbent's current and forecasted rates, makes the largest possible contribution to the recovery of the total forward-looking costs of the SARR in order to demonstrate an excessive rate and obtain a rate reduction. In sum, the ICC's decision to allow a shipper to group issue and non-issue traffic that was to be carried end-to-end was fully consistent with the basic precepts of CMP and with the twin goals of ensuring railroad viability and extending protection to captive shippers.

However, the inclusion of cross-over traffic as a component of the stand-alone railroad has undermined the proper SAC construct – and its public policy rationale. As we shall see below, inclusion of cross-over traffic revenues in the base of revenues attributed to the SARR coupled with the concomitant burdening of the incumbent with the potentially excessive responsibility for the recovery of the costs of operating its residual network distorts the applicability of the SAC test as a test for cross-subsidy. To put it bluntly, by permitting cross-

[11] Actually, this calculation also requires the regulator to calculate or infer the value of the Ramsey multiplier, k (see fn. 8 above).

over traffic to be included in a SAC analysis, the Board has enabled the complaining shipper to use strategic revenue shifting and to game the regulatory process by constructing a hypothetical railroad that is neither stand-alone nor required to contribute to the recovery of the long-run costs of the residual incumbent who must defray all of its remaining costs, including the costs of facilities without which cross-over traffic would not be possible.

The inclusion of cross-over traffic in the SAC analysis necessitates arbitrary allocations of net revenues from such traffic. This, in turn, creates a real danger that the SAC test is rendered meaningless and that regulatory policy will be set back to the pre-Staggers Act era in which rates were evaluated using arbitrary cost allocation standards. Indeed, once the revenues from cross-over traffic are incorporated in the SAC test, the finding that the issue rate is excessive does not imply at all that the issue traffic is cross-subsidizing other traffic. As vividly demonstrated by Otter Tail's strategy in this proceeding, the inclusion of cross-over traffic in the SAC test can lead to unwarranted rate reductions on the issue traffic despite the fact that the properly constructed SARR would not generate revenues in excess of pertinent costs. This analysis is developed more fully below.

III. THE ECONOMIC DANGERS OF PERMITTING CROSS-OVER TRAFFIC IN A SAC TEST

There is no economically defensible way to "attribute" un-allocable joint and common costs to different traffic groups or different shippers. By definition, these costs are not caused by any particular shipment and thus cost-causality cannot be depended upon to guide cost recovery from any given shipment. Instead, economic efficiency requires that differential pricing (*i.e.*, Ramsey pricing principles) be used to recover these costs from the totality of the traffic that uses the pertinent facilities and, in the aggregate, causes these costs to be incurred. This is the basic principle of cost-causality which states that those who cause costs to be incurred should be

responsible for their recovery. In its standard formulation, SAC recognizes and builds on this principle of cost-causality because it tests whether revenues from a group of traffic exceed (or fall short of) all the costs *caused* by that group of traffic. In line with the cost-causality principle, the SAC test compares the total revenues generated by the traffic group with the full economic costs of *all* the facilities needed to serve the movements in the traffic group.

Introduction of cross-over traffic vitiates this approach. It splits what should be a stand-alone railroad into interline segments, strategically chosen by the complaining shipper, some of which are included in the SARR and some that are not built and thus remain with the residual incumbent.[12] As a result, while after this strategic split the quantum of costs remains unchanged (besides the putative reduction in costs because the SARR is allegedly designed to be more efficient), the responsibility for the recovery of the efficiently incurred costs is now divided between two entities – the SARR and the residual incumbent. This severing of the joint responsibility for cost recovery and the consequent arbitrary allocation of revenues is inconsistent with the economic rationale for the SAC test and creates the incentives for what I termed strategic revenue shifting, the objective of which is to ensure that the challenged rate is deemed to be excessive.[13]

The hypothetical SARR carries the cross-over traffic only for a portion of the end-to-end movement that currently occurs over the defendant railroad(s). That traffic is originated,

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[12] This artificial severing caused by the use of cross-over traffic must be distinguished from the real world interlining of traffic between railroads. Interlining is a result of arm's length transactions between willing railroads, neither of which in the ordinary situation could provide the through service on its own; whereas, as noted, the dismemberment of the incumbent is a strategic move designed to ensure that the shipper's rate is found to be excessive.

[13] As I noted earlier, a challenged rate is strategically "cross-subsidized" when it is found to be excessive only when cross-over revenues are included but is not excessive when such revenues are excluded. Strategic cross-subsidy does not necessarily imply actual cross-subsidy as this term is defined in the economics.

terminated (or both) on the off-SARR portions of the track owned and controlled by the defendant railroad (the residual incumbent) whose rates are being subjected to regulatory scrutiny. It is apparent from the definition of cross-over traffic that the hypothetical stand-alone railroad that incorporates cross-over traffic does not stand-alone after all; it is a SARR only in name but not as an economic entity. Traffic moves on the SARR for only a portion of its journey, not from end-to-end. The SARR remains "attached" to the residual incumbent by means of the cross-over traffic that they jointly carry, potentially siphoning revenue from the residual incumbent without removing any of the non-attributable costs of that traffic. But for the presence of the residual incumbent, the so-called "stand-alone" railroad would not, in fact, be able to carry the cross-over traffic, since it chooses not to build all the facilities needed to serve that traffic. The SARR is thus critically dependent on the residual incumbent to carry traffic from and to it, but since it does not build the lines that carry that traffic end-to-end, the SARR does not incur all the costs required to generate those revenues. Yet, through the allocation rule, it claims a portion of revenues that before the split helped to defray (a portion) of these costs.

The introduction of cross-over traffic into the SAC analysis is a recipe for economic distortions stemming from strategic revenue shifting that results in finding an excessive rate for the issue traffic, a circumstance that I also termed "strategic" cross-subsidy of the issue traffic. Let me elaborate on this point. The Board tests for cross-subsidy by determining whether revenues from the issue traffic and other traffic in the chosen shipper group exceed SAC. The introduction of cross-over traffic can make such a finding of cross-subsidy a mirage, because the revenues from cross-over movements are claimed without accounting for the costs incurred to generate those revenues. This magical generation of revenues by means of strategic revenue shifting comes at the expense of the residual incumbent which has no guarantee of receiving

sufficient contribution to cover the joint and common costs caused by the traffic it carries, including its portions of the cross-over movements. The revenue transfer to the SARR from the residual incumbent is a strategic cross-subsidy. In fact, because of the leeway in which the revenues from cross-over traffic are allocated, an issue rate may be deemed excessive or non-excessive depending solely on the share of cross-over revenues that is attributable to the SARR. Such an outcome is impossible if the shipper is required to build a SARR that carries all the claimed traffic end-to-end.

As noted, the inclusion of cross-over traffic puts the two railroads – the SARR and the residual incumbent – in a "vertical relationship" in which the profitability of the SARR is directly (*i.e.*, proportionately) linked to how *unprofitable* the complaining shipper can make the residual incumbent by means of strategic revenue shifting. When cross-over traffic is permitted, the complaining shipper no longer has the incentive to design the most efficient stand-alone railroad. Instead it has the incentive to siphon off as much revenue as possible from the residual incumbent while shedding responsibility for contributing adequately to the recovery of all the costs that must be incurred over a long run in order to generate the claimed cross-over traffic revenues.

The shipper must build out the facilities that are required to carry the issue traffic. Basic logic compels a conclusion that the shipper would build out other facilities if doing so generates less in incremental costs than it generates in additional revenues. When it comes to cross-over traffic, that traffic imposes no costs on the railroad but generates net revenues.[14] Revenue "freed" from responsibility for costs in this manner engenders the risk of strategic "cross subsidy" to the SARR. The true nature of this subsidy is disguised because, in a real setting, the net revenues

[14] By this I mean no costs besides directly attributable costs.

from cross-over traffic cannot be meaningfully associated with any particular portion of the track over which the cross-over traffic moves. All the fixed facilities used by cross-over traffic contribute to the viability of that traffic and must be paid for with the available sources of railroad revenues. When the SARR captures for itself the net revenues from cross-over traffic, it leaves with other shippers who use the residual incumbent's lines the burden of paying for those costs that, heretofore, were recovered in part from cross-over traffic revenues. This residual burden is smaller the smaller the portion of revenues that are strategically shifted to the SARR. However, the identified risks cannot be entirely obviated because any allocation is by its very nature arbitrary. It follows that the mileage based allocations advocated by Otter Tail are no solution to this endemic problem: no allocation methodology can handle the fact that prior to the artificial break up of the incumbent into a SARR and a residual incumbent, the net revenues from "cross-over" traffic contributed to the recovery of all fixed costs incurred by the incumbent. After the break up, the same pool of net revenues from cross-over traffic must be arbitrarily allocated among the two railroads whose total costs have been gerrymandered by the complaining shipper for its maximum advantage.

Reliance on cross-over traffic invites distortion into the SAC analysis because it precludes the comparison of total through revenues and end-to-end costs that are at the heart of the SAC test. The unattributable off-line costs that must be incurred in order to enable cross-over traffic, as well as other traffic that may move on these off-line portions of the residual incumbent, cannot be ascertained *unless* the off-line facilities are actually "built" as a part of the SARR. Thus, there is no way of identifying and eliminating the potential distortion created by

use of cross-over traffic short of requiring the proponent of a stand-alone system to conduct the test properly by building all the facilities needed to carry its non-issue traffic end-to-end.[15]

The Board should have no illusions regarding the incentives that complaining shippers have to exploit cross-over traffic in the manner described above. It should also be clear to the Board that the potentially distorting effect of cross-over traffic increases in magnitude as the proportion of cross-over traffic in the overall traffic group carried by the putative stand-alone railroad increases, as in Otter Tail's case. The Board could limit the incentives and ability of the complaining shipper to rely on cross-over traffic to lower its rate(s) by limiting the amount of cross-over traffic that it permitted to be included in a SAC model. Similarly, the Board may require that the complaining shipper who wishes to include some cross-over traffic in the SAC test actually build as part of the SARR those "off-line" facilities that are effectively dedicated to the claimed cross-over traffic. Plainly, if the non-included off-line facilities are totally dedicated to cross-over traffic, the cross-over traffic should have to pay for them. The Board can further constrain these incentives and the concomitant misallocations by insisting, as I suggested earlier, that the shipper justify why it prefers not to build out all the requisite facilities for the carriage of claimed traffic.

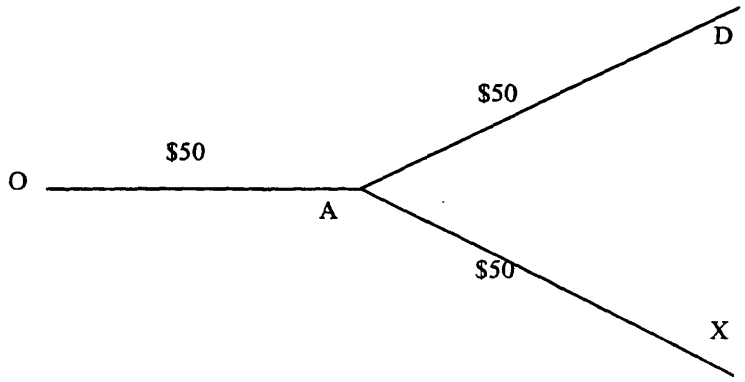
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[15] Any time a facility is built out, it may have an additional "layer" of cross-over traffic associated with it. The first layer of cross-over traffic is the traffic that shares facilities with the issue traffic. The next level of cross-over traffic, layer 2 cross-over traffic, does not share such facilities. Hence, the complaining shipper may argue that it has no incentive to build out the initial layer of facilities to handle cross-over traffic unless it receives a share of layer 2 net revenues. I recognize the issue raised by the ever-expanding SARR network. The concern it raises must not be exaggerated, however. The problem that exists now is that recent SARRs do not even approach "stand-alone" status and therefore the results of SAC analyses do not even approach the results that would be realized under a true stand-alone analysis.

A. Distorting Effects Of Cross-Over Traffic Revenues On The Results Of The SAC Test: A Simple Example

To make the foregoing discussion more transparent, I develop a simplified example which illustrates how use of cross-over traffic can lead to a finding that the issue rate is excessive, where, in fact such a finding is economically irrational and would undermine the viability of the residual incumbent. Assume that the Board is assessing the reasonableness of a rate charged for traffic moving between origin O and destination D through point A. The fixed costs for that movement, standing alone, are $100 with $50 in costs for segment OA and $50 in costs for segment AD (operating costs are ignored for purposes of this example). Assume that the rates charged by the defendant for the issue traffic generate $90 of revenue. Therefore, when the issue traffic is analyzed on its own, without any grouping of other traffic, the costs of providing the issue traffic service ($100) exceed the issue traffic revenues ($90) by $10 ($100-$90).

Figure 1
Hypothetical Railroad System



Now assume that the defendant railroad also moves traffic for a different shipper between origin O and destination X through point A. Assume the line segment OA has sufficient capacity

to handle traffic for *both* shippers without additional investment. The additional cost of line segment AX is $50. Also assume that the second shipper has a more elastic demand for the rail service than the complainant. This limits the revenues the incumbent can charge for this movement to $60 rather than the $90 which the complainant pays on the issue traffic movement. The total cost for this traffic group is now $150 ($50 + $50 + $50) and the total revenues are $150 ($90 + $60). In other words, the revenues from the traffic group exactly match the costs of providing service. Recall that the issue traffic standing alone could not cover its full SAC. The grouped traffic can cover the SAC because of the economies of scope that exist in handling both the issue and the non-issue traffic over the line segment OA. This simple example illustrates how shippers presenting SAC evidence can potentially benefit from grouping end-to-end non-issue traffic with issue traffic and realize cost savings from economies of scope. In the example, there is no finding of excessive rate, however, since the pertinent revenues exactly match pertinent costs.

To this point, the example does not include cross-over traffic. In fact, it illustrates a circumstance in which the shipper can readily present evidence on the stand-alone costs of the entire system, as the complaining shippers in fact successfully did in the *West Texas Utilities*[16] and *APS*[17] cases. Presenting the stand-alone costs of the complete SARR system required to provide the stand-alone traffic with the same service as the incumbent does today is the only accurate way to ensure that the full economic costs of all of the lines are covered on a stand-

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[16] *West Texas Util. Co. v. Burlington Northern R.R.*, 1 S.T.B. 638 (1996), *aff'd. Burlington Northern R.R. Co. v. Surface Transp. Bd.*, 114 F.3d 206 (D.C. Cir. 1997) (*WTU*).

[17] *Arizona Public Service Co. and PacifiCorp. v. Atchison, Topeka and Santa Fe Ry. Co.*, 2 S.T.B. 367 (1997) (*APS*).

alone basis, and to ensure that there is no payment by the stand-alone traffic for facilities it does not use and from which it derives no benefit.

Now, assume that the complainant does not want to build the AX segment but, nevertheless, wants to claim some revenues for carrying traffic on the OA portion of the OAX movement. The complaining shipper thus chooses not present evidence on the costs of segment AX. It therefore posits a stand-alone railroad that runs only between OA and AD. The OX traffic becomes "cross-over" traffic, *i.e.*, it moves over segment OA but interchanges with the residual incumbent at the fictional interchange point A. The costs of this reduced railroad are only $100 ($50 + $50). The issue traffic contributes $90 of revenue, as noted above. What then is the revenue contribution from the non-issue traffic for the OA portion of its OAX end-to-end movement? The simple, and the only correct answer, is that this question cannot be answered at all![18] The $60 worth of net revenue from the OAX traffic, *i.e.*, revenue in excess of variable cost, cannot be attributed to either segment, be it OA or AX. As explained earlier, the movement requires that both segments be in place and thus the costs of both segments need to be covered from *all* sources of revenues in order to make the SARR and the residual incumbent sustainable over the long run where all costs are variable.

If the movement from O to A is the same distance as the movement from A to X, the MMP approach used by Otter Tail in this proceeding to allocate revenues on certain movements would generate equal division of revenue from the cross-over traffic to each carrier, or $30 contributed to the SARR and $30 to the residual incumbent. (Recall that in this example the incumbent receives $60 of revenue for the through OAX movement.) While having the air of objectivity and even-handedness, it is clear that this approach actually biases the SAC test in

[18] Another, equally unhelpful answer is that the number is either $0 or $60, or any number in-between.

favor of the complaining shipper. The theoretical rationale behind this conclusion is that if the complaining shipper believed that it could maximize the excess of total contribution (*i.e.*, maximize the difference between total revenues and total SARR costs) by building out the railroad to include the "off-line" segment, it would have done so! Hence, the mere fact that the complaining shipper prefers to include in its base of revenues the pro-rate *while incurring no additional costs* is evidence that this strategy is intended to yield a higher alleged overcharge on the issue traffic movement than the alternative of building out the full end-to-end railroad.[19]

As was demonstrated above, when the SAC analysis is done correctly and the full costs and revenues are considered, the revenues from the two movements ($90 + $60) just equal the full economic costs of providing service to the two shippers ($50 + $50 + $50). In other words, the incumbent's costs are fully covered and the rates charged for the issue traffic do not exceed a reasonable maximum. But in the cross-over example, if the modified mileage prorate is used to calculate the contribution from cross-over traffic to the SARR that does not include the AX segment (the "reduced" SARR) then the stand-alone "revenues" of $120 ($90 + $30) substantially exceed the costs of $100 ($50 + $50). This strategic revenue shift lowers the AX residual incumbent's share of revenues below its full economic costs of serving the cross-over traffic.

In the cross-over example, therefore, the rate charged for the issue traffic is determined to be unreasonably high, while in the full SAC analysis the rate would be deemed reasonable. Importantly, the former finding would result in a lower rate for the shipper whose demand has

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[19] I am not claiming that this conclusion rises to a level of a theorem. Considerations such as the potential presence of the second layer of "off-off-line" traffic complicate the general proof. However, if the off-line is preponderantly used for cross-over traffic, or if cross-over traffic is a substantial portion of all the traffic claimed by the SARR, then the force of the conclusion in the text is enhanced.

been deemed inelastic and a need to increase the rate for the shipper (the one moving on the OAX) whose demand has been deemed potentially more elastic. Such "rebalancing" of rates, assuming that the rate to the elastic shipper could even be raised, would harm economic efficiency and would be counter to the principles of Ramsey (differential) pricing. Of course, if the rate to the elastic shipper cannot be raised, because the shipper may not be willing to pay more than $60, the residual incumbent will become revenue inadequate and, over the long-haul, will have to withdraw service on the AX segment.

Note that the preferred allocation rule referred to earlier – *i.e.*, a rule that would make the proponent of the SARR indifferent between performing the SAC test properly by building out the AX segment, on the one hand, and using the cross-over traffic assumption, on the other – would allocate only $10 to the O-A-D SARR and $50 to the AX residual incumbent, thereby ensuring that revenues on each of these two entities are just sufficient to cover costs (the same result achieved by properly constructing the SARR to include both the OAD and AX segments).

However, as I have explained above, there is no formula or algorithm that, in the abstract, can calculate the ideal allocation in an individual cross-over traffic situation – the only way to determine the allocation that leads to the postulated indifference is to determine what it would cost to construct and operate the lines of the residual incumbent required to move the cross-over traffic to its end-points on the defendant railroad. No single allocation formula can determine that point unless the actual incremental costs of the off-line are calculated and presented. Because shippers have an incentive to use cross-over traffic only when the resulting net revenue contribution to the SARR is higher than it would be if the test were conducted properly, it is a reasonable presumption that any allocation "rule" advocated by shippers is likely to bias the SAC

results in favor of the shipper, no matter how vociferously the shippers claim it is "fair" or "even-handed."

Let me recapitulate by pointing out how the foregoing example illustrates the three propositions set forth at the beginning of this section.

First, when cross-over traffic is introduced, the stand-alone railroad is no longer "stand-alone." In the example, segments OA, AD, and AX taken together comprise a stand-alone system. They constitute all the facilities needed to handle all the traffic that the shipper has selected. When cross-over traffic is introduced, the new, putative stand-alone comprises segments OA and AD; these are now severed from segment AX. Nevertheless, the new stand-alone is inextricably linked to the residual incumbent serving the AX movement, because the traffic that moves over from AX is the source of revenue that affects the outcome of the SAC analysis. If the AX segment ceased to exist, the OAX traffic would not move, and the only revenue available to cover the $100 of costs on the OAD segments would be the $90 in revenue generated by the OAD issue traffic. The complaining shipper cannot have it both ways; if it is entitled to assume that cross-over traffic revenues will be available to defray a portion of the costs of the OAD segment, it must also demonstrate that the AX segment will be viable over the long run. Otter Tail has made no such showing in this proceeding with respect to the lines of the residual BNSF upon which the movement of cross-over traffic relies.

Second, the use of cross-over traffic is a vehicle for strategic cross subsidy. Of the $30 in revenues from the movement OAX that is allocated under the modified mileage prorate to the stand-alone, $20 is actually needed to cover the costs of segment AX. If cross-over traffic is permitted, this $20 becomes a strategic subsidy from the residual incumbent to the SARR.

Third, the distorting effects of cross-over traffic increase as the share of cross- over traffic in the stand-alone traffic group increases. In the example, the cross-over movement yields contribution to the SARR in excess of costs, and the more such cross-over movements are added to the SARR, the greater the potential magnitude of the alleged overcharge on the issue traffic movement.[20]

[20] To illustrate, assume that the SAC of the issue traffic is $100 and that the current rate is $90. Hence, on the pure SARR basis there is no finding of excessive rate. Now assume that a huge volume of cross-over traffic moves over the portion of the SARR. Assume that this traffic generates $1000 in net contribution, which is just enough to cover the full costs of the total network (including the $10 shortfall on the SARR built to carry the original end-to-end traffic). Now assume that the shipper shifts $50 (or 5%) of that contribution from cross-over traffic to the SARR. With $50 so allocated, the revenues from the SARR are $150 which exceeds the SARR's SAC of $100 by $50, thus mandating a very substantial rate reduction under the Board's rate prescription methodology. Note that the distortion from the cross-over allocation is far greater in this example, even though only 5 percent of cross-over revenues are allocated to the SARR, than the initial outcome in which 50 percent of the revenues are allocated to the SARR.

Verified Statement of Economists Supporting the Principles of Constrained Market Pricing

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Submitted to the
Interstate Commerce Commission
Coal Rate Guidelines – Nationwide,
Ex Parte No. 347 (Sub-No. 1)

June 1983

APPENDIX A

VERIFIED STATEMENT OF ECONOMISTS
SUPPORTING THE PRINCIPLES OF
CONSTRAINED MARKET PRICING

On February 24, 1983, the Interstate Commerce Commission announced its proposal to adopt a new policy called "Constrained Market Pricing" to govern the regulation of railroad rates on coal traffic subject to the Commission's jurisdiction. In many important respects, this proposal represents a breakthrough in bringing federal regulatory policy in line with modern economic theory. We, the undersigned economists, many of whom have participated in the development of this theory, join in this statement to express our support for the principles which the Commission has proposed to adopt to shape its new policy.

We understand the key principles of the new policy to include the following: (1) regulation must afford railroads the opportunity to earn a rate of return on their investment equal to the current cost of capital; (2) permitting railroads to set their rates in accordance with the principles of Ramsey Pricing will lead to economic efficiency in the market for railroad transportation; (3) in addition to promoting efficiency in other respects, the role of proper regulation is to prevent any abuse of monopoly power by ensuring that revenues derived from the rates for any particular rail

service or group of rail services do not exceed so-called "stand-alone costs," the minimum current costs of providing that service or group of services in isolation; and (4) attempts to impose rate ceilings based on arbitrary cost allocation schemes, such as fully allocated costs, will cause economic inefficiency in railroad transportation.

In the ensuing discussion, we shall explain the basis of our agreement with each of these points.

1. Regulation Must Permit Railroads To Earn A Competitive Return On Their Investment.

At page 7 of the decision, the Commission addresses the need for rate regulation to afford railroads the opportunity to earn "adequate revenues." The Commission states:

> In Ex Parte No. 393, Standards for Determining Railroad Revenue Adequacy, 364 I.C.C. 803 (1981), aff'd sub nom. Bessemer & Lake Erie R.R. Co., ___ F.2d ___ (No. 81-1492, 3d Cir., Oct. 1982), we concluded that railroads should have the opportunity to achieve earnings sufficient to yield a return on investment equal to the current cost of capital. As we explained in that case, railroads can obtain funds for investment only by offering rates of return comparable to other investment opportunities. Investments earning less than the cost of capital will not be able to retain existing funding or obtain new fundings, because investors could invest available funds elsewhere at a higher rate of return. Thus, if railroads are to provide adequate service to the shipping public, then we must construct a maximum rate standard which gives them the opportunity to earn adequate revenues.

We concur fully with the statement. If regulation is to serve the public interest, it must not only protect ratepayers from abuses of monopoly power; it must also allow the regulated entities (here, railroads) the opportunity to attract the capital necessary to build and maintain the facilities on which their service depends. The capital markets being highly competitive, railroads can only attract that capital if they have the opportunity to earn a rate of return that is comparable to the rates of return expected to be available on investments of similar risks. This is what is commonly understood to be a "current cost of capital" return. If a system of regulation is imposed which, a priori, forecloses the opportunity to earn such a rate of return, investors can be expected to take their funds elsewhere, and the railroads' services will eventually disappear. Thus, the Commission has properly recognized that its system of regulation must afford railroads the opportunity to earn a rate of return on their investment equal to the current cost of capital.

2. Pricing In Accordance With Ramsey Principles Will Lead To Economic Efficiency.

The decision poses the issue of what principles should govern the determination of maximum reasonable rates in an industry characterized by a significant proportion of

costs that are not directly attributable to any individual service, but are instead joint or common to groups of services. The Commission has chosen the principles of Ramsey pricing to fulfill this role. As the Commission explains:

> Ramsey pricing is designed to apply when marginal costs are less than average total costs. In such instances, marginal cost pricing would not permit recovery of total costs. Ramsey pricing assigns a mark up above marginal cost on the basis of inverse demand elasticity. Thus, the highest mark up would be charged to the traffic most dependent on the service provided (low elasticity traffic). By contrast, a highly competitive (highly elastic) rail service market would tolerate only a small markup over the attributable cost of providing that service. * * * Ramsey pricing analysis yields economically efficient rates, because the resulting rates do not bias the demand patterns that would be achieved under marginal cost pricing. We emphasize that Ramsey pricing is not the same as monopoly pricing because the markups above marginal cost can be constrained by whatever limits on the firm's overall earnings are set by the regulator * * *.
>
> * * *
>
> The constrained market pricing system we are proposing allows carriers to use market demand as the basis for their ratemaking. By this approach, the carriers take the ratemaking initiative, as contemplated by the statute, on all traffic. [Decision at 9-10.]

The Commission's adoption of Ramsey pricing principles is correct, and its analysis of why Ramsey pricing

leads to economically efficient rates is sound. By apportioning all unattributable costs on the basis of the values of the services to shippers, as reflected by their demand elasticities, Ramsey pricing maximizes shippers' total net benefits among the prices that are compatible with the financial viability of the railroad. Since it is the railroads themselves that are closest to the market and best apprised of demand and cost conditions, pricing and resource allocation will be most efficient when the railroads are permitted to take the ratemaking initiative. Unless otherwise constrained by regulation, they will have the incentive to price in accordance with the principles of Ramsey pricing.

3. The Stand-Alone Cost Test Is A Proper Check On The Abuse Of Any Monopoly Power.

To ensure that rates on captive traffic set in accordance with Ramsey principles do not exceed levels that could be charged under competition, the Commission proposes to adopt the "stand-alone cost test." As the Commission explains:

> The "stand-alone cost" to any given shipper (or shipper group) is the cost of serving that shipper alone, as if it were isolated from the railroads' other customers. It represents that level at which the shipper could provide the service itself. No shipper would reasonably agree to pay more to a railroad for transportation than it would cost to produce

> in isolation itself, or more than it would cost a competitor of the railroad to provide the service to it. Thus, the stand-alone cost serves as a surrogate for competition; it enforces a competitive standard on rail rates in the absence of any real competitive alternative.
>
> * * *
>
> Because the stand-alone cost represents the cost of obtaining service from another source (i.e., reproducing the service capability), the cost of facilities must be based on replacement cost, or the current cost of producing equipment or plant with equivalent capabilities. This is appropriate since, to insure continuity of service, a long-run pricing strategy must permit sufficient income to allow for replacement of existing assets. [Decision at 11-12; footnotes omitted.]

We agree with this analysis. To prevent abuse of any monopoly power, there is no need to regulate prices that are no higher than those which could prevail under effective competition. Where competition is effective, no railroad will be able to charge any shipper rates in excess of the minimum cost (including the capital costs) that would be incurred currently to provide the service in isolation. The reason for this constraint is simple: in a market subject to effective active or potential competition, any railroad charging in excess of that amount would invite entry into the market by a firm willing to charge no more than is necessary just to cover that level of costs. Since the stand-alone cost is the minimum current cost of providing a

service in isolation, the stand-alone cost test is the proper means to ensure that rates do not involve any abuse of monopoly power.

The Commission is also correct in recognizing that the stand-alone cost test applies to rates for groups of services or shippers as well as individual services. Just as rates that return revenues in excess of the minimum current cost of providing a single service will invite entry by a competitor willing to charge rates which earn no more than that level of costs, rates consistently in excess of the minimum current cost of providing any group of services will also invite competition.

We agree, further, that stand-alone costs must include or reflect the total current replacement costs of providing a service or group of services in isolation. This is so whether current costs are higher or lower than costs that were incurred in the past, for the costs that affect pricing in competitive markets, i.e., the costs of entry, are always current replacement costs.

Finally, the Commission has properly recognized that the stand-alone cost test serves as a check against cross-subsidy:

> The stand-alone cost defines the point at which cross-subsidy would begin to take place. No shipper can be said to be cross-subsidizing other shippers

> if it pays no more than the cost to the railroad of providing service dedicated soley to it. (If it pays less than the stand-alone cost, it simply benefits from the economies of scope and density that exist in the railroad's system.) Thus, with the stand-alone cost as a rate cap, shippers can be assured that they will not be required to contribute toward the cost of facilities that do not serve them. [Decision at 11; footnotes omitted.]

This is an entirely correct analysis of economic cross-subsidy. Cross-subsidies are properly of concern to economists and regulators because they may result in a misallocation of resources by encouraging inefficient investment. For customers of a railroad, they may be of concern because they are perceived as unfair. Yet, while shippers who pay more for their service than other shippers may feel that they are being forced to "cross-subsidize" the other shippers, mere payment of a relatively higher rate is not evidence of a cross-subsidy where fixed and common costs must be covered. Rather, as the Commission recognizes, a cross-subsidy can only occur in an economic sense where a shipper (or group of shippers) pays more than the total cost of serving it alone. Where no shipper or shipper group pays more than that amount, differences in their rates simply reflect differing contributions to the common costs of the system, and not cross-subsidies.

4. Regulation Based On Arbitrary Cost Allocations Will Lead To Economic Inefficiency.

In adopting Ramsey pricing as the theoretical framework for assessing the reasonableness of the common cost allocations reflected in rail rates, the Commission explicitly rejects the alternative of arbitrary cost allocation schemes:

> We seriously doubt that any system of rate regulation based solay upon an arbitrary cost-allocation formula will enable rail carriers to achieve revenue adequacy. We cannot assume that traffic will actually move in each market at the fully allocated cost rate level as determined by a cost allocation formula. Carriers must charge competitive rates in competitive markets or lose the traffic. * * * [T]he market ignores the "scientific" assignment of certain costs to each of the carrier's rates. Yet, if an arbitrary allocation of costs were used to formulate and impose a rate ceiling, the carrier could not make up for the revenue shortfall it would suffer on movements that fall below the rate necessary to contribute the allocated amount.
>
> It is only through a demand-based pricing system that the nonattributable costs can be allocated in an efficient manner. * * *
>
> * * *
>
> By incorporating demand elasticity into ratemaking, Ramsey pricing should encourage more shippers to purchase transportation service than if an arbitrary cost-apportionment formula were used to set rates. As noted earlier, "fully allocated cost" and other similar methodologies frequently "over-" or "underassign" to a particular service (relative to

> actual market demand) portions of the carrier's common or unattributable costs. As a result, a carrier actually levying such a rate would acquire less than maximum net revenue contribution. If, however, the carrier is allowed to allocate costs on the basis of demand elasticity, the contribution should be maximized and the carrier's resources more efficiently utilized. [Decision at 8-10.]

This discussion accurately points up the indefensibility of any arbitrary cost allocation approach to setting prices. By failing to reflect differences in shipper demand, rates based on such approaches can preclude carriers from covering their total costs. They also tend to promote economic inefficiency by unnecessarily diverting traffic that could make a positive contribution to the railroads' common costs at lower rates, and by failing to obtain required contributions from shippers of other, less elastic traffic which they are able and willing to pay.

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Kenneth J. Arrow
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Professor David Sappington
University of Pennsylvania

Professor Ann F. Friedlaender
M.I.T.

Professor Robert D. Willig
Princeton University

Professor Richard J. Gilbert
Stanford University

APPENDIX B

VERIFIED STATEMENT OF

GEORGE J. STIGLER

My name is George J. Stigler, and I am a Professor in the Graduate School of Business at the University of Chicago. I have read the "Verified Statement of Economists Supporting the Principles of Constrained Market Pricing" signed by Professor William Baumol and others for submission in proceedings before the Interstate Commerce Commission in Coal Rate Guidelines -- Nationwide, Ex Parte No. 347 (Sub-No. 1). Since I have not participated in that proceeding nor have I participated in the development of the Ramsey Pricing Theory, it seems desirable to make a separate statement.

I have specialized in studies of prices and public regulation. I am confident that adoption of the Interstate Commerce Commission's proposed maximum rail rate policy set forth in its decision of February 8, 1983, with regard to coal and other traffic as well, would lead to a major improvement in and a rationalization of our railroads' rate structures, and in the efficiency of the rail industry.

Verification

George J. Stigler, being duly sworn, states that he has read the foregoing statement, knows the contents thereof, and that the same are true as stated.

George J. Stigler

Subscribed and sworn to before me this 13 day of June, 1983.

Notary Public

My Commission expires:

BNSF Reply Exhibit III.A-2

Has Been Redacted

Operations Authorized by Original Trackage Rights Agreements



BNSF

Burlington Northern Santa Fe Railway

BNSF Reply Exh. III.A-3

Operations Authorized by Trackage Rights Agreements Effective September 2003



BNSF

Burlington Northern Santa Fe Railway

BNSF Reply Exh. III.A-4

Comparison of TNR Coal Tonnage Forecast by AEP Texas and by BNSF

	AEP Texas Opening (Tons)	BNSF Reply (Tons)	Difference
2000	96,571,980	81,674,695	14,897,285
2001	189,919,913	161,552,706	28,367,207
2002	189,256,471	161,358,786	27,897,684
2003	194,130,567	156,290,007	37,840,560
2004	206,212,111	154,865,568	51,346,543
2005	202,459,588	146,062,665	56,396,923
2006	204,386,201	147,810,781	56,575,420
2007	207,506,499	149,574,587	57,931,912
2008	209,995,492	149,818,764	60,176,727
2009	212,617,028	154,116,900	58,500,128
2010	217,580,652	155,142,317	62,438,335
2011	219,998,898	156,429,968	63,568,930
2012	221,459,579	159,071,214	62,388,366
2013	222,462,175	160,960,812	61,501,363
2014	223,416,887	161,800,234	61,616,654
2015	224,222,893	162,478,319	61,744,573
2016	225,334,341	164,008,355	61,325,986
2017	226,679,081	164,718,459	61,960,622
2018	227,467,042	164,189,550	63,277,492
2019	228,484,860	165,300,041	63,184,818
2020	229,597,655	166,152,328	63,445,327

BNSF Reply Exhibit III.A-6

Has Been Redacted

BNSF Reply Exhibit III.A-7

Has Been Redacted

BNSF Reply Exhibit III.A-8

Has Been Redacted

Development of More Precise Mileage-Block Credits

The source of the 100-mile origin and termination blocks used in the MSP formula is the Board's Carload Waybill Sample, which divides revenue on interline moves using an assumption that the originating and terminating carriers each receive an additional revenue credit that is the equivalent of a 100-mile line haul move. This credit is expressly intended to compensate the originating and terminating carrier for the costs associated with originating and terminating each move.[1]

However, this 100-mile block credit was calculated to apply across all shipments, whether the traffic moves in single-car, multiple-car, or unit-train shipments, whether the traffic moves in shipper-owned or carrier-owned equipment, and regardless of the traffic type. The 100-mile block credit may reasonably reflect the origination and termination costs of a "system-average" carload. But its use in a SAC case to allocate revenue on cross-over traffic creates a perverse incentive for the complainant to load the SARR with short-haul coal traffic because the relative costs of originating and terminating a carload of unit train coal are considerably lower than the costs of originating or terminating a "system-average" carload of traffic.

1. Unit Coal Trains

Unit coal trains consist of continuously cycling sets of cars moving between an established origin and an established destination. The essence of unit-coal train service, and one of the main factors driving railroads to provide unit-train service, is the elimination of costs

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[1] The documentation explaining the Waybill calculations states that the origin carrier receives "an additional [100-mile] block to allow for the pick-up and switching expenses," and the destination carrier receives "an additional [100-mile] block to allow for delivery expenses." *User Guide for the 1996 Surface Transportation Board Waybill Sample* at 8-33. The cited excerpt is included in BNSF's Reply electronic workpapers at "user guide.pdf."

associated with the switching that would otherwise be incurred to create a trainload from numerous individually originated cars or smaller blocks of cars. To originate a unit train carload, an existing set of preconfigured cars is sent to a mine, where the entire set of cars is moved through the loading facilities. In the Powder River Basin ("PRB"), coal is automatically dumped into each car from a loading tipple as the car moves through the loading dock. All of these operations are carried out on mine-owned loop tracks, so the originating railroad does not even own any road property associated with the origination of the coal. In some cases, the loading operations are carried out by third-party loading crews that specialize in these activities. The loading operations in the PRB have become highly efficient due to the large volume of trains that load at individual mines. Unit trains that regularly consist of 115 to 130 carloads can be loaded at PRB mines in a matter of three to four hours.

The Board's URCS costing methodology recognizes the efficiencies and lower costs associated with originating and terminating unit trains. *Ex Parte No. 270 (Sub-No. 4)* prescribes specific adjustments to various URCS system-average costs to account for these efficiencies. Incorporating these adjustments for unit-train traffic results in substantial reductions to system-average costs.[2]

In Attachment 1 to this exhibit, BNSF shows the effect of these unit train adjustments using BNSF's 2002 URCS. Attachment 1 shows that URCS itself assumes that the costs to originate and terminate unit train carloads in shipper-owned cars is about 25 percent of the cost to originate the system-average carload and the cost to originate and terminate unit train carloads in railroad owned cars is about 57 percent of the system average (the vast majority of coal traffic

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[2] *Ex Parte No. 270 (Sub-No. 4), Investigation of Railroad Freight Rate Structure Coal*, 344 I.C.C. 71, 227 (decided Dec. 3, 1974).

in AEP Texas' SARR moves in shipper-owned equipment.) Applying these relationships to the 100-mile blocks that the Board's Waybill Sample uses to reflect the origination and termination costs of the system-average carload results in revised origination and termination blocks of 25 miles and 57 miles, respectively, for unit-train carloads of coal in shipper cars and railroad cars.

BNSF carried out two additional analyses to confirm the reasonableness of these mileage blocks for unit-train carloads. First, BNSF examined the relationship between unit-train line-haul costs and unit-train origination costs as determined by URCS. The only significant difference in the URCS treatment of line-haul costs for unit trains as compared to shipments of single and multiple carloads is that URCS eliminates intertrain and intratrain ("I&I") switching. Since I&I switching is not a particularly large cost, there is little difference between the URCS line-haul costs for unit-train carloads and the URCS line-haul costs for single and multiple train carloads. As such, the relationship of line-haul costs to origination costs for unit-train carloads -- and therefore, the appropriate size of the mileage block for unit-train originations -- is not different than the relationships between the origination costs presented in Attachment 1.[3]

Second, BNSF examined the variable cost evidence that it submitted in this proceeding for the AEP Texas movements to determine the relationship between origination and line-haul costs. The AEP Texas movement is a relatively long, unit train movement that is reasonably representative of other BNSF movements of PRB coal. Attachment 2 sets out a movement-specific analysis showing that the variable origination costs for the AEP Texas movements to Oklaunion are the equivalent of about 38 miles of line-haul costs. Taken together, these two analyses demonstrate that an origination and termination credit of 25 miles would be more

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[3] BNSF Reply electronic workpaper "Term Cost Single vs Unit Train.123," worksheet "linehaul."

appropriate than the 100-mile MSP block for unit train coal moved in shipper cars, the predominant type of traffic on the TNR, and a credit of 57 would be more appropriate for unit train service in railroad-provided cars.

Revision of the origin/termination blocks used in MSP would reduce the incentive a complainant has to game SAC results through the selection of short-haul, cross-over traffic. The size of the block credit for origination and termination is relatively unimportant in a case where the SARR carries cross-over traffic for a significant portion of the through movement. Indeed, in the TMPA case, where BNSF sponsored an adjustment to the origination/termination credits in MMP similar to the adjustment proposed here, the Board found that the adjustment had no significant effect on the revenue calculations.[4] That was a case, however, where the SARR carried the cross-over traffic on average for a considerable portion of the move. Where, as here, the SARR is assumed to carry much of the cross-over traffic for a relatively short distance,[5] an overstated origination credit gives the SARR a disproportionate amount of revenue and therefore provides a strong incentive to game the SAC test through the use of short-haul traffic.

2. Non-Unit Train Traffic

a. Merchandise Traffic

As described above, the 100-mile origination/termination credit in the Waybill Sample applies across the board to all movements, and therefore reflects the cost to originate and terminate the system-average carload. However, just as the cost to originate and terminate a

[4] *TMPA* at 31.

[5] For example, the TNR posits short-haul unit-coal-train movements of as few as 10 miles that are interchanged with BNSF at Campbell and South Logan. For this traffic, the use of the generic 100-mile origination credit significantly distorts the revenue division. Similarly, as the majority of the TNR's coal traffic moves only 250 miles before it is interchanged with the residual BNSF at Alliance, the 100-mile origination credit improperly overstates the allocation of revenues to the stand-alone railroad for that traffic as well.

carload of unit-train traffic is significantly less than average, the cost to originate and terminate a carload of merchandise traffic is significantly higher than average. URCS recognizes this through the use of a make-whole adjustment that is applied in assessing the costs of non-unit train service. Attachment 3 shows the relationship between the system-average carload origination cost and the origin/termination costs of non-unit train cars after the make-whole adjustment is applied. This analysis shows that the cost of originating/terminating a non-unit train carload in railroad equipment is about 341 percent of the cost of originating/terminating a system average carload in railroad equipment. For private equipment, the cost is 237 percent. This indicates that a mileage credit of 341 miles should be applied to merchandise traffic moving in railroad-owned equipment and a mileage credit of 237 miles should be applied to merchandise traffic moving in shipper-owned equipment.

b. Intermodal Traffic

The 100-mile credit for originations and terminations is also inappropriate for intermodal traffic, which is typically characterized by relatively low line-haul costs and relatively high origination and termination costs. In fact, intermodal terminal operations are among the most complex and costly operations in the railroad industry.[6] The disparity between intermodal terminal costs and line-haul costs is especially pronounced in the type of intermodal traffic selected by AEP Texas for the TNR, *i.e.* long-haul traffic, much of which moves between California and Texas in efficient double-stack equipment.[7]

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[6] *See* BNSF Reply electronic workpaper "FIRE.pdf."

[7] *See* BNSF Reply electronic workpaper "intermodal cars.xls."

Since AEP Texas does not include a significant amount of intermodal traffic in its stand-alone network,[8] BNSF has not undertaken a special study to determine the origin and termination costs associated with such traffic. Instead, since the TNR's intermodal traffic, like carload traffic, is typically waybilled as single-car traffic and does not experience the trainload cost reductions experienced by unit trains, BNSF uses the same approach for modifying the mileage block credits for intermodal traffic that it uses for merchandise traffic. Specifically, BNSF applies the make-whole adjustment to assess the costs of this non-unit train traffic, resulting in a 341-mile block credit for railroad equipment and a 237-mile block credit for private equipment. These results more reasonably account for the more significant costs of terminal operations associated with handling intermodal traffic than the 100-mile block credit assumed in the generic MSP and are more consistent with other independent sources of the relationship between the terminal and line-haul costs of intermodal service.

Specifically, these results are more consistent with the relationship between terminal costs and line-haul costs for intermodal traffic found in a recent Foundation for Intermodal Research & Education ("FIRE") study. The FIRE study estimated a lift cost of $62.50 per unit for each origination or termination.[9] This study also estimated intermodal line-haul costs that averaged 17.5 cents per unit-mile for 200-unit trains and 21.3 cents per unit-mile for all trains in the study, including 100-unit trains.[10] Dividing these line-haul costs into the intermodal O/T cost

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[8] Intermodal traffic constitutes only 4.2 million of the 197 million tons transported by the TNR in 2001, its first full year of operation, according to AEP Texas. *See* AEP Texas Opening Exh. III-A-15, column 4.

[9] This Fire Study is included in BNSF's Reply electronic workpapers at "FIRE.pdf."

[10] BNSF Reply electronic workpaper "FIRE Costs.xls." These estimates are almost certainly higher than the relevant line-haul costs associated with the TNR intermodal traffic, since the FIRE study was analyzing costs for shorter-haul operations of 300-450 miles.

produces mileage-credit equivalents of 357 for 200-unit trains and 293 for all trains, which are much more consistent with the credits developed for manifest traffic above than the understated 100 used in the generic MSP application.

In fact, the use of the URCS "system-average" O/T cost for non-unit train traffic described above tends to understate the costs for intermodal terminal events, as the calculations for the average freight car include no portion of the loading and unloading ("lift") expense or the pick-up and delivery ("dray") expense that the railroad incurs in providing intermodal service.

Finally, the use of the relationship calculated for an average freight car is more applicable to establish origination and terminations costs for intermodal traffic than the use of URCS costs specified for intermodal traffic. It is widely acknowledged that the URCS costs estimates for intermodal traffic do not satisfactorily account for the costs associated with rail intermodal transportation, including terminal activities.[11] For example, many of the operating input assumptions associated with intermodal traffic are outdated and the calculation of terminal costs associated with intermodal traffic improperly includes no allocation of the flat-car equipment expense.

Consequently, BNSF applies the same O/T mileage credits of 341 for railroad-provided equipment and 237 for private equipment to all TNR non-unit train traffic, including intermodal traffic.

3. Summary of Revised Origination/Termination Blocks

In sum, the 100-mile origination and termination blocks assumed under the Board's MSP methodology are problematic. The modified origination/termination mileage blocks calculated by BNSF above are as follows:

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[11] *Review of the General Purpose Costing System*, 2 S.T.B. 659, 662-663 (1997)

Traffic Type	Equipment Owner	
	Railroad-Provided	Private
Trainload Traffic (Coal, Grain, Other Unit Trains)	57	25
Other Traffic (Manifest, Autos, Intermodal)	341	237

BNSF Reply Exhibit III.A-10 shows that using the adjusted mileage credits described above results in an overall four percent reduction in TNR 2002 base-year revenues from those calculated using MSP with the generic 100-mile credit for all originations or terminations.

Attachment 1 to BNSF
Reply Exh. III.A-9

Comparison of URCS Unit-Train Origination and Termination Costs to URCS System-Average Origination and Termination Costs

Cost Component	*System-Average Single Car* RR-Owned Car	*System-Average Single Car* Private Car	*115-Car Trainload Shipment* RR-Owned Car	*115-Car Trainload Shipment* Private Car
Station Clerical	$6.82	$6.82	$5.13	$5.13
Industry Switch Engine Minute	$53.90	$53.90	$14.18	$14.18
Industry Car Days	$49.04	$0.00	$25.15	$0.00
Industry Car Miles	$1.19	$0.00	$0.63	$0.00
Total	$110.95	$60.72	$45.09	$19.31
Carloads by Car Owner	3,366,000	5,932,000		
Percent by Car Owner	36.20%	63.80%		
Composite Variable Cost per Origination or Termination	**$78.90**		$45.09	$19.31
Origination/Termination Costs Relative to System-Average			**57.1%**	**24.5%**

Source: 2002 BNSF URCS and BNSF Supp. electronic work paper "TERM COSTS SINGLE VS UNIT TRAIN.123" tab "summary"

Attachment 2 to BNSF
Reply Exh. III.A-9

AEP Texas Movement-Specific Origination Costs
FROM Black Thunder TO Oklaunion -- 2Q 02 LEVELS
Developed From BNSF's Variable Cost Analysis

	Origin Mine	2002 Q2 Black Thunder	Source
1	Carload Clerical for Origination or Termination	**$5.12**	BNSF AEP REPLY PRG.123 tab D, cell H8 divided by 2
2a	Loading Loop Track	**$0.00**	BNSF AEP REPLY PRG.123 tab D, cell H11
2b	Origin / Destination Switching	**$13.54**	BNSF AEP REPLY PRG.123 tab D, cell H10 divided by 2 + H13 divided by 2
3	Loading Crew Wages/Train	$0.00	N/A - Switching Crew expense included in line 2b; Road Crew expense removed from road switching costs in line 2b.
4	Wages associated with Mine Loading	$0.00	N/A
5	Cars per Train	117.8	BNSF AEP REPLY PRG.123 tab D, cell H49
6	T&E Wages/Carload at Mine	$0.00	Line 4 divided by Line 5
7	3rd Party Load Crew Payments	**$0.00**	N/A
8	Total Loco Cost per Carload	$0.00	N/A - Switching Locomotive ownership expense included in line 2b
9	Round Trip Cycle Hours	156.8	BNSF AEP REPLY PRG.123 tab D, cell H51
10	Loco Cost per Hour	$0.000	Line 8 divided by Line 9
11	Cycle Mine Days	0.00	N/A
12	Mine Hours	0.00	Line 11 times 24 hours
13	Loco Loop Cost	**$0.00**	Line 10 multiplied by Line 12
14	Car cost for Origination or Termination - Day	$15.26	BNSF AEP REPLY PRG.123 tab O, cell T53
15	Car cost for Origination or Termination - Yard	$0.44	BNSF AEP REPLY PRG.123 tab O, cell T46
16	Total Origination Cost	$34.37	Line 1 + Line 2a +Line 2b + Line 6 + Line 7 + Lines 13,14 and 15
15	Total Trip Cost per Carload	$1,038.95	BNSF AEP REPLY PRG.123 tab D, cell H28
16	Origination and Termination Costs	$68.75	Line 14 times 2
17	Line Haul Costs per Carload	$970.20	Line 15 minus Line 16
18	Loaded Miles	1065.3	BNSF AEP REPLY PRG.123 tab D, cell H46
19	Cost per Mile	$0.91	Line 17 divided by Line 18
20	Origination Mileage Credit	37.7	Line 16 divided by Line 19

Source: 2002 BNSF URCS and BNSF Supp. electronic work paper "TERM COSTS SINGLE VS UNIT TRAIN.123" tab "movespecific"

Comparison of URCS Single-Car Origination and Termination Costs with Make-Whole Adjustments to URCS System-Average Origination and Termination Costs

	System-Average Single Car		*Single Car w/ Make-Whole*	
Cost Component	RR-Owned Car	Private Car	RR-Owned Car	Private Car
Station Clerical	$6.82	$6.82	$6.82	$6.82
Industry Switch Engine Minute	$53.90	$53.90	$53.90	$53.90
Industry Car Days	$49.04	$0.00	$49.04	$0.00
Industry Car Miles	$1.19	$0.00	$1.19	$0.00
Make-Whole Adjustment	xxx	xxx	$158.14	$126.44
Total	$110.95	$60.72	$269.09	$187.16
Carloads by Car Owner 1/	3,366,000	5,932,000		
Percent by Car Owner	36.20%	63.80%		
Composite Variable Cost per Origination or Termination	**$78.90**		$269.09	$187.16
Origination/Termination Costs Relative to System-Average			**341.0%**	**237.2%**

Source: 2002 BNSF URCS and BNSF Supp. electronic work paper "TERM COSTS SINGLE VS UNIT TRAIN.123" tab "summary"

BNSF Reply Exhibit III.A-10

Has Been Redacted

BNSF Reply Exhibit III.A-11

Has Been Redacted

BNSF Reply Exhibit III.A-12

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BNSF Reply Exhibit III.A-13

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BNSF Reply Exhibit III.A-14

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BNSF Reply Exhibit III.A-15

Has Been Redacted

Comparison of TNR Coal Revenue Forecast by AEP Texas and by BNSF

	AEP Opening	BNSF Reply	Difference
2000	$384,194,684	$321,027,715	$63,166,969
2001	$723,260,103	$607,680,293	$115,579,810
2002	$745,241,660	$628,012,777	$117,228,883
2003	$756,368,384	$599,991,954	$156,376,430
2004	$812,362,857	$606,017,518	$206,345,339
2005	$801,355,166	$584,388,290	$216,966,876
2006	$820,928,002	$601,714,559	$219,213,443
2007	$847,859,922	$616,888,101	$230,971,821
2008	$884,728,983	$634,352,638	$250,376,345
2009	$907,166,431	$652,763,499	$254,402,932
2010	$937,277,999	$638,762,612	$298,515,387
2011	$957,297,702	$655,158,419	$302,139,283
2012	$975,522,029	$674,059,440	$301,462,589
2013	$993,581,303	$689,325,746	$304,255,558
2014	$1,010,755,958	$707,091,752	$303,664,206
2015	$1,028,235,564	$723,269,391	$304,966,173
2016	$1,042,524,128	$744,010,674	$298,513,454
2017	$1,058,318,071	$760,778,669	$297,539,403
2018	$1,072,790,414	$772,177,511	$300,612,903
2019	$1,087,627,575	$793,314,743	$294,312,832
2020	$1,104,170,500	$810,748,599	$293,421,900

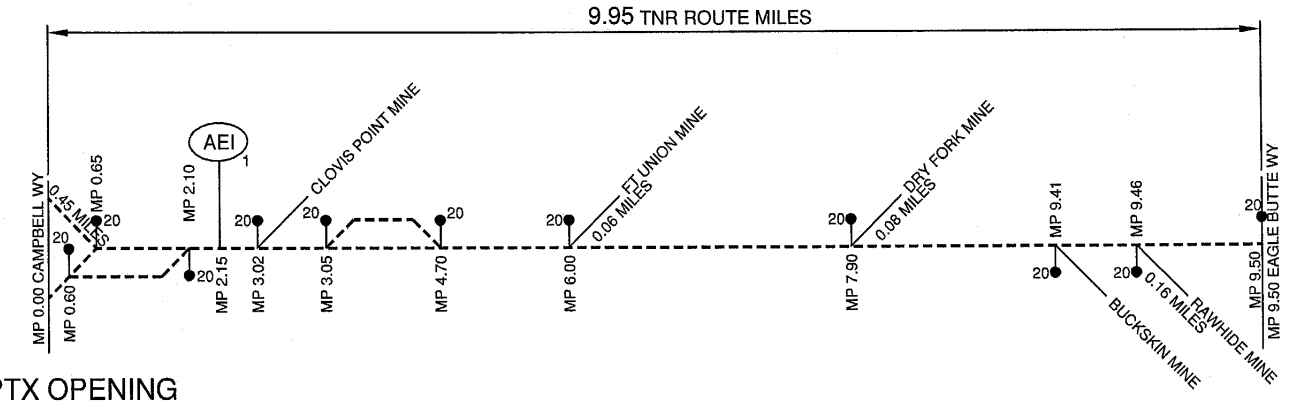
Comparison of TNR Total Tonnage and Revenue Forecast by AEP Texas and by BNSF

	AEP Opening		BNSF Reply		Difference	
	Tonnages	Revenue	Tonnages	Revenue	Tonnages	Revenue
2000	102,043,625	$407,442,589	87,146,340	$346,185,564	14,897,285	$61,257,024
2001	198,692,007	$767,312,777	170,324,800	$654,566,246	28,367,207	$112,746,532
2002	195,424,814	$772,201,509	167,527,129	$656,963,303	27,897,684	$115,238,205
2003	200,596,124	$784,096,775	162,755,564	$629,771,545	37,840,560	$154,325,230
2004	212,794,713	$840,836,834	161,448,170	$636,601,324	51,346,543	$204,235,511
2005	209,154,616	$830,676,319	152,757,693	$615,885,500	56,396,923	$214,790,819
2006	211,168,052	$851,032,481	154,592,632	$634,054,013	56,575,420	$216,978,468
2007	214,360,016	$878,617,948	156,428,104	$649,930,889	57,931,912	$228,687,059
2008	216,910,847	$916,126,519	156,734,119	$668,085,101	60,176,727	$248,041,418
2009	219,588,056	$939,186,877	161,087,928	$687,168,895	58,500,128	$252,017,982
2010	224,602,496	$969,910,072	162,164,161	$673,829,760	62,438,335	$296,080,313
2011	227,067,470	$990,533,397	163,498,540	$690,879,693	63,568,930	$299,653,704
2012	228,572,459	$1,009,361,539	166,184,094	$710,435,856	62,388,366	$298,925,683
2013	229,615,485	$1,028,014,935	168,114,122	$726,347,261	61,501,363	$301,667,674
2014	230,608,448	$1,045,780,210	168,991,795	$744,754,658	61,616,654	$301,025,552
2015	231,448,125	$1,063,831,547	169,703,551	$761,552,679	61,744,573	$302,278,868
2016	232,587,641	$1,078,664,596	171,261,655	$782,883,558	61,325,986	$295,781,039
2017	233,953,686	$1,094,969,172	171,993,064	$800,203,037	61,960,622	$294,766,136
2018	234,757,608	$1,109,927,275	171,480,116	$812,125,283	63,277,492	$297,801,991
2019	235,787,389	$1,125,232,165	172,602,570	$833,765,516	63,184,818	$291,466,649
2020	236,909,400	$1,142,232,930	173,464,073	$851,691,610	63,445,327	$290,541,320

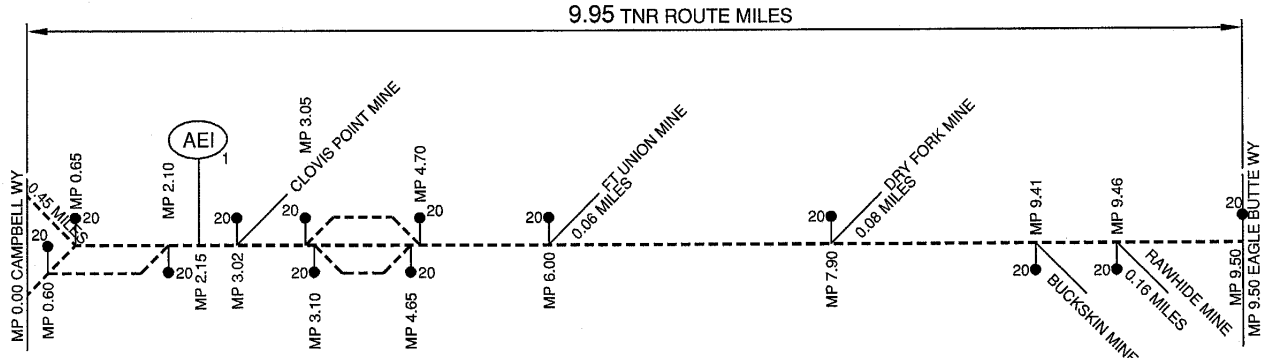
BNSF Reply Exhibit III.A-18

Has Been Redacted

III.B: Stand-Alone Railroad System



AEPTX OPENING



BNSF REPLY

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PAGE 1 OF 20

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SUBDIVISION: **CAMPBELL**

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TO: **EAGLE BUTE** MP: **9.50**

SHEET 1 OF 1

DATE: **5/24/04**

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- 115# CWR CLASS 1 RELAY

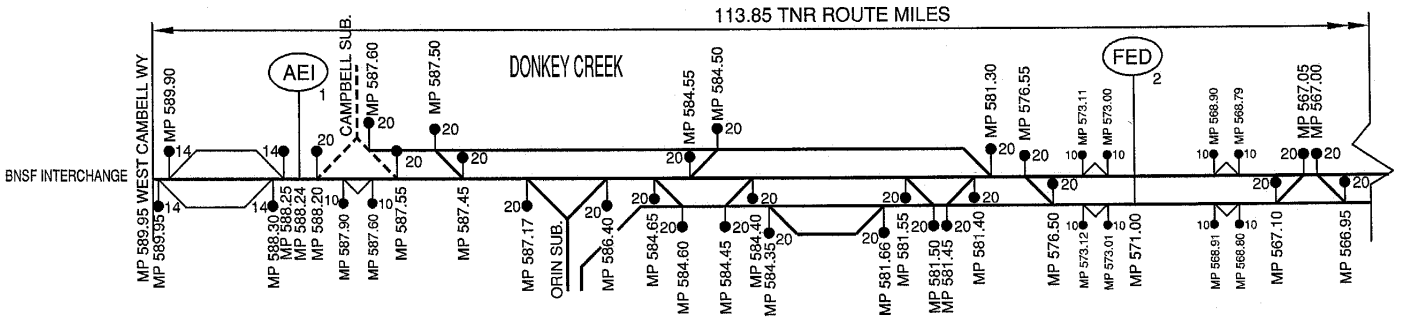
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HW= HOT WHEEL DETECTOR

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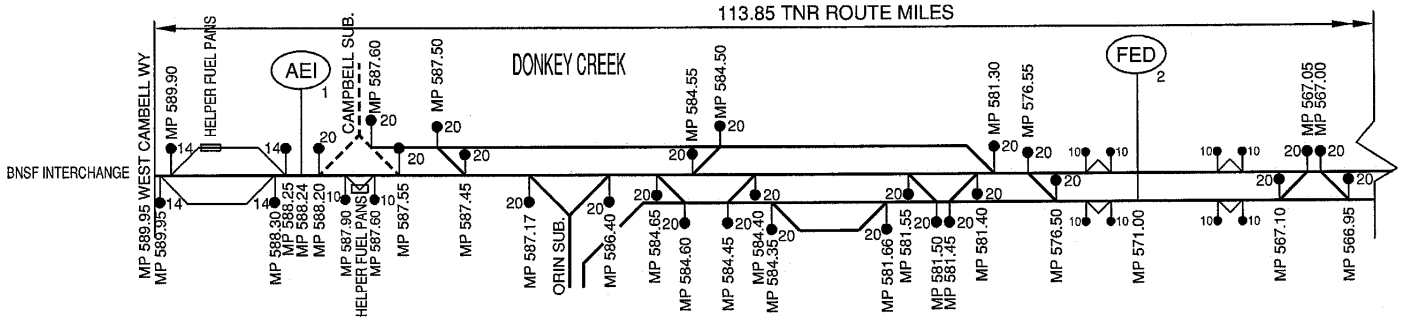
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* TURNOUT TYPES
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14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 3
PAGE 2 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BLACK HILLS**

FROM: **WEST CAMPBELL** MP: **589.95**

TO: **EDGEMONT** MP: **476.10**

SHEET 1 OF 3

DATE: **05/24/04**

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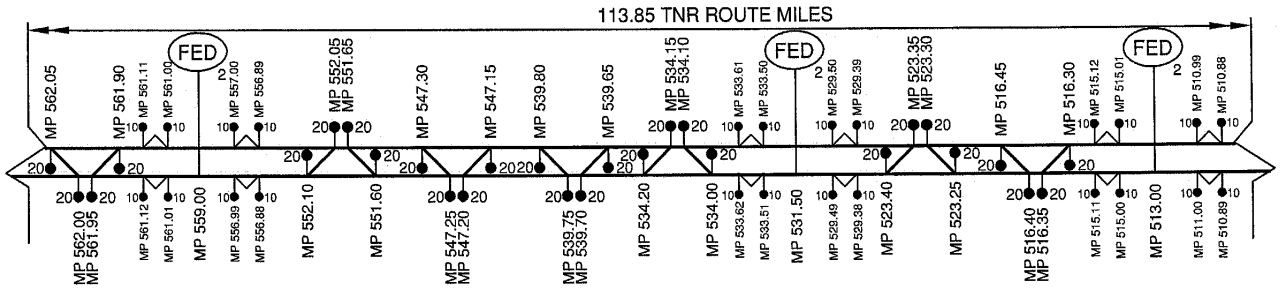
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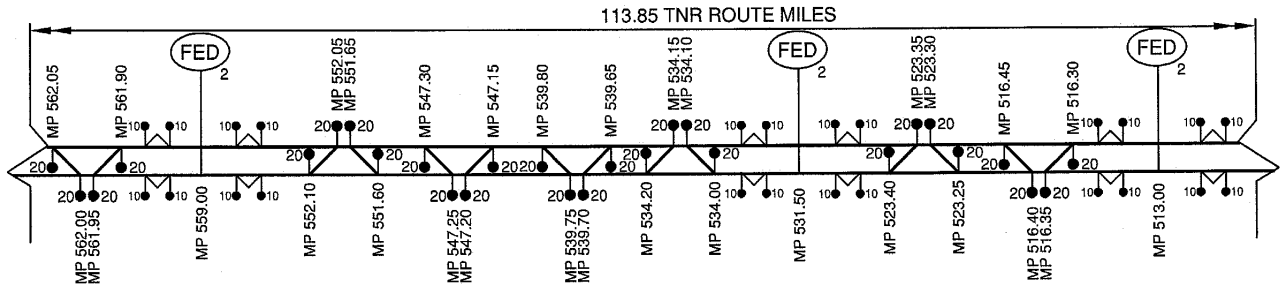
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* TURNOUT TYPES
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14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 3
PAGE 2 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BLACK HILLS**

FROM: **WEST CAMPBELL** MP: **589.95**

TO: **EDGEMONT** MP: **476.10**

SHEET 2 OF 3

DATE: **05/24/04**

NOT TO SCALE

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- 115# CWR CLASS 1 RELAY

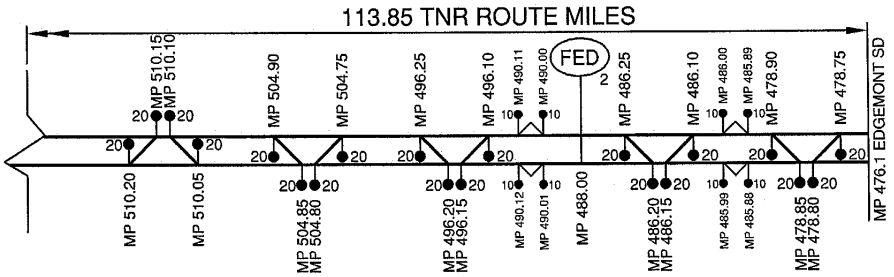
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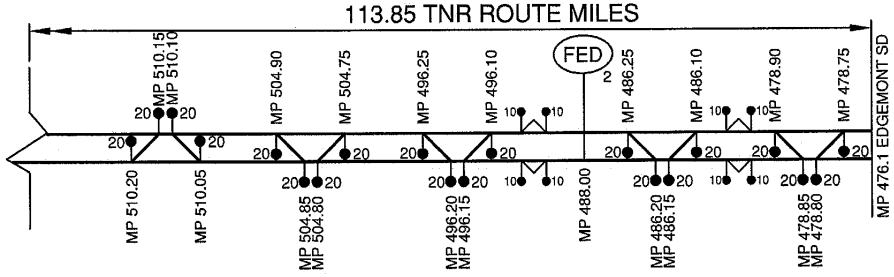
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14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 3
PAGE 2 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BLACK HILLS**

FROM: **WEST CAMPBELL** MP: **589.95**

TO: **EDGEMONT** MP: **476.10**

SHEET 3 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

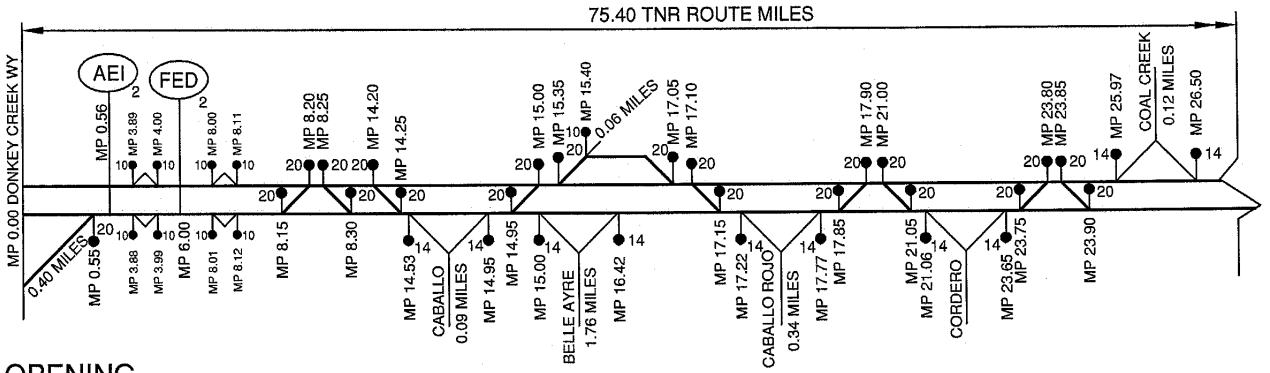
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

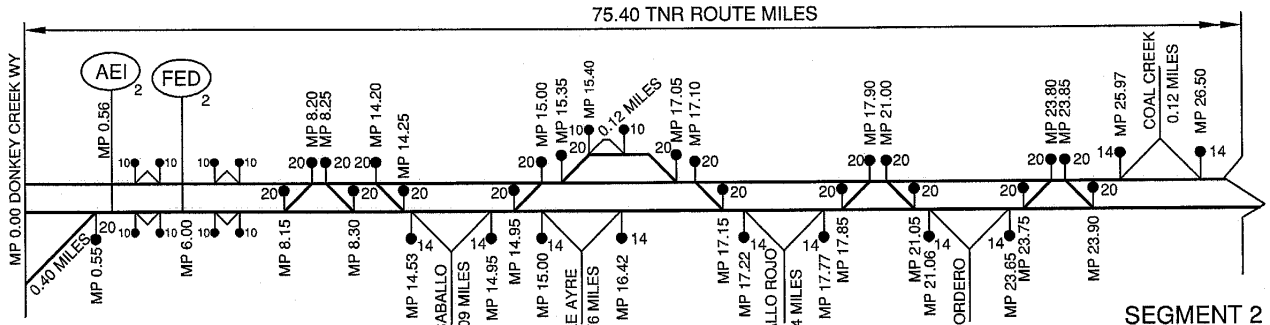
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 2
PAGE 3 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ORIN**

FROM: **DONKEY CREEK** MP: **0.00**

TO: **SOUTH LOGAN** MP: **75.0**

SHEET 1 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

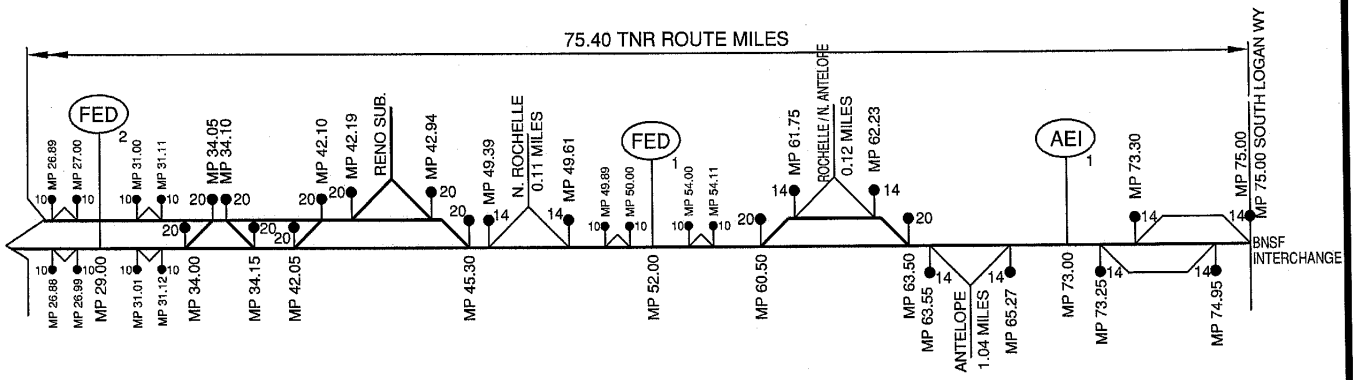
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

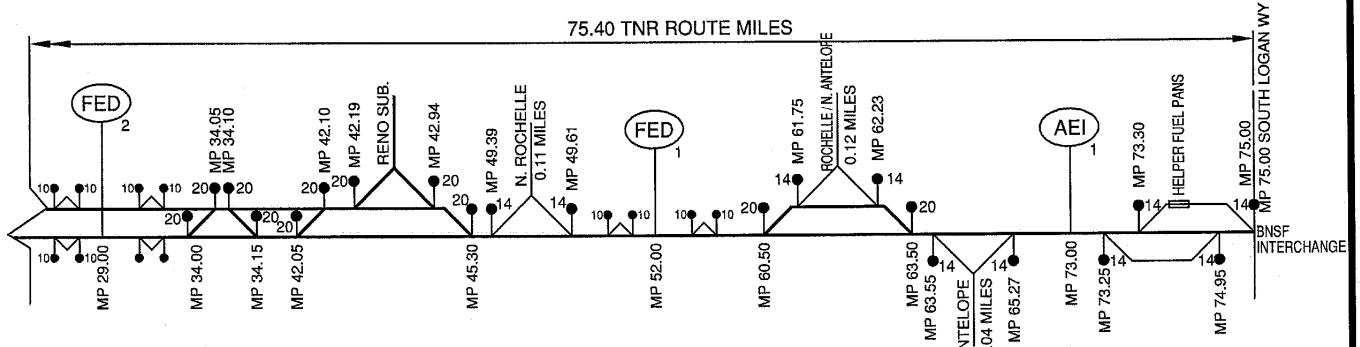
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 2
PAGE 3 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ORIN**

FROM: **DONKEY CREEK** MP: **0.00**

TO: **SOUTH LOGAN** MP: **75.0**

SHEET 2 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

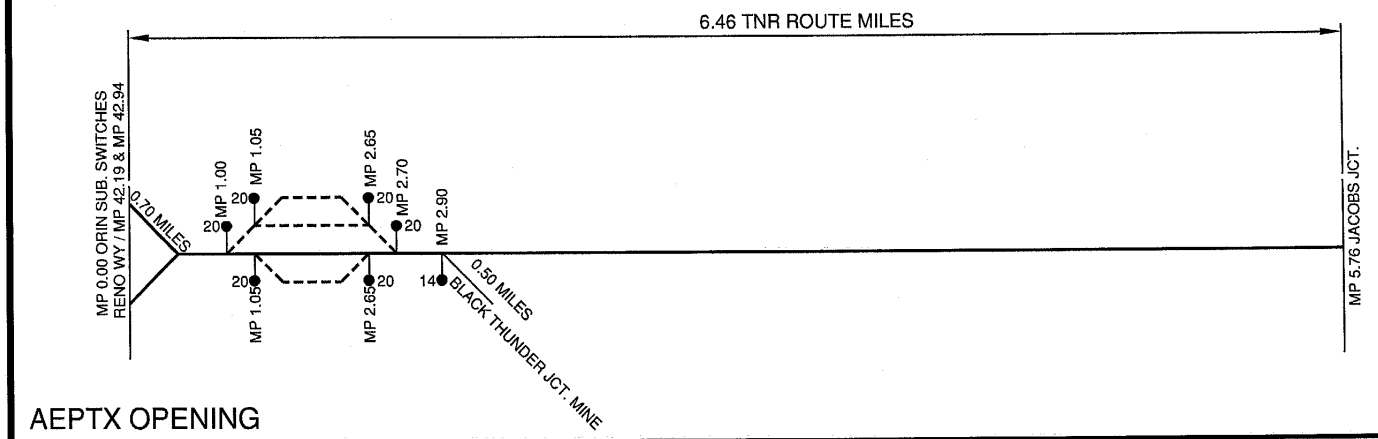
FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

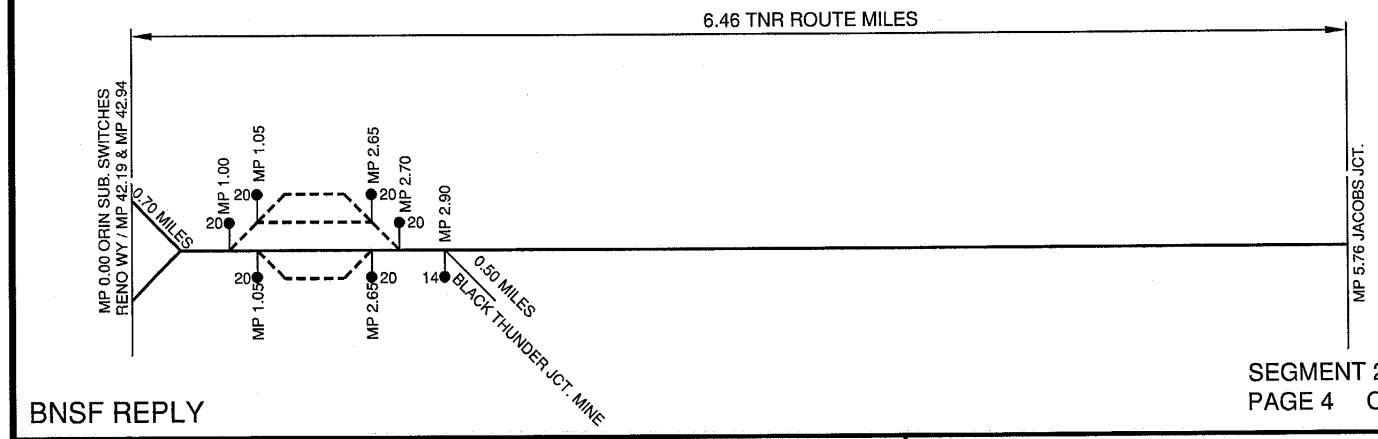
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 2A
PAGE 4 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **RENO**

FROM: **ORIN SUB. SWITCHES** MP: **0.0**

TO: **JACOBS JCT.** MP: **5.76**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

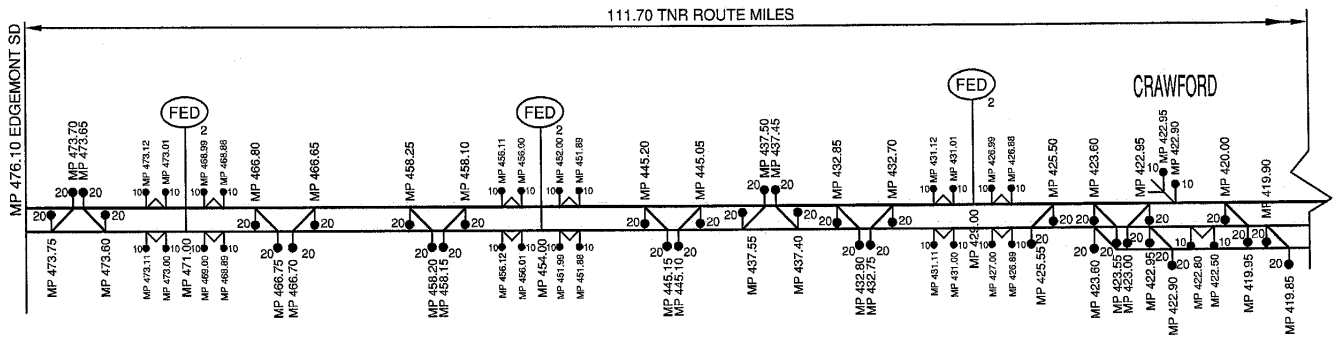
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

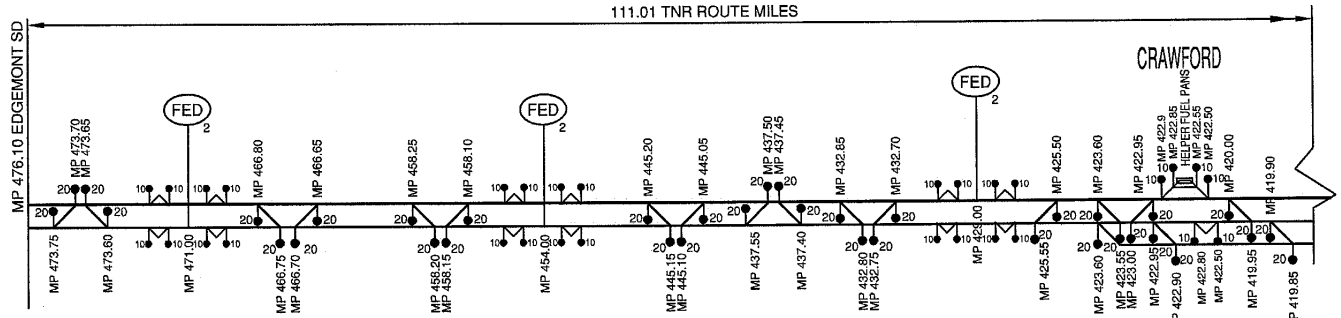
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 3
PAGE 5 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BUTTE**

FROM: **EDGEMONT** MP: **476.1**

TO: **EAST ALLIANCE** MP: **364.40**

SHEET 1 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

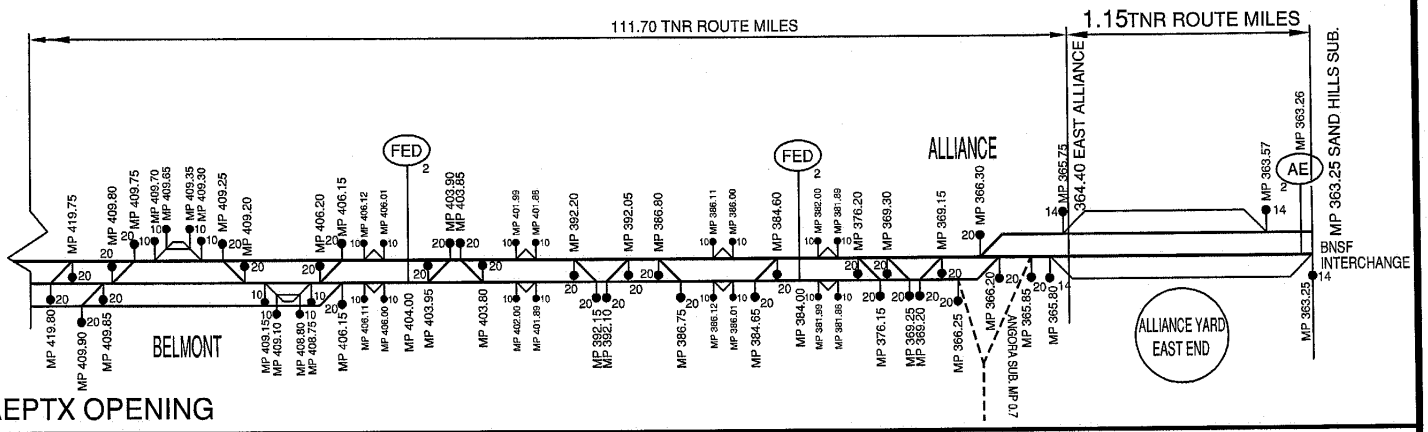
(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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HW= HOT WHEEL DETECTOR

(AEI)$_1$ AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

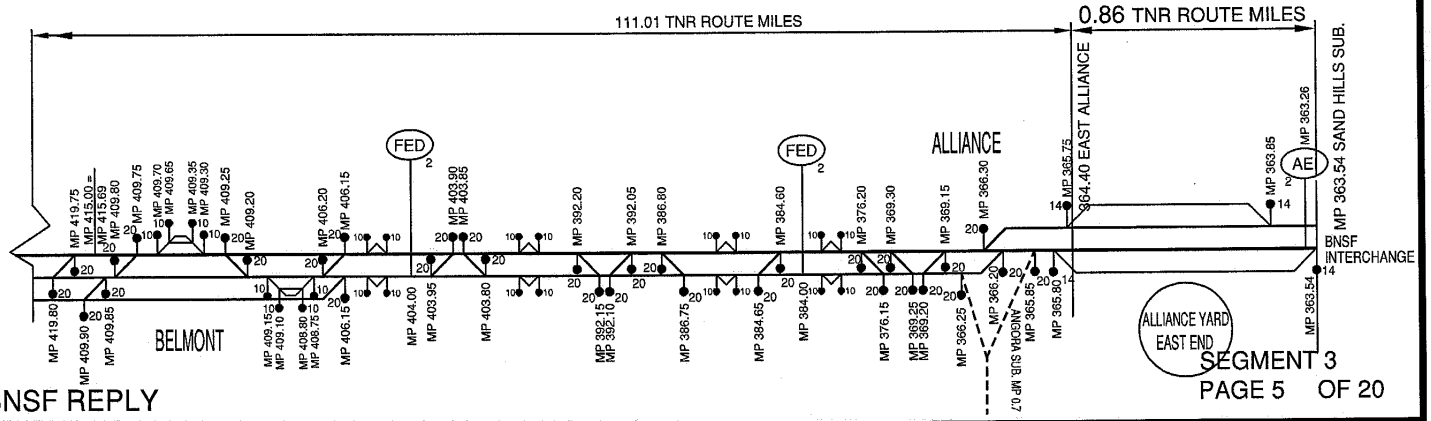
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

DIVISION: **POWDER RIVER**

SUBDIVISION: **BUTTE**

FROM: **EDGEMONT** MP: **476.1**

TO: **EAST ALLIANCE** MP: **364.40**

SHEET 2 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

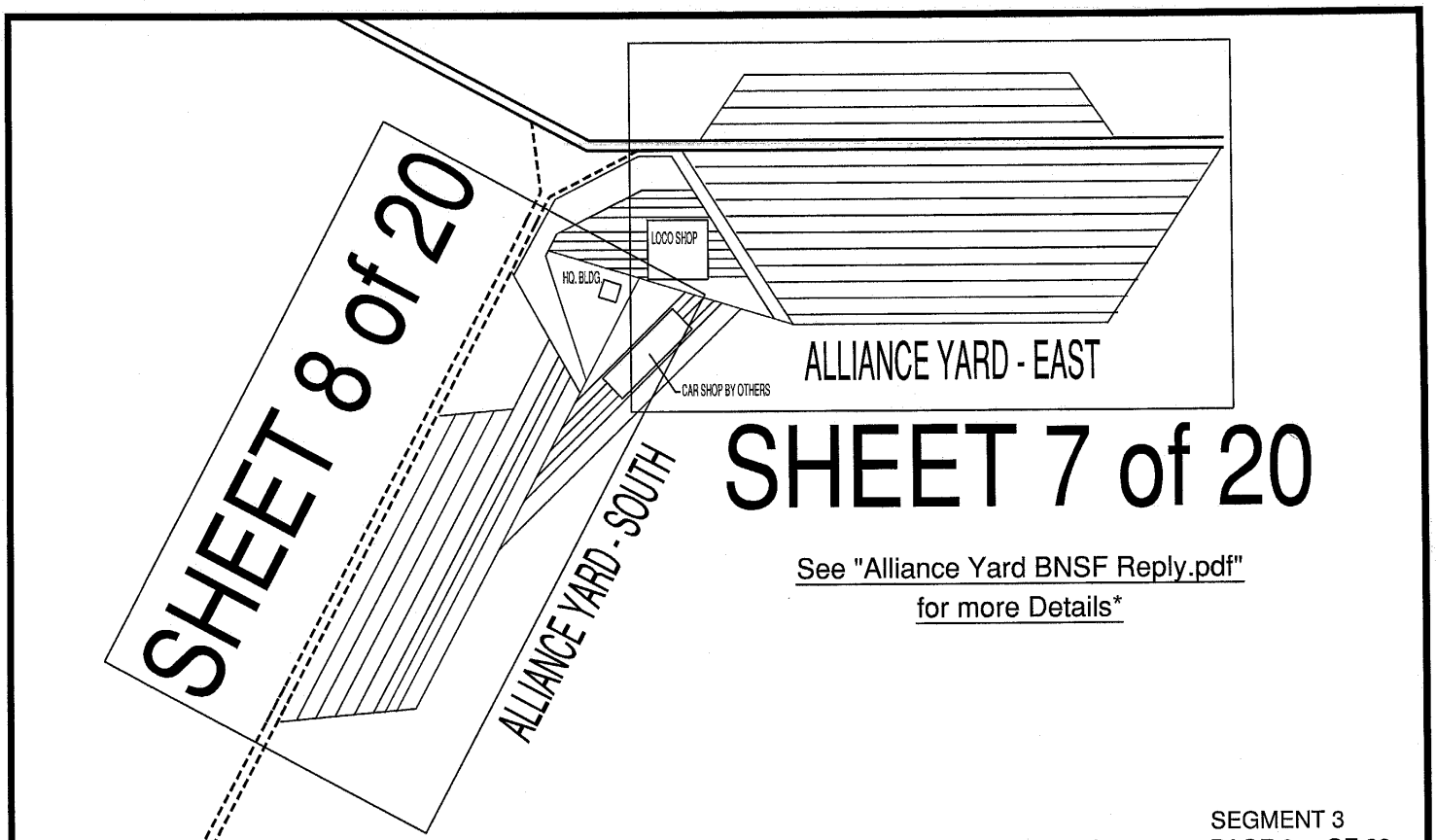
FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



SHEET 7 of 20

See "Alliance Yard BNSF Reply.pdf" for more Details*

*See AEP Texas Opening Exhibit III-B-3 for more Details on AEP Texas' Alliance Yard

DIVISION: **POWDER RIVER**

SUBDIVISION: **BUTTE / ANGORA**

FROM: **ALLIANCE YARD OVERVIEW** MP:

TO: MP:

DATE: **02/19/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

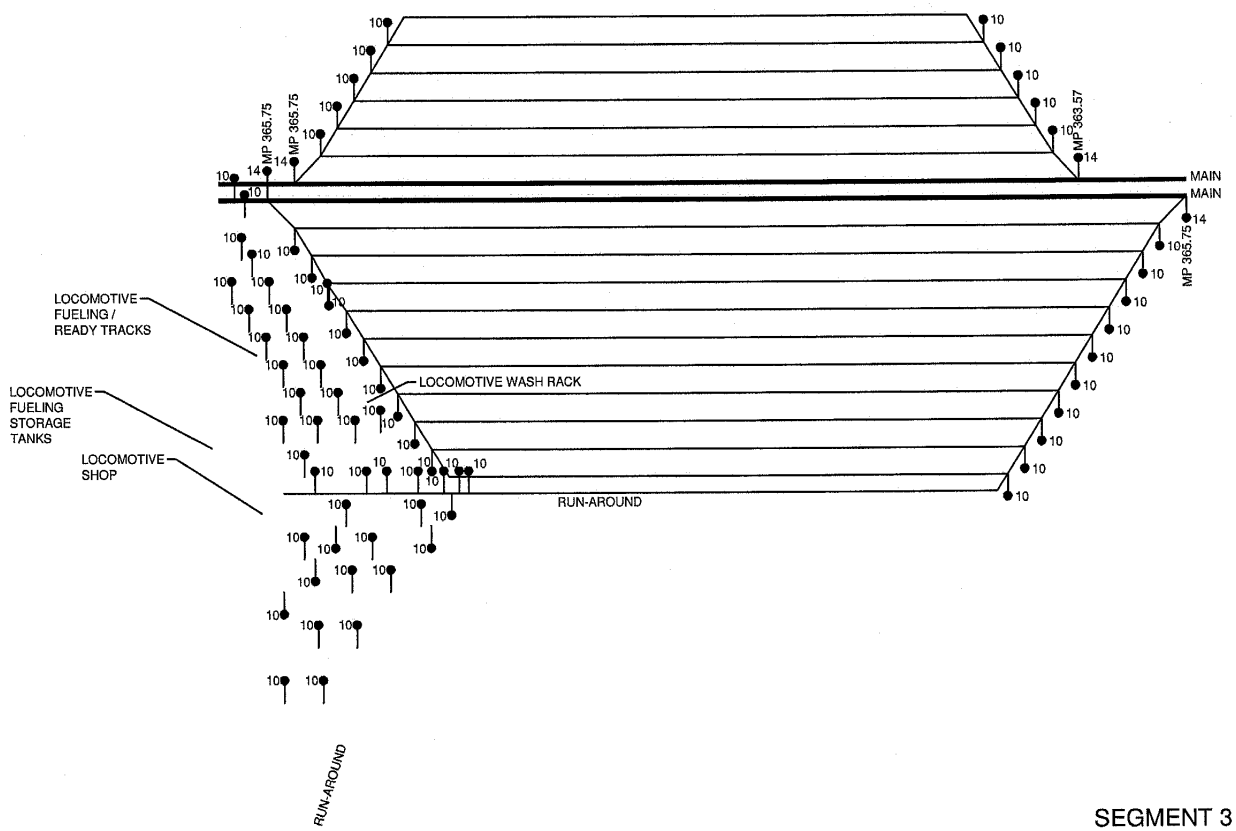
(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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24 - #24 ELECTRIC
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14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



SEGMENT 3
PAGE 7 OF 20

AEPTX OPENING

CONTINUED ON SHEET 8

DIVISION: **POWDER RIVER**

SUBDIVISION: **BUTTE**

FROM: **ALLIANCE YARD - EAST** MP: **365.80**

TO: MP: **363.25**

SHEET 1 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

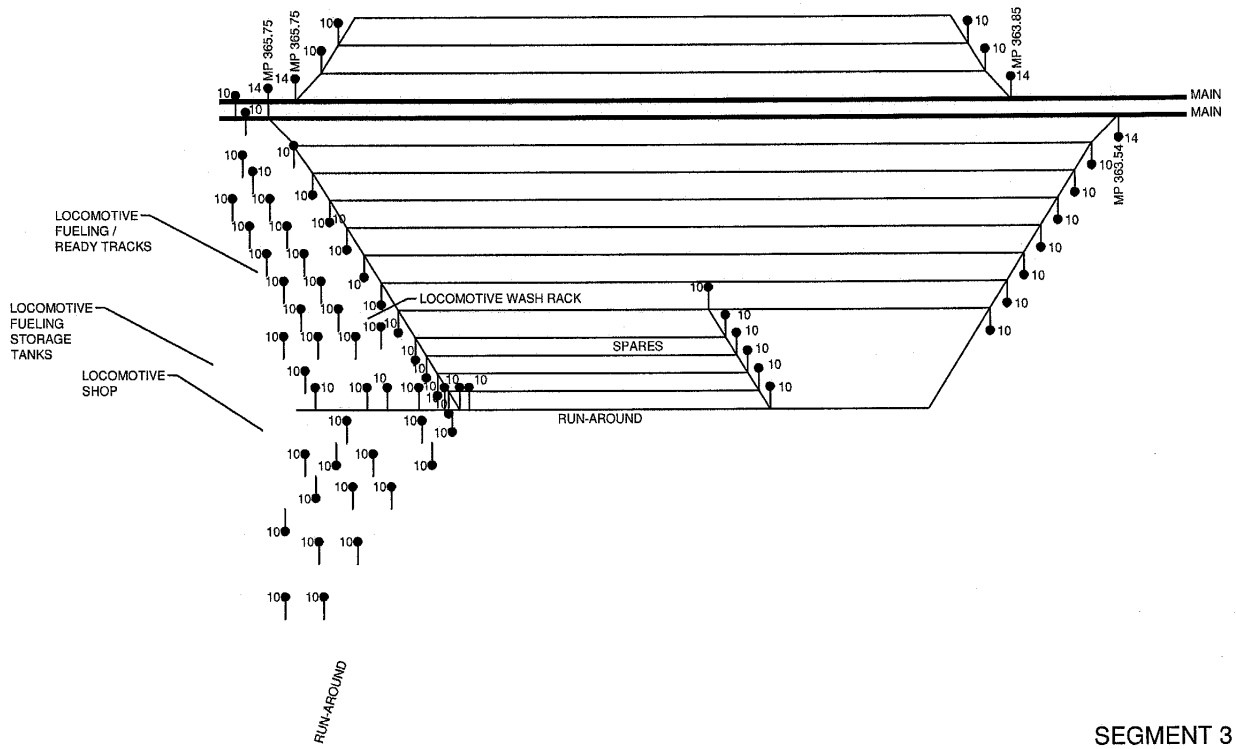
FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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24 - #24 ELECTRIC
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14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



SEGMENT 3
PAGE 7 OF 20

BNSF REPLY

CONTINUED ON SHEET 8

DIVISION: **POWDER RIVER**

SUBDIVISION: **BUTTE**

FROM: **ALLIANCE YARD - EAST** MP: **365.80**

TO: MP: **363.54**

SHEET 2 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

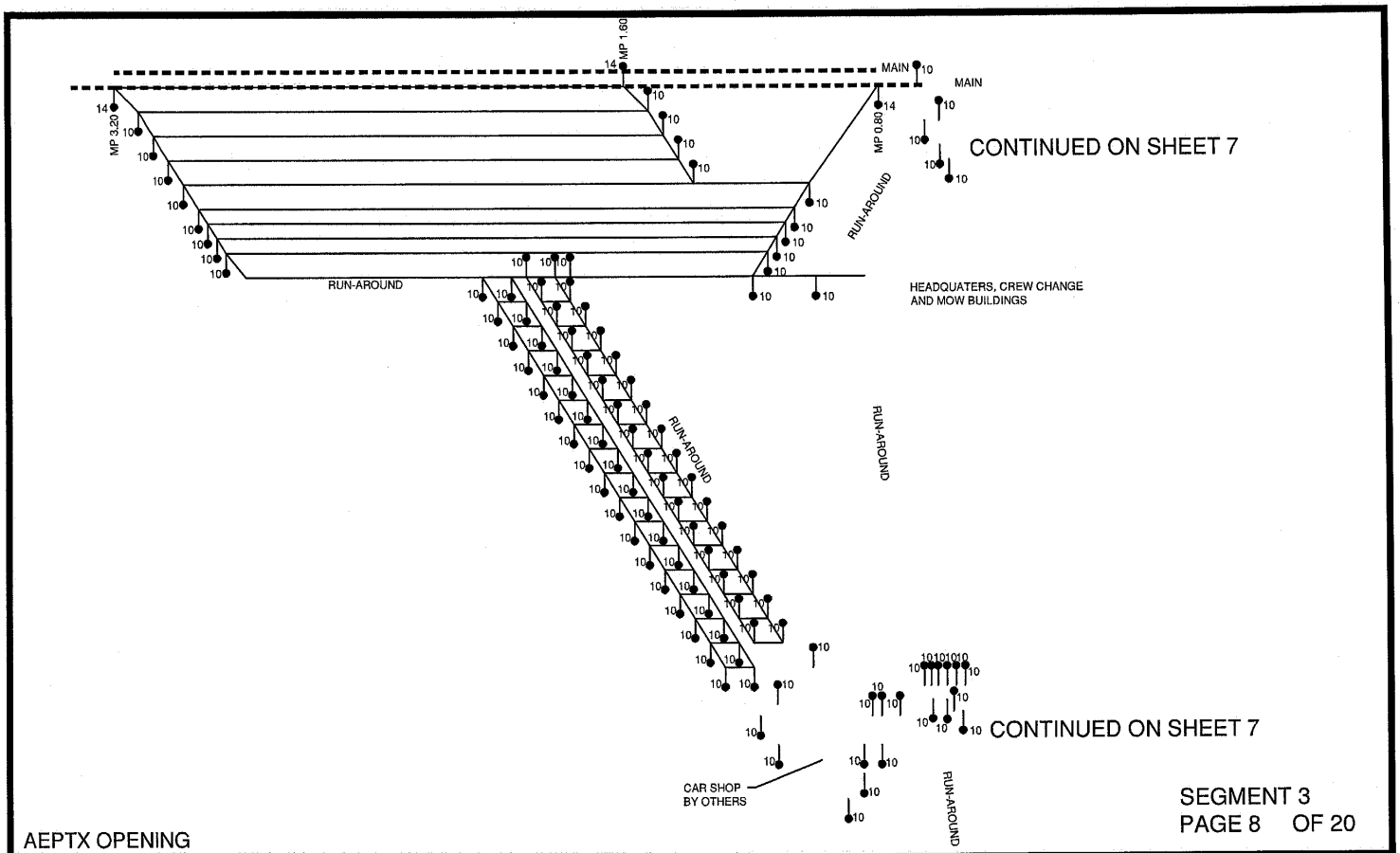
(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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20= TURNOUT TYPE*

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24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



SEGMENT 3
PAGE 8 OF 20

AEPTX OPENING

DIVISION: **POWDER RIVER**

SUBDIVISION: **ANGORA**

FROM: **ALLIANCE YARD - SOUTH** MP: **0.80**

TO: MP: **3.20**

SHEET 1 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

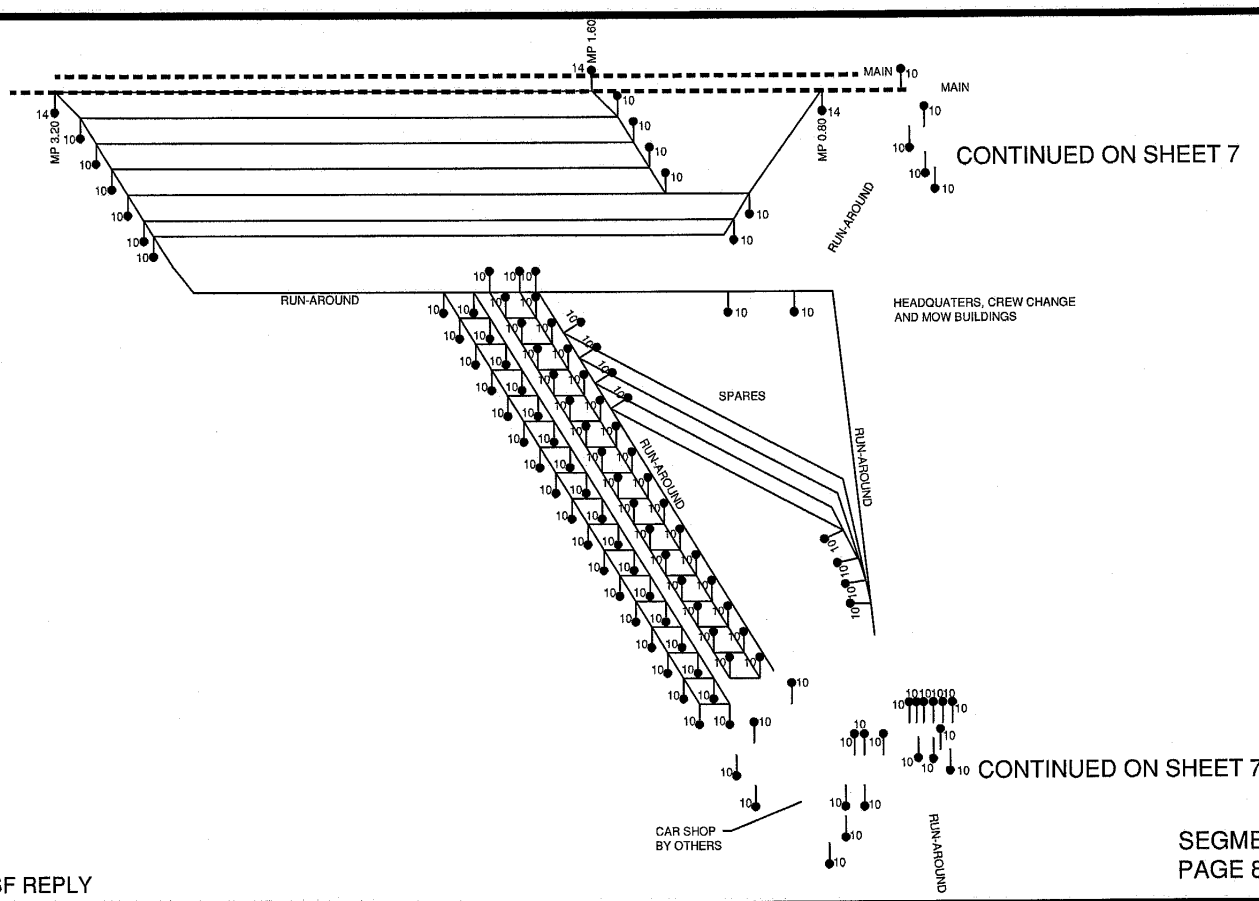
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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24 - #24 ELECTRIC
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14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



BNSF REPLY

SEGMENT 3
PAGE 8 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ANGORA**

FROM: **ALLIANCE YARD - SOUTH** MP: **0.80**

TO: MP: **3.20**

SHEET 2 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

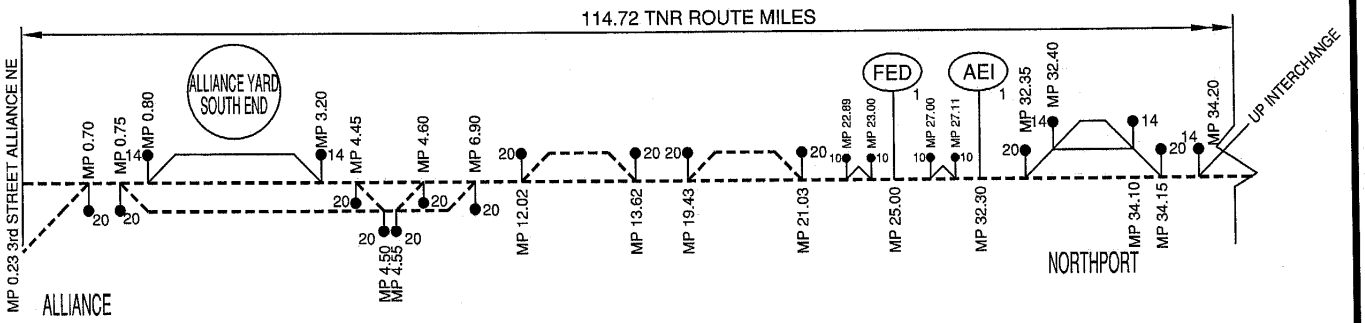
FED$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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AEI$_1$ AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

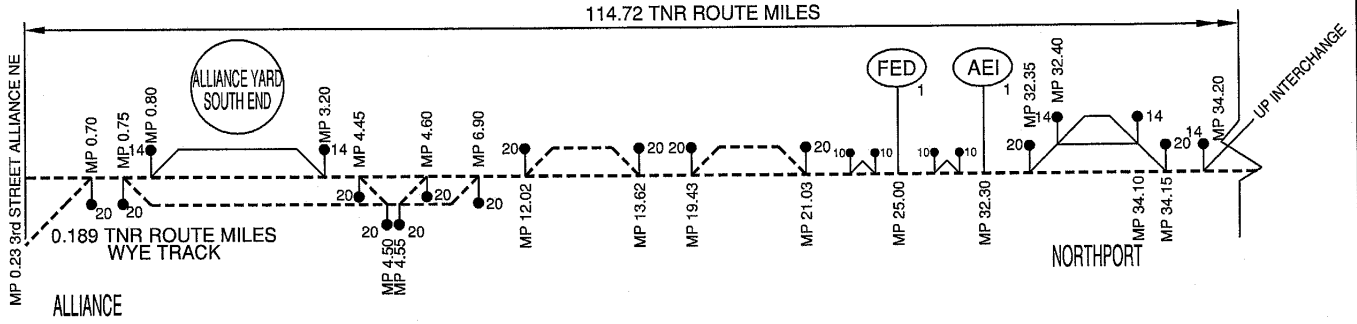
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14H- #14 HAND-THROWN
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10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 9 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ANGORA**

FROM: **3rd STREET ALLIANCE** MP: **0.23**

TO: **STERLING** MP: **114.95**

SHEET 1 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

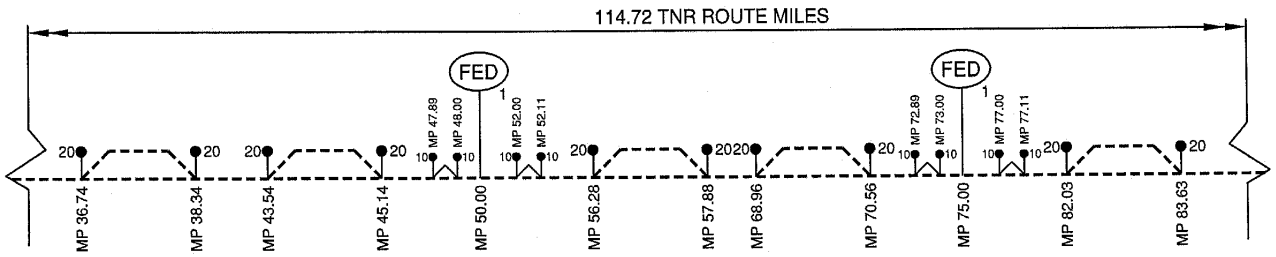
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1

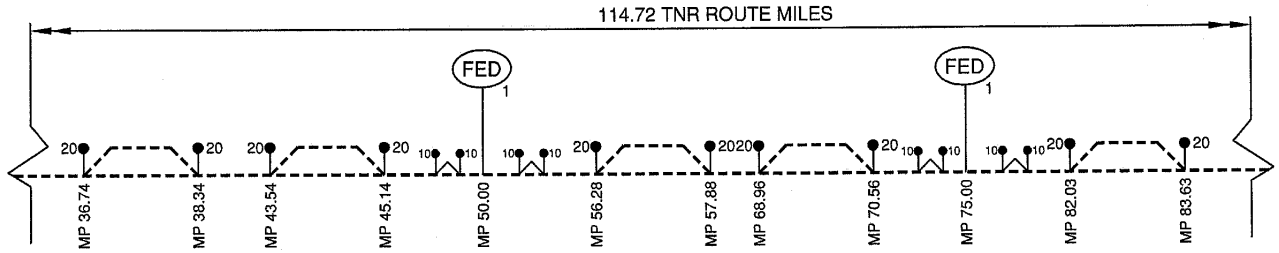
20 = TURNOUT TYPE*

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24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 9 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ANGORA**

FROM: **3rd STREET ALLIANCE** MP: **0.23**

TO: **STERLING** MP: **114.95**

SHEET 2 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

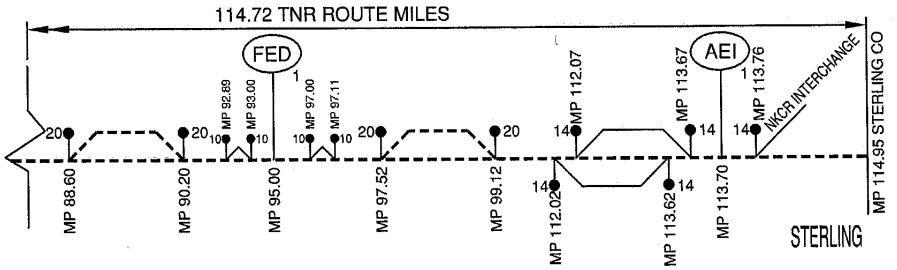
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AEI 1

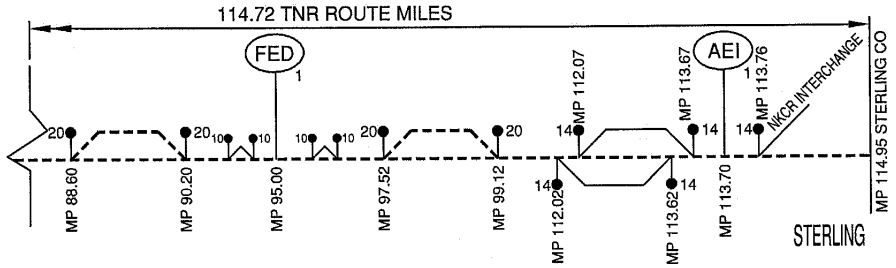
20 = TURNOUT TYPE*

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24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 9 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **ANGORA**

FROM: **3rd STREET ALLIANCE** MP: **0.23**

TO: **STERLING** MP: **114.95**

SHEET 3 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

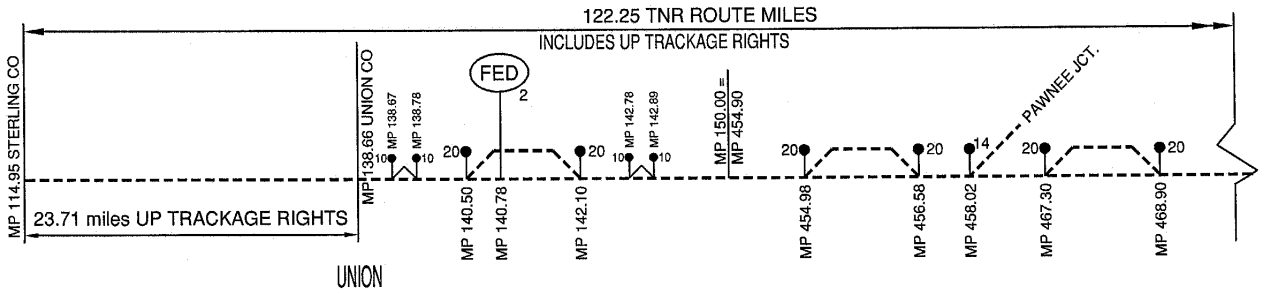
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AEI 1

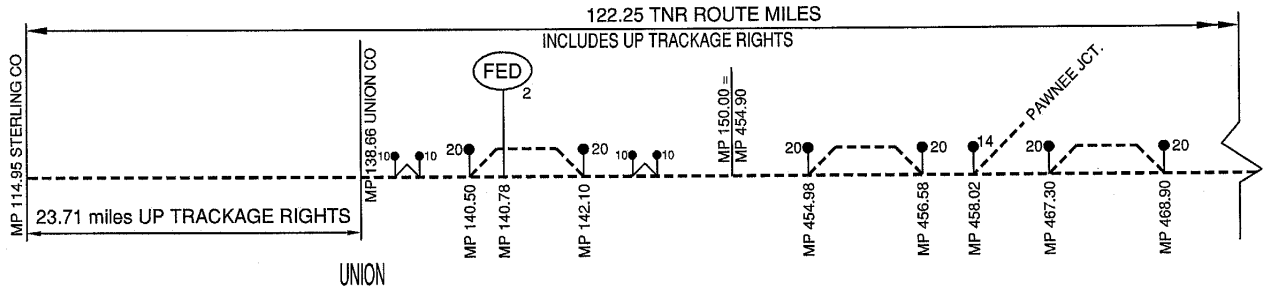
20 = TURNOUT TYPE*

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24 - #24 ELECTRIC
20 - #20 ELECTRIC
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14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 10 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BRUSH**

FROM: **STERLING** MP: **114.95**

TO: **20th STREET DENVER** MP: **542.10**

SHEET 1 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

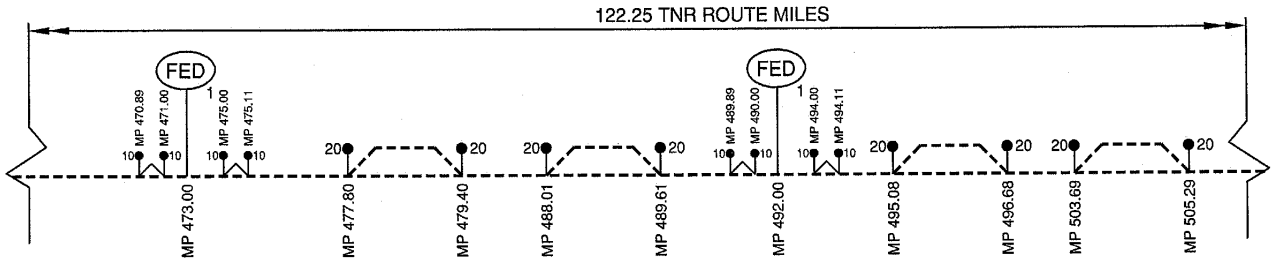
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

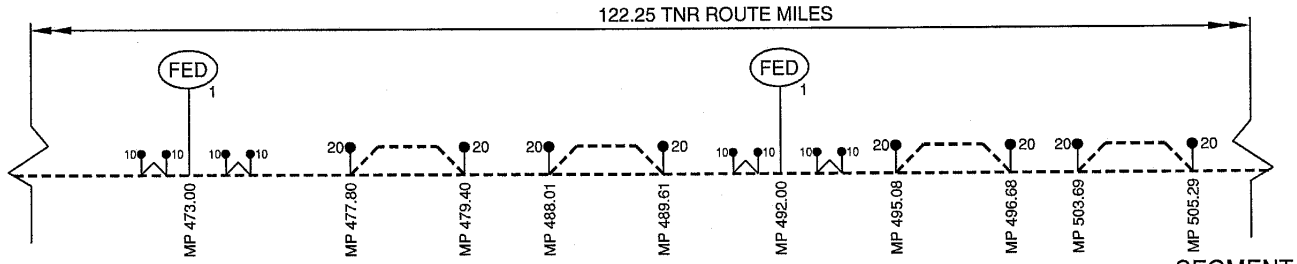
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 10 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BRUSH**

FROM: **STERLING** MP: **114.95**

TO: **20th STREET DENVER** MP: **542.10**

SHEET 2 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

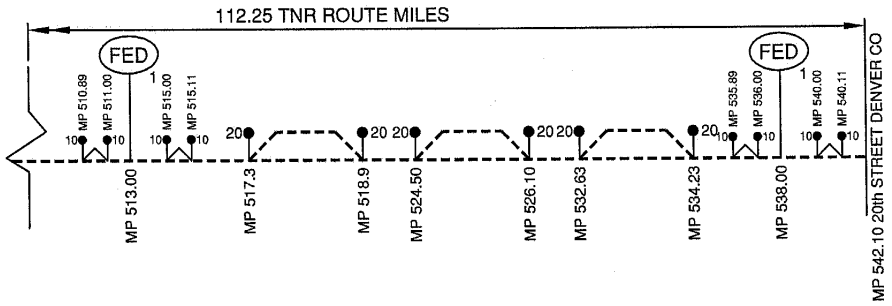
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

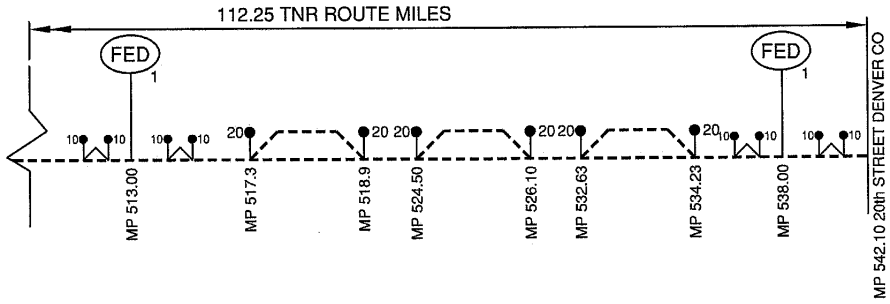
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 4
PAGE 10 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **BRUSH**

FROM: **STERLING** MP: **114.95**

TO: **20th STREET DENVER** MP: **542.10**

SHEET 3 OF 3

DATE: **02/19/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

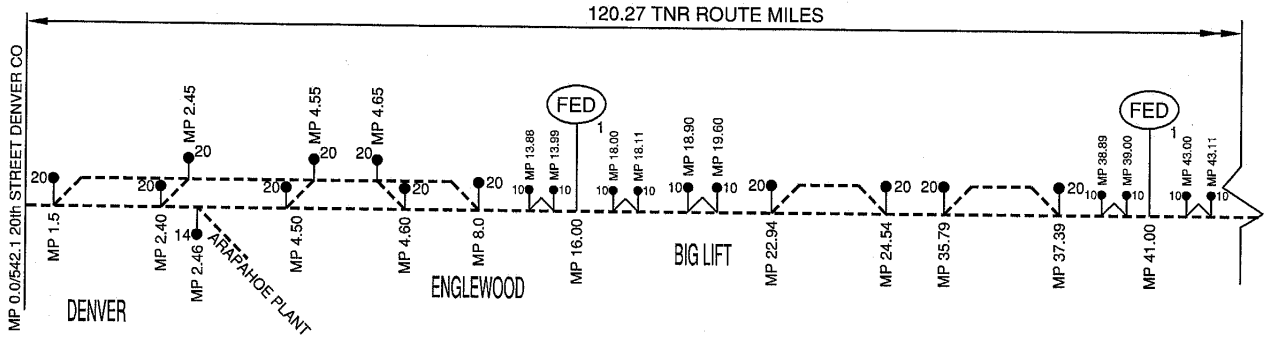
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

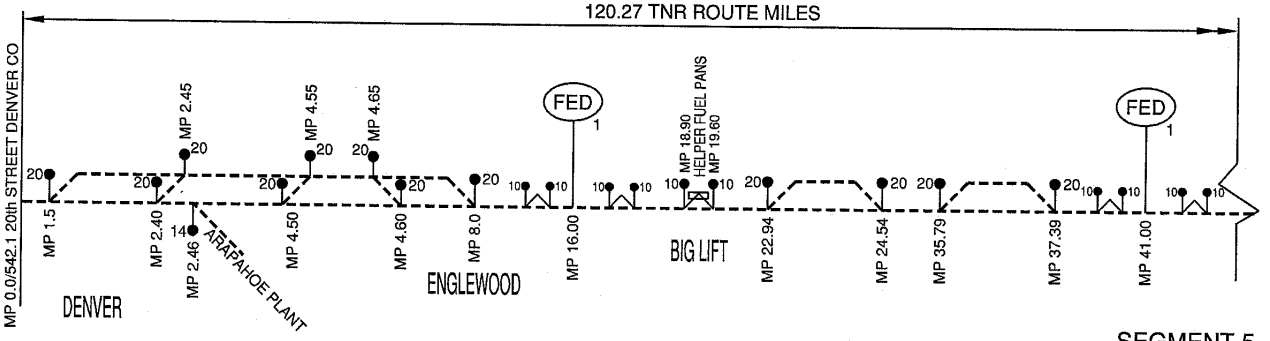
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 5
PAGE 11 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **PIKES PEAK**

FROM: **20th STREET DENVER** MP: **0.0**

TO: **PUEBLO JCT.** MP: **120.27**

SHEET 1 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

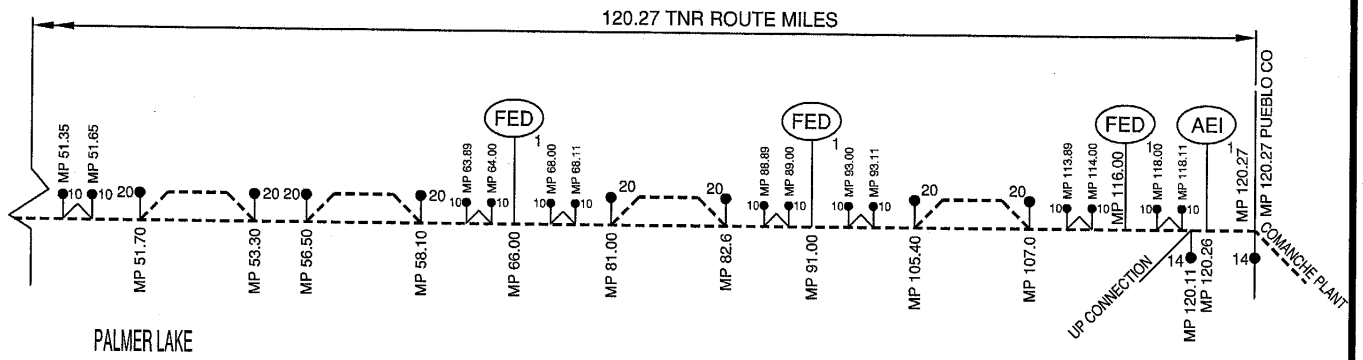
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

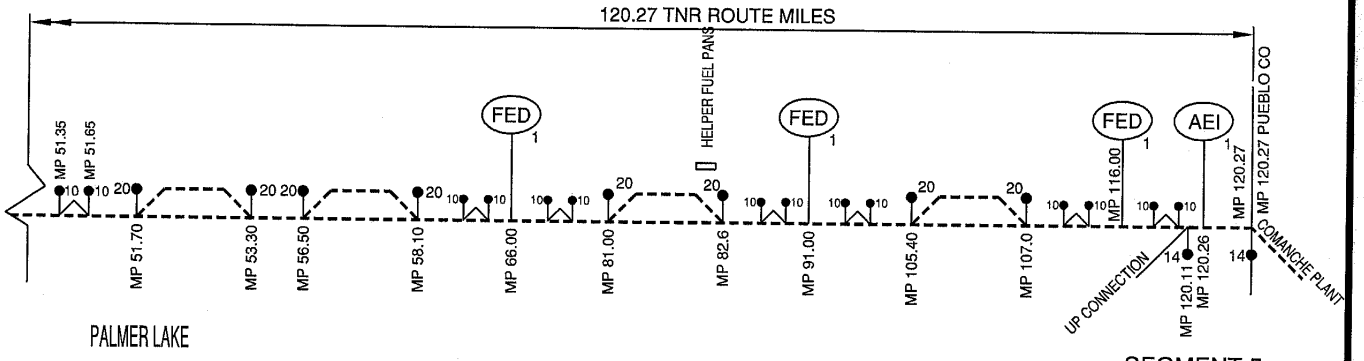
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 5
PAGE 11 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **PIKES PEAK**

FROM: **20th STREET DENVER** MP: **0.0**

TO: **PUEBLO JCT.** MP: **120.27**

SHEET 2 OF 2

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

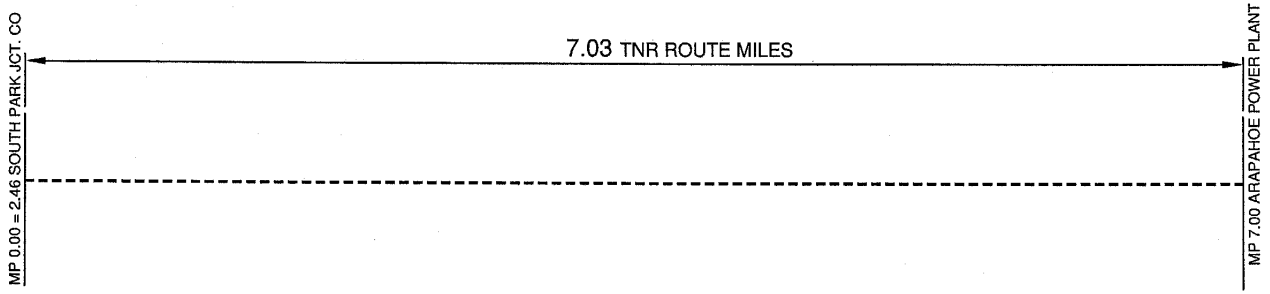
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

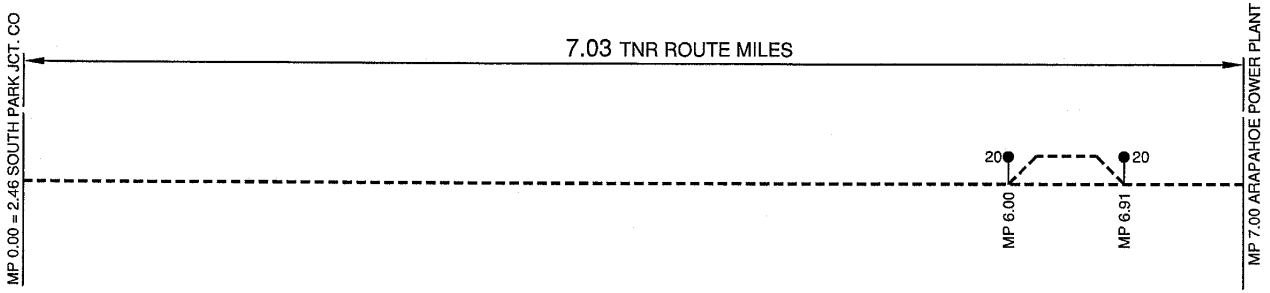
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 5A
PAGE 12 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **PIKES PEAK**

FROM: **SOUTH PARK JCT.** MP: **0.00**

TO: **ARAPAHOE POWER PLANT** MP: **7.00**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

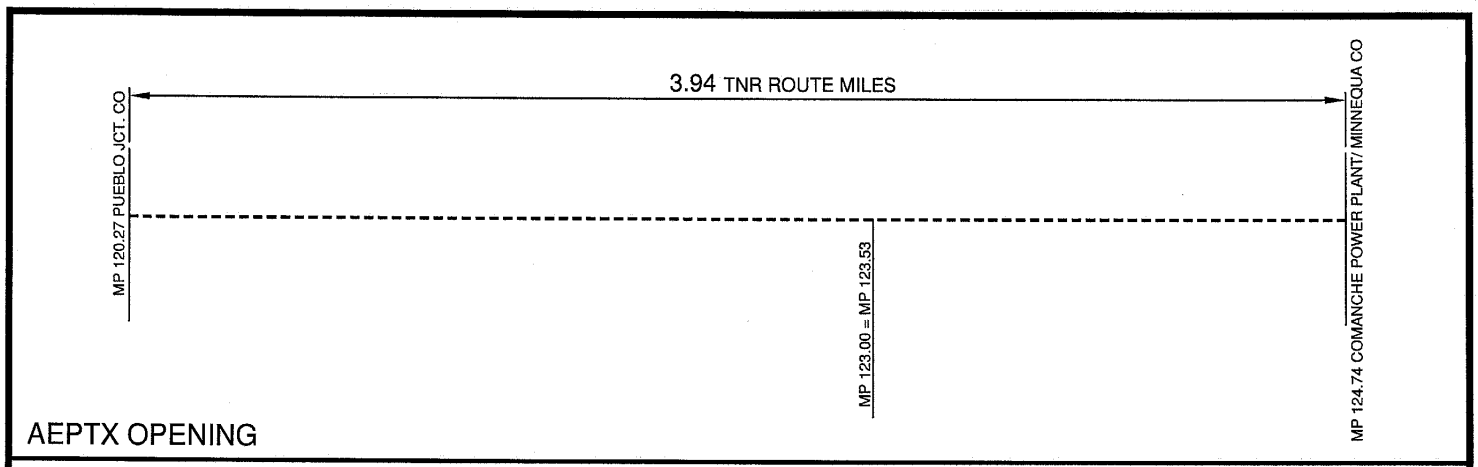
FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

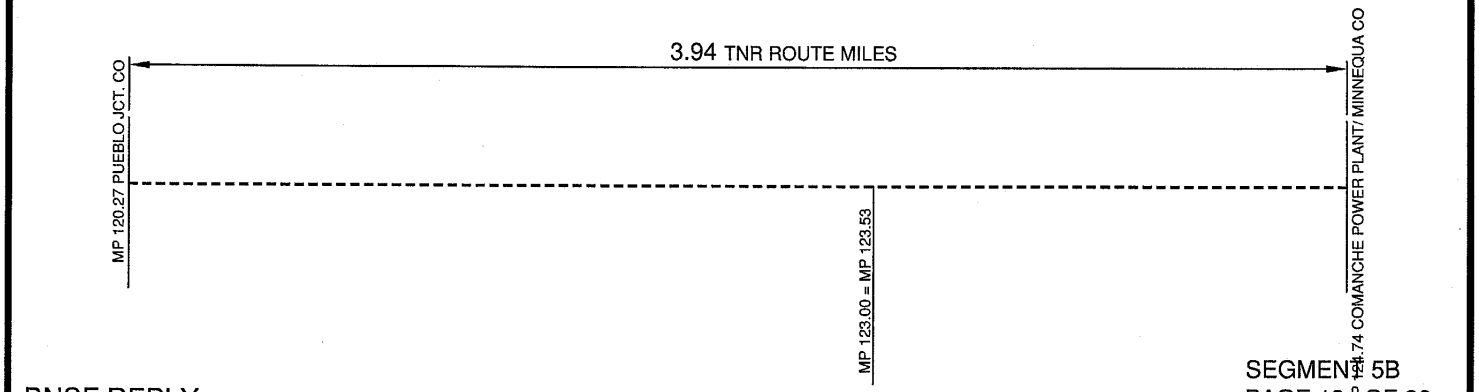
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 5B
PAGE 13 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **SPANISH PEAKS**

FROM: **PUEBLO** MP: **120.27**

TO: **COMANCHE POWER PLANT** MP: **124.74**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

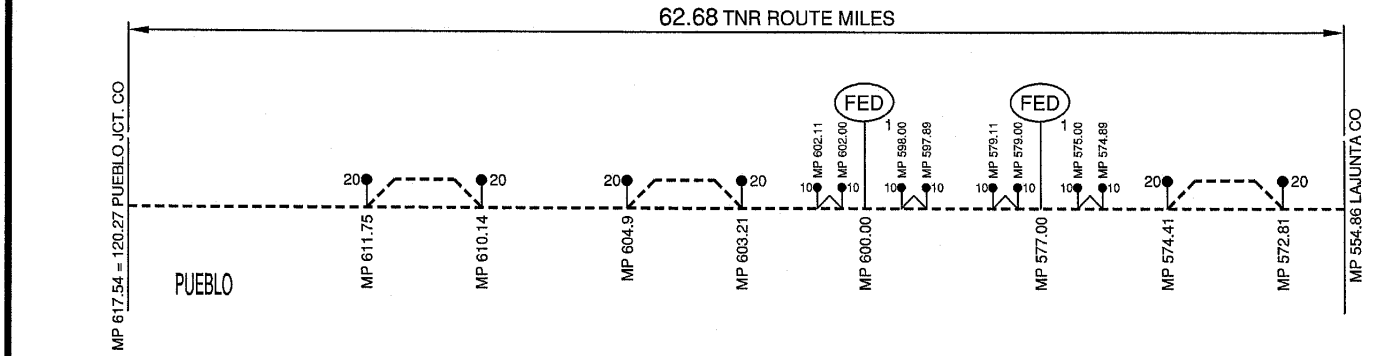
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

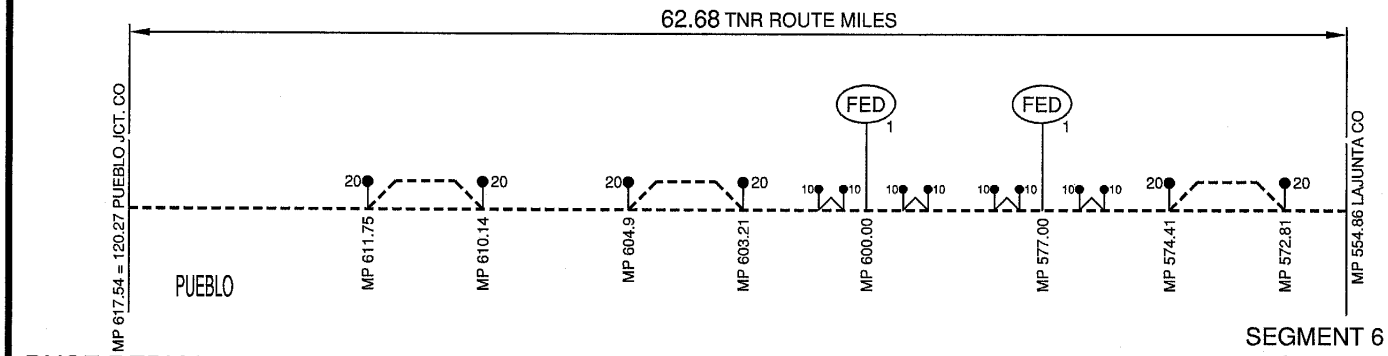
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 6
PAGE 14 OF 20

DIVISION: **POWDER RIVER**

SUBDIVISION: **PUEBLO**

FROM: **PUEBLO** MP: **617.54**

TO: **LA JUNTA** MP: **554.86**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

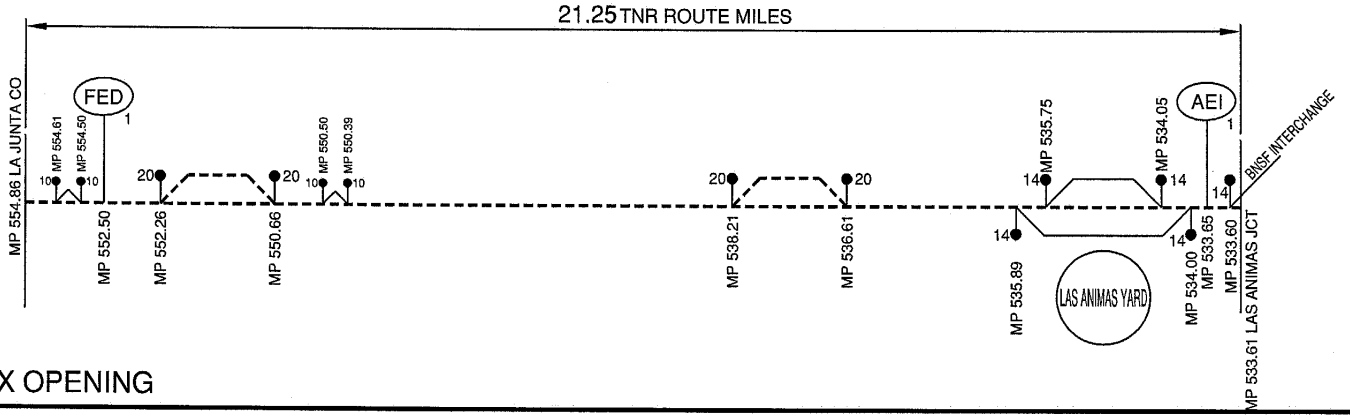
(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

(AEI)$_1$ AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

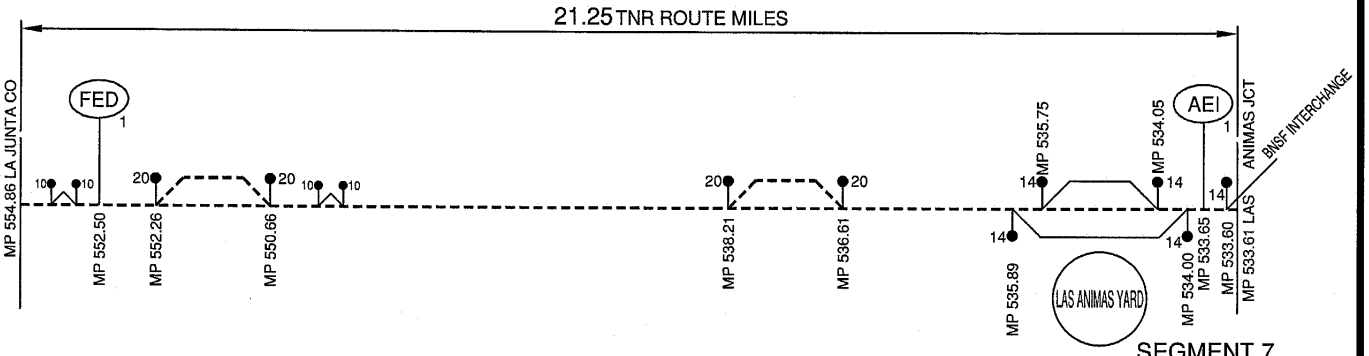
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 7
PAGE 15 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **LA JUNTA**

FROM: **LA JUNTA** MP: **554.86**

TO: **LAS ANIMAS JCT** MP: **533.61**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

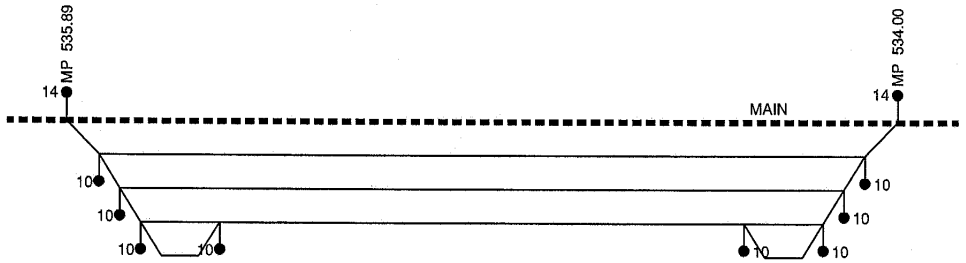
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

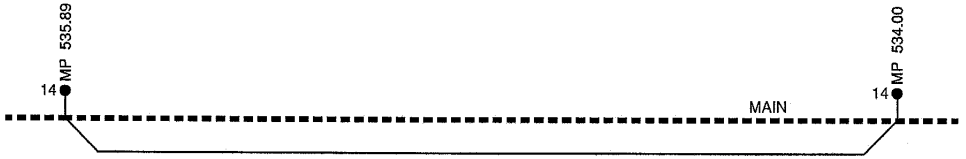
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 7
PAGE 16 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **LA JUNTA**

FROM: **LAS ANIMAS YARD** MP: **535.85**

TO: MP: **534.00**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

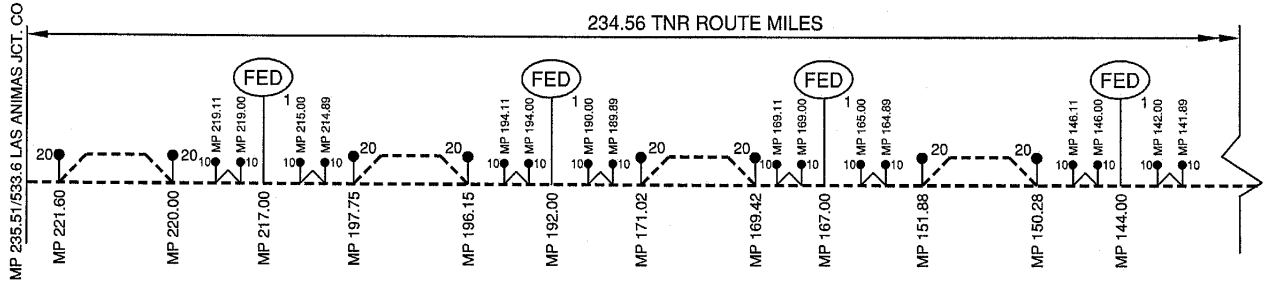
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

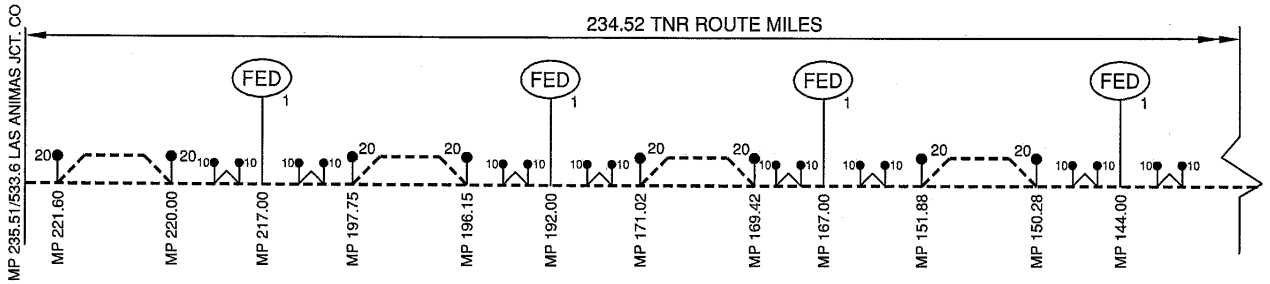
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 8
PAGE 17 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **BOISE CITY**

FROM: **LAS ANIMAS JCT.** MP: **235.51**

TO: **DUMAS JCT.** MP: **0.95**

SHEET 1 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

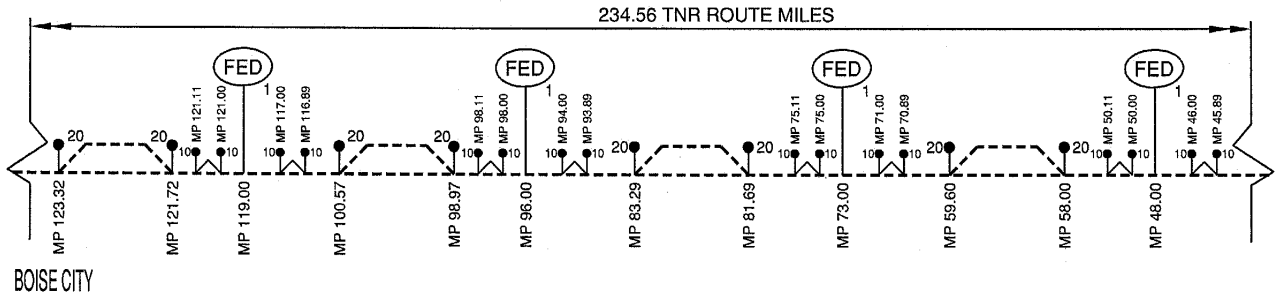
FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

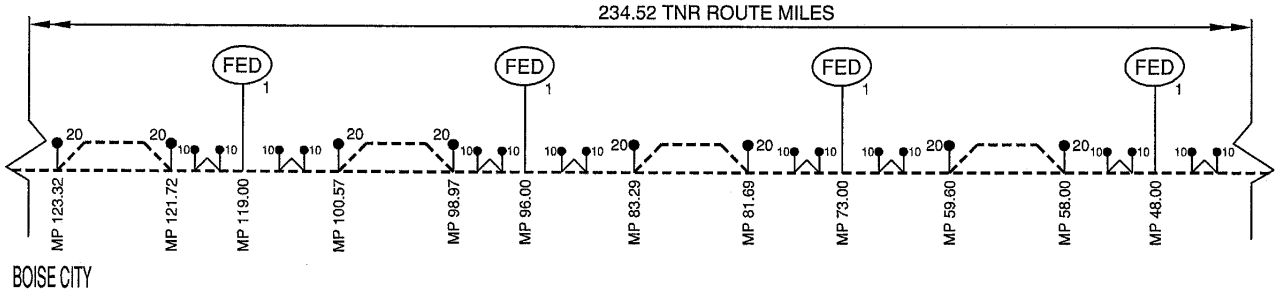
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 8
PAGE 17 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **BOISE CITY**

FROM: **LAS ANIMAS JCT.** MP: **235.51**

TO: **DUMAS JCT.** MP: **0.95**

SHEET 2 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

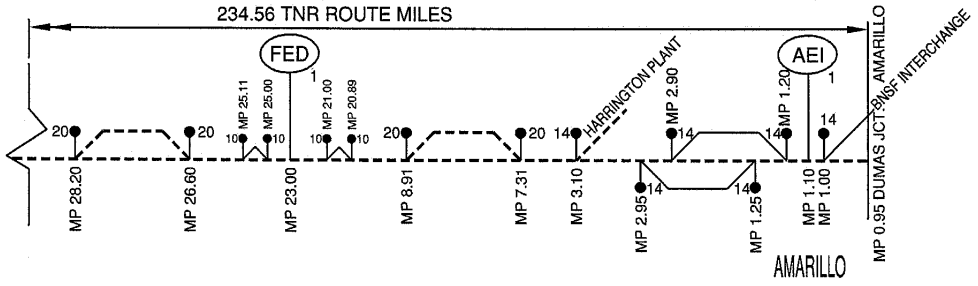
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

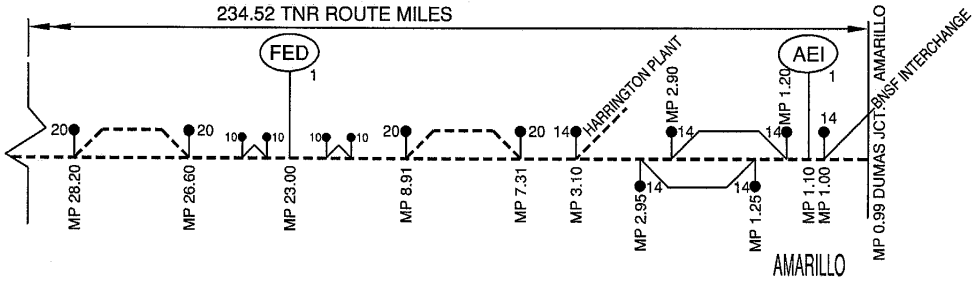
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 8
PAGE 17 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **BOISE CITY**

FROM: **LAS ANIMAS JCT.** MP: **235.51**

TO: **DUMAS JCT.** MP: **0.95**

SHEET 3 OF 3

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

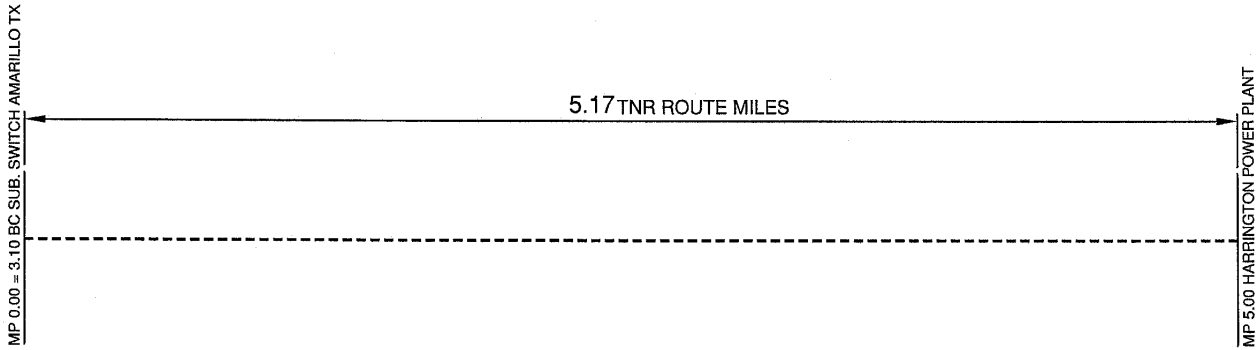
FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

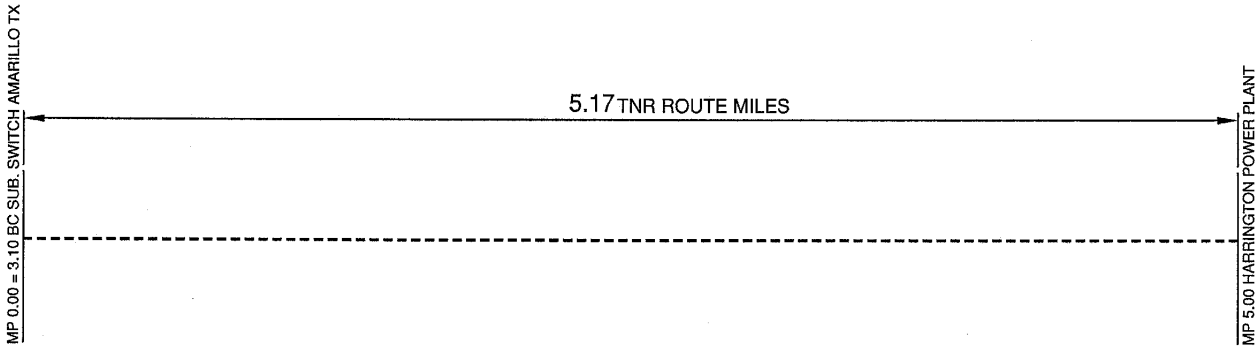
20 = TURNOUT TYPE*

* TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
14H- #14 HAND-THROWN
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 8B
PAGE 18 OF 20

DIVISION: **KANSAS**

SUBDIVISION: **BOISE CITY**

FROM: **AMARILLO** MP: **0.00**

TO: **HARRINGTON POWER PLT.** MP: **5.00**

SHEET 1 OF 1

DATE: **05/24/04**

NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 115# CWR CLASS 1 RELAY

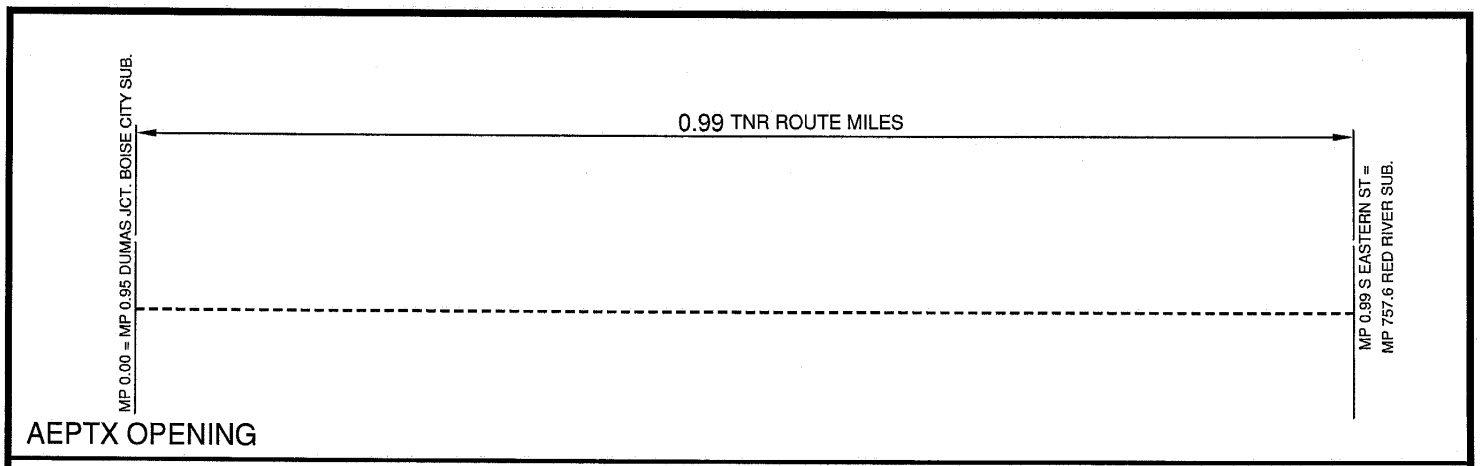
(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

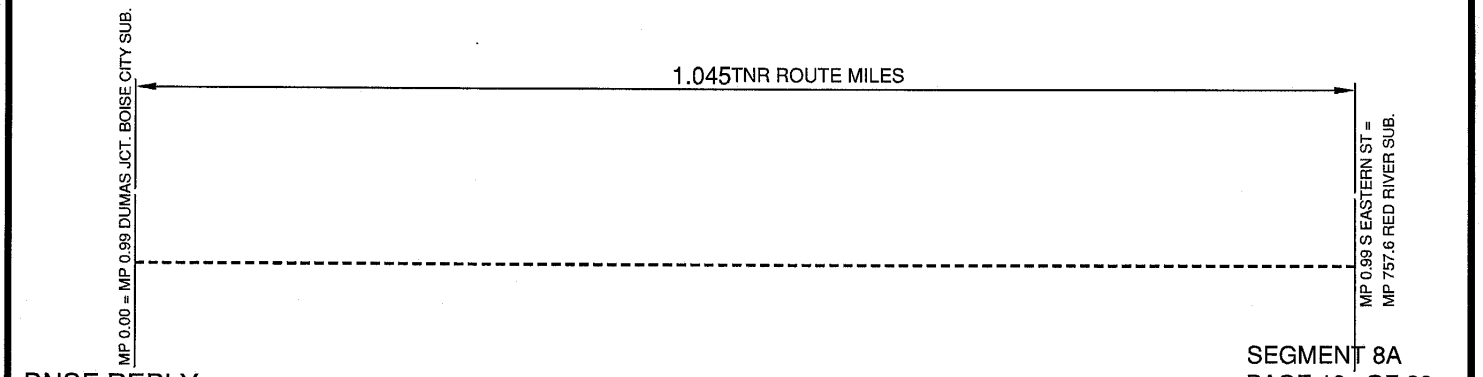
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10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 8A
PAGE 19 OF 20

DIVISION: **TEXAS** SHEET 1 OF 1

SUBDIVISION: **B.C./R.R.V. CONNECTION**

DATE: **05/24/04**

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TO: **S. EASTERN ST.** MP: **757.6/332.6** NOT TO SCALE

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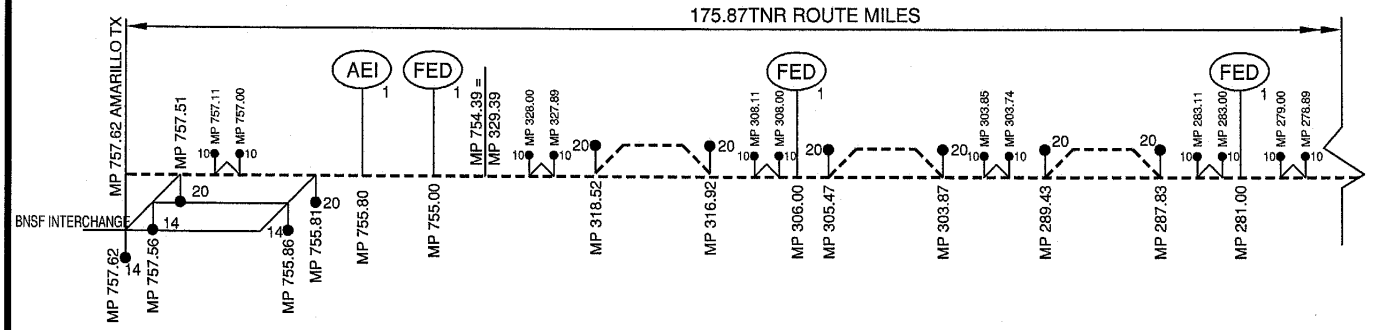
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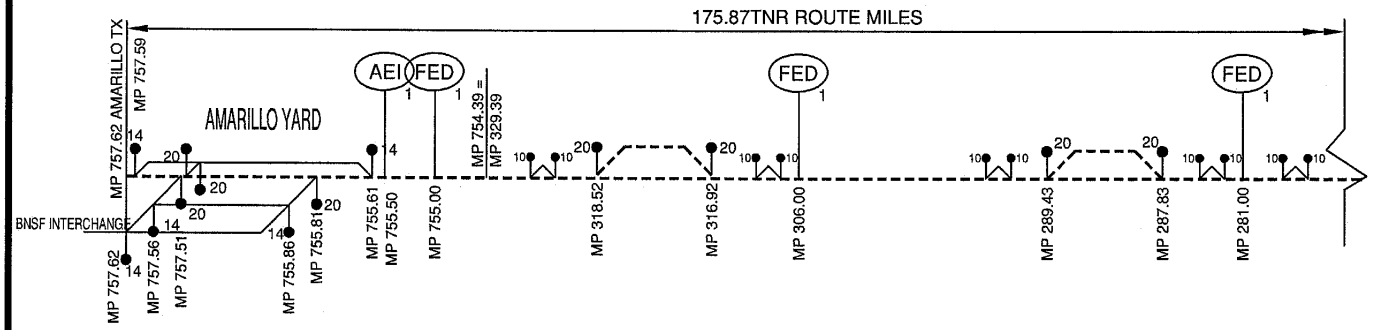
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10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 9
PAGE 20 OF20

DIVISION: **TEXAS**

SUBDIVISION: **RED RIVER VALLEY**

FROM: **AMARILLO** MP: **757.62**

TO: **W. TEXAS POWER** MP: **156.75**

SHEET 1 OF 4

DATE: **05/24/04**

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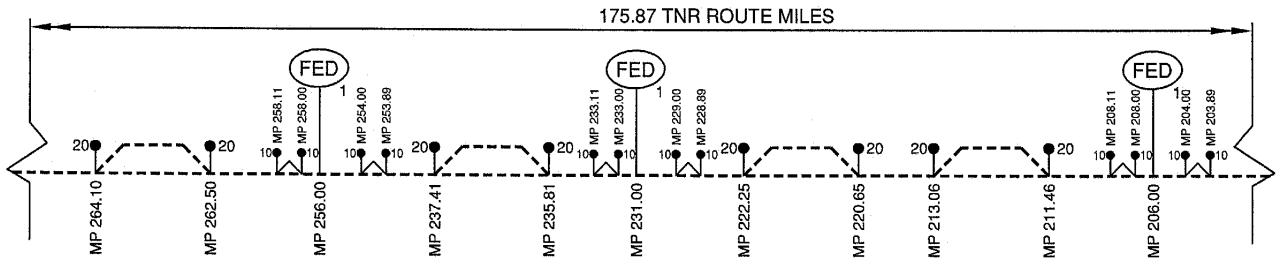
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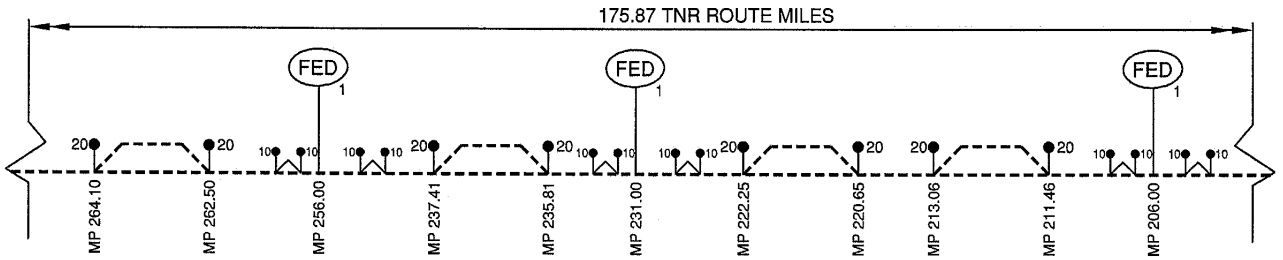
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EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 9
PAGE 20 OF20

DIVISION: **TEXAS**

SUBDIVISION: **RED RIVER VALLEY**

FROM: **AMARILLO** MP: **757.62**

TO: **W. TEXAS POWER** MP: **156.75**

SHEET 2 OF 4

DATE: **05/24/04**

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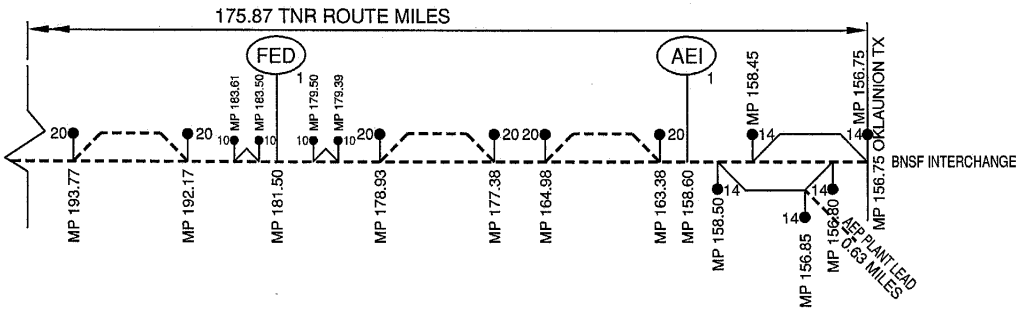
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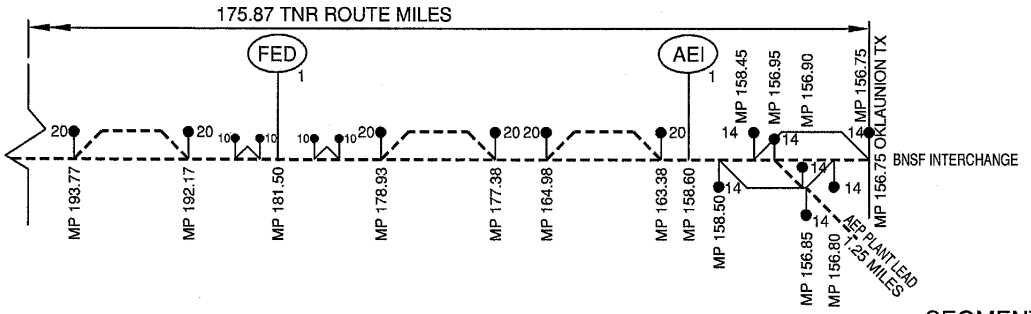
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EXHIBIT: **III-B-1**



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BNSF REPLY

SEGMENT 9
PAGE 20 OF20

DIVISION: **TEXAS**

SUBDIVISION: **RED RIVER VALLEY**

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TO: **W. TEXAS POWER** MP: **156.75**

SHEET 3 OF 4

DATE: **05/24/04**

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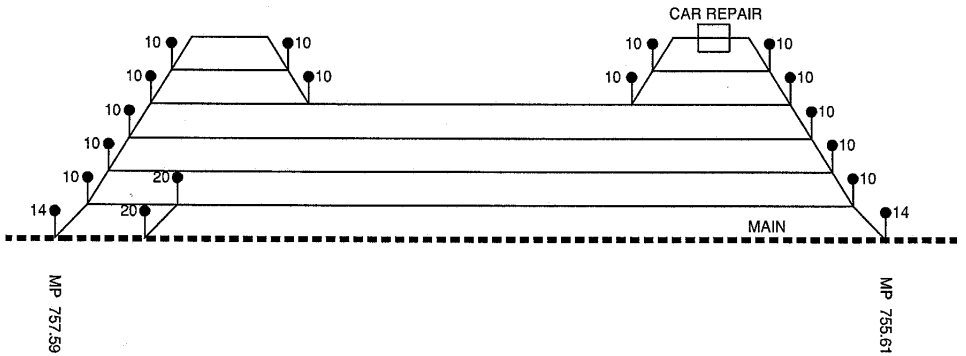
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10E- #10 ELECTRIC

EXHIBIT: **III-B-1**



AEPTX OPENING



BNSF REPLY

SEGMENT 9
PAGE 20 OF 20

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SUBDIVISION: **RED RIVER VALLEY**

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SHEET 4 OF 4

DATE: **05/24/04**

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EXHIBIT: **III-B-1**

III.C: Operating Plan

BNSF Reply Exhibit III.C-1

Has Been Redacted

III.C: Operating Costs

BNSF Reply Exhibit III.D-1

Has Been Redacted

BNSF Reply Exhibit III.D-2

Has Been Redacted

UP in a Jam

BY JOHN GALLAGHER

Railroad struggles to keep network fluid as lack of power, crews slows service

Union Pacific Railroad's mini service crisis is tying up freight while dragging down the company's earnings potential.

Severe winter weather along with a shortage of locomotive power and the crews to run them has left trains stopped dead on their tracks for two and three days at a time across the 33,000-mile UP network. Although the current crisis is not of the magnitude that caused the railroad's meltdown in 1998, it threatens to impede UP's ability to take advantage of an improving U.S. economy.

"Yes, it is affecting our ability to get the revenue growth that was predicted," said Greg Barbe, UP's vice president and general manager for industrial products. Based on economic growth projections, investments and overall system capacity, UP had forecast roughly 8 percent growth in its intermodal business and 4 percent growth on the carload side for 2004.

The service crisis, combined with $35 million in damages UP must pay as a result of an accident at a grade crossing, forced UP to adjust its earnings forecast. The company originally targeted a 30 to 40 percent growth over the $0.57 per diluted share it earned from continuing operations in the first quarter of 2003. However, last week UP Chairman and CEO Dick Davidson said the company will not meet the low end of that projection. The verdict in the grade crossing case alone will cost about $0.08 per diluted share.



Photo by Larry Smith/Trans Pixs

"Severe winter weather, continuing high fuel costs and lingering crew shortages primarily in the Western region" in January and February have hampered efforts to restore fluidity to the UP network, increasing costs and reducing revenue in the first quarter, Davidson said.

Crew shortages are a continuing and seemingly growing concern behind service problems at several railroads over the last two quarters, including Burlington Northern Santa Fe Railway and CSX.

But UP seems to have been hit harder and longer.

In the week before Thanksgiving last year, an internal bulletin from vice presidents of the railroad's four operating regions conceded the railroad "should have hired sooner" more than 1,000 new employees, and asked current crews to work as many hours as possible during the holiday weekend.

"I went home that night and stuck that bulletin on my refrigerator," said a UP locomotive engineer who did not want to be identified. "It's the first time I've ever seen UP admit to anything."

Troubles ditto for CSX

Union Pacific isn't the only railroad struggling to shake off service problems.

CSX recently responded to a formal complaint by the National Industrial Transportation League on behalf of NITL members complaining of poor service.

"Harsh winter weather resulting in broken rails that reduced train speeds, equipment utilization and crew availability" has caused service disruptions along the railroad's northern tier, especially in the Northeast and Mid-Atlantic regions, according to a letter to the League from Clarence Gooden, CSX's senior vice president, Merchandise Service Group.

According to the League, Gooden said CSX is "moving aggressively" to compensate for the service challenges. "Forty-one locomotives have been leased since January and are being deployed to the Northeast," Gooden said. "We have acquired and will have 45 new locomotives coming on-line during the first quarter, and 55 more between July and the end of the year. We also will be leasing 120 locomotives this summer."

Also like UP, CSX is responding with an aggressive hiring campaign. It hired more than 1,000 new employees who are in the final stages of engineer training and will be available for assignment in the first quarter and second quarters this year. "This will add significantly to our ability to fully crew and originate trains on schedule," Gooden told the League.

CSX said it is also adding manpower to its locomotive maintenance program to increase the efficiency and utilization of the fleet. "Customers should be seeing the effects of these efforts also immediately," Gooden said.

— by John Gallagher

The memo also was an indication, say union leaders, of not only poor planning at the railroad but also of a widespread atmosphere of employee abuse.

"I've been with the railroad for 41 years and this is the worst I've ever seen it," said Richard Karstetter, general chairman for the United Transportation Union, which represents UP conductors. "It's a crisis now, but we've been telling them the dike has been breaking for three years. Their answer has been to step up disciplinary action against its labor force. However, we're overworked to the point of exhaustion, and it is getting to the point where our members are actually looking forward to being disciplined because it's the only way that they can get some rest."

John Bentley, a spokesman for the Brotherhood of Locomotive Engineers and Trainmen, said work fatigue was an industry-wide problem. "Railroads in general are trying to get too much work done with not enough people and our members are suffering because of it," he said.

Karstetter said UP has started to address the problem. "They're hiring, and we're starting to see a difference in places like St. Louis," he said. "But much of this was too little too late. There are trains stopped all over America, and it's going to take months to dig out of this mess."

UP spokesman John Bromley acknowledged employees are getting more trip turns than normal but said the railroad is acting within the hours of service laws. "We've had a real problem getting people to stay marked up (available for work)," Bromley said. "In some instances there's been a high percentage of employees not available on weekends, and there has been disciplinary action taken to address that."

Last year UP hired more than 2,500 engineers and another 1,000 in January of this year. The plan for 2004 is to hire 3,500 trainmen.

UP customers, particularly those in the western portion of the UP system where the effect of the labor shortage is biggest, have adjusted their transport plans accordingly. The Portland & Western Railroad, which interchanges lumber shipments with UP in the Pacific Northwest, is temporarily storing product in general-use boxcars until it can get high-end boxcars suitable for transporting finished paper.

"They've closed down their temporary crisis center that they set up last year up here to help with the problem, but there's still a backlog" of inventory, said Ron Vincent, director of customer service for the P&W. "The weather has been worse this year than in previous years, which hasn't helped. But all things considered, they've been doing an excellent job of reacting."

"The noise level from our customers has gotten quite loud," said Tom Shurstad, president of intermodal carrier Pacer Stacktrain, a big shipper of automotive parts on UP between Mexico, the United States and Canada. Because a lack of crews means having to park trains, "locomotives are not getting to destination fast enough before they have to turn around and go back," Shurstad said. He said UP was improving every day but "they haven't yet hit the right threshold."

To do that UP has to increase the overall velocity of its network, which has shown a dramatic downturn in average train speed in 2004 versus the same time last year. Experts say every one mile-per-hour increase in average train speed results in 250 additional locomotives that wouldn't otherwise be available.

UP wasn't placing a timeline on its recovery. "As we look to the remainder of the quarter, our outlook is unclear," said Davidson. "We are hopeful that a solid March performance will help us regain some of the momentum we lost earlier in the quarter. Once the difficult winter operating environment begins to improve, we continue to believe that our efforts will bear fruit." ●

UP's Average Train Speed

(Miles per hour)

	Historical Periods		Week Ended			
	10-03	3-Feb-04	30-Jan-04	23-Jan-04	16-Jan-04	3-Feb-04
Intermodal	31.5	28.4	28.2	27.8	26.8	28.3
Manifest	22.1	19.5	19.0	18.9	18.6	18.8
Multilevels	26.0	23.6	23.4	22.8	22.4	23.3
Coal unit	24.2	22.2	21.9	21.6	20.7	22.6
Grain unit	22.6	19.9	19.8	19.7	18.0	19.8
All trains	24.8	22.3	21.9	21.8	21.1	22.1

Source: ©1999-2002 Union Pacific, all rights reserved.

CN sweetens offer

Canadian National Railway kept its trains rolling as the Canadian Auto Workers union strike entered its second week, though intermodal shippers reportedly experienced delays. The railroad offered three proposals to the CAW, including a bonus, but the union said last week it wants disciplinary rules rolled back before it will end its strike.

The two sides were to meet in Montreal March 3 to discuss CN's new proposals. The first proposal would tack on a one-time lump sum payment, or signing bonus, in the first year of a new contract in lieu of some of the previously offered benefits.

In addition to the signing bonus, the second proposal offers a four-year agreement with wage increases of 3 percent in each of the first three years followed by a 4 percent increase in the final year. CAW already has rejected a three-year contract proposal. Finally, CN offered to submit all its proposals to nonbinding arbitration.

But the union says the railroad will have to change disciplinary procedures before it discusses any of its offers. "There's an atmosphere of intimidation and harassment that has increased to the point where our members are afraid to report any problems" to management, said CAW spokesman Abe Rosner. Union members can be suspended for 10 to 30 days for what Rosner called minor offenses. CN acknowledged disciplinary issues and said it would resolve them "to the satisfaction of both parties."

If the labor dispute continues the Canadian government may step in to end it, rail industry analysts said. "Our sense is that the government would be unlikely to allow the strike to go on for more than a few weeks," said Edward M. Wolfe, a Bear Stearns analyst.

— by John Gallagher

BNSF Reply Exhibit III-D-4-1

Has Been Redacted

STB Docket No. 41191 (Sub-No. 1)

AEP Texas North Company v. The Burlington Northern and Santa Fe Railway

BNSF Reply Evidence

Commercial Analysis of AEP Texas Maintenance of Way Plan

by William J. Rennicke

Mercer Management Consulting, Inc.

May 24, 2004

I. Introduction and Summary

Qualifications of William J. Rennicke and Mercer Management Consulting, Inc.

My name is William J. Rennicke. I am a Managing Director of Mercer Management Consulting, Inc. (Mercer). Mercer is a member of the Marsh & McLennan Companies, Inc. Mercer has one of the largest consultancies in the world dedicated to financial and project planning in the transportation and logistics sectors. It provides a comprehensive set of services and capabilities to transportation carriers, to the users and regulators of transportation services, and to the financial sector that funds and underwrites major transportation projects and transactions. Mercer's transportation and financial sector clients include national and regional governments on six continents as well as many of the world's largest railways, commercial banks and leasing companies, and industrial and consumer manufacturing firms. Along with our sister company Marsh, Inc., our transportation, logistics, and financial support practices provide in-depth expertise on a wide range of project evaluation, financial projection, and project-related issues for companies engaged in operating or providing services to all forms and modes of transportation.

A description of Mercer's qualifications and experience is provided in Annex A.

I have been a railway executive and a consultant to railways in the United States, Canada, and worldwide for nearly 30 years. I specialize in railway strategic planning, management, and operations, and have particular expertise in project and transaction due diligence, transportation asset valuation, and transactions (including mergers and acquisitions). I have worked with senior executives at all of the major North American railways, as well as with senior officials at many government-owned railways worldwide. I have been involved with asset and financial valuation activities that have focused on over $30 billion of assets since 1999. I have testified before the U.S. and Canadian legislatures and federal transportation agencies on rail regulation and rail transactions, have testified in regulatory and Federal court proceedings on key rate and service issues in the U.S. and Canada, and have spoken and published widely on issues affecting the productivity and capital needs of the rail industry. I am also a licensed representative of Mercer

Securities, Inc, Marsh & McLennan's Broker Dealer which provides many of the same functions as a standard investment bank.

Before joining Mercer, I was a vice president of the Boston & Maine Railroad. During my tenure, I managed rail industry service performance project case studies as part of the industry-wide Freight Car Utilization Program. I have also held operating positions with the Southern Pacific and New Haven railroads, and was a transportation consultant with Deloitte Haskins & Sells (the predecessor of Deloitte & Touche). I have a B.S.B.A. in accounting from the School of Business Administration at Georgetown University and an M.B.A. with a concentration in transportation and logistics from the University of Minnesota. I am also a member of the Transportation Research Forum and the Council of Logistics Management. My qualifications and experience in the rail industry, together with a listing of cases in which I have given testimony, are provided in Annex B.

Context of Mercer's Analysis

In this STB proceeding, Complainant AEP Texas North Company ("AEP Texas") challenges the reasonableness of common carrier rates established by Defendant, The Burlington Northern and Santa Fe Railway Company ("BNSF"), applicable to the transportation of coal in unit trains of BNSF-supplied railcars from mines in the Powder River Basin of Wyoming ("PRB") to the Oklaunion Generating Station operated by AEP Texas near Vernon, Texas. AEP Texas has calculated the stand-alone cost (SAC) for the movement of coal from the PRB mines to the Oklaunion station as would be charged by a hypothetical least-cost, most efficient competitor, the Texas & Northern Railroad ("TNR"). The TNR consists of 1,168.54 route-miles[1] and replicates BNSF's Frontier Range Route from the PRB to Oklaunion, TX, via Campbell, WY; Edgemont, SD; Alliance and Northport, NE; Denver, Pueblo, and Las Animas Junction, CO; and Amarillo, TX. In 2001, TNR's traffic group consisted of 187.3 million tons of primarily coal

[1] Excluding 23.71 miles of trackage rights over Sterling-Union segment. BNSF.WP.RP.III.D.4-0277 to 0280.

and some general freight.[2] The resulting hypothetical railroad has an average traffic density that is over twice that of any of the Class I railroads.

Mercer was asked to evaluate two areas of AEP Texas' proposed plan for the TNR. In a separate exhibit, I have analyzed the schedule and cost projections contained in AEP Texas' construction plan. In this exhibit, I have examined AEP Texas' projected infrastructure maintenance costs for the TNR with respect to:

- Standard life cycle costing techniques used by railroads and financial interests to optimize investments and minimize costs; and,
- Maintenance performance benchmarks from the world's most efficient high-density freight railroads.

My overall objective in this review was to compare AEP Texas' maintenance plans against standard evaluation frameworks used in making real-world investment decisions and against actual railroad maintenance procedures and costs.

Summary of Findings

My review reveals fundamental flaws in AEP Texas' maintenance plan. First, AEP Texas hypothesizes maintenance productivity levels that have not been attained anywhere in North America, or for that matter on any bulk heavy haul railroad in the world. AEP Texas' estimates for most activities are only a fraction of what U.S. Class I railroads would spend for a similar high-density dedicated infrastructure. AEP Texas provides no maintenance benchmarks from a high-density railroad anywhere in the world that has been able to match the productivity levels and cost structure proposed for the TNR.

Second, AEP Texas appears to have completely de-linked projected operating maintenance costs from the underlying assumptions made for the construction of the line. Standard life cycle cost

[2] AEP Texas electronic workpaper "BNSF Traffic Tapes Historical Tonnage (final).xls." BNSF.WP.RP.III.D.4-0281.

analysis exposes underlying inconsistencies between construction costs on the one hand and required maintenance levels on the other. Highly optimistic maintenance assumptions, while possible in isolated cases, can almost never be achieved with the level of resources AEP Texas has projected for the construction phase.

II. AEP Texas has violated well-established and universally employed principles of life cycle costing by decoupling construction decisions from their resulting impact on future maintenance and operating costs.

Every railroad in the world – from the largest integrated national rail system down to the smallest single-customer shortline – makes tradeoffs between capital investment (whether for construction or for rehabilitation) and subsequent maintenance and operating costs. The financial imperative for a railroad to understand the relationship between investment decisions and future maintenance and operating costs applies regardless of tonnage; as tonnage increases, however, the maintenance cost impact becomes more immediate and more significant. Given the very high density envisioned for the TNR, AEP Texas' recognition of the relationship between construction standards and future costs becomes a critical required component of its overall plan.

Background on life cycle costing

Post-construction operating and maintenance assumptions are directly tied to the design and characteristics of the rail infrastructure. Matching post-construction maintenance levels directly to investment is a basic principle of life cycle costing, which is a fundamental concept that drives asset investment across a myriad of industries.

Life cycle costing is the standard method used both by railroads to manage their financial performance and by financial institutions to assess the total value of a project over the lifetime of an investment. Life cycle costing allows a project owner or other interested parties to make the financial trade-offs associated with alternative levels of investment (construction), maintenance and operating expense, and where appropriate, income streams. These procedures are

universally applied in large transportation projects and are an important component of transportation investment policy.[3]

The National Institute of Standards and Technology identifies several key characteristics of life cycle costing:[4]

- The basic premise of the life cycle cost method is that to an investor or decision maker *all costs arising from that investment decision are potentially important* to that decision, including future as well as present costs.
- Applied to constructed facilities, *the life cycle cost method encompasses all relevant costs over a designated study period*, including the costs of designing, purchasing/leasing, constructing/installing, operating, maintaining, repairing, replacing, and disposing of a particular design or system.
- The life cycle cost method *is particularly suitable for determining whether the higher initial cost of a constructed facility or system specification is economically justified by lower future costs* (*e.g.*, losses due to natural or man-made hazards) when compared to an alternative with a lower initial cost but higher future costs.

Life cycle costing precepts are so universally applied that they have become a standard concept not only in industry, but in our everyday lives. People often buy appliances or cars based in part upon the trade-off between purchase prices and future cost – electricity, repair, expected life of the purchase, etc. Highway departments routinely assess the lifetime cost implications of the higher initial cost of using concrete versus asphalt in road construction against the lower future resurfacing requirements. For exactly the same reasons, railroads install higher weight rail, for example, to reduce future maintenance costs.

Ignoring life cycle costs, and taking the shortsighted approach of holding down construction costs without considering the downstream impacts, inevitably dooms a project to a spiral of

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[3] U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA), "Improving Transportation Investment Decisions through Life-Cycle Cost Analysis"; U.S. DOT "Life-Cycle Cost Analysis Primer"; U.S. DOT FHWA, "1997 Federal Highway Cost Allocation Study Final Report." BNSF.WP.RP.III.D.4-0282 to 0297.

[4] National Institute of Standards and Technology Interagency Report (NISTIR) 7025: "Applications of Life-Cycle Cost Analysis to Homeland Security Issues in Constructed Facilities: A Case Study," October 2003. BNSF.WP.RP.III.D.4-0298 to 0300.

lower reliability, poorer service, and increasing operating and maintenance costs as infrastructure deteriorates. In Mercer's experience, the interrelationship between investment and operating requirements is a major issue in assessing project design and feasibility.

Life cycle costing is used routinely in the railroad industry for any major investment decision.

Railroads apply life cycle costing principles (whether in name or in practice) in virtually every investment decision, whether it involves track, signaling and communications, rolling stock, or facilities. In Mercer's experience, in the rail and financial industries, life cycle cost is a fundamental factor underlying virtually every significant investment or purchase made by U.S. railroads.

Often, the benefit of higher investment is only achieved if accompanied by a specific maintenance regime that supports the financial life cycle cost calculations. A common example is "premium rail" – without a maintenance plan that provides the resources to maintain rail lubrication devices or that provides for regular grinding and defect inspection, the anticipated benefit of "premium rail" will be severely diminished.

The need for a life cycle perspective is driven to a great extent by the rail industry's combination of high capital requirements and high operating costs. A wrong decision – investing either too little or too much – has serious implications for maintenance, operations, and reliability over the life of the investment. If the investment is too conservative, the railroad ends up paying more to maintain and fix the track or facility because it cannot handle the traffic adequately. If the investment is too high (*i.e.*, "gold plating"), the railroad ends up paying for a level of service or performance that it doesn't need.

AEP Texas has failed to account for life cycle cost implications in its decisions.

My intention in this section of my review is to assess the implications of AEP Texas' failure to recognize the life cycle cost impacts that construction decisions have upon maintenance and operating costs. Testimony provided by BNSF's construction, maintenance, and operations witnesses establishes the cost of those cases where AEP Texas has (a) failed to propose constructing a railroad to the maintenance-reducing standards of the BNSF-equivalent route; (b)

utilized BNSF (or lower) maintenance cost data without regard to the infrastructure investment that enabled BNSF to achieve that maintenance cost structure; or (c) failed to make full allowance for the maintenance required to maximize the life of capital investments

I will provide three examples to demonstrate the impact of AEP Texas' de-linking of construction and operating assumptions.

Impact of selection of wood ties on maintenance costs. AEP Texas proposes utilizing only wood ties – no concrete ties – in constructing the TNR. Clearly, it is possible to use only wood ties to construct a rail line. But just as clearly, it is not possible for AEP Texas to suggest that its decision to use only wood ties is independent from its calculation of maintenance costs. BNSF, UP, and most other heavy haul railroads have turned to concrete ties in locations where the maintenance and operating costs associated with wood ties were so high that the additional initial cost of concrete ties was justified on a life cycle cost basis.

AEP Texas has simply ignored the life cycle cost issues associated with wood ties by failing to incorporate their higher maintenance requirements in its maintenance cost calculations.

It is difficult to understand how AEP Texas could have ignored life cycle cost principles in developing its tie maintenance plan. A partial explanation may be provided by examining an additional oversight AEP Texas has made – its assumption regarding wood tie life. AEP Texas assumes it will achieve BNSF's average wood tie life of 30 years.[5] However, a detailed multi-year analysis of tie life by ZETA-TECH Associates[6] reveals that, at the average TNR density of 80 MGT, average wood tie life should be just over 21 years on tangent track, falling to under 17 years on 4 degree curves (Figure II-1).

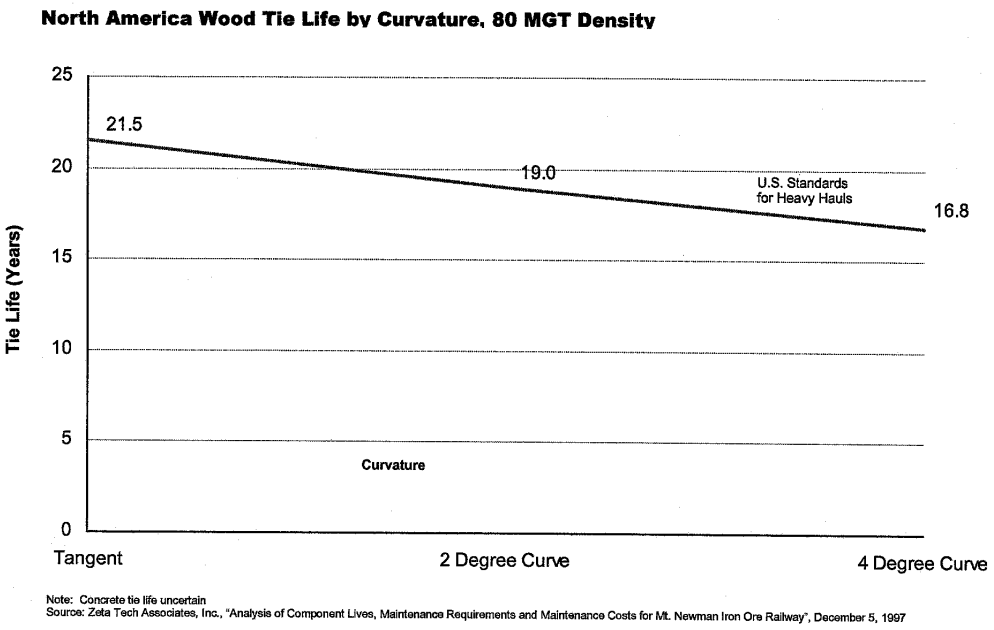
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[5] In its maintenance spreadsheet "SpotMaint.xls," AEP Texas implies a tie life of 21 years. This figure is not used in the DCF, where tie replacement is calculated on a 30-year tie life basis. BNSF.WP.RP.III.D.4-0301 to 0302.

[6] ZETA-TECH Associates, Inc., "Analysis of Component Lives, Maintenance Requirements and Maintenance Costs for Mt. Newman Iron Ore Railway," December 5, 1997. BNSF.WP.RP.III.D.4-0303 to 0305.

In employing a 30-year tie life in its DCF, AEP Texas completely ignores (a) the implications of the TNR's very high tonnage on wood tie life,[7] and (b) BNSF's practice of replacing wood ties with concrete in locations where wood tie life has been particularly short (high density, sharp curves, heavy grades, etc.), which has the effect of raising the overall average for its remaining wood ties.

Figure II-1



Slope stabilization. AEP Texas proposes placing topsoil only in those locations where BNSF included topsoil on the line segments of TNR that were constructed within the past 40 years.[8] In

[7] As discussed more thoroughly in the following section, AEP Texas' average density (GTM/track-mile) is nearly twice as high as BNSF's (on a system-wide basis). BNSF.WP.RP.III.D.4-0306.

[8] AEP file "TNR GRADING.xls."

no cases does it include the cost of seeding.[9] AEP Texas attempts to justify this approach by suggesting that topsoil and seeding are an "entry barrier" since BNSF predecessors did not incur topsoil and seeding costs when the lines were originally built.

What AEP Texas fails to recognize is the elevated level of annual maintenance costs for slope stabilization that BNSF and its predecessors incurred in subsequent years as a result of the lack of including topsoil and seeding during the original construction. AEP Texas certainly has the option of reducing its construction costs by deciding not to add topsoil and seeding. But in so doing, AEP Texas must also accept the associated maintenance and operating cost implications resulting from erosion and soil contamination, which it has failed to do.

The costs associated with slope stabilization cannot simply "disappear" – either they are paid for up front through the addition of topsoil and seeding, or they are paid for on an on-going basis through increased levels of day-to-day maintenance. AEP Texas must provide for the cost of erosion mitigation one way or the other.

Geotextile fabric. AEP Texas clearly recognizes the benefits of geotextiles in reducing future maintenance costs of the high-density TNR. AEP Texas' recognition of the value of geotextiles reflects the Board's recent finding in *CP&L*, where the Board concluded that, given the general acceptance of geotextile use, the cost of placing geotextiles under turnouts and crossings generally should be included in SAC construction projects.[10]

Despite its recognition of the positive impact of geotextiles upon future maintenance costs, AEP Texas attempts to reduce the cost of geotextiles by proposing a geotextile "footprint" for turnouts and road crossings that is insufficient to provide the desired maintenance benefits,[11] and by not

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[9] AEP Texas claims that in those cases where it does propose to spread topsoil, the price also includes seeding. BNSF.WP.RP.III.D.4-0308 to 0311. BNSF witnesses Gouger and Phillips have explained that this is not the case in Section III-F.

[10] *CP&L*, slip op. at 89. BNSF.WP.RP.III.D.4-0312-0313.

[11] BNSF.WP.RP.III.D.4-0314 to 0315. As described in Section III-F, AEP Texas does not provide sufficient length of geotextiles in advance of turnouts and road crossings to minimize soil penetration at these high maintenance locations. In failing to provide sufficient geotextiles,

including *any* geotextiles under railroad crossings. In failing to comply with the STB's finding in *CP&L*, AEP Texas must then accept the cost consequences resulting from the additional ongoing maintenance required because of its minimal application of geotextile fabric.

III. AEP Texas' estimates for infrastructure maintenance expenses per unit are far below the levels achieved by even the most efficient heavy haul railroads in the world, including BNSF.

The final area of AEP Texas' operating plan that I reviewed covered estimates of expenditures for infrastructure maintenance. I found that, in addition to violating the principles of life cycle costing, AEP Texas proposes infrastructure productivity and maintenance cost levels that have never been achieved nor even approached by heavy haul railroads in North America or anywhere in the world.

In proposing its infrastructure maintenance costs, AEP Texas provides little, if any, supporting detail for its spectacular productivity assumptions. During my 30-year career consulting to major railroads around the world, I have reviewed the business plans and financial performance of literally dozens of regional and large heavy haul specialized railroads in North America, Australia, South Africa, and Europe. In none of these reviews have I found evidence of productivity levels at or even near the range proposed by AEP Texas.

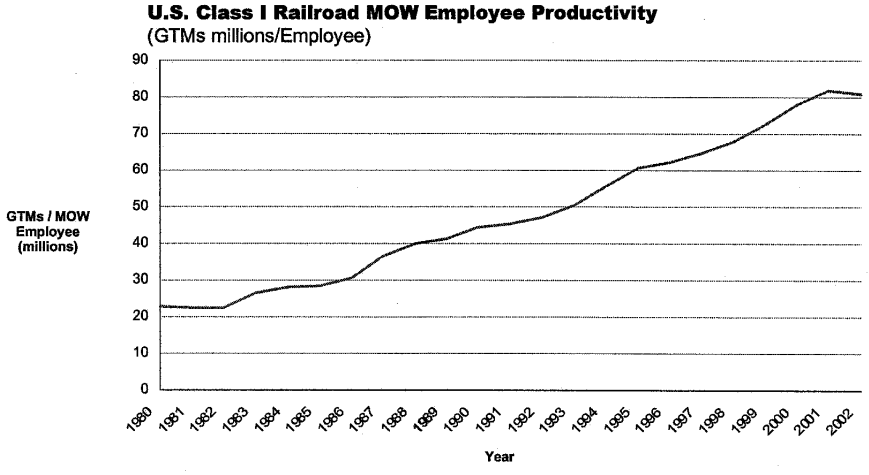
In support of its claims, AEP Texas relies only on a few general "work process" comments (outsourcing and cross-training, for example) based on railroads that are utterly dissimilar to the TNR. AEP Texas implies its "work process" comments reflect a unique approach overlooked by all other railroads. In actuality, heavy haul railroads around the world have been using a host of innovative methods for many years to improve productivity and lower costs. AEP Texas provides no evidence that it should be expected do better.

AEP Texas is proposing an approach that will actually reduce the overall benefit of the geotextiles it does install since ballast fouling in advance of the turnout will dictate more frequent maintenance of the entire turnout/road crossing.

The U.S. Class I railroads with which the TNR compares are already highly productive; there is little to no "fat" left in U.S. railroad maintenance expenses.[12]

AEP Texas' claim that it will be able to improve on the efficiency of US Class I's is difficult to fathom. Since deregulation in 1980, all of the Class I's have continuously been improving employee productivity. Figure III-1 shows that the productivity of the Class I maintenance of way staff increased 257% between 1980 and 2002, from 22.7 MGTMs[13] per employee to 81.7 MGTMs per employee.[14] On an annual basis over this period, Class I productivity increased at a compound annual growth rate (CAGR) of 6%. This certainly is not the performance record of an "inefficient" railroad industry.

Figure III-1



Note: Based on Employee headcount for MOW and structures
Source: U.S. Class I Railroads Analysis of Class I Railroads, 2003. Analysis found in Mercer electronic spreadsheet "MOW Headcountv2.xls"

[12] Mercer has based its analysis on R-1 data filed by the individual railroads to the Surface Transportation Board (STB). The R-1s provide a consistent and STB-regulated reporting procedure of annual railway performance and are the basis for many STB and industry reports and processes. The R-1s differ from internal railway GAAP-based financials, but still provide a widely recognized and established method of Class I comparison.

[13] Million gross ton-miles.

[14] Mercer electronic spreadsheet "MOW Headcountv2.xls." BNSF.WP.RP.III.D.4-0316 to 0318.

Significant productivity improvement is the only way the railroads have been able to remain viable in an environment where input unit costs have risen by 218% between 1980 and 2002, at the same time that yields (revenues per ton-mile, in real dollars) have fallen by 24%.[15] In this highly competitive transport market, the railroads could not simply raise their prices in order to recover inflationary costs, so solvency depended on major gains in productivity, including infrastructure maintenance. The Class I's have achieved these impressive results by employing a comprehensive range of cost-reduction strategies, including:

- Detailed maintenance scheduling and management
- Investment in low-maintenance assets
- Revisions in labor contracts
- Concentration of resources in high-production specialized gangs
- Outsourcing those functions that provide benefit, such as providing specialized ballast distribution and ROW clean-up trains

As a result, the infrastructure maintenance cost structure of the U.S. Class I's has become the standard by which all other railroads measure themselves. Foreign railroads – even those with purpose-built, high-density bulk material operations – often find the gap between their own MOW costs and those of the U.S. Class I's is so large that even the most ambitious productivity-improvement programs are deemed successful if they can close the gap by only 25 to 50 percent.

BNSF in particular has been viewed for many years as among the "best of the best," especially in the area of infrastructure maintenance. In previous benchmark studies for major international heavy haul railroads, Mercer found that the Burlington Northern (one of BNSF's predecessors) was the standard by which other heavy haul railways (*e.g.*, coal, iron ore) measured their own productivity.[16] Figure III-2 summarizes the results of two separate benchmark studies Mercer conducted on behalf of two international heavy haul railroads. In both studies, BN's coal traffic

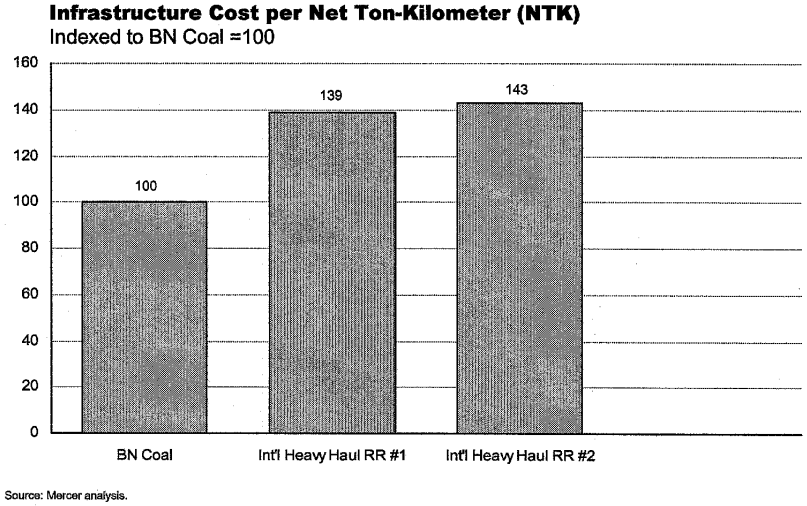
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[15] Analysis of U.S. Class I Railroads, 1980 to 2002. BNSF.WP.RP.III.D.4-0316 to 0318.

[16] {Rail name redacted}- World's Best Practices in Export Coal Haulage, March 18, 1994; {Rail name redacted} Freight Benchmarking Study, August 22, 1994. BNSF.WP.RP.III.D.4-0319 to 0324.

established the "best practice" level for infrastructure cost per net ton-kilometer, with one railroad's expense 39% higher than BN's and the other railroad's expense 43% higher.[17]

Figure III-2



Source: Mercer analysis.

Faced with the level of performance improvement the Class I's have achieved, it is difficult to even imagine how AEP Texas might suggest the infrastructure maintenance cost structure of the Class I railroads reflects some gross inefficiency which the TNR somehow will correct. But this is exactly what AEP Texas' cost proposal suggests.

Based on the traffic density proposed for TNR, AEP Texas' maintenance costs per route-mile are unrealistically low compared with the U.S. Class I experience.

In its cost projections, AEP Texas appears to make no acknowledgement whatsoever of the "best in class" position the U.S. Class I railroads have earned in maintenance productivity. Instead,

[17] In both studies, Mercer ensured an "apples to apples" comparison by making adjustments to remove the effect of institutional issues such as labor rates, unit material costs, and currency and tax issues.

AEP Texas proposes to actually *exceed* the performance standards that have taken the Class I's more than 20 years to reach.

In addition, as was presented in the life cycle cost section of my statement, AEP Texas expects to achieve this unheard-of level of productivity at the same time that it has proposed a number of construction standards that require higher maintenance than the more robust infrastructure of BNSF (and of most other heavy haul railroads).

AEP Texas appears to either be unaware of or simply ignore the well-documented principle that maintenance workload (and expense) increases as a function of increasing traffic density. The relationship between density and expense has been analyzed in detail by ZETA-TECH Associates, the recognized leader in quantitative analysis of track maintenance practices and costs.[18] Figure III-3 plots the relationship between density and maintenance cost calculated by ZETA-TECH[19] for track with moderate curvature and moderate traffic mix.[20] ZETA-TECH's

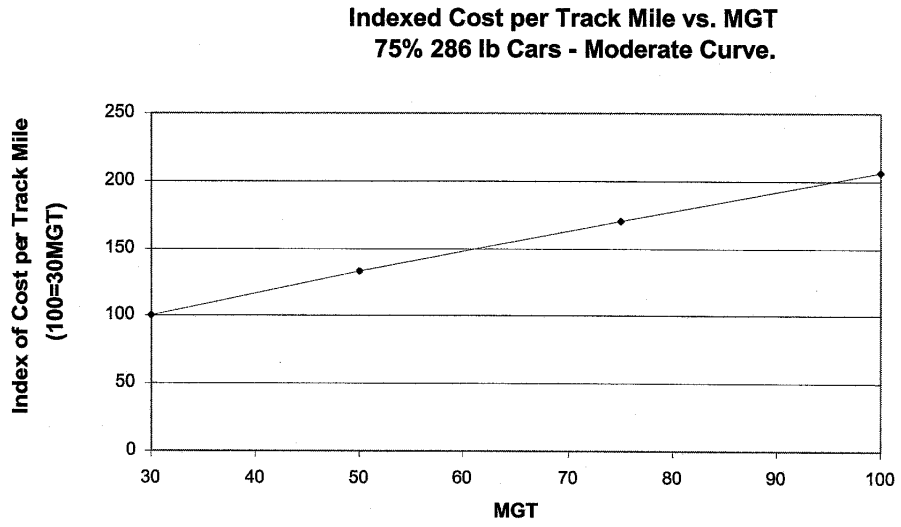
[18] ZETA-TECH Associates, founded in 1984, provides technical, operations, and economic consulting services to passenger and freight railroads, rail transit operators, industry suppliers, and governments at all levels. The company has strong expertise in the areas of railroad civil engineering, rail transportation cost analysis, operations planning, track and vehicle analysis, maintenance planning, and information system development and implementation. Its clients include Class I and other railways in North America, foreign national railways, and government oversight and regulatory organizations. For the Federal Railroad Administration, ZETA-TECH developed a matrix of track costs for various combinations of high speed passenger and heavy freight traffic, to serve as a "planners' handbook" for the development of high speed passenger rail service.

[19] ZETA-TECH Associates, "Analysis of MoW Costs as a Function of Traffic Density," May 2004. BNSF.WP.RP.III.D.4-0325 to 0339. Analysis utilized ZETA-TECH's Work Unit Model to estimate non-capital track maintenance expenditures associated with specific track segments and territories, and ZETA-TECH's Steady State Capital Model, which uses standard lives and costs for track components to estimate future or "steady state" spending required to replace components as they wear out, to calculate the cyclic capital costs.

[20] Analysis based on moderate track curvature (90% of track <2 degrees, 8% between 2 and 6 degrees, and 2%> 6 degrees) and moderate traffic mix (75% 286,000 lb. cars, 25% 263,000 lb. cars). Based on AEP Texas' tonnage (187,248,630 tons in 2001; see AEP Texas file "BNSF Traffic Tapes Historical Tonnage (final).xls") and carloads (1,682,459 carloads in base year; see AEP Texas file "TNR Operating Statistics.xls"), the average of 111.3 tons/car implies that the majority of AEP Texas' fleet will consist of the larger, 286,000 lb. cars. BNSF.WP.RP.III.D.4-0340 to 0341.

analysis shows that line at 60 MGT per track-mile should require maintenance costs approximately 50% higher per track-mile than a 30 MGT line.

Figure III-3

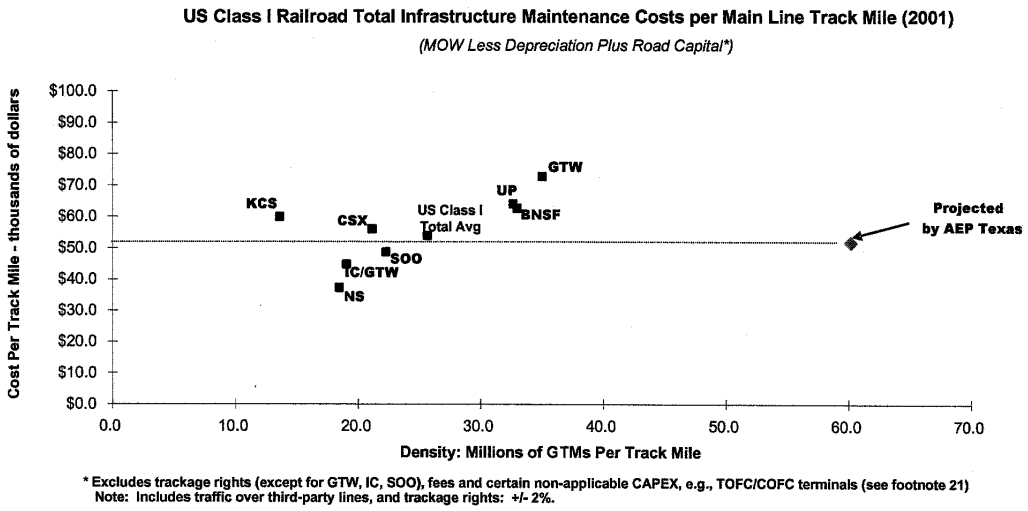


Mercer electronic spreadsheet "COST_P_MILE_MATRIX_mercer_4.xls"

In contrast, AEP Texas proposes that the TNR, at 60 MGT per track-mile, needs to spend only 4% more per track-mile than the U.S. Class I total average at 25.6 MGT (Figure III-4), rather than the 50% more indicated by ZETA-TECH's modeling of infrastructure maintenance costs, as well as by actual rail industry experience. It is proposing to spend less per track-mile than all but three of the U.S. Class I railroads, even with the TNR at two to five times the system-wide densities of any Class I.[21]

[21] For the Class I railroads, we have relied on information reported in each railroad's R-1 in making this and other comparisons to AEP Texas' TNR. Some R-1 line items typically have not been included in a SAC MOW analysis, therefore to make the most conservative comparison possible we have excluded the following items reported in the R-1: Schedule 410 MOW excludes line items 103, 104-108, 118-132, 139-144; Schedule 330 excludes line items 13, 16-19. BNSF.WP.RP.III.D.4-0342 to 0350. AEP Texas' MOW expense includes a separate line item of $4.5 million for "Derailments" (see AEP Texas electronic spreadsheet "SpotMaint.xls"), while the Class I's distribute costs associated with derailments and clearing wrecks directly

Figure III-4



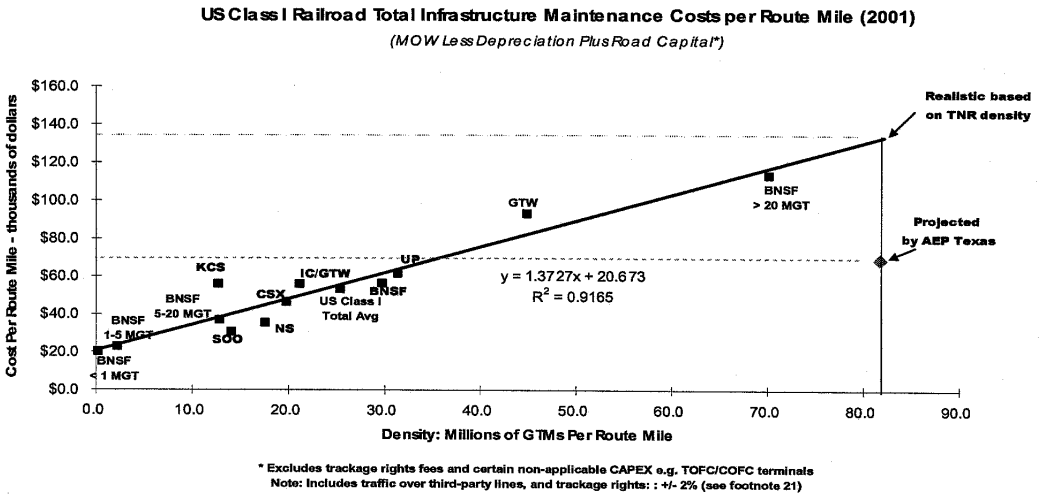
The same conclusion is reached if density is measured in route-miles. As can be seen in Figure III-5, despite proposing a railroad with more than two times the average density per route-mile of most of the Class I railroads, AEP Texas proposes TNR infrastructure maintenance spending levels that are barely more than the average expense of the most dense Class I railroads (BNSF and UP). For example, AEP Texas at density levels of 80 MGT[22] per route-mile proposes to spend only 12% more per route-mile than UP spends on average at just over 30 MGT.

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under other line items (*i.e.*, Track). Line items 115-117 (~3% of Mercer's total Class I MOW estimates) also partially include such costs, and hence have been included.

[22] Mercer calculation, see Mercer electronic spreadsheet "MOW Benchmarks 0518 v final STAND.xls."

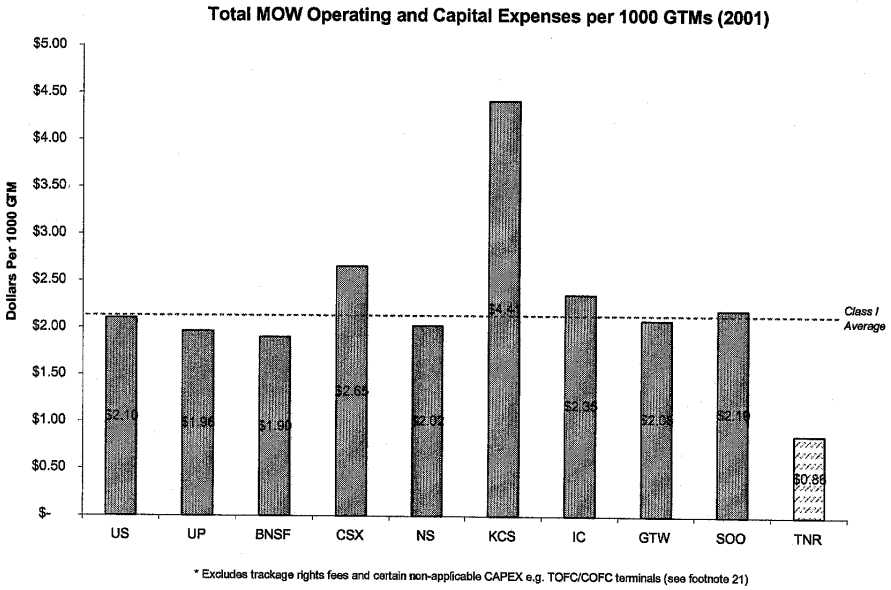
Figure III-5[23]



This combination of very high density and very low maintenance costs results in AEP Texas proposing to spend less than half the Class I average per 1000 GTMs (Figure III-6).

[23] BNSF does not calculate maintenance costs by specific density level. Given the extremely high density projected by AEP Texas, Mercer calculated a cost by STB density category in order to support the regression. Mercer projected BNSF costs by density category using the approach described in Attachment III-1. *See* Mercer electronic spreadsheet "MOW Benchmarks 0518 v final STAND.xls."

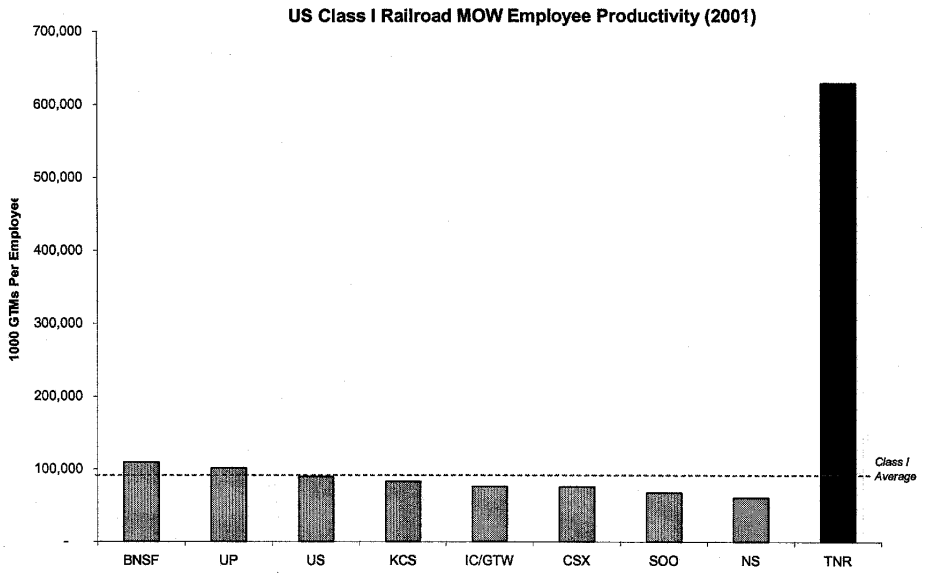
Figure III-6



AEP Texas' dramatically lower spending is not the result of "efficiencies" that accrue from squeezing out perceived "waste" by every Class I. Rather, the magnitude of the difference suggests AEP Texas has simply failed to recognize the maintenance implications of the traffic volumes it is proposing, or the experience of any North American Class I railroad. As I will discuss later in this section, AEP Texas has not been able to provide a single benchmark of any railroad actually handling even near the TNR's proposed traffic volume that achieved maintenance costs similar to what AEP Texas has hypothesized.

The virtually total lack of reality in the AEP Texas plan is further demonstrated when one considers the implications for employee productivity. Based on internal employees only, AEP Texas' plan would imply employee productivity levels more than *500%* greater than even the most efficient Class I railroad currently achieves (Figure III-7).

Figure III-7



Mercer electronic spreadsheet "MOW Benchmarks 0518 v final STAND.xls" (see footnote 21)
Note: AEP Texas' MOW headcount includes Manager of Testing/Environmental and one Clerk that AEP Texas included in G&A.

AEP Texas suggests that this productivity level is achievable due to extensive outsourcing. To test this claim, I calculated the equivalent headcount implied by AEP Texas' outsourcing expense[24] and added that figure to AEP Texas' internal MOW staff of 152 employees.[25] I also calculated the implied headcount of AEP Texas' planned capital expenditures, even though AEP Texas accounts for no additional personnel under its capex.[26] This provides an "apples to

[24] Mercer calculated the headcount implied by AEP Texas' outsourcing spend – that is, how many equivalent TNR employees are implied by the amount AEP Texas has allocated for outsourcing. Equivalent employees implied by operating and purchased services expense were calculated as follows: Mercer took 67% of AEP Texas' operating expense (the same ratio of labor cost to total MOW expense for the combined U.S. Class I's in 2001) and divided that figure by AEP Texas' average MOW employee cost.

[25] Includes AEP Texas' stated 150 MOW staff plus Manager of Testing/Environmental and one Clerk that AEP Texas included in G&A.

[26] Equivalent employees implied by capex calculated as follows: Mercer took 45% of AEP Texas' capex expense and divided that figure by AEP Texas' average MOW employee cost. Mercer conservatively estimated 45% of capex as labor, considering that 67% of MOW

apples" comparison with the Class I railroads by representing the total number of workers (including both internal and outsourced) AEP Texas assumes are available to carry out maintenance on the TNR.

Looked at this way, AEP Texas has an implied total MOW staffing level of 525 (270 implied capex equivalents + 152 internal + 103 opex equivalents from outsourcing). If the average Class I railroad were staffing for the TNR's density, Mercer estimates it would require 924 workers.[27] This headcount is estimated by dividing the labor portion of TNR's required infrastructure maintenance costs based on Class I data (per route-mile cost as shown in Figure III-5 multiplied by TNR's total route mileage of 1,168.5 miles) by AEP Texas' average MOW employee cost. Therefore, we see that, even after including implied headcount from outsourcing, the estimated number of TNR's maintenance workers (525) is still 399 fewer than those that a Class I railroad would require (924) – a gap of 43% (Figure III-8).

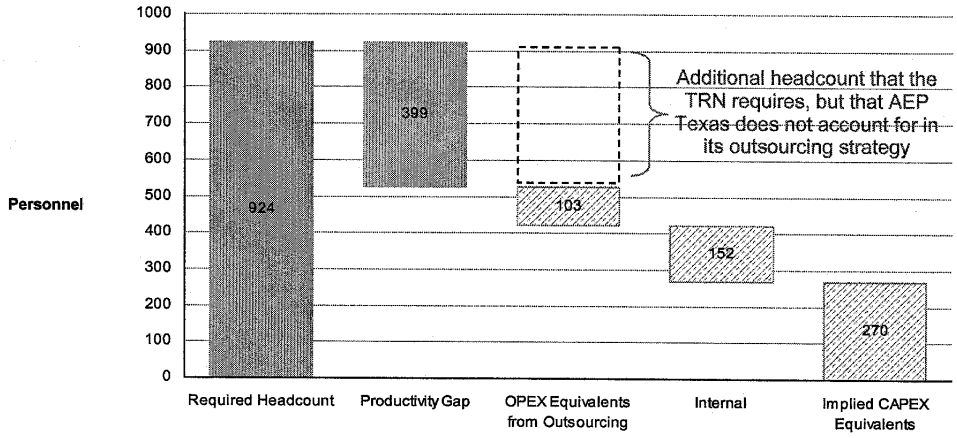
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expense was labor in 2001 for the U.S. Class I's, and capex costs comprise significantly more material costs for major, capital-intensive, scheduled repairs.

[27] Required MOW+Capex headcount calculated as follows: by dividing 52% (weighted average of Opex labor and Capex labor percentages (67% and 45%, respectively) by Opex and Capex as a percentage of total Opex and Capex (35% and 65%, based on 2001 US Class I percentages)) of total MOW+Capex spend by average MOW employee cost. BNSF.WP.RP.III.D.4-0351 to 0352.

Figure III-8

AEP Texas Implied and Actual MOW Headcount



Mercer electronic spreadsheet "MOW Benchmarks 0518 v final STAND.xls"

AEP Texas' explanation for how it intends to achieve such unheard-of employee productivity derives from AEP Texas' (and Mr. Krestinski's) experience with "MOW forces on the Huron Central Railway and the Quebec Gatineau Railway, both Canadian short lines ... where cross-trained employees have successfully been used."[28, 29] Mr. Krestinski's views may be appropriate for the railroads he cites, which are characterized by lower traffic levels and relatively unsophisticated infrastructure. However, in the high-density environment of the TNR, the benefits of cross-training are minimal or nonexistent.

In his testimony, BNSF witness Mr. Gerry Albin discusses the relatively small potential impact on productivity provided by cross-training in a high-density railroad environment, where many maintenance functions require specialists rather than generalists. For example, heavy haul Class

[28] AEP Texas at III-D-110.

[29] AEP Texas also referenced Mr. Gerry Albin's testimony in Otter Tail regarding UP's and CP's MOW work force levels as evidence of BNSF's inefficiency. As stated in Mr. Albin's testimony, AEP Texas has misconstrued Mr. Albin's original testimony and compares UP's and CP's track *maintainers* to Mr. Albin's total MOW employees proposed for the Otter Tail standalone railroad. As a result of this error, AEP Texas' comparisons are invalid and incorrect.

I railroads have minimized expense over the years by transitioning to the optimal use of specialized track maintenance production gangs which are supported by highly mechanized work processes and sophisticated track maintenance equipment. As a result, the vast majority of field maintenance employees now limit their focus to such activities as periodic inspections, responding to equipment failures, and addressing specific repair issues (switch component welding, for example), rather than general maintenance.

These actions have enabled BNSF and other railroads to reduce routine maintenance and patrol personnel by 59% from 84,259 in 1980 to 34,902 in 2002.[30] In fact, most Class I's have found that, particularly in high-density territory with highly sophisticated track and signal equipment, it is to their advantage to train employees as specialists; benefits from the reduction in maintenance costs and train operations delays due to reduced time to find and correct equipment failures far outweigh any potential benefit from employing cross-trained "generalists."

AEP Texas utilizes entirely inappropriate benchmarks to support its claimed productivity levels.

AEP Texas cites BCRail in support of its proposition that BNSF has an excessive level of maintenance of way staff. It is difficult to understand how AEP Texas reached this conclusion. First, BCRail is a very light density railroad, averaging just over 5 MGTs per track-mile on its network in 2000, compared with 60 MGTs per track-mile for the TNR. Second, AEP Texas provides no statistically significant information to support its contention that BCRail's infrastructure maintenance is uniquely efficient. In fact, public information provided during the process of the Province of British Columbia's recent sale of BCRail suggests just the opposite – one of the key issues faced by the government was moderating the impact of reductions in staff associated with the sale.[31]

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[30] Mercer analysis; Association of American Railroads, Analysis of Class I Railroads 1980 through 2002. BNSF.WP.RP.III.D.4-0358 to 0359.

[31] CN press release, 11/25/03: CN announces employee reductions are planned, to BC Rail's current workforce of 1,380 employees to 950. BNSF.WP.RP.III.D.4-0360 to 0362.

Figure III-9 compares the freight railroads AEP Texas uses for benchmarks with the TNR. Neither BCRail nor the other railroads AEP Texas cites are comparable to the TNR, and they provide few direct points of comparison. The TNR is significantly larger (15 to 60 times) in terms of carloads and freight density. The benefits on light density short lines in Canada from cross-training may be interesting but are almost totally useless on a heavy haul high-density railroad where specialization, mechanization, and high production are the keys to lowering unit cost.

Figure III-9

Category	AEP's TNR	Quebec Gatineau (sold by CP in 1997)	Huron Central (Sold by CP in 1997)	BC Rail
Total Employees	895	135	45	?
Total Carloads	1,682,459	49,000	23,000	164,848
Route Miles	1168 (1,192 including trackage rights)	309	181	1,438
Estimated Revenues	$750 million	Under US$30 million	Under US$20 million	Over CADS310 million
Estimated Freight Density (GTM per route mile)	Over 80 million	Under 3 million	Under 5 million	Over 5 million

Source: AEP documents, Company websites and annual reports, Mercer analysis

I find AEP Texas' maintenance comparisons inappropriate and a classic case of comparing "apples and oranges." The railroads chosen as examples are completely inappropriate benchmarks upon which to base a case for the supposed "inefficiency" of BNSF's MOW work force.

My conclusion – and the only one that I believe an impartial analysis will support – is that AEP Texas' maintenance plan is infeasible. AEP Texas has ignored the performance of the Class I

railroads (including BNSF) in achieving the most efficient infrastructure cost structure in the world. AEP Texas has failed to account for the implications of the very high density of the TNR for infrastructure costs, proposing a cost structure half that of the most efficient Class I railroads. AEP Texas has failed to incorporate the maintenance cost implications of construction standards BNSF has found to be unacceptable in high-density environments. AEP Texas has hypothesized "strategies" to reduce maintenance that have been demonstrated to be without merit. And finally, AEP Texas has failed to identify a single real-world example of a high-density railroad that has actually achieved the cost structure AEP Texas proposes. The AEP Texas plan is not feasible by any reasonable standard.

Mercer BNSF Density Class analysis

To have an appropriate point of comparison to the TNR, Mercer looked to isolate BNSF's Category A track, which, with its high traffic density, would be most comparable to that of the TNR. As seen in Exhibit II-A-10 (below), AEP also disaggregated BNSF data by Track Category. To verify, Mercer compared this data with the densities and track quantities found in BNSF's 2001 R-1. While there are some minor differences, none for which AEP provides any explanation, Mercer has accepted AEP's BNSF Track Category data, as presented below, for the sake of having a fair comparison to AEP (even if on AEP's terms), given its extremely high traffic density, with BNSF Track Category A.

To estimate the cost of maintaining BNSF track by density class, Mercer first estimated the constant cost of maintaining the rail line itself, absent of any traffic. From past experience Mercer believes a cost of approximately $20,000 in rail maintenance and capex cost is a reasonable assumption on the minimum level of expenditure required to keep one route mile of railroad in appropriate operating condition. Based on BNSF's total route mileage (25,355 route miles) this amounts to $507.1 million for the BNSF system. As BNSF reports $1,866.6 million in total maintenance (less depreciation) and capex expenses in 2001, $1,359.0 million ($1,866.6 less $507.1 million) is considered purely traffic related maintenance.

Mercer then obtained BNSF track category route mileage and average density from AEP Exhibit II-A-10.

AEP Opening Evidence, Exhibits Vol. 1 of 3, Exhibit II-A-10, pg. 11 of 16.

Table 5: BNSF System Maintenance-of-Way (MOW) Costs by Track Category 2001

Track Category	Route Miles	Average Density per Route Mile
A- More than 20 MGT	13,165.1	70.1
B- Between 5 and 20 MGT	7,175.5	12.8
C- Between One and 5 MGT	2,478.8	2.2
D- Less than One MGT	2,539.6	0.2
TOTAL	25,355.0	xx

Traffic density, or GTMs, by Track Category was then estimated by multiplying route miles by average density per route mile, for a total of 1,020,629,990 GTMs. The traffic related maintenance cost per GTM for BNSF, then, is approximately $0.00133 ($1,359,007,000/1,020,629,990 GTM).

Mercer then found the sum of the cost of rail maintenance and the density-related maintenance costs, for each Track Category:

($20,000/route mile)*(Track Category route miles) + ($0.00133/GTM)*(Track Category GTM)

Non-traffic related maintenance costs — Traffic related maintenance costs

In summary, Mercer's estimated BNSF MOW Opex and Capex costs, by Track Category, are as follows:

Track Category	GTM (millions)	GTM (% of Total)		MOW Opex and Capex (thousands)	MOW Opex and Capex (% of Total)
A-Est. BNSF>20 MGT	922,873,510	*90.4%*	$	1,492,143	*80.0%*
B-Est. BNSF 5-20 MGT	91,795,200	*9.0%*	$	265,659	*14.2%*
C-Est. BNSF 1-5 MGT	5,453,360	*0.5%*	$	56,837	*3.0%*
D-Est. BNSF <1 MGT	507,920	*0.0%*	$	51,468	*2.8%*
Total BNSF	1,020,629,990	*100%*	$	1,866,107	*100%*

Annex A. Mercer Management Consulting, Inc., Qualifications and Experience

As one of the world's premier corporate strategy and operations firms, Mercer Management Consulting helps leading enterprises develop, build, and operate strong businesses that deliver sustained shareholder value growth. Mercer's proprietary business design techniques, combined with its specialized industry knowledge and global reach, enable companies to anticipate changes in customer priorities and the competitive environment, and then design their businesses and improve operations to seize opportunities created by those changes.

For 30 years, Mercer has worked with leaders of major companies in chemicals and pharmaceuticals, communications, computing, consumer goods, financial services, health care, media and entertainment, manufacturing, oil and gas, retail, transportation, and utilities. Mercer's public sector clients include many of the world's largest government-owned railways, international financing institutions such as the World Bank, the European Bank for Reconstruction and Development, and the U.S. Trade and Development Agency; national and state governments; regulatory agencies; and operating authorities around the world.

Mercer's thought leadership on the topic of value growth is evident in eight agenda-setting books published in the past seven years:

Grow to Be Great *1997* Re-engineering is dead. Focus on the customer.	*Value Migration* *1997* Value flows to the Business Design best matched to customer priorities.	*The Profit Zone* *1998* Reinvention and profit-centric thinking are the keys to sustained value growth.	*Profit Patterns* *1999* Pattern thinking helps executives see tomorrow's profit zones before the competition.
Value Nets *2000* Winning business designs in the next economy will be dynamically assembled around customer priorities.	*How Digital Is Your Business?* *2000* To expand your strategic options, think business issues first, technology second.	*The Art of Profitability* *2002* Explore the many ways that profit happens.	*How to Grow When Markets Don't* *2003* Explore opportunities for growth in difficult markets.

The firm's capabilities and intellectual capital are enhanced by its industry expertise, geographic range, and hands-on approach. The firm also offers special services in the areas of Internet strategy and private equity investing. Mercer has offices in Beijing, Boston, Chicago, Cleveland, Dallas, Frankfurt, Houston, Hong Kong, Lisbon, London, Madrid, Mexico City, Montreal, Munich, New York, Paris, Pittsburgh, San Francisco, Seoul, Toronto, and Zurich.

Mercer Management Consulting is part of Mercer Inc., one of the world's largest consulting organizations. The firm can thus draw on the complementary capabilities of its sister companies, all of them leaders in their respective fields: Mercer Human Resource Consulting, human capital strategies; Mercer Delta Organizational Consulting, organizational architecture and change; Mercer Risk, Finance & Insurance Consulting, actuarial advice; Lippincott & Margulies, brand and identity management; and National Economic Research Associates, microeconomic consulting. Together, the firms of Mercer Inc. have 15,000 employees in more than 39 countries throughout the world.

In addition, Mercer is able to enhance the value it delivers to clients by tapping the resources of its parent, Marsh & McLennan Companies (MMC), including Marsh Inc., the world's leading risk and insurance services firm, and Putnam Investments, a recognized leader in investment management.

Broad Management Perspective...

Mercer helps clients develop effective and lasting responses to the challenges and opportunities they face by offering a full range of management consulting services that balance a general management perspective with specialized industry and functional expertise.

Mercer's generalist perspective provides a framework for identifying the sources of the value an organization produces and their contribution to bottom-line profitability, concentrating on the core disciplines common to most situations that confront management:

financial planning and evaluation assignments for nearly all major railroads in North America and for state-owned railways in Europe, South America, Africa, and the Pacific Rim.

Mercer is known for its innovation and creativity. Mercer staff were heavily involved in the restructuring of the bankrupt northeastern U.S. railroads into Conrail, both as consultants and as senior managers at Conrail. Mercer also spearheaded the regional railroad movement following deregulation, and has led the development of unique public-private partnerships and operating agreements that have helped railroads recover from bankruptcy and compete effectively in a deregulated environment.

Mercer's services cover several key areas of rail management:

- *Rail System Restructuring, Commercialization, and Privatization.* Mercer's key rail staff have been deeply involved in rail restructuring, commercialization, and privatization projects worldwide – including in Mexico, Canada, the Czech Republic, Hungary, Poland, Argentina, Chile, Colombia, Uruguay, Australia, New Zealand, the United Kingdom, and the United States. Mercer engagements have ranged from commercializing internal rail functions, such as engineering, construction, and workshop activities, to privatizing rail segments or entire railways. Mercer has developed privatization strategies to return maximum value to the shareholders, identified interested parties, and helped negotiate asset sales.
- *Transportation Cost and Financial Analysis.* Mercer has been active in rail costing and financial analysis for two decades. For such clients as the National Railway Labor Conference, major financial institutions and equipment leasing companies, British Rail, SNCF, Deutsche Bahn, Conrail, Amtrak, Class I and regional railroads, major commuter rail authorities, and state departments of transportation, Mercer has assessed operating costs of rail operations, allocated costs between freight and passenger operations, analyzed joint costs of public and private rail operations, and determined the degree to which costs are fixed or variable. Mercer has presented its findings in legal proceedings, public hearings, and other public or regulatory forums.

- *Market and Revenue Analysis for Rail Passenger and Freight Transportation Services.* About one-third of the Practice's major projects involve analysis of the market for transportation services. Clients include international transportation companies (American President Lines, Sea-Land), leasing companies and financial institutions, major European and Asian railways, and North American Class I and regional railroads. Mercer provides critical insights into the transportation marketplace that serve as the basis for strategic planning, new business assessment, organizational realignment, and acquisition and divestiture planning. Mercer is experienced in analyzing the markets for most major commodities carried in freight service, as well as for intercity and commuter passenger services.

- *Operational Strategies for Freight and Passenger Railroads.* The Mercer rail practice brings together professionals who, as both consultants and senior railroad managers, have planned and executed a wide range of operating strategies, including a number of organizational transitions. Collectively, they possess a high degree of management and technical expertise in all the disciplines related to rail operations.

- *Organizational Assessment of Public and Private Sector Clients.* Since its founding, Mercer has conducted several dozen organizational and operational analyses of public and private sector service providers. For example, Mercer has analyzed the organization, operations, and deployment of funds for several state rail programs, and has evaluated the entire management structure of the PKP (the Polish State Railways) in Europe and the Port Authority of New York and New Jersey in North America.

- *Commercial Strategy, Customer Service, Sales/Marketing Process Reengineering.* Mercer has assisted leading railway clients and rail industry suppliers in the design and execution of their commercial strategies. Mercer provides clients with reorganization assistance, formulation of integrated sales and marketing planning processes and techniques, channel management strategy development, preparation and installation of decision support tools (modal costing, total logistics analysis), design and development of customer service center activities, and training.

- *Asset Valuation and Line of Business Assessment.* Mercer has extensive experience valuing assets of transportation companies, using approaches including net liquidation value, going concern value, original cost less depreciation value, and comparable sales value. In addition, Mercer has analyzed transportation companies not only as single entities, but also as a collection of "unbundled" assets and rights. Because the value of the parts often differs from the value of the whole, this innovative approach has proven extremely useful in some cases. Mercer has been involved in freight and passenger service evaluations and in helping government and railways agree on equitable subsidy levels for unremunerative services.

- *Intermodal Strategy and Implementation.* Mercer has been closely involved in developing breakthrough intermodal strategies. For example, in Russia Mercer developed the Moscow/St. Petersburg intermodal strategy; in the UK it helped develop British Rail's Channel Tunnel intermodal strategy; and in North America it advised American President Companies and CSX/Sea-Land, among others, in the early development of doublestack container intermodal network strategies. In Europe, Mercer helped several companies develop intermodal and operating strategies in preparation for the EC's 1992 single-market initiative and the 1994 opening of the Channel Tunnel.

Annex B. Witness Qualifications and Experience

William J. Rennicke, a Managing Director in Mercer Management Consulting's Travel and Transportation Group, specializes in transportation strategic planning, management, marketing, economics, and operations, and has particular expertise in restructuring, organizational redesign, and transactions to improve financial and operating performance of transport operators around the world.

Mr. Rennicke's career in the transportation industry spans three decades, including senior management and operating positions at Class I railways. He has been in the forefront of restructuring and transaction-related activities for both private and government-owned transport operators. He has also managed the development of strategic and financial planning, simulation, and control models for transportation companies. Mr. Rennicke has worked closely with service providers and operating companies; commercial and investment banks; large investors and investment fund firms; operators; equipment manufacturers and leasing companies; construction and engineering companies; and government transportation entities in many countries.

Drawing on his extensive experience, Mr. Rennicke has served as an expert witness in litigation, regulatory and arbitration cases. He has also provided expert testimony before the U.S. and Canadian legislatures. In his testimony, Mr. Rennicke has been a consistent and strong advocate for allowing transportation operators the freedom and flexibility they need to thrive in a changing economic and competitive environment. Mr. Rennicke has also spoken extensively at transportation industry conferences on the benefits of outsourcing and other means of private sector participation in the public transport sector. His relevant experience includes the following:

Testimony on Behalf of or Before	Subject	Year
U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Railroads	Hearing on the Status of the Surface Transportation Board and Railroad Economic Regulation	2004
Testified regarding Mercer's perspective on the state of the railroad industry, including its current financial conditions and transformation since enactment of the Staggers Rail Act of 1980		
U.S. House of Representatives Committee on Transportation and Infrastructure, Subcommittee on Railroads	Hearing on Passenger Rail Service in America	2002
Testified regarding worldwide trends in private sector involvement in passenger railroad restructuring and privatization, and potential public policy changes and restructuring options for the U.S. passenger rail system		
U.S. Senate Commerce Committee	Hearing on S. 1991, the National Defense Rail Act	2002
Testified as to worldwide trends toward private sector involvement in passenger railroad restructuring and privatization over the past 10 years		
Canadian Transportation Agency	In the matter of an application by the Ferroequus Railway Co. Ltd. pursuant to sections 93 and 138 of the *Canada Transportation Act*, seeking third-party running rights over CN infrastructure	2002
Testified as to the adverse impacts on CN and the Canadian rail system of granting FE, a "virtual railroad," forced access to CN's privately owned infrastructure.		
Canadian Transportation Agency	In the matter of complaints filed by Naber Seed and Grain Co. Ltd. pursuant to section 116 of the *Canada Transportation Act,* alleging CN's failure to fulfill its level of service obligations	2002
Testified as to the adverse impacts on CN and the Canadian rail system of Naber's requested remedy of granting a third-party carrier access to CN's network.		

Testimony on Behalf of or Before	Subject	Year
U.S. District Court for the Northern District of Maryland	In the matter of Allfirst Bank vs. Progress Rail Services Corp. and Railcar Ltd.	2002
Submitted a statement assessing the market demand for certain railcar equipment sold by PRSC and RL to Allfirst Bank.		
U.S. Senate Subcommittee on Surface Transportation and Merchant Marine	Hearing on the State of the Rail Industry	2001
Testified as to the current financial conditions and transformation of the US rail industry since enactment of the Staggers Rail Act of 1980, infrastructure capacity and its impact on rail service, and long-term capital funding needs.		
Canada Transportation Act Review Panel	Review of the Canada Transportation Act	2000
Submitted a statement regarding the state of the Canadian rail industry and the application of differential pricing and efficient component pricing theory relative to the industry's financial needs.		
U.S. Surface Transportation Board	Ex Parte No. 582, Public Views on Major Rail Consolidations	2000
Assisted in preparation of Mercer's testimony with respect to Mercer's views on major railroad consolidations and the future structure of the North American railroad industry.		
U.S. Surface Transportation Board	Ex Parte No. 582, Public Views on Major Rail Consolidations	2000
Testified as to the financial and productivity trends of U.S. freight railroads, key drivers of railroad performance, and why the railroads may have difficulty sustaining historical performance trends in the future.		
U.S. Surface Transportation Board, on behalf of Assoc. of American Railroads	Ex Parte No. 575, Review of Rail Access and Competition Issues:	1998
Testified as to why open access or forced access is not required for the U.S. freight rail network and the likely impacts if it were instituted.		

Testimony on Behalf of or Before	Subject	Year
U.S. Senate Subcommittee on Surface Transportation and Merchant Marine	Hearing on the Financial Viability of Amtrak	1997
Assisted in the preparation of Mercer's testimony on the financial viability of Amtrak (U.S. intercity passenger rail).		
Connecticut Department of Transportation	In the Matter of Arbitration Between the Connecticut Department of Transportation and the Metropolitan Transportation Authority (NY)	1996
Testified regarding Mercer's assessment of the economics of the New Haven commuter rail line and the fair and equitable allocation of operating deficit and shared capital costs between the two states that share the line.		
Canadian National Railway	Before the Interstate Commerce Commission: Finance Docket 32640 – Contract to Operate Grand Trunk Western Railroad Inc. and Duluth, Winnipeg and Pacific Railway Co.	1994
Testified before the ICC concerning a restructuring of the GTW and DWP to enhance operational efficiency and overall profitability.		
General Electric	For the Department of Justice and Federal Trade Commission: In the Matter of Chrysler Rail Transit	1993
Statement to the DOJ and FTC concerning the level of competition relative to the ownership of rail boxcars and the impact of the proposed acquisition on competition.		
Consolidated Rail Corp.	President's Emergency Board No. 221: Dispute Between Consolidated Rail Corp. and Its Employees Represented by the Brotherhood of Maintenance of Way Employees	1992
Testified regarding the outlook for Conrail in the context of the financial condition and prospects of the Class I railroad industry.		

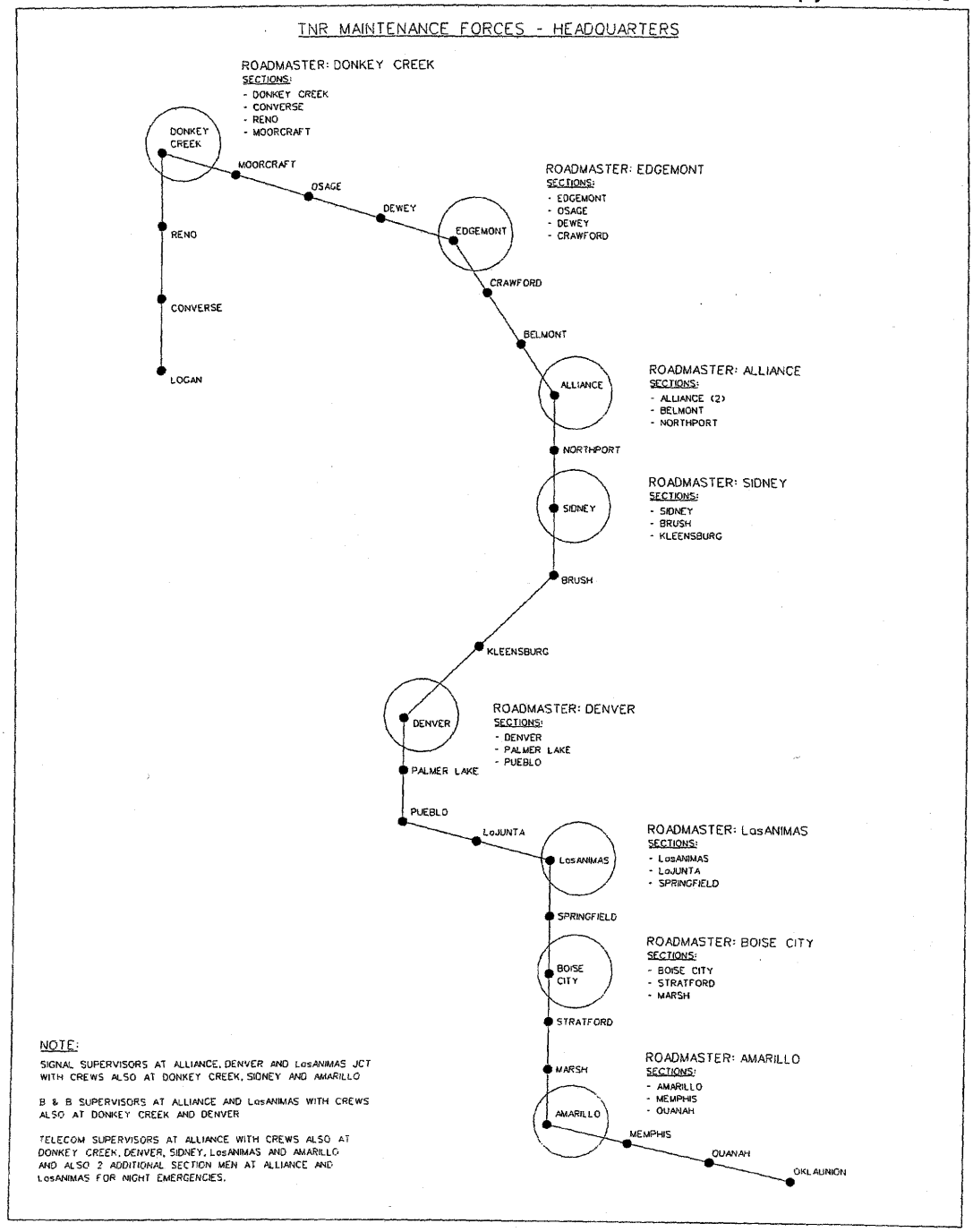
Testimony on Behalf of or Before	Subject	Year
Wisconsin Central	Before the Interstate Commerce Commission: Finance Docket No. 32036 – Wisconsin Central Transportation Corp. et al. – Continuance in Control – Fox Valley & Western Ltd.	1992
Testified before the ICC regarding the effect on competition of Wisconsin Central's proposed acquisition of the Fox Valley & Western Railroad.		
National Carriers Conference Committee	Before Presidential Emergency Board No. 219, Financial Condition and Prospects for the Class I Railroad Industry	1990
Testified concerning the financial challenges facing the U.S. freight rail industry, as part of the process of government intervention to resolve a labor dispute over wages and benefits.		
Citicorp	Before the Federal Bankruptcy Court re: Chicago and Missouri Western Railway	1988
Testified on behalf of a major institutional creditor of the CM&W concerning the outlook for profitable operation of the railway.		
Santa Fe Southern Pacific Corporation	Before the Interstate Commerce Commission: Docket Nos. 30400, 30400 (Sub No. 1) et al. – Santa Fe Southern Pacific Corp. – Control – Southern Pacific Transportation Company	Various 1984-85
Testified on behalf of the Applicants regarding the effect on competition of the proposed merger of the Santa Fe and Southern Pacific railroads.		
Confidential investor in rail equipment	Confidential lawsuit	Early 1980's
Assessed overall demand for rail equipment in the late 1970's and early 1980's to determine the validity of long-term equipment plans.		

Testimony on Behalf of or Before	Subject	Year
Boston & Maine Railroad	Before a Federal Arbitration Panel re: Crew Consist Issues on the B&M	Various 1980s
Was a key witness for the B&M in the first crew consist arbitration case in the United States. Result was the creation of single brakeman and conductor only crews, ten years before the rest of the industry.		
Boston & Maine Railroad	Before the Federal Bankruptcy Court re: Boston & Maine Railroad	Various Late 70's-Early 80's
Testified numerous times on a wide variety of subjects related to the future of the B&M and the validity of the reorganization plan.		

Before joining Mercer, Mr. Rennicke held various senior positions at the Boston and Maine Railroad. He is a member of the Transportation Research Forum and the Council of Logistics Management.

Mr. Rennicke holds a B.S.B.A. in accounting from the School of Business Administration at Georgetown University and an M.B.A. with a concentration in transportation and logistics from the University of Minnesota.

BNSF Reply Exh. III.D.4-3



BNSF Reply Exhibit III.F-1

Has Been Redacted

Requirements for a Class I Railroad Communications System

In today's railroading, the communications network will be made up of digital wireless subsystems that operate at very high speeds. The physical communications plant requires towers, antennas, radio base stations, radio consoles, copper wires (cables), AC power, generators, telephones, telephone exchanges, portable radios, mobile radios, locomotive radios, batteries, computer work stations, servers, routers, modems, audio systems, voice recorders, videos and monitors, battery chargers, beepers, cellular telephones, end-of-train-devices, head-of-train-devices, distributed power radios, weigh-in-motion scale radios, automatic equipment identification radios and a whole host of other electronic equipment. Generally, all the above equipment must exist within the space of several miles. Radio or wireless communications when confined become very complicated because of the levels of output power of each radio system, the frequency compatibility of each system, and the interference caused by other radio or wireless systems. All of these things must be taken into consideration in developing a reliable radio communications system.

The various components of a railroad communications system are discussed below.

Microwave System

The backbone microwave system is the means by which the various railroad communication subsystems are integrated into a wireless digital voice and data environment. There are two terminal (one path) microwave stations at the end points of the system with backbone (two or more path) microwave base stations at each of the microwave tower sites along the route. The microwave base station serves as a hub for the various directions that are

necessary to reach important railroad operational infrastructure. The radio communications microwave network is very much like the rail network itself: it connects the entire railroad together (end-to-end) and supports the operational control and management that takes place 24 hours a day, seven days per week.

Dispatch System

The terminal microwave station is located close to the Dispatch Center (discussed in Section III.F.6.a above), which is the focal point for train control. Through the microwave system, dispatchers remotely control the wayside signal system and communicate with field personnel involved in handling and moving trains. In addition to controlling train movement, the dispatchers coordinate the daily maintenance of roadway work by track crews, bridge crews, and signal maintainers as well as the various activities of outside contractors and vendors that occur along the right of way.

In addition to the dispatching system itself, there is a Dispatch Voice Recorder System for data that is a part of the communications system. The antennas of VHF two-way radio stations and the antennas of the base stations of signal data radios are focused in the direction of microwave towers that connect to the dispatcher's center. This makes coordination in "real-time" possible.

Locomotive Control

The subsystems for train control are critical components of the communications system. Each train (which by FRA definition includes a single locomotive[1]) is assigned a train number and each locomotive is assigned a locomotive number. It is important to understand the

[1] 49 CFR 236.832.

difference between the locomotive number and the train number, particularly when communications are directed to the train crew operating the lead locomotive in trains with distributed power (DP).

The TNR will have a locomotive fleet equipped with VHF two-way radio, a four frequency distributed power two-way radio system and a head-of-train-device (HOTD) as basic equipment. The distributed power (Locotrol) is a two-way radio system that provides a radio communication link between two locomotives where the controls of one locomotive (the lead unit in consist) remotely control a second locomotive located on the end or in the middle of the same train. The remote locomotive mimics the lead. For example, if the lead locomotive goes into throttle position three (power), the rear remote control locomotive will go into throttle position three (power). A train operating in DP will have continuous automatic radio communications between the remote and the lead. When the lead locomotive changes status, a radio transmission is sent to the remote. The remote receives the data message, acts on it, and then transmits a message back to the lead unit acknowledging the original set of instructions. When the radio signals (radio link) between these two locomotives fail, an air brake application causes the remote locomotive to throttle down to idle.

It is crucial that trains using DP equipment not lose the radio link between the lead unit and the remote unit, particularly when handling heavy tonnage coal unit trains. In areas where loss of DP may occur, radio repeaters are required. Train control devices such as End-of-Train-Devices (EOTDs), Head-of-Train Devices (HOTDs), and Distributed Power (DP) are generally included in the lease costs for leased locomotives discussed in Section III.D.1.

FEDs

The TNR will have 31 FEDs in single track and 13 in double track locations. The FEDs will require two-way radios using the mainline frequency of the division where located. The detector can transmit anytime after a train movement turns on the system in order to enable it to detect a defect anywhere along the train. As noted above, the FED system includes both a VHF radio signal component for direct communication to the train crew and a data communications component for relaying data back to management. The communications component relays a message to the dispatcher to alert management of any problems. At the same time data is transmitted from the FED location to the IT archive system to ensure that the event is recorded.

Control Points

In addition to its communications function, the Dispatch System is designed to send control messages to signal control points and receive indications from them. The TNR signal control points (CP) use signal data radios to transmit/receive from the CP to the nearest microwave tower. At the CP location a data radio system with antenna mounted on a tower located adjacent to the CP connects the field equipment to the office dispatcher control center riding the microwave radio communication system. The dispatcher will use the microwave system to interface in the field to the signal data radio system to clear signals at the control points. The CP location will send back a signal indication every time a change in status occurs. The control messages sent out by the dispatcher include changes to "reverse" or "normal" position of power switch (s), clear a signal (s), turn on snow blowers, call a signal maintainer, etc. The indications from CP(s) include changes in status of train occupancy (track circuits on/off), power switch locked-up, signal cleared, AC power on/off, and snow blowers on/off.

AEIs

Another important component of railroad communications is the Automatic Equipment Identifications (AEI) system. The data communication message from the AEI is sent 20 seconds after the rear of the train has passed the location. The telephone message is a data format using an AAR railroad standard. The AEI will automatically call and download data to the IT data network via a data radio co-located at the AEI location and transmitted to the nearest microwave station. From there the data is routed to the IT center at Alliance. The IT data network will use the data to verify and/or correct any errors in a train consist. The AEI system provides the electronic identification of each rail vehicle in the train. This electronic train list includes locomotives, railcars and EOTDs (End-of-Train-Devices). Dynamic AEI transponders are also mounted on the sides of locomotives to measure the amount of fuel onboard, which is valuable information for the refueling of locomotives.

Telephone System

Telephones are another component of the communications system. The TNR will have its own private telephone network riding the digital microwave radio communications system with PBX Telephone Exchanges located at headquarters and major rail yard locations. The microwave system also enables train employees to use the Teleconference System and thus reduce travel expenses. A PBX system must be customized to meet the exact requirements for the system being developed. In the real world, a complex capacity study would be undertaken to determine the specifications for the system.

The ARN (Administration Radio Network) two-way radio system provides all operating personnel using company vehicles equipped with mobile VHF radios access to the telephone network at any point over the entire right of way. Using the ARN frequency, users can place

calls to both the private railroad telephone network or to the public telephone networks of their customers. When necessary, field operating personnel and management level personnel can handle company business by radio, by telephone and with wireless equipped laptop computers.

The railroad communications system also facilitates rapid and thorough investigation of incidents on the railroad, such as accidents, derailments, washouts or other emergencies. When an incident has occurred, the TNR management investigating team has full access to the Dispatcher Voice Recording System where all train movement radio channels are monitored 24 hours a day.

To ensure the safety of trains and personnel, the TNR like all other major railroads in North America must be equipped with a communications system that provides the clearest, most reliable, and most rapid response communications possible.

STB Docket No. 41191 (Sub-No. 1)

AEP Texas North Company v. The Burlington Northern and Santa Fe Railway

BNSF Reply Evidence

Commercial Analysis of AEP Texas Construction Schedule and Cost Estimate

by William J. Rennicke

Mercer Management Consulting, Inc.

May 24, 2004

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II. Standard construction industry practice and benchmarking indicate that the contingency rate should be set at 20% or higher, given the lack of planning and detail underlying AEP Texas's proposed plan. 9

III. AEP Texas's proposed construction schedule has virtually no probability of being met, making even a 20% contingency unjustifiable. 19

IV. AEP Texas's cost estimates do not provide the level of resources that would be required to meet its aggressive schedule. 38

I. Introduction and Summary

Qualifications of William J. Rennicke and Mercer Management Consulting, Inc.

My name is William J. Rennicke. I am a Managing Director of Mercer Management Consulting, Inc. (Mercer). Mercer is a member of the Marsh & McLennan Companies, Inc. Mercer has one of the largest consultancies in the world dedicated to financial and project planning in the transportation and logistics sectors. It provides a comprehensive set of services and capabilities to transportation carriers, to the users and regulators of transportation services, and to the financial sector that funds and underwrites major transportation projects and transactions. Mercer's transportation and financial sector clients include national and regional governments on six continents as well as many of the world's largest railways, commercial banks and leasing companies, and industrial and consumer manufacturing firms. Along with our sister company Marsh, Inc., our transportation, logistics, and financial support practices provide in-depth expertise on a wide range of project evaluation, financial projection, and project-related issues for companies engaged in operating or providing services to all forms and modes of transportation.

A description of Mercer's qualifications and experience was provided in Annex A to my BNSF Reply Exhibit III.D.4-2.

I have been a railway executive and a consultant to railways in the United States, Canada, and worldwide for nearly 30 years. I specialize in railway strategic planning, management, and operations, and have particular expertise in project and transaction due diligence, transportation asset valuation, and transactions (including mergers and acquisitions). I have worked with senior executives at all of the major North American railways, as well as with senior officials at many government-owned railways worldwide. I have been involved with asset and financial valuation activities that have focused on over $30 billion of assets since 1999. I have testified before the U.S. and Canadian legislatures and federal transportation agencies on rail regulation and rail transactions,

have testified in regulatory and Federal court proceedings on key rate and services issues in the U.S. and Canada, and have spoken and published widely on issues affecting the productivity and capital needs of the rail industry. I am also a licensed representative of Mercer Securities, Inc, Marsh & McLennan's Broker Dealer which provides many of the same functions as a standard investment bank.

Before joining Mercer, I was a vice president of the Boston & Maine Railroad. During my tenure, I managed rail industry service performance project case studies as part of the industry-wide Freight Car Utilization Program. I have also held operating positions with the Southern Pacific and New Haven railroads, and was a transportation consultant with Deloitte Haskins & Sells (the predecessor of Deloitte & Touche). I have a B.S.B.A. in accounting from the School of Business Administration at Georgetown University and a M.B.A. with a concentration in transportation and logistics from the University of Minnesota. I am also a member of the Transportation Research Forum and the Council of Logistics Management. My qualifications and experience in the rail industry, together with a listing of cases in which I have given testimony, was provided in Annex B to my BNSF Reply Exhibit III.D.4-2.

Context of Mercer's Analysis

In this STB proceeding, Complainant AEP Texas North Company ("AEP Texas") challenges the reasonableness of common carrier rates established by Defendant, The Burlington Northern and Santa Fe Railway Company ("BNSF"), applicable to the transportation of coal in unit trains of BNSF-supplied railcars from mines in the Powder River Basin of Wyoming ("PRB") to the Oklaunion Generating Station operated by AEP Texas near Vernon, Texas. AEP Texas has calculated the stand-alone cost (SAC) for the movement of coal from the PRB mines to the Oklaunion station as would be charged by a hypothetical least-cost, most efficient competitor, the Texas & Northern Railroad ("TNR"). The TNR consists of 1,168.54 route-miles[1] and replicates BNSF's Frontier Range Route from the PRB to Oklaunion, TX, via Campbell, WY; Edgemont, SD; Alliance and Northport, NE; Denver, Pueblo, and Las Animas Junction, CO; and

[1] Excluding 23.71 miles of trackage rights over Sterling-Union segment.

Amarillo, TX. The TNR's traffic group for 2001 as proposed by AEP Texas consists of 187.3 million tons of primarily coal and some general freight[2]. The resulting hypothetical railroad thus has an average traffic density that is over twice that of any of the Class I railroads.

Mercer was asked to evaluate AEP Texas's construction schedule and cost projections in light of best practice construction estimation techniques and construction benchmarks. In undertaking this analysis, Mercer focused on three questions:

- Is AEP Texas's contingency level reasonable in light of recognized construction management guidelines and demonstrated large transportation project experience?
- Does AEP Texas's aggressive construction schedule meet minimum commercial standards for reasonableness and achievability?
- Does AEP Texas's construction cost estimate adequately account for the required level of resources to meet its aggressive schedule?

Fundamentally, these questions address an underlying critical issue – when viewed in their entirety, do AEP Texas's construction cost projections truly represent an achievable "least cost" plan, or are these projections simply a compilation of individual "potentially possible" assumptions that would never be accepted together as the basis for a feasible project by the commercial community?

In determining the actual commercial feasibility of a major rail investment, the assessment of risk ("uncertainty") is as significant as projections of costs or revenues. Over the past several decades, advances in construction project planning and cost estimating capabilities have enabled planners, bidders, risk underwriters, financial institutions, and other interested parties to gain a more accurate understanding of the risks and potential cost outcomes associated with complex projects. Project sponsors and financers are now able to assign highly accurate contingency rates to individual projects based upon the clear understanding of the most likely cost and time risk associated with

[2] From BNSF Traffic Tapes Historical Tonnage (final).xls. BNSF.RP.WP.III.F-1549 to 1550.

the project. Individual assumptions are explicitly estimated, quantified, and integrated into the final project cash flows.

In the construction and financing industries today, no project approaching the size of AEP Texas's TNR could even be considered by the project sponsors, the financial community, or performance bonding underwriters unless it was supported by a plan that (a) provided a clear assessment of the appropriate contingency based upon the level of information, engineering and aggressiveness of assumptions underlying that plan, (b) clearly accounted for the linkages between activities underlying the plan, and (c) adequately accounted for the level of resources required to support the schedule. A project simply will not be undertaken if the risk of exceeding schedule or cost is too high – or, stated another way, if the probability is unacceptably low that the project can be completed on time and on budget as designed or (in the case of TNR) as estimated.

AEP Texas has completely ignored this commercial reality. As a consequence, its plan is fundamentally flawed:

- AEP Texas has proposed a contingency level which is unsupportable by its level of construction project planning.

- AEP Texas has arbitrarily taken the optimistic positions for many of the durations of individual activities and other key construction and cost assumptions, with minimal consideration of required sequencing between individual activities or the probability that the sum total of its projections represents a feasible least-cost plan.

- AEP Texas has failed to reflect the implications of its aggressive construction schedule upon the resources required to support that schedule.

In my analyses that have led me to these conclusions, I have fully considered the implications of "barriers to entry" which the STB and its predecessor, the ICC, have historically disallowed. In comparing AEP Texas's proposal to real-world construction

estimation practices, Mercer has recognized, and incorporated into its analysis, the implications of the numerous barrier-to-entry issues decided in previous SAC cases, e.g.:

- In the Coal Trading Corp. v. Balt. and Ohio R.R. Co., the ICC stated that in line with its barrier-to-entry concepts "if the incumbent railroads did not incur costs for public improvements, the SARRs should not incur them either."[3]

- In West Texas Util. Co. v. BNSF, the Board adopted WTU's definition of an entry barrier as "any costs that a new entrant must incur that were not incurred by the incumbent."[4] The Board noted this definition "accords with our view of the SARR as a replacement carrier that steps into the shoes of the incumbent carrier for the segment of the rail system that the SARR would serve."[5]

- In the same case, the Board stated "[entry barriers] include resource constraints that slow the construction of the rail plant and legal or regulatory barriers or requirements that would impede entry."[6]

- In recent cases the Board has identified a range of issues to represent entry barriers, including acquiring easements (FMC), property assemblage (FMC), topsoil and seeding (FMC), utility relocation (FMC & WPL), environmental mitigation (FMC), and highway relocation (WPL).

None of these barrier-to-entry considerations affect the conclusion that AEP Texas simply has failed to put forth a feasible plan for a replacement rail service that could deliver on its service commitments for the cost levels AEP Texas proposes.

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[3] ICC 424, *Coal Trading Corp. v. Balt. and Ohio R.R. Co.*, 6 I.C.C.2d 361 (1990).
[4] S.T.B. 638 (1996), *aff'd, Burlington Northern R.R. Co. v. STB*, 114 F.3d 206 (D.C. Cir. 1997)("*WTU*").
[5] *Ibid.*at 670
[6] *Ibid.*at 656 n.37.

Organization of Exhibit

My statement is organized into the following analyses:

Section II: Standard construction industry practice and benchmarking indicate that the contingency rate should be set at 20% or higher, given the lack of planning and detail underlying AEP Texas's proposed plan. Comparison with other large construction projects, including rail projects, demonstrates that actual design/engineering/project management procedures and experience would support, at best, a 20% contingency level for AEP Texas's proposed plan.

Section III: AEP Texas's proposed construction schedule has virtually no probability of being met, making even a 20% contingency unjustifiable. Even after excluding barrier-to-entry issues, industry-standard construction planning and scheduling practices and modeling show that AEP Texas's project schedule is unattainable.

Section IV: AEP Texas's cost estimates do not provide the level of resources that would be required to meet its aggressive schedule. AEP Texas has failed to recognize the need to provide additional resources to support its construction schedule. In doing so, AEP Texas has presented a plan under the guise of "least cost" that in actuality is "infeasible." Its proposal is far out of line with experience on other large construction projects completed under far less aggressive schedule constraints.

II. Standard construction industry practice and benchmarking indicate that the contingency rate should be set at 20% or higher, given the lack of planning and detail underlying AEP Texas's proposed plan.

Accepted construction industry practice dictates that contingency rates are lowered only as a construction plan develops through stages of increasing specificity. The levels of planning and detail underlying AEP Texas's proposal fall short even of the initial conceptual stage of construction planning. At this stage, standard construction and financial community practice as well as Federal agency policies dictate, at best, a 20% contingency factor.

By definition, construction project contingency reflects the level of uncertainty associated with the individual components of a construction work plan. A recent draft study by the U.S. Department of Transportation's (DOT's) Federal Transit Administration (FTA)[7] cites probabilistic risk as a critical determinant of contingency levels. Specifically, the DOT analysis recognizes the need to base contingency levels on an "...analysis where multiple elements of risk can be treated as random variables and computer simulations are utilized to generate a most likely outcome based on thousands of computer generated what-if scenarios."[8]

The appropriate contingency level is directly related to the stage of construction planning. As set forth by the American Association of Cost Engineers,[9] current best practices in estimating involve a statistically defined process, in which an appropriate contingency is not defined as a fixed amount but as a floating value that diminishes as more unknowns

[7] Document FTA-MD-26-7001-96-2."Probabilistic Risk Analysis for Turnkey Construction: A Case Study," prepared for FTA Office of Planning, June 1996. BNSF.RP.WP.III.F-1551 to 1582.
[8] ; Document FTA-MD-26-7001-96-2."Probabilistic Risk Analysis for Turnkey Construction: A Case Study," prepared for FTA Office of Planning, June 1996. Reference to study by Feiner, Joseph, EG&G Dynatrend, Assessment of Financial Control Systems and Risk in the Transit Construction Industry, December 1994. BNSF.RP.WP.III.F-1581.
[9] AACE's Professional Practice Guide (PPG) #8-Contingency. Kul B. Uppal, PE, Editor, AACE International, 2001. BNSF.RP.WP.III.F-1583 to 1608.

are eliminated.

The U.S. DOT-FTA not only has recognized this relationship between contingency level and planning stage, it has established specific guidelines that reflect this relationship. As Table II-1 shows,[10] as a project progresses, the "probable accuracy"[11] of the estimates rises, allowing a reduction in the contingency. By FTA standards, a contingency range of 5-15% is appropriate only when a project reaches the "definitive" stage, in which design is 75-100% complete and progress plans and specifications, as well as a working construction schedule, have been prepared. At this point, the "probable accuracy" of the cost estimates also falls within the 5-15% range.

For projects at the initial "order of magnitude" or "conceptual" stage, the appropriate contingency rate is 20% or even higher. Even for this level of contingency, the U.S. DOT-FTA expects that a project sponsor would have "100-scale alignment, facility descriptions, sketches, study reports" available; that the "cost of a similar facility" is available on which to base costs for the new facility; and that a "typical design is used to develop quantities and costs for elements."

AEP Texas's proposal – based upon a construction schedule so lacking in detail that it includes fewer than 20 discrete elements – fails to meet even the rudimentary requirements for a "conceptual plan." Under even the most generous interpretation of FTA standards, the AEP Texas plan does not qualify for even a 20% contingency. Given that AEP Texas's plan is based upon literally hundreds of extremely optimistic assumptions, contains minimal detail, and relies on inappropriate or unsupported comparisons, I would expect the U.S. DOT-FTA, supported by the construction and financial communities, would insist on a contingency of 30-35% or even higher.

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[10] http://www.fta.dot.gov/transit_data_info/reports_publications/publications/project_construction_management_guidelines/12206_ENG_HTML.htm. BNSF.RP.WP.III.F-1609.

[11] The FTA employs the definition of "probable accuracy" as provided in the Cost Estimation Classification System of the Association for the Advancement of Cost Engineering (AACE International). BNSF.RP.WP.III.F-1610.

Table II-1: U.S. DOT-FTA Recommended Contingency by Estimating Stage

Table A-1. Recommended Contingency by Estimating Stage

ESTIMATE STAGE	PROBABLE ACCURACY [1]	DESIGN STAGE	PURPOSE	INFORMATION AVAILABLE	ESTIMATE METHODS	CONTINGENCY GUIDELINE
ORDER OF MAGNITUDE (CONCEPTUAL)	50% - 30%	Preliminary	Evaluation of projects or alternatives	100-scale alignment, facility descriptions, sketches, study reports	Parametric - Cost of a similar facility is adjusted to represent the new facility. Includes costing by SF, LF, or CF. Model - A typical design is used to develop quantities and costs for elements.	20% or higher
PRELIMINARY (BUDGET)	15% - 30%	Preliminary Design Report (25%)	Establish Control Budget	40-scale alignment, facility descriptions, sketches, study reports, cross sections, profiles, elevations, geotechnical data, staging plans, schedule, definition of temporary work	Quantity development of major commodities, pricing by database, manuals, quotes, bid results, or experience which may be adjusted for the conditions of the specific package. Rough estimates or allowances developed for immeasurable items.	10% - 20%
DEFINITIVE	15% - 5%	75% to 100% complete	Detailed Control Budget, Cost Control, and Reporting	Progress Plans and Specifications, working construction schedule	Takeoff of quantities from plans, representative pricing by database, manuals, quotes, bid results, or experience adjusted for the conditions of the specific package. Crewed approach to labor and equipment, percent approach to general conditions, overhead and profit, contingency, and escalation. Some allowances carried for immeasurable items.	5% - 15%
DETAILED (ENGINEER'S ESTIMATE)	±5%	PS&E	Check Estimate for Bids, Commit Funds	Complete Plans and Specifications for Bidding, Detailed Construction Schedule, Contract Terms and Conditions	Detailed takeoff of all measurable items, detailed review of specifications, detailed pricing including price quotes, crewed approach to labor and equipment, detailed estimate of general conditions, overhead & profit, and escalation. Consideration of construction schedule, work restrictions, shift requirements, and risk.	0% - 10%

[1] Probable Accuracy as stated by the Association for the Advancement of Cost Engineering International (AACE)

For example, the U.S. DOT-FTA recently made this point clear when it ruled that even a 26% contingency level was low in a heavy-rail extension project in California.[12] The ruling was made based on the project's early stage of development and its inclusion of complex construction elements.

The necessity of linking the stage of project planning with the contingency level is demonstrated by real-world experience with large construction projects. Figure II-1 focuses on the subset of rail infrastructure projects from a study of 258 transportation infrastructure projects worldwide.[13] The figure groups the projects into 20% "buckets" of cost variation from original estimates. That is, it shows what percentage of the projects overran their budgets by 0-20%, 20-40%, etc., and similarly what percentage came in under budget by 0-20%, 20-40%, etc. It is important to recognize that the actual project overruns occurred even after the completion of detailed engineers' estimates (see Table II-1), which represent a level of design significantly beyond anything proposed by AEP Texas.

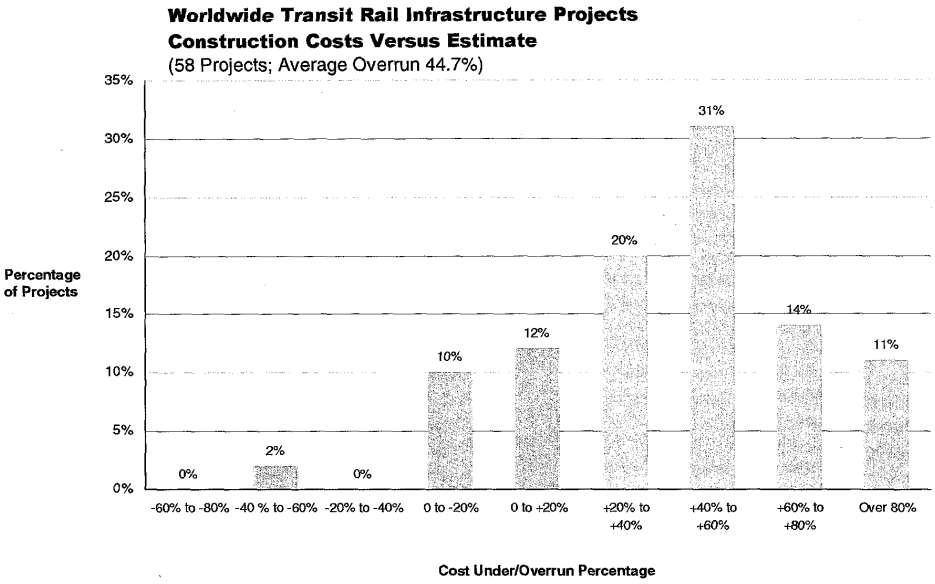
As can be seen, for the 58 rail projects analyzed in this study, the average cost overrun was nearly 45%. Only one in four rail infrastructure projects were completed within 20% of planned cost. While in some limited cases a portion of the cost increase may be attributable to environmental or other issues that would be considered "entry barriers" for SAC, the magnitude and consistency of project overruns cannot be dismissed as simply a reflection of "entry barrier" issues.

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[12] FTA New Starts report on Santa Clara Valley Transportation Authority (SCVTA) proposal for 16.3 mile heavy-rail extension from the Bay Area Rapid Transit (BART) system. Released February 2004. BNSF.RP.WP.III.F-1611 to 1616.

[13] "Underestimating Costs in Public Works Projects: Error or Lie?" article by Flyvbjerg, Holm, Buhl, 2002. BNSF.RP.WP.III.F-1617 to 1633.

Figure II-1

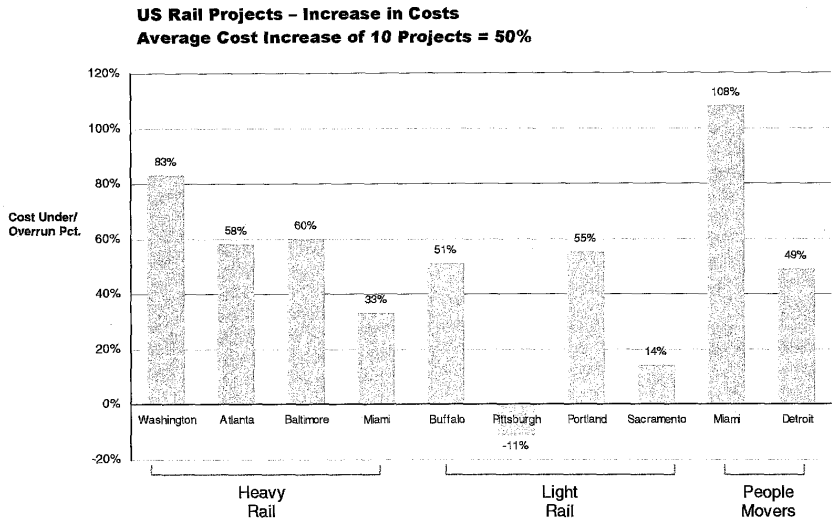


Source: "Underestimating Costs in Public Works Projects: Error or Lie?" article by Flyvbjerg, Holm, Buhl, 2002.

In a separate study addressing the increase in project cost from initial estimate to final construction, the U.S. DOT[14] compared actual construction cost against estimates. The average increase in costs from estimation to completion was 50%. Only one of the ten transit projects reviewed was completed within 10% of the originally estimated cost (Figure II-2), and that project was a light rail project, not a heavy rail project whose construction standards are more similar to a heavy haul freight railroad such as the TNR.

[14] U.S. Department of Transportation, "Urban Rail Transit Projects: Forecast Versus Actual Ridership and Cost", October 1990. BNSF.RP.WP.III.F-1634 to 1637.

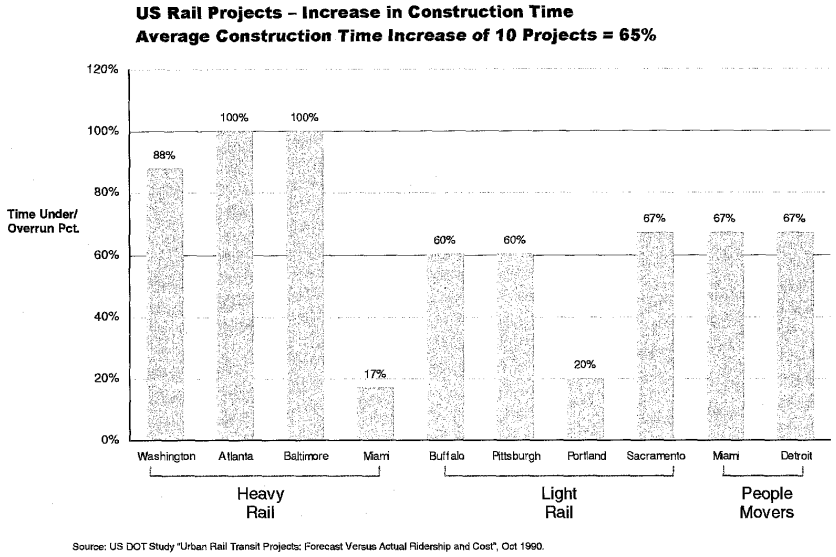
Figure II-2



Source: US DOT Study "Urban Rail Transit Projects: Forecast Versus Actual Ridership and Cost", Oct 1990.

Beyond reviewing the increase in costs, this same DOT study reviewed actual construction time versus estimate. On average, the projects required over 60% longer to construct than estimated; none was completed on time (Figure II-3). Heavy rail projects fared much worse than the average – of the four heavy rail projects, two projects doubled the original schedule estimate, and a third came in 88% over the original schedule.

Figure II-3



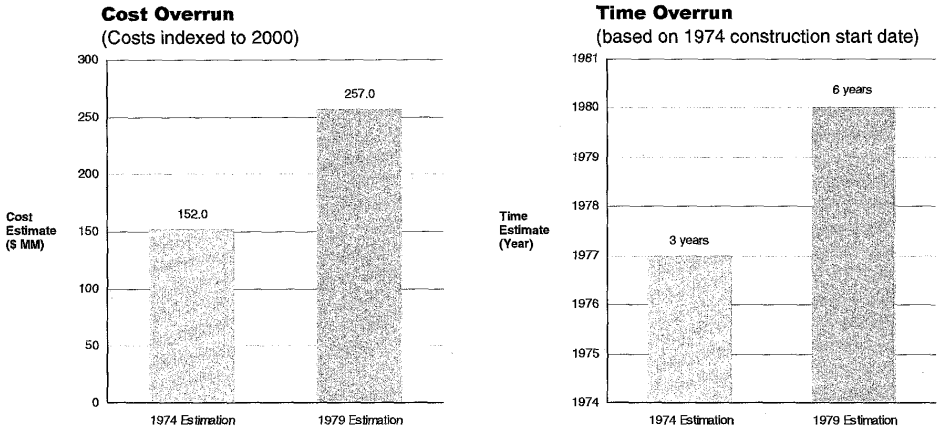
Source: US DOT Study "Urban Rail Transit Projects: Forecast Versus Actual Ridership and Cost", Oct 1990.

High project cost and schedule failure rates are not limited to publicly funded projects. North American freight network construction projects also have often experienced substantial overruns of cost or increases in construction time. For example, in the Powder River Basin, a joint-track line was started based on a 1974 construction estimate of $152 million (indexed to 2000);[15] by 1979, based on a partially completed project the estimate was increased to $257 million (indexed to 2000)[16] and the completion date was extended by 3 years (Figure II-4).[17] Although the projected scope in 1979 was slightly different than envisioned in 1974, the fact still remains that costs on this large, heavy haul infrastructure construction project, which was similar to the proposed TNR in many characteristics and considerations, surpassed the initial cost estimate by nearly 70% and doubled the original time estimate.

[15] $50 million in 1974 dollars. BNSF.RP.WP.III.F-1638 to 1649 at 1640.
[16] $105 million in 1979 dollars. BNSF.RP.WP.III.F-1638 to 1649 at 1648.
[17] ICC Finance Docket Nos.27579, 29066, 29036; Costs indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and Railroad Cost Recovery Index (RCRI). BNSF.RP.WP.III.F-1650.

Figure II-4

Powder River Basin Joint Line Construction Projections

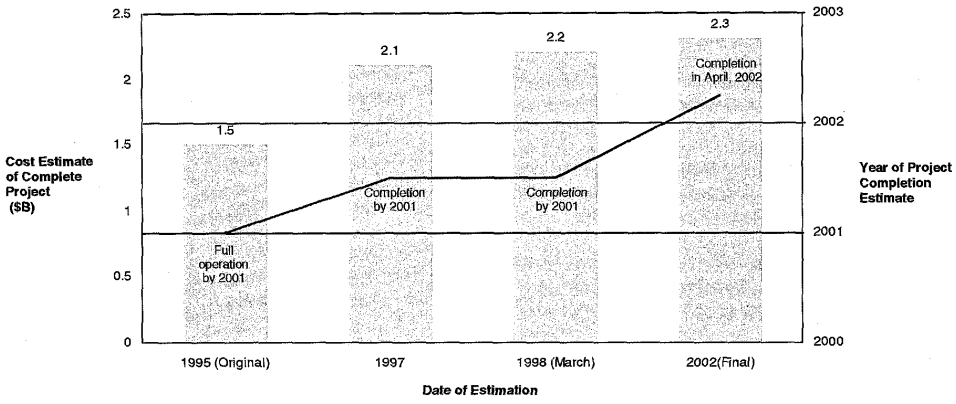


In another example, the final cost of the recently completed Alameda Corridor public-private freight rail access to the ports of Los Angeles and Long Beach was 53% higher than projected ($2.3 billion actual vs. $1.5 billion estimated, indexed to 2000), and required 16 months longer to construct than originally estimated (Figure II-5).[18]

[18] Los Angeles Times, ACTA press releases, ICC Finance Docket #32830. BNSF.RP.WP.III.F-1651 to 1661.

Figure II-5

Alameda Corridor Cost and Time Estimate

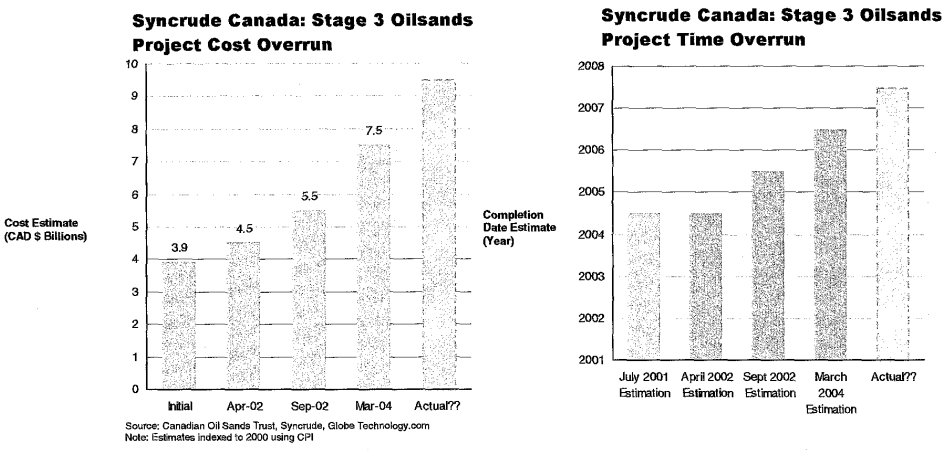


Note: Costs indexed to 2000 using RCRI
Source: ICC Finance Docket #32830, Los Angeles Times, ACTA press releases

Cost and schedule overruns are not limited to transportation projects; they are a typical part of most large complex construction projects. For example, in Western Canada, a major energy project – Syncrude Canada's Stage 3 Oilsands – is overrunning costs by more than 90% and is nearly 2 years behind schedule (Figure II-6).[19]

[19] Canadian Oil Sands Trust, Syncrude, GlobeTechnology.com. BNSF.RP.WP.III.F-1662 to 1686.

Figure II-6



This review of projected versus actual cost and schedule experience for large construction projects confirms the perspective of the U.S. DOT-FTA and recognized construction engineering standards organizations – large construction projects entail large risk and unknowns. The appropriate level of contingency for each stage of project planning reflects the associated level of risk and unknowns.

AEP Texas's plan is so conceptual that it is incumbent upon AEP to apply – at an absolute minimum – a 20% contingency to its cost proposal. AEP Texas cannot dismiss the need to increase its contingency under the guise of "least cost" or "entry barrier" – to attempt to do so would be to suggest that AEP Texas is exempt from any consideration of construction management principles, standards, or real-world experience.

III. AEP Texas's proposed construction schedule has virtually no probability of being met, making even a 20% contingency unjustifiable.

To evaluate the complete set of construction assumptions offered by AEP Texas, I have initially separated the proposed construction schedule from the projected resource and cost estimates. I began my evaluation with the AEP Texas construction schedule since it provided an overall view of the process used to develop the TNR estimated project construction cash flows.

Even excluding the typically recognized entry barrier issues (such as resource constraints, property acquisition, or costs the incumbent railroad did not incur), I have found that AEP Texas's basic proposed project plan remains highly optimistic by industry standards and unlikely to qualify even for the 20% contingency level under FTA guidelines. AEP Texas proposes constructing 1,677.9 track-miles[20] of a railroad crossing eight (8) states in 14 months,[21] an average rate of nearly *120 miles* per month. By contrast, major railroad construction projects over the last 30 years have typically averaged a tiny fraction of this rate.[22]

The issue is not whether individual project planning components or events, taken as standalone, isolated activities, are achievable. Rather, the true test of reasonableness or feasibility is whether AEP Texas's overall start-to-finish construction schedule can be accomplished. While it is conceivable that minor individual tasks (with short duration, fixed cost, or well defined scope) could be completed within AEP Texas's aggressive

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[20] See AEP Texas file "IIIFTotal.xls" worksheet "Track Quantities." Total of 1,677.9 track miles includes 1,587.4 miles of mainline track, 69.4 miles of yard track, 16.8 miles of branch line and 4.4 miles of mine lead track. BNSF.RP.WP.III.F-1687 to 1688.

[21] AEP Texas at III-D-116 states construction of bridges and structures will take a maximum of 14 months; track construction, signals, and control systems will be constructed at the same time as the bridges over a 12 month period.

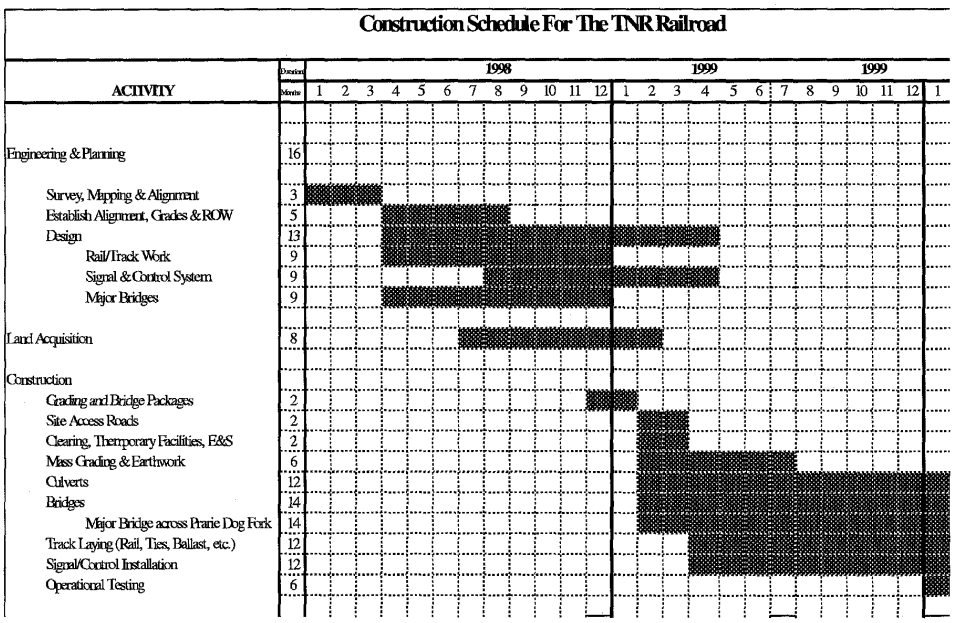
[22] For example, in 2003 BNSF, under an extremely aggressive time work schedule, constructed 32 miles of new track on its Panhandle double track project in just over 3 months (measured from "dropping the first tie" to placing the track in service in 2003). It should be noted that much of the grading had been completed prior to start of construction. BNSF.RP.WP.III.F-1689.

timeline, taken together it is virtually impossible that every task could be completed at that level.

AEP Texas has proposed an extremely aggressive schedule, even under the most optimistic view.

AEP Texas proposes an extremely aggressive construction schedule consisting of overlapping activities within an overall 30-month timeline from surveying to start of operations. The plan contains a total of only 16 activities, grouped into three categories – "Engineering and Planning" (5 activities), "Land Acquisition (a single activity), and "Construction" (10 activities),[23] as displayed in Figure III-1.

Figure III-1: AEP Texas Proposed Construction Schedule



[23] See AEP Texas file "CONSTRUCTION SCHEDULE.XLS"

To assess the reasonableness of the AEP Texas plan, I have considered five key scheduling issues that are based upon widely recognized construction management "best practices"[24] (adjusted to reflect barrier-to-entry issues as discussed earlier in this document):

A. Have all major activities been identified?

B. Has the required sequencing of specific tasks been accounted for?

C. Are the projected durations of individual activities reasonable?

D. Have key construction realities been identified and accounted for?

E. Has appropriate allowance been made for expected delays?

If the answer were "yes" to all of these questions, then the likelihood of meeting the schedule would be relatively high and the FTA contingency guidelines would be appropriate. If, however, the answer to even one of these questions were "no," the likelihood of achieving the overall schedule would decline dramatically and the contingency requirements should exceed those outlined in Table II-1. (As an example, properly addressing items B-E in the above list would not make up for the failure to incorporate all major activities in the plan as required in item A.) If, in the extreme, the answer to all of the questions were "no," AEP Texas's plan would be dismissed outright as "infeasible" by the financial and construction communities.

While AEP Texas does not provide a detailed construction project plan, even the limited information available from its plan provides insights into each of these five issues.

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[24] AACE International Recommended Practice No. 23R-02, PLANNING & SCHEDULING. IDENTIFICATION OF ACTIVITIES (TCM Framework Reference 8.2), AACE International March 2004; BNSF.RP.WP.III.F-1690 to 1693.
AACE International Recommended Practice No. 24R-03, PLANNING & SCHEDULING. DEVELOPING ACTIVITY LOGIC (TCM Framework Reference 8.2), AACE International, March 2004. BNSF.RP.WP.III.F-1694 to 1698.

AEP Texas's proposed schedule is a "black box" that does not identify all necessary activities.

A fundamental flaw in AEP Texas's construction schedule is that it is a classic "black box." AEP Texas only provides start and finish dates, with no details indicating how it plans to get from point A to point B. In AEP Texas's construction plan, an activity starts, and then emerges complete months later – it is not possible to ascertain what happens inside the "black box."

Even after taking into consideration the fact that the planning exercise is for a hypothetical railroad, there is still far too little information and documentation to validate that any steps in the highly compressed schedule can actually be achieved. AEP Texas states only that construction of all bridges and structures will take a maximum of 14 months to build, as the Prairie Dog Fork Bridge "with today's construction technology can be completed within the fourteen-month time frame."[25] (As I will demonstrate further on, even AEP Texas's assumption of which bridge to use as its "longest event" to establish this time frame is faulty.)

Such a lack of detailed planning is unheard of by industry standards. For example, Attachment III-1 contains a schedule that Mercer developed[26] for constructing the Canadian River Bridge at MP 19.2 on the Boise City sub (a bridge on the BNSF route that is larger and more complex than the Prairie Dog Fork Bridge which AEP Texas uses to bound its schedule).[27] Mercer's schedule for the Canadian River Bridge incorporates more than 95 discrete and linked activities for this single task, compared with a total of

[25] AEP Texas at III-F-115.
[26] Mercer's design and schedule for the Canadian River Bridge was reviewed and approved by Mr. Steve Millsap, BNSF Assistant Vice President – Structures. BNSF.RP.WP.III.F-1699 to 1700.
[27] Mercer is aware that AEP Texas has a document entitled "Establishing a Solid Foundation for New Bridge Construction; Replacement of Bridge 412.1 over the South Canadian River New Purcell, Oklahoma, Burlington Northern and Santa Fe Railway," by John W. Hronek, HNTB Corporation, October 6, 2003. This document is not referring to the Canadian River Bridge that Mercer has identified as the most critical construction element for the TNR. Mercer notes that AEP Texas's costs for this bridge reflect a different type of construction, which for purposes of the SAC evidence, BSNF has accepted with several modifications. However, we note that in the real world this bridge would be built as a steel truss bridge and therefore we have established a schedule consistent with that reality. BNSF.RP.WP.III.F-1701.

16 activities for AEP Texas's *entire* schedule. This schedule is straightforward; the discrete activities comprising the schedule are easily understood; and the durations are realistic[28] – none of which can be said of AEP Texas's "black box" schedule for the Prairie Dog Fork Bridge. AEP Texas's plan shows only a single, undifferentiated 14-month bar for the Prairie Dog Fork Bridge in its Excel-based Gantt chart format.[29]

AEP Texas's under-recognition of actual complexity is not limited to physical structures. The first activity undertaken in AEP Texas's work plan is "surveying," beginning on Day 0. AEP Texas makes no mention of any of the essential work steps required prior to beginning any "physical" construction-related work, such as:

- Building and organizing the construction management team
- Completing legal documents and procedures
- Establishing internal policies and procedures
- Developing and implementing procurement and contracting strategies
- Completing the contractor award process – sourcing and selection, contract negotiation and award

None of these activities are barriers to entry, and so none can be excluded in developing the schedule for a SARR; each of these activities requires a certain amount of time to complete; and all must be started before AEP Texas's putative "Day 0."

The potential impact of AEP Texas's oversight of these activities upon its schedule is significant. Utilizing the pre-construction activity lists shown in Figure III-2, which Mercer compiled from the Project Management Institute's Body of Knowledge (PMBOK), Mercer estimates it could take as long as 12-18 months for AEP Texas to prepare for "Day "0." (Mercer has assumed that many of these activities could be undertaken simultaneously.) Simply adding time for these essential activities that AEP Texas ignores would increase AEP Texas's overall construction time by more than a third.

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[28] Mercer reviewed its schedule for the Canadian River Bridge with Mr. Steve Millsap, BNSF Assistant Vice President – Structures, who confirmed that Mercer's schedule was reasonable. BNSF.RP.WP.III.F-1699 to 1700.

[29] See AEP Texas file "CONSTRUCTION SCHEDULE.XLS"

Figure III-2

Pre-"Day 0" Tasks	Estimated Duration
Project Initiation	
Establish/Refine Project Charter	.25 mon
Organize and Staff Project Start-up Cadre	.5 mon
Establish Project/Construction Management Approach	
Perform or manage tradeoff studies	2 mons
Evaluate studies & Select alternative	.5 mon
Develop Key Project Plans	
Project Objectives and Scope	1 mon
Develop Work Breakdown Structure (WBS)	0.5 mons
Develop and Optimize Project Schedule	1 mon
Develop Cost/Resource Management Plans and Budgets	2 mons
Develop Project Staffing Plan	1 mon
Develop Project Quality Management Plan	1 mon
Develop Project Safety Management Plan	1 mon
Develop Project Permitting Plans	2 mons
Develop Internal and External Communications Plans & MIS	2 mons
Develop Risk Management Approach/Plans	1 mon
Identify/evaluate Project Risks	2 mons
Develop Procurement Management Approach/Plans	2 mons
Establish Project Management Office Policies & Procedures	1 mon
Develop and ImplementScope Management Plans/Procedures	0.5 mons
Develop and Implement Schedule Management Plans/Procedures	0.5 mons
Organize and Staff Project/Construction Management Office	4 mons
Key Procurement Activities	
Procurement Management Planning	
Make or Buy Analyses	0.5 mons
Contract Type Alternatives/Strategy	0.5 mons
Develop Specifications	3 mons
Prepare Statement(s) of Work (SOW)	2 mons
Contract Solicitation Planning	
Prepare Procurement Solicitation Packages (RFQ, RFI, RFP, etc.)	2 mons
Evaluation Criteria	1 mon
Contract Solicitation (Time for Bidders to Submit Proposal)	1 mon
Contract Source Selection	
Technical and Price Evaluations	3 mons
Contract fact-finding/negotiations	2 mons
Contract Award(s) ENGR & PLANNING PHASE	
ENGR & PLANNING CONTRACT MOBILIZATION	2 mons

Revised Construction Schedule: Adding Required Activities Preceding AEP Texas's "Day 0" activities:

- AEP Original Schedule: 30 months
- Pre-"Day 0" Activities: 12-18 months
- *Revised Schedule After Issue A:* *42-48 months*

AEP Texas ignores the required sequencing of some tasks, which makes its overall schedule impossibly compressed.

AEP Texas's focus on accelerating the construction schedule apparently has resulted in AEP Texas ignoring fundamental task sequencing requirements. If AEP Texas's approach were applied to construction of a house instead of a railroad, then AEP Texas would claim that work on the foundation, walls, roof, and interior finishing could all begin on the same day. Obviously, no contractor would even attempt such a schedule.

For example, on Day 91, AEP Texas proposes simultaneously establishing alignment and grades and right-of-way, designing track layout, and designing bridges.[30] There is no feasible way that each of these activities could begin simultaneously:

- Grading design and bridge design could not commence until the ROW had been established and property acquired in order to enable detailed on-site surveys and material samples to be taken. (AEP Texas's schedule actually delays property acquisition until Day 181, which as noted below, is inconsistent with commencing design on Day 91.) For example, it would be impractical to presume (as AEP Texas does) that a bridge could be designed without the knowledge of its exact location, the composition of the material to support that bridge, and so on – all issues that could only be resolved after the alignment had been established and the property acquired.

[30] See AEP Texas file "CONSTRUCTION SCHEDULE.XLS"

- Rail track design requires the alignment and grade design be completed in sufficient detail that the location of sidings, interlockings, and a host of other track design issues could be addressed with certainty.

Similarly, on Day 181, AEP Texas begins land acquisition, which is out of sequence with the engineering work above.[31] Land acquisition should start even *before* surveying ("Day 0" in AEP Texas's plan) is allowed to proceed on the property.

As a third example, AEP Texas assumes that the grading, bridges, clearing, access roads, mass earthwork, and culverts can begin and progress concurrently; that track laying and signal control work can begin 60 days later; and that all these activities finish simultaneously. AEP Texas simply ignores the reality that a constraining factor in railroad construction is the combination of access to the ROW and the shuttling of equipment and materials to the railhead under construction.

By its very nature, rail construction is linear, in that one activity has to be largely complete before the next activity can proceed – one cannot simply "do everything at the same time in the same place." In reality, a significant amount of clearing must proceed before construction of access roads can start; access roads must be largely complete so heavy equipment can get into the site and begin mass earthwork; a certain amount of mass earthwork has to be done before culverts and key bridge approaches and abutments are constructed; abutments and pier foundation structures must be in place before bridge superstructures can be started; and track work can only cross major structures after these structures are complete. Only after track work is far enough along can signals and communications work proceed.

AEP Texas omits the details of virtually all considerations of these fundamental and logical relationships between activities. This lack of detail confirms my conclusion in Section II that AEP's plan would not even be considered "conceptual" under accepted construction industry and U.S. DOT-FTA guidelines. One can only speculate at the scope and magnitude of errors and oversights in AEP Texas's plan. If AEP Texas's

[31] See AEP Texas file "CONSTRUCTION SCHEDULE.XLS"

activities were simply sequenced logically, without correcting for other errors and omissions, the project schedule would be pushed out to at least another 10 months (see Attachment III-2).[32]

Revised Construction Schedule: Adding Adjustment for Task Sequencing:

- AEP Original Schedule: 30 months
- Pre "Day 0" Activities: 12-18 months
- Properly Sequencing Tasks: 10 months
- *Revised Schedule After Issue B: 52-58 Months*

Many of AEP Texas's projected durations for individual activities are unreasonable.

Even constrained by the sparse detail AEP Texas provides, I have been able to identify several examples of unreasonable project durations.

Surveying. AEP Texas's first activity, surveying, is likely to require at least triple the time AEP Texas plans for. AEP Texas allows only 90 days for surveying to gather all required alignment data. This estimate does not reflect actual experience on large construction projects – realistically, it would take more than 90 days just to organize a project management team and identify, contact, agree on scope and deliverables, retain, and coordinate the field work of the dozens of surveying firms required to perform the work in the shortest duration. The actual fieldwork of surveying, office work of mapping, engineer's reviewing and checking, technical compiling, production of hard copy maps and plats, and integration of electronic databases associated with the railroad alignment would take at least an additional 6 months.[33]

Contract development, bidding, and award. To minimize construction time, AEP Texas proposes to subdivide construction into many segments to be built concurrently.

[32] Note that Attachment III-2 does not include required Pre-Day 0 activities discussed above – it starts at the same surveying activity point as the AEP Texas plan.
[33] See Attachment III-3.

The increases in complexity and the need for coordination associated with this approach are obvious – not only must AEP Texas develop a host of individual contract specifications, but those specifications will have the added complexity of addressing integration and coordination issues at the interfaces between contractors on these individual segments.

Yet AEP Texas allocates only 2 months for bidding time for the grading and bridging construction packages. Based on actual large project construction projects, 6 months should be considered an absolute minimum for this task.

Bridge construction. AEP Texas selected the Prairie Dog Fork Bridge as its "longest event" in the construction cycle, with total construction time of 14 months. This structure is approximately 16 feet high, crosses a normally dry wash, and for the most part sits on pile caps and I-beam piles that are driven into the dry river bed. Based upon this "longest event," AEP Texas established a 14-month construction schedule for the entire route.

In actuality, the Prairie Dog Fork Bridge is far from being the "longest event" structure on the route. The Canadian River Bridge at MP 19.3 on the Boise City sub (see Attachments III-4A through C) would clearly take longer to build than the Prairie Dog Fork Bridge (see Attachments III-4D through F).[34] The Canadian River Bridge is more than 100 feet high, sits on massive concrete caissons and bridge piers, and has a large and complicated structural steel truss superstructure. The BNSF construction expert Mercer consulted[35] confirmed that the construction duration for a bridge of this design likely would be almost double that of the much smaller and simpler Prairie Dog Fork Bridge (25.8 months versus 14 months).[36]

This one error alone would extend the construction period by nearly 12 months. Even if all other deficiencies in AEP Texas's construction plan were addressed, AEP Texas's

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[34] As footnoted earlier in this section, the Canadian River Bridge at MP 19.3 is not the bridge discussed in the document written by John W. Hronek of HNTB, and in fact is a larger and more complex structure than the bridge of the same name cited by Mr. Hronek.
[35] Mr. Steve Millsap, BNSF Assistant Vice President – Structures.
[36] See Attachment III-1. Durations for each individual activity were estimated by Mercer's construction and engineering consultants, led by Mr. Ben Nolan, Vice President, Delta Consulting Group, Inc.

error in identifying – and improperly estimating the duration of – the "longest event" makes its construction schedule unachievable.

Revised Construction Schedule: Adding Adjustment for Longest Task:

- AEP Original Schedule: 30 months
- Pre "Day 0" Activities: 12-18 months
- Properly Sequencing Tasks: 10 months
- Longest Task – Canadian River Bridge: 12 months
- *Revised Schedule After Issue C: 64-70 Months*

AEP Texas does not identify or account for key construction realities.

Even excluding entry barrier challenges, the construction of a SARR still must be based on a "feasible" plan. AEP Texas's proposal fails this basic test, as I can demonstrate using two examples.

In the first example, AEP Texas provides no insight into how it intends to transport 1,440-foot lengths of continuous welded rail (CWR) to its multiple job sites. In choosing the CWR option, AEP Texas must also accept the construction scheduling constraint of moving the rail by railcar from the manufacturing plant to the railhead. This of course requires that a railroad physically exist all along the way, i.e., AEP Texas would have to wait until one section of track was finished before it could begin the next. I have found no indication in AEP Texas's proposal that it recognizes this constraint. This is not a "barrier to entry" – it is simply a physical reality.[37]

In a second example, AEP Texas has built its construction plan around a right-of-way width that is inconsistent with its selection of earthwork equipment. AEP Texas suggests in its overview it would use off-road trucks capable of turning within a space of 27 feet, and uses this capability to justify its contention that a narrow 27-foot work area would be

[37] While AEP Texas implies it will construct the railway outward from railheads, its proposed schedule dictates otherwise. To meet its track laying schedule, AEP Texas will require far more work sites than it has usable rail connections. In several locations, TNR junctions with rail lines capable of handling welded rail trains are separated by hundreds of miles.

sufficient. However, AEP Texas then bases its equipment cost estimate on the use of less-expensive 11 CY scrapers and dozers. The physical reality is that scrapers and dozers cannot turn within the 27-foot space allowed for off-road trucks – in fact, it would be difficult to turn this equipment around and operate efficiently in a 100-foot work area. Compounding the error, AEP Texas also states it would use a 300 Hp push dozer to push the scrapers where ripping was needed for the stone base. This combination of vehicles would preclude the ability to turn around in such a small area. Despite these physical realities, AEP Texas has made no allowance for temporary roadways and/or relief areas, or for the added time (and cost) required to acquire necessary property rights and to construct these roadways and relief areas.

Such oversights of the key realities of construction activities indicate the shallowness of AEP Texas's construction plan – in its drive to cut corners, AEP Texas has gone so far as to ignore universal physical constraints.

Revised Construction Schedule: Adding Adjustment for Construction Realities:

- AEP Original Schedule: 30 months
- Pre "Day 0" Activities: 12-18 months
- Properly Sequencing Tasks: 10 months
- Longest Task – Canadian River Bridge: 12 months
- Construction Realities: Unknown
- *Revised Schedule After Issue D:* *>64-70 Months*

AEP Texas has made no allowance for the types of expected delays that a project of this size and complexity inevitably will encounter.

AEP Texas's optimistic construction time projections fail to recognize the inevitable disruptions or delays that accompany any construction project of this size (as I discussed in Section II). While the following is not intended as an exhaustive list, standard

construction management suggests that at a minimum AEP Texas should consider – as should any planner – the inevitable risk of delay caused by:

- Scope changes due to redesigns or design corrections
- Weather or environmental delays
- Equipment malfunctions
- Unforeseen geological problems or issues
- Rework
- Failures during operational testing

It is inconceivable that a major project such as TNR would be free from the impact of the types of routine delays universally experienced on large-scale construction projects, over and above any delays caused by "barriers to entry." I am aware of no construction project approaching the size of the TNR that has ever avoided routine delays of some type. AEP Texas's failure to address these issues in developing its schedule is simply contrary to construction planning principles and standards[38] and clearly makes the schedule "infeasible."

Revised Construction Schedule: Add Adjustment for Construction Realities:

- AEP Original Schedule: 30 months
- Pre "Day 0" Activities: 12-18 months
- Properly Sequencing Tasks: 10 months
- Longest Task – Canadian River Bridge: 12 months
- Construction Realities: Unknown
- Expected Delays: Unknown
- *Revised Schedule After Issue E: >64-70 Months*

[38] As stated in various sources: 1.Project Management Institute. 2000. *A Guide to the Project Management Body of Knowledge*. 2000 Edition. Newton Square, PA, Project Management Institute. 2. Institute of Civil Engineers and the Faculty and Institute of Actuaries. 1998. *Risk Analysis and Management for Projects (RAMP)*. Thomas Telford, London. 3. Construction Industry Institute. 2003. *"Risk Assessment on International Projects: A Management Approach.* Research Summary 181-1. Austin, TX.. BNSF.RP.WP.III.F-1702 to 1717.

AEP Texas has not properly addressed the five key questions essential to any major construction project.

In reviewing just five key items that impact the feasibility of AEP Texas's – or any other construction project – AEP Texas's plan is found to be deficient. Its deficiencies are not seen simply on an item-by-item basis (even though, as noted earlier, a single item failure alone could disrupt a construction time schedule), but on each one of the key questions:

- Have all major activities been identified?
- Has the required sequencing of specific tasks been accounted for?
- Are the projected durations of individual activities reasonable?
- Have key construction realities been identified and accounted for?
- Has appropriate allowance been made for expected delays?

The answer to the fundamental question – "Can AEP Texas's overall start-to-finish construction schedule be considered reasonable, or even feasible?" – is a clear "no." Even with no allowance for key construction realities and expected delays discussed above, AEP Texas's schedule – at a minimum – should be more than doubled.

Monte Carlo simulation reveals the unacceptably low probability that AEP Texas's proposed schedule can be achieved.

The results of my review of AEP Texas's schedule are confirmed by a second analysis that I undertook to assess the impact of risk. In this second analysis, I worked directly from AEP Texas's proposed schedule, making no adjustment for Pre-Day 0 activities or the selection of the wrong "longest task." The only adjustment I made to AEP Texas's proposed schedule was to properly sequence its tasks as shown in the previously referenced Attachment II-2.

In contrast to AEP Texas's simplistic approach, I then applied a probability distribution to each of AEP Texas's activities in the re-sequenced schedule and ran a Monte Carlo simulation to establish the relative likelihood of completion on specific dates. A number of standard construction estimation, planning, and scheduling software packages are available and used within the industry to provide Monte Carlo simulations. Monte Carlo simulation is a standard methodology for providing information on relative risk of a particular project, which allows the project stakeholders (owners, sponsors, financers, etc.) to set realistic expectations with regard to good and bad outcomes.

The Monte Carlo simulation establishes a spectrum of probabilities for discrete potential outcomes. In this case, Mercer used a standard three-point simulation based on the most optimistic schedule (i.e., shortest time to completion for the re-sequenced schedule), the most pessimistic schedule (i.e., the longest time to completion), and a "most likely" schedule. The optimistic and pessimistic points were established by railroad construction experts I consulted.[39] For the "most likely" point, we simply accepted AEP Texas's list of activities and the durations assumed by AEP Texas; the only difference was in adding logical links between activities and sequencing them properly.

The Monte Carlo simulation is then used to run thousands of iterations of different combinations of activities based on different assumed durations for each activity. The railroad construction experts I consulted also established the duration range for each

[39] Mr. Ben Nolan, Vice President, Delta Consulting Group, Inc.

activity around a "most likely" duration, which Mercer assumed to be the duration as provided by AEP Texas. This iterative process determines the probability that construction could be completed on any specified date between the optimistic and pessimistic endpoints.

The output from the Monte Carlo simulation is presented in Figure III-3. For each date, the simulation produces a probability (percent certainty) that the project would be completed on or before that date. The probability increases that the project will be completed. The accumulation of probabilities is shown as the "S" curve in Figure III-3, where the probability rises as the schedule lengthens. The table below the graph displays the completion dates associated with each increment of 5 percent in probability.

The Monte Carlo simulation dramatically demonstrates the impact of properly sequencing AEP Texas's work activities. As I have mentioned, we set our "most likely" point by accepting AEP Texas's own list of activities and durations, and simply sequencing those activities logically. Without correcting the other oversights and errors I have described in my statement, this results in a completion date of 6/24/02. Yet even for this date – which is two years later than AEP Texas assumes – the probability of completing the TNR falls only between 50 and 55%.

Project planners and financers typically expect to see a probability of 85% before proceeding with a project. To reach this industry-standard probability of completion of 85%, the TNR's schedule would have to be extended to 11/24/02 – an addition of nearly two and one-half years to AEP Texas's proposed schedule. AEP Texas's own proposed completion date of 6/30/00 is so unrealistic that it falls below the most optimistic schedule, even based on its own activities, and it would be dismissed as "infeasible" by the standards of the construction and financial communities.

If we add to this result the required pre-"Day 0" activities (12-18 months) and correction of the longest task (an additional 12 months), modeling the schedule using standard probabilistic estimating techniques yields a total projected construction time of at least

83-89 months – almost three times AEP Texas's proposed schedule. This result still excludes any additional time for dealing with "construction realities."

Revised Construction Schedule: Applying Probability to Outcomes:

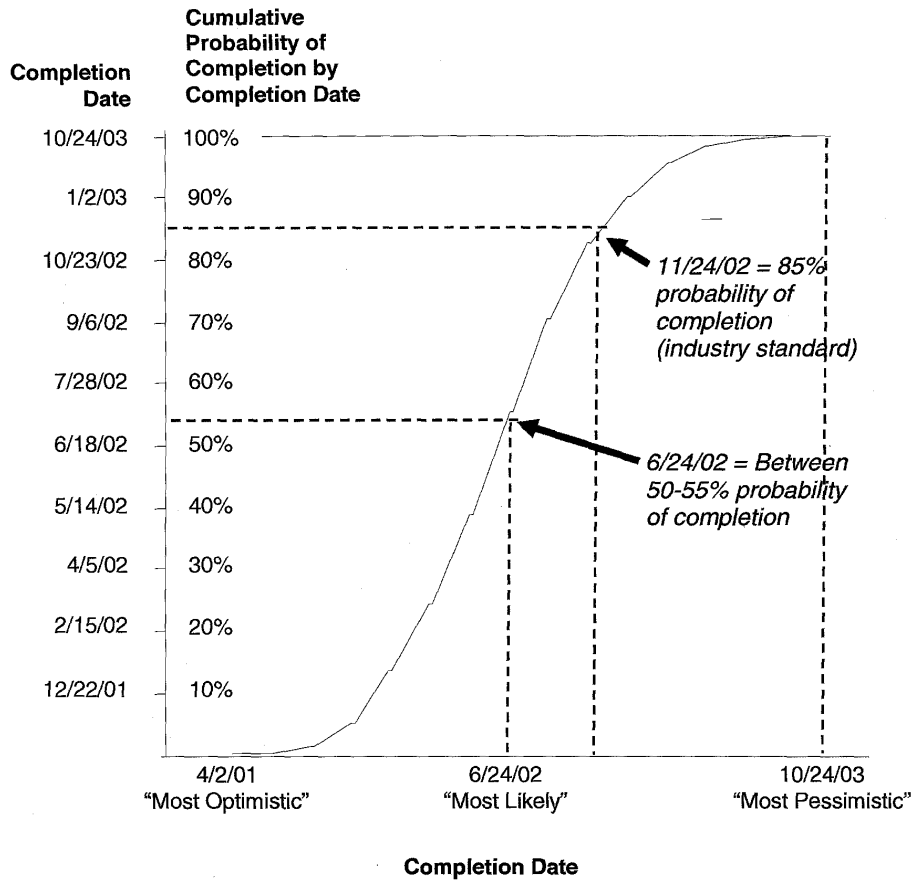
- AEP Original Schedule: 30 months
- Sequencing @ 85% Probability:[40] 29 months
- Pre-"Day 0" Activities: 12-18 months
- Longest Task – Canadian River Bridge 12 months
- Construction Realities Unknown
- *Total Revised Schedule:* *>83-89 Months*

Two separate methodologies – one focused on the deficiencies in the plan, and one focused on the probability of AEP Texas task durations being met – have led to the same irrefutable conclusion: AEP Texas's schedule is not a "shortest time" schedule; it is a fabrication based upon an unacceptable lack of detail or application of standard construction estimation processes.

[40] The use of this probabilistic methodology replaces the previous considerations of Issues B (Properly Sequencing Tasks) and E (Expected Delays).

Figure III-3

Monte Carlo Simulation Showing Likely Outcomes of a Revised Construction Plan



Surveys of construction estimators [41] have consistently identified lack of clear scope definition as one of the most significant factors contributing to construction cost overruns and schedule failures. AEP Texas consistently fails to properly define its scope.

[41] Construction Industry Institute, RS 181, page 10, Table 3, item 1, Scope Development Process is noted as having the most frequent (33%) impact on project performance. BNSF.RP.WP.III.F-1713 to 1720 at 1720.

I conclude that AEP Texas's overall process is fundamentally flawed, depending as it does on looking at each activity without regard to other activities linked to it, and selecting the most optimistic—and least likely—outcome for each isolated activity. This process naturally produces estimates of SARR construction costs that are both unrealistic and entirely inadequate for determining the achievable schedule for providing a competitive replacement service. If AEP Texas were required to actually build the project from the plan it proposes, it would almost certainly not achieve the optimistic results it argues for, nor does the schedule it presents justify a contingency level even of 20%.

IV. AEP Texas's cost estimates do not provide the level of resources that would be required to meet its aggressive schedule.

In Section III, I discussed the construction schedule proposed by AEP Texas. In this section I will turn to construction costs. Prior SAC decisions have found that it is appropriate for shippers to propose, in total, a least-cost construction plan for the total SARR.[42] But there is a constraint – AEP Texas's cost projection also must be *feasible*. As I will show below, AEP Texas's construction cost projection does not pass this test.

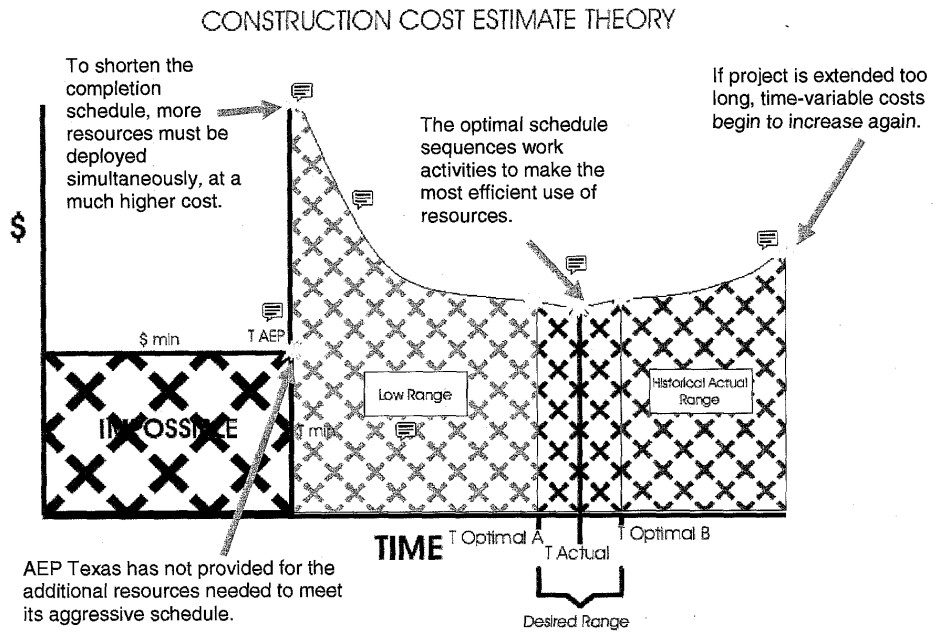
It is important to recognize that schedule and cost are not independent issues. To suggest the two issues could be viewed separately would be to suggest that the desire for an accelerated completion schedule would have no bearing on costs, or conversely that the level of resources applied to a project had no bearing on completion date. Mercer is unaware of any credible source that would express, or accept, either of these perspectives.

Mercer's linkage of schedule and cost does not focus on the *unit costs* of construction resources. Rather, Mercer focuses on the *amount* or level of construction resources required and the cost of those resources. Proposing, as AEP Texas has done, a very aggressive construction schedule, AEP Texas is then obligated to provide adequate resources to ensure that an accelerated schedule can be met. These resources must literally be on "stand-by" to ensure no opportunity to accelerate construction is lost due to a lack of resources.

Providing these necessary working and "stand-by" resources to complete an aggressive schedule has its costs. As illustrated in Figure IV-1, as a proposed construction schedule approaches the "physically impossible" time barrier, the amount of resources required increases dramatically versus those required for a project planned to be completed under a more efficient time schedule.

[42] See AEP Texas at III-F-37.

Figure IV-1



I have not found anything in AEP Texas's proposal to indicate that AEP Texas recognizes this relationship or has increased its cost and resource estimates to match its accelerated schedule. In fact, AEP Texas's estimates of the overall total cost to construct the TNR are inconsistent with the actual experience found in a wide range of rail construction projects.

As I will show, AEP Texas's projections of total construction cost per mile are substantially lower than those found on similar railroad construction projects, as well as lower than actual costs experienced by BNSF.[43] AEP Texas does not provide any credible justification for how it would achieve such a virtually unprecedented result.

[43] Discovery, AEP Texas North v. the Burlington Northern and Santa Fe Railway Docket No. 41191 (Sub-No.1), Bates Nos. 03325, 03335, 03345, 03350, 35941,36021, 36045, 36159. BNSF.RP.WP.III.F-1721 to 1728.

Using AEP Texas's total construction costs, Mercer has calculated that AEP Texas is proposing to construct the TNR's 1,677.9 track-miles for $1.5 million/track-mile. Given that AEP Texas's schedule for the TNR is highly accelerated, one would expect to find most actual railway construction projects which have been built on less aggressive schedules to be significantly less expensive. My review of railroad construction projects – including portions of the proposed TNR – show that this is not the case. In fact, just the opposite is true – AEP Texas proposes both an extremely aggressive schedule and unheard-of low costs. I would note that none of the benchmarks I have used are "confidential"; AEP Texas could have reviewed virtually all of this data if it had wanted to assess the reasonableness of its construction cost estimate.

For example, in 1986, a 10.7-mile CNW/WRPI extension into the Powder River Basin cost $63.8 million (in 2000 dollars), at an average cost of $6.0 million/track-mile[44] – an increase of 75%[45] over AEP Texas's projected cost per track-mile for the TNR. The CNW/WRPI line was built by contractors, as in AEP Texas's plan.

International experience confirms Mercer's view that AEP Texas's construction costs are unrealistically low. In Australia, a country that closely parallels U.S. track and operating standards, the lowest bid to construct a new 60-mile long narrow gauge[46] coal railway in central Queensland in 2003 was in excess of US$2.5 million per track-mile in nominal dollars, excluding signals and train control and despite the generally lower labor costs in Australia compared to the U.S.

Perhaps one of the most significant issues with AEP Texas's cost estimation is its failure to consider the construction cost information provided by BNSF to AEP Texas requests during discovery. For example, BNSF documentation provided to AEP Texas contains details on:

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[44] ICC Finance Dockets Nos. 30700, 29398; inflation indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and RCRI. BNSF.RP.WP.III.F-1729 to 1734.
[45] Costs indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and RCRI. BNSF.RP.WP.III.F-1735 to 1736.
[46] Narrow gauge is less costly to build than AEP Texas's proposed standard gauge.

- BNSF's 100-mile addition of second main track to its transcontinental mainline in New Mexico, at a cost of $2.4 million per track-mile[47]
- A 3.8-mile extension to serve Alabama Power at $3.6 million per track-mile[48]
- A 7.7-mile extension into the Dow Chemical plant that cost $2.5 million per track-mile, even though the project required no signaling other than at the main line connection[49]

Of these three projects, only the transcontinental mainline second tracking project is projected to handle high tonnage. It is difficult to find an explanation of AEP Texas's failure to consider these examples in developing its own construction cost for the TNR, and it is even more difficult to provide a rational basis for AEP Texas's proposal to build a greenfield, standalone railroad for nearly 40% less per track-mile than was achieved in the lowest-cost example that AEP Texas had requested from BNSF.

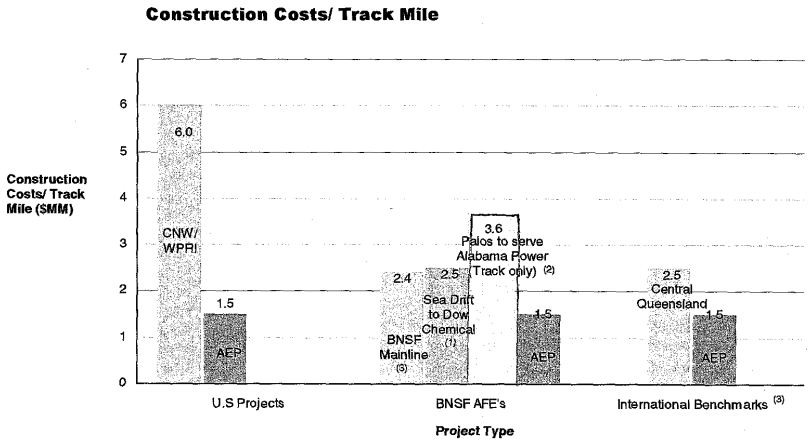
Additionally, close inspection of the AFE data requested by AEP Texas shows extensive use of outside contractors to complete the line construction.[50] These would be the same type of firms that would actually build the TNR, and so would be unlikely to perform the same work at a lower cost than they have for BNSF.

In comparing AEP Texas's cost per track-mile with this range of benchmarks (Figure IV-2), I conclude that, in developing its construction cost estimate, AEP Texas chose not only to ignore the costs associated with prior PRB-related construction projects and with international experience, but to ignore the very evidence that it demanded from BNSF. It is highly unlikely that a profit-focused railroad such as BNSF would pay a premium on

[47] STB Docket No. 41191 (Sub-No.1), AFE#A031136 (Bates# 03325), A031135 (Bates#03335), A031095 (Bates#03340), A031140 (Bates#03345), A031141, (Bates#03350) A000113 (Bates# 35941). BNSF.RP.WP.III.F-1721 to 1728.
[48] STB Docket No. 41191 (Sub-No.1), AFE #A980283 (Bates#36045); Costs indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and RCRI inflation indexed to 2001 using Railroad Cost Recovery Index. BNSF.RP.WP.III.F-1736.
[49] STB Docket No. 41191 (Sub-No.1), AFE # A010232 (Bates#36021); costs for bridge excluded. Costs indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and RCRI. BNSF.RP.WP.III.F-1737 to 1738.
[50] Examination of AFE produced in discovery in Docket No. 41191 reveal numerous instances where "No Gang Needed", and is confirmed by "work will cover contracted portion of the project", e.g., Bates# 36022. BNSF.RP.WP.III.F-1739 to 1740.

construction costs. I conclude that AEP Texas's estimates for construction costs per track-mile either have no basis in reality or at best are at the very extreme level of optimism.

Figure IV-2

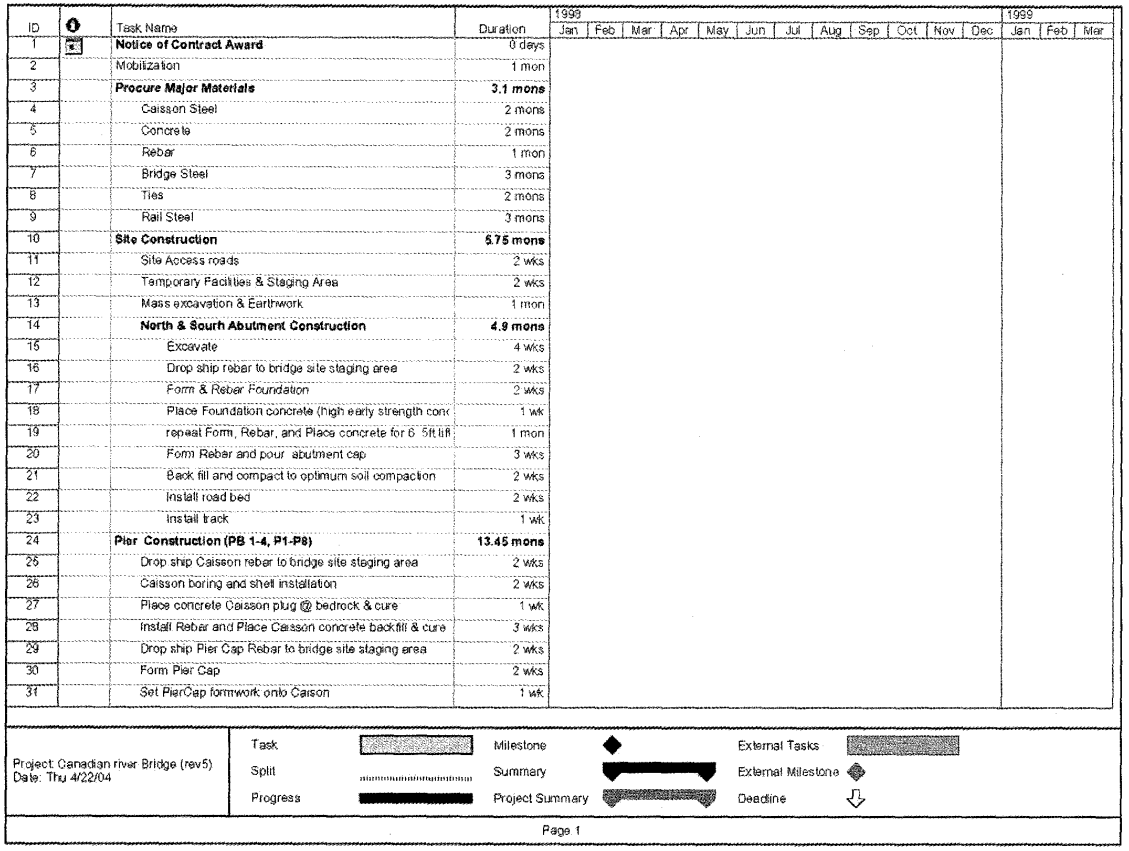


Source: STB Docket # 30700, 29398, 30186; BNSF AFE Docket # 41191 (Sub-No.1)
Note: Cost/ mile adjusted for inflation, indexed to 2000 using AAR Railroad Cost Indexes for Wage Rate and Supplements, Materials and Supplies, and RCRI. (1) Sea Drift to Dow Chemical does not include signals, land acquisition costs or highway overpass; (2) Palos to Alabama Power excludes signals and additional mileage associated with signals; (3) BNSF Mainline and Central Queensland estimates in 2004 dollars

Attachment III-1 (1 of 9)

Mercer construction schedule for Canadian River Bridge

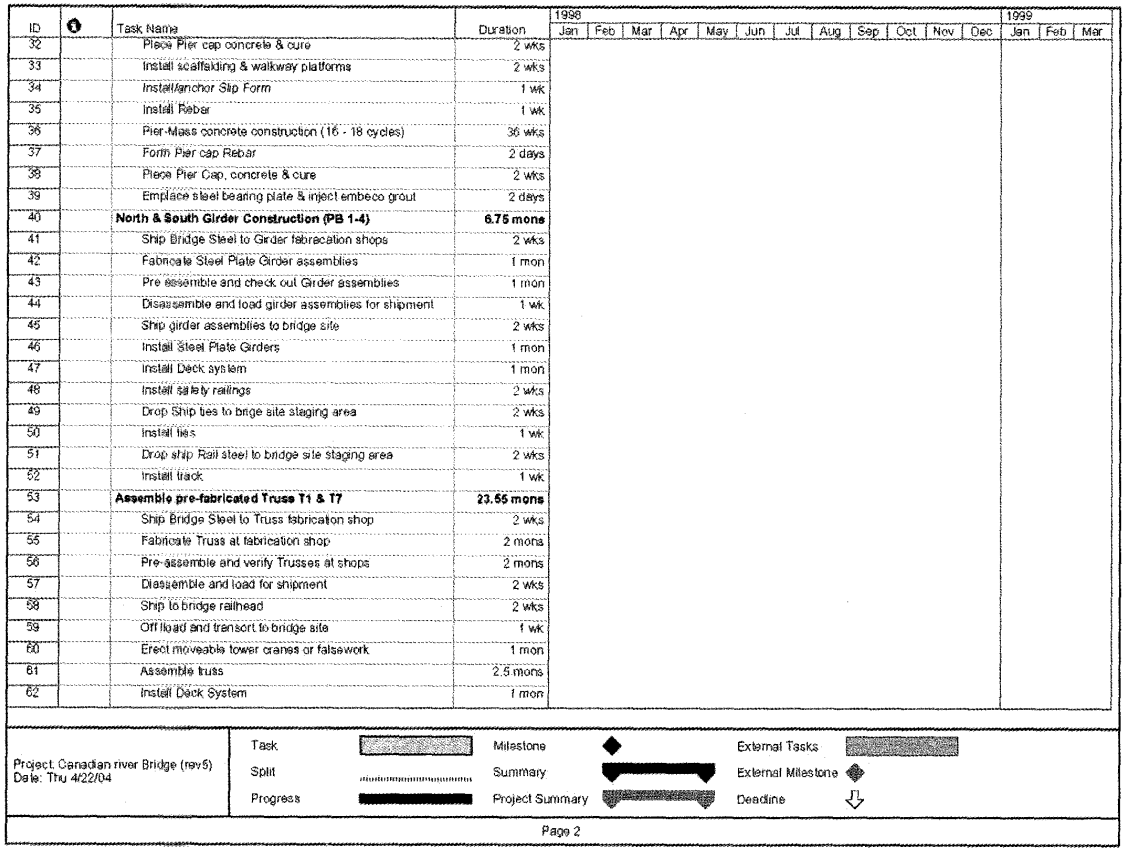
ID	Task Name	Duration
1	**Notice of Contract Award**	0 days
2	Mobilization	1 mon
3	***Procure Major Materials***	***3.1 mons***
4	Caisson Steel	2 mons
5	Concrete	2 mons
6	Rebar	1 mon
7	Bridge Steel	3 mons
8	Ties	2 mons
9	Rail Steel	3 mons
10	**Site Construction**	**5.75 mons**
11	Site Access roads	2 wks
12	Temporary Facilities & Staging Area	2 wks
13	Mass excavation & Earthwork	1 mon
14	**North & South Abutment Construction**	**4.9 mons**
15	Excavate	4 wks
16	Drop ship rebar to bridge site staging area	2 wks
17	Form & Rebar Foundation	2 wks
18	Place Foundation concrete (high early strength conc	1 wk
19	repeat Form, Rebar, and Place concrete for 6 5ft lift	1 mon
20	Form Rebar and pour abutment cap	3 wks
21	Back fill and compact to optimum soil compaction	2 wks
22	Install road bed	2 wks
23	Install track	1 wk
24	**Pier Construction (PB 1-4, P1-P8)**	**13.45 mons**
25	Drop ship Caisson rebar to bridge site staging area	2 wks
26	Caisson boring and shell installation	2 wks
27	Place concrete Caisson plug @ bedrock & cure	1 wk
28	Install Rebar and Place Caisson concrete backfill & cure	3 wks
29	Drop ship Pier Cap Rebar to bridge site staging area	2 wks
30	Form Pier Cap	2 wks
31	Set PierCap formwork onto Caison	1 wk



Attachment III-1 (2 of 9)

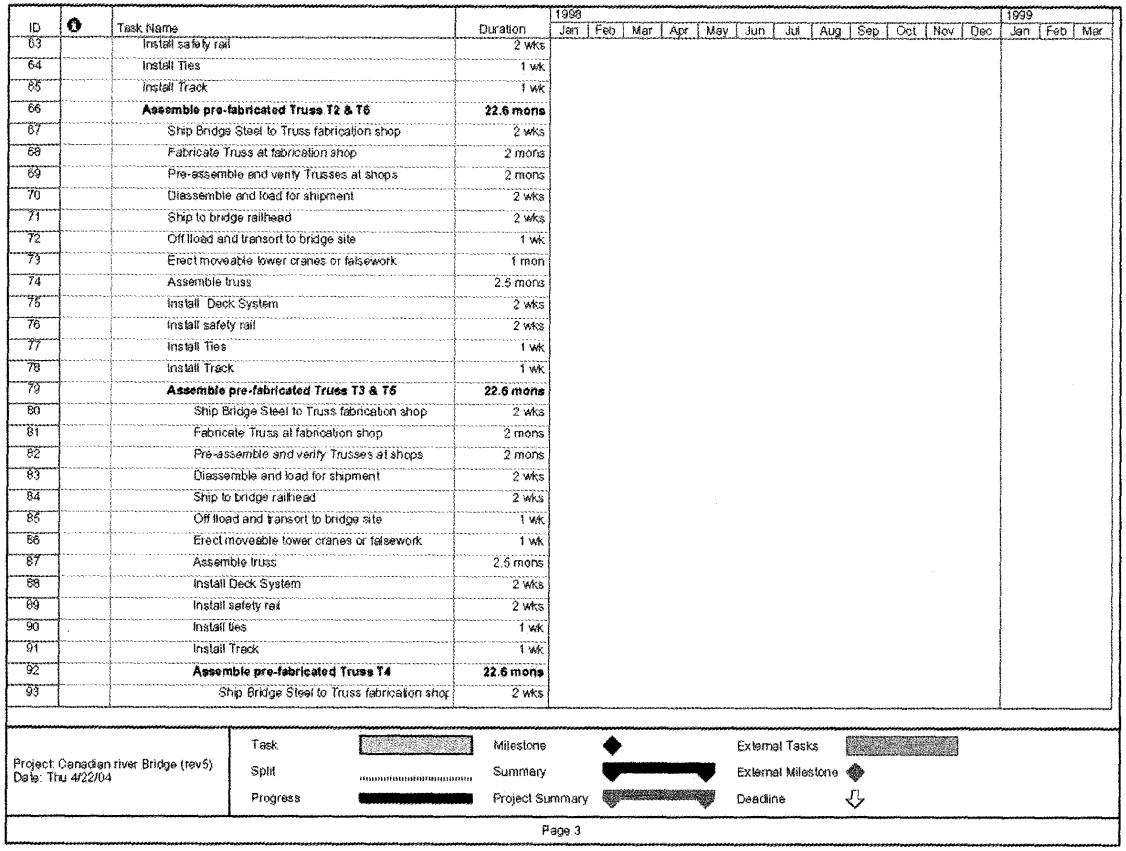
Mercer construction schedule for Canadian River Bridge

ID	Task Name	Duration
32	Place Pier cap concrete & cure	2 wks
33	Install scaffolding & walkway platforms	2 wks
34	Install/anchor Slip Form	1 wk
35	Install Rebar	1 wk
36	Pier-Mass concrete construction (16 - 18 cycles)	36 wks
37	Form Pier cap Rebar	2 days
38	Place Pier Cap, concrete & cure	2 wks
39	Emplace steel bearing plate & inject embeco grout	2 days
40	**North & South Girder Construction (PB 1-4)**	**6.75 mons**
41	Ship Bridge Steel to Girder fabrication shops	2 wks
42	Fabricate Steel Plate Girder assemblies	1 mon
43	Pre assemble and check out Girder assemblies	1 mon
44	Disassemble and load girder assemblies for shipment	1 wk
45	Ship girder assemblies to bridge site	2 wks
46	Install Steel Plate Girders	1 mon
47	Install Deck system	1 mon
48	Install safety railings	2 wks
49	Drop Ship ties to brige site staging area	2 wks
50	Install ties	1 wk
51	Drop ship Rail steel to bridge site staging area	2 wks
52	Install track	1 wk
53	**Assemble pre-fabricated Truss T1 & T7**	**23.55 mons**
54	Ship Bridge Steel to Truss fabrication shop	2 wks
55	Fabricate Truss at fabrication shop	2 mons
56	Pre-assemble and verify Trusses at shops	2 mons
57	Disassemble and load for shipment	2 wks
58	Ship to bridge railhead	2 wks
59	Off load and transort to bridge site	1 wk
60	Erect moveable tower cranes or falsework	1 mon
61	Assemble truss	2.5 mons
62	Install Deck System	1 mon



Attachment III-1 (3 of 9)

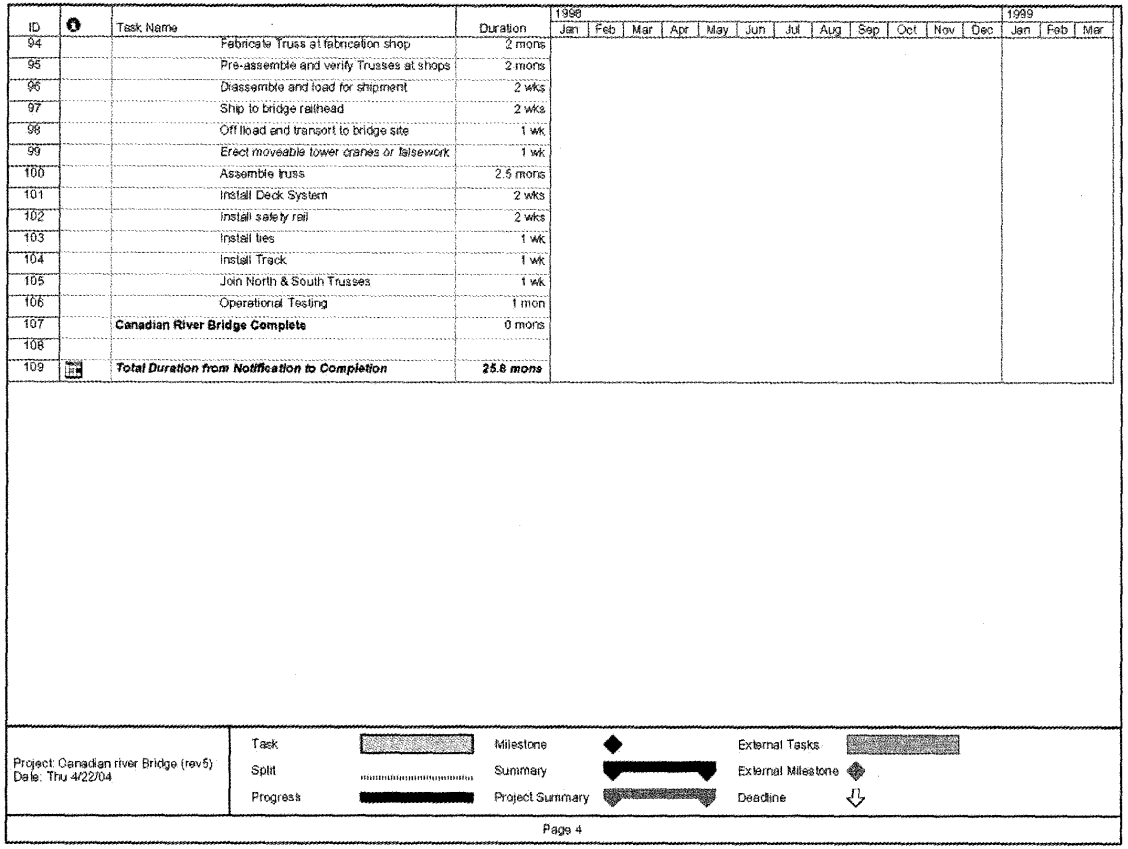
Mercer construction schedule for Canadian River Bridge



ID	Task Name	Duration
63	Install safety rail	2 wks
64	Install Ties	1 wk
65	Install Track	1 wk
66	**Assemble pre-fabricated Truss T2 & T6**	**22.6 mons**
67	Ship Bridge Steel to Truss fabrication shop	2 wks
68	Fabricate Truss at fabrication shop	2 mons
69	Pre-assemble and verify Trusses at shops	2 mons
70	Diassemble and load for shipment	2 wks
71	Ship to bridge railhead	2 wks
72	Off lload and transort to bridge site	1 wk
73	Erect moveable tower cranes or falsework	1 mon
74	Assemble truss	2.5 mons
75	Install Deck System	2 wks
76	Install safety rail	2 wks
77	Install Ties	1 wk
78	Install Track	1 wk
79	**Assemble pre-fabricated Truss T3 & T5**	**22.6 mons**
80	Ship Bridge Steel to Truss fabrication shop	2 wks
81	Fabricate Truss at fabrication shop	2 mons
82	Pre-assemble and verify Trusses at shops	2 mons
83	Diassemble and load for shipment	2 wks
84	Ship to bridge railhead	2 wks
85	Off lload and transort to bridge site	1 wk
86	Erect moveable tower cranes or falsework	1 wk
87	Assemble truss	2.5 mons
88	Install Deck System	2 wks
89	Install safety rai	2 wks
90	Install ties	1 wk
91	Install Track	1 wk
92	**Assemble pre-fabricated Truss T4**	**22.6 mons**
93	Ship Bridge Steel to Truss fabrication shop	2 wks

Attachment III-1 (4 of 9)

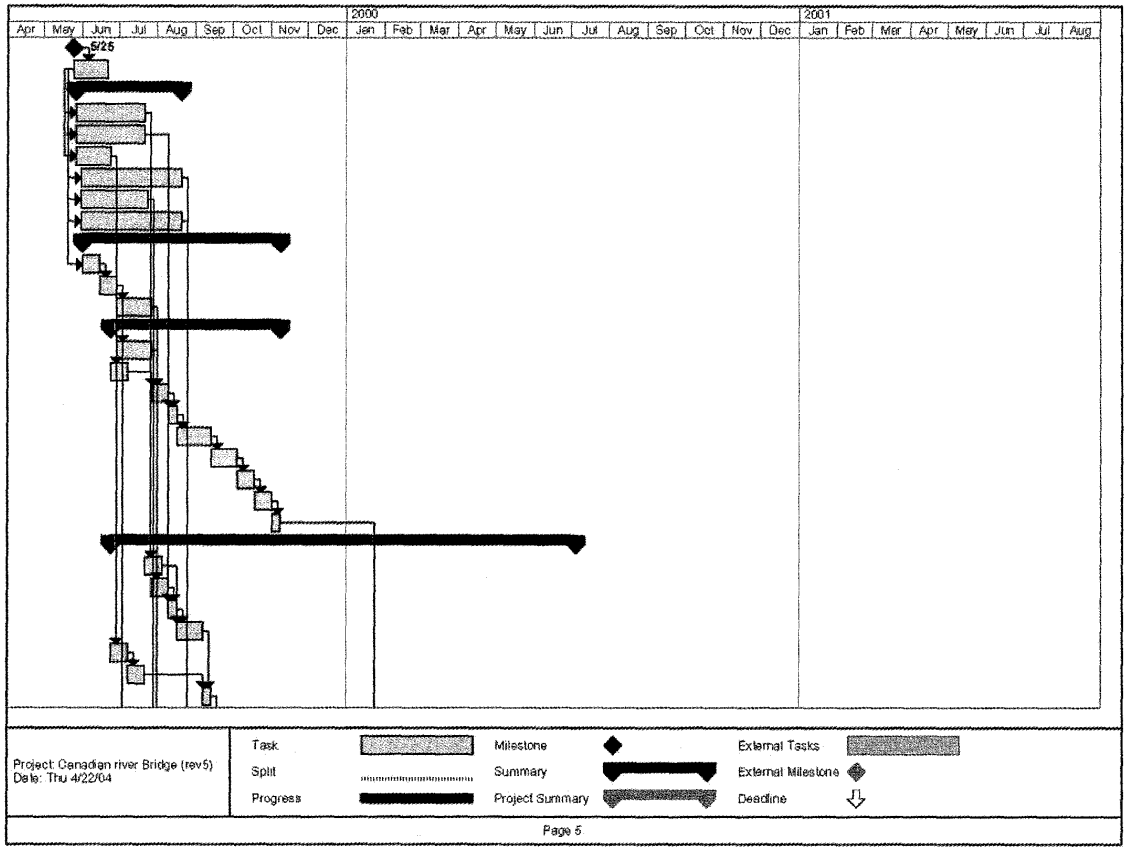
Mercer construction schedule for Canadian River Bridge



ID	Task Name	Duration
94	Fabricate Truss at fabrication shop	2 mons
95	Pre-assemble and verify Trusses at shops	2 mons
96	Disassemble and load for shipment	2 wks
97	Ship to bridge railhead	2 wks
98	Off load and transport to bridge site	1 wk
99	Erect moveable tower cranes or falsework	1 wk
100	Assemble truss	2.5 mons
101	Install Deck System	2 wks
102	Install safety rail	2 wks
103	Install ties	1 wk
104	Install Track	1 wk
105	Join North & South Trusses	1 wk
106	Operational Testing	1 mon
107	**Canadian River Bridge Complete**	0 mons
108		
109	***Total Duration from Notification to Completion***	***25.8 mons***

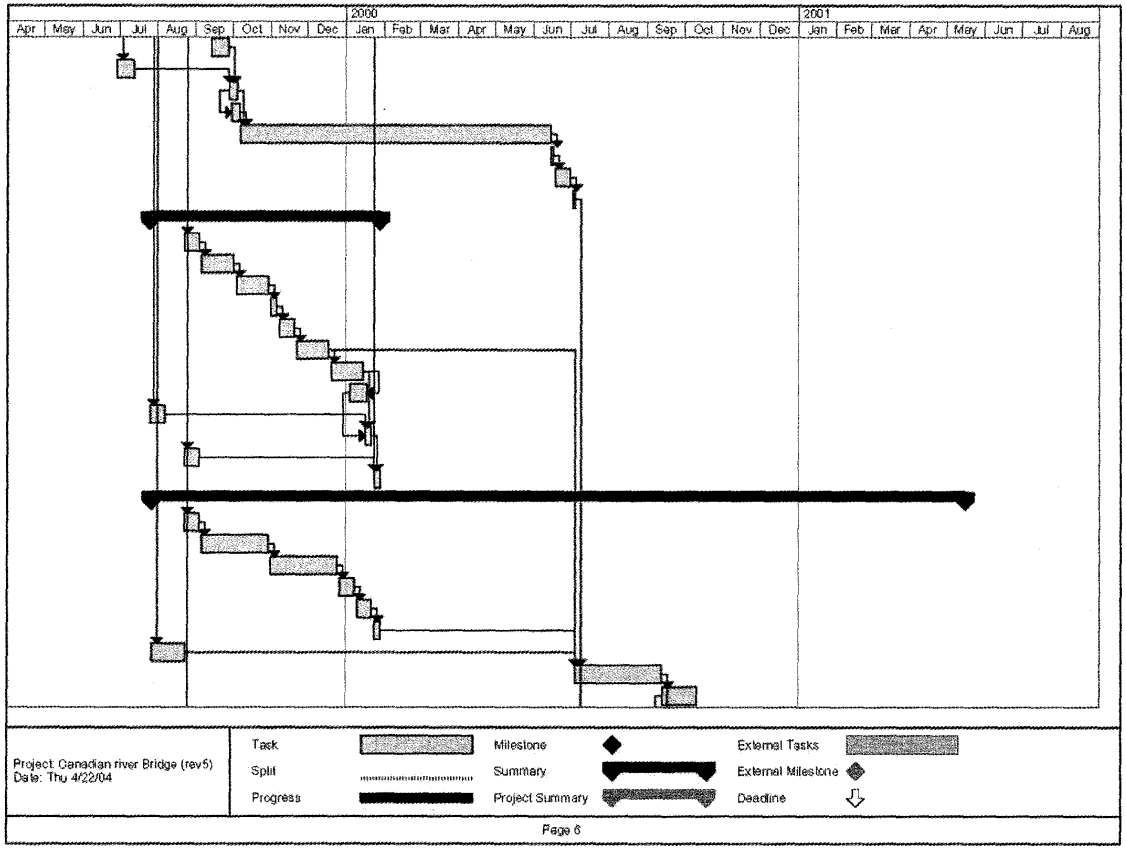
Attachment III-1 (5 of 9)

Mercer construction schedule for Canadian River Bridge



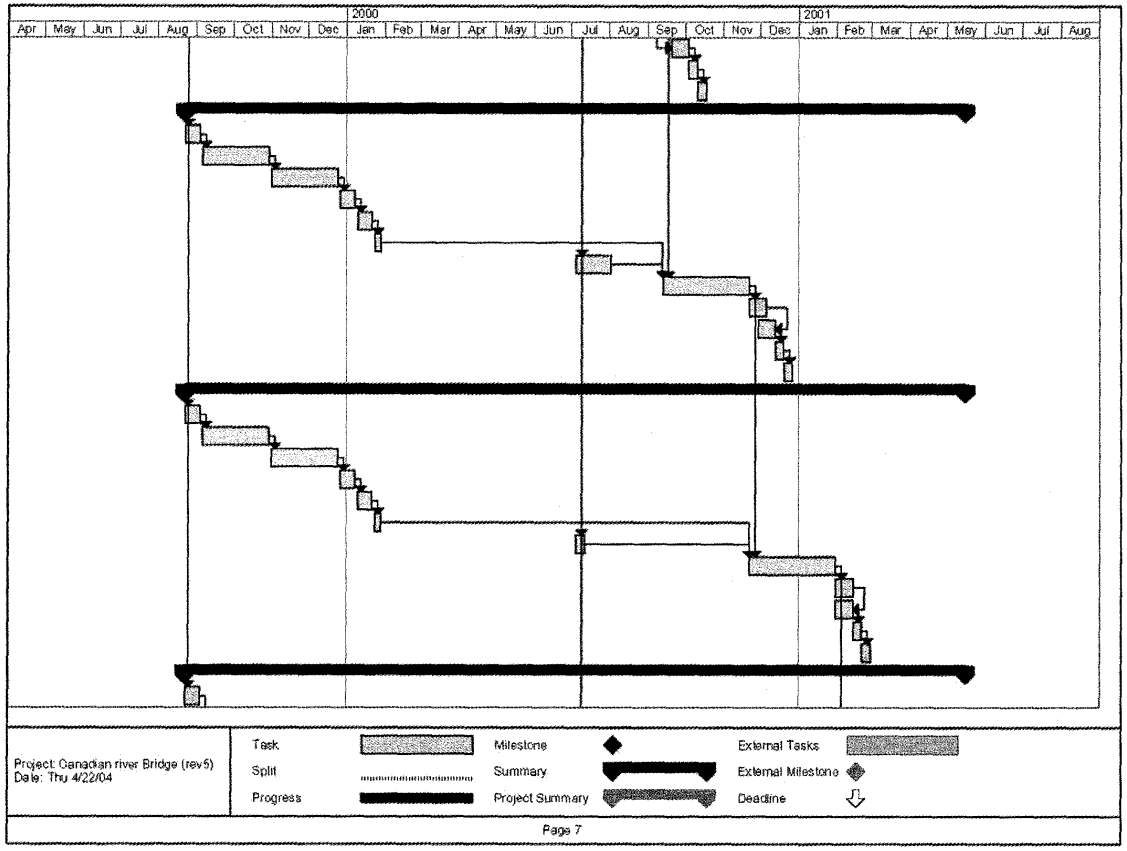
Attachment III-1 (6 of 9)

Mercer construction schedule for Canadian River Bridge



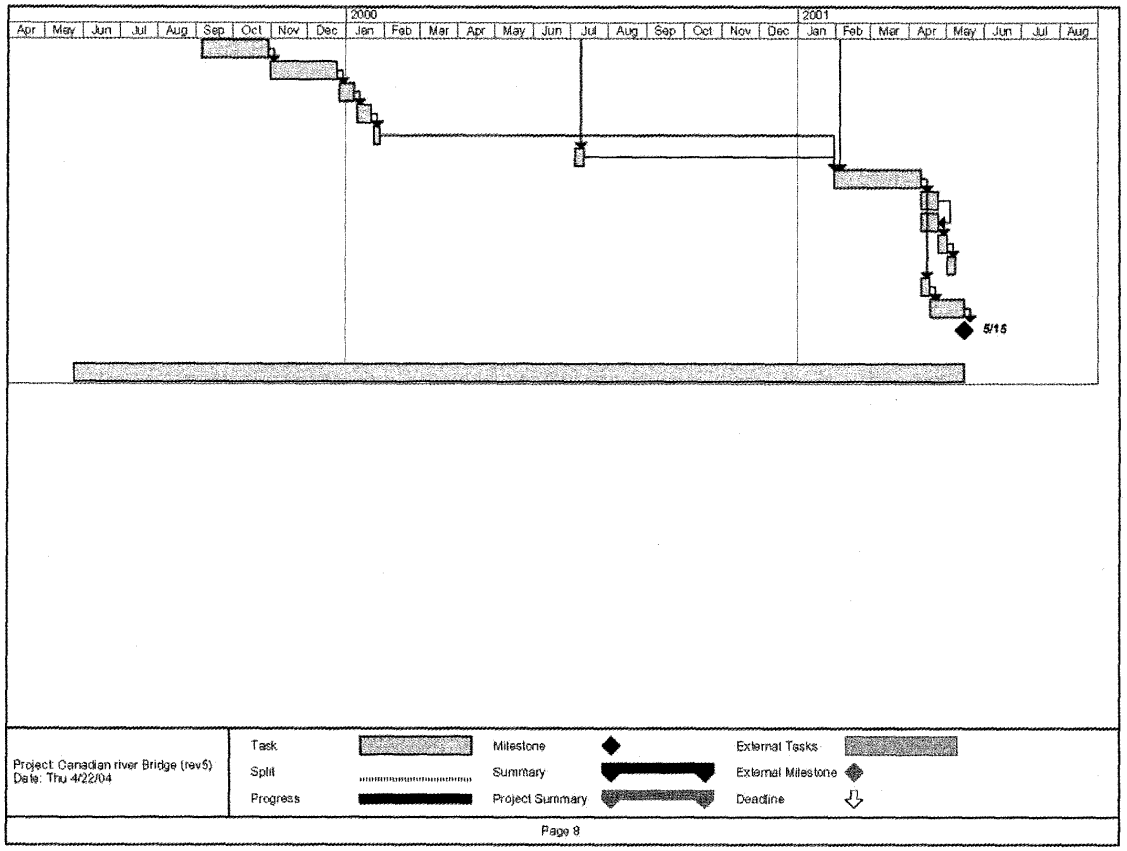
Attachment III-1 (7 of 9)

Mercer construction schedule for Canadian River Bridge



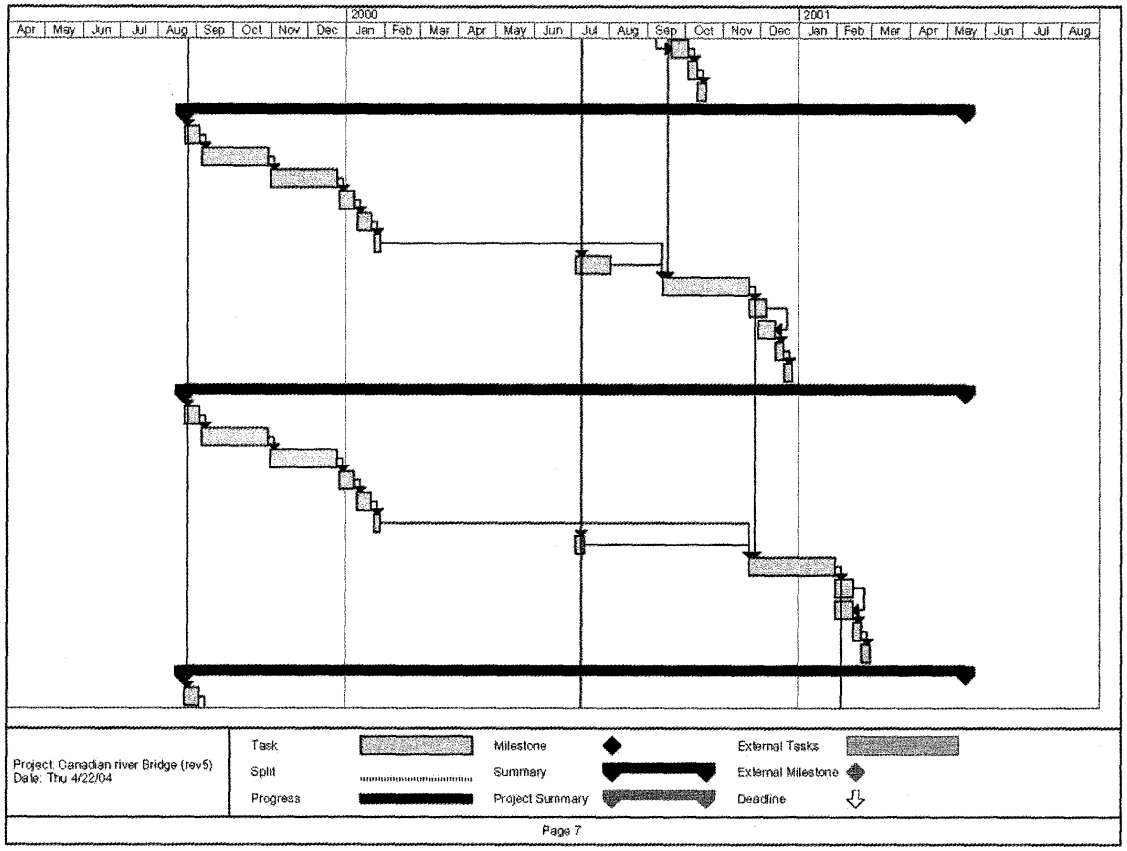
Attachment III-1 (8 of 9)

Mercer construction schedule for Canadian River Bridge

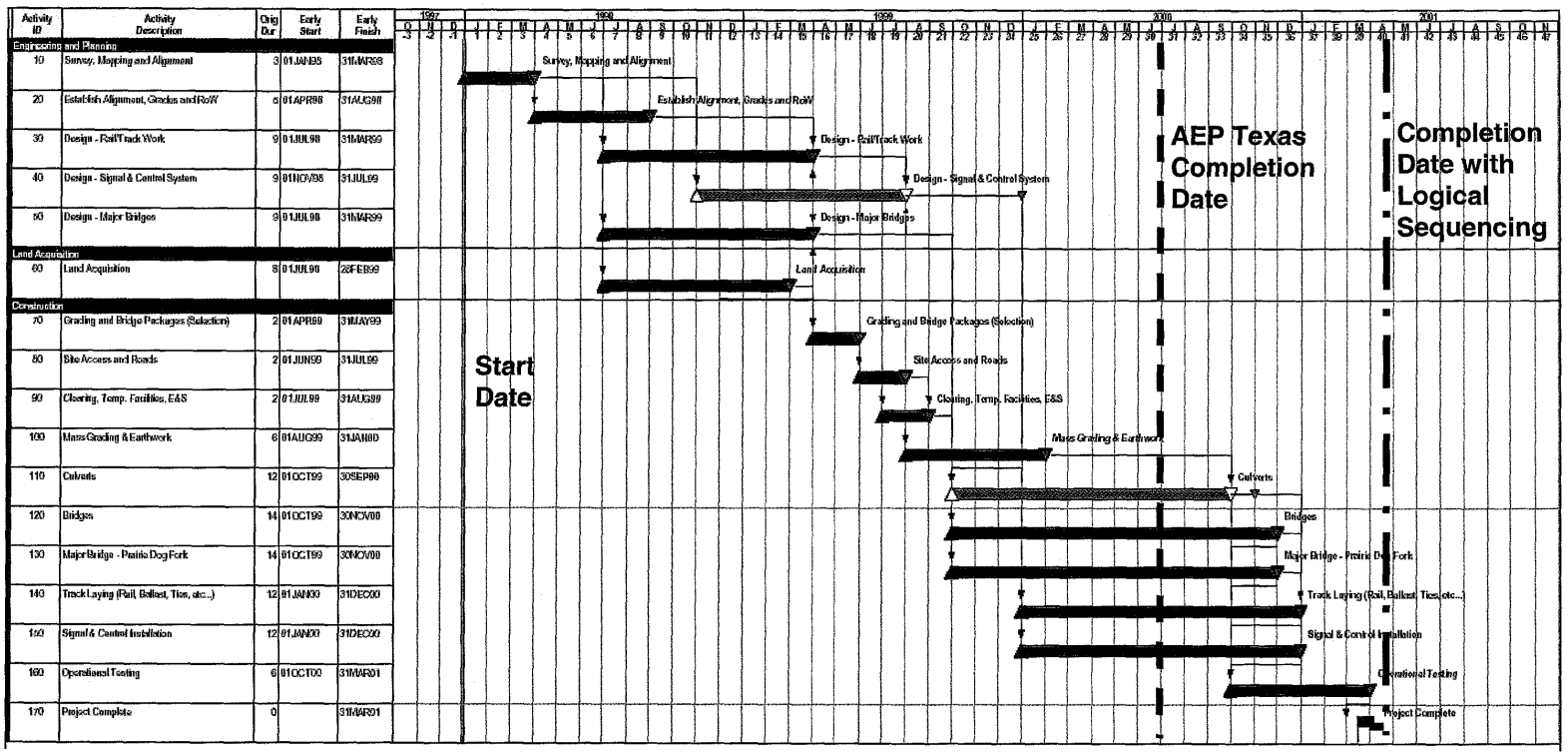


Attachment III-1 (9 of 9)

Mercer construction schedule for Canadian River Bridge



Attachment III-2
AEP Texas schedule with logic applied



Attachment III-3: Time to Complete Surveys

Technical Manual 850-02, Railroad Design and Rehabilitation, see para 4.b., states that survey measurements should be taken at selected intervals (perhaps every 100 to 250 feet):

4. INITIAL SURVEY.

a. The objective of the initial survey is to obtain sufficient information to allow preparation of initial earthwork and construction estimates and to establish a location for the track and drainage paths on maps back at the office. When the route choice is clear from the reconnaissance, the initial and final surveys are often combined.

b. The initial survey is done by approximating the routes as a series of tangents, taking elevations and cross section data at selected intervals (perhaps every 100 to 250 ft) along the route. Generally, where terrain is fairly uniform, the longer survey intervals can be used. Elevations and cross section data should also be taken at points representing a rapid change in terrain or at other points of special interest that may be useful to aid construction estimating. All useful landmarks should also be tied into the survey. Stakes need to be driven in sufficient number to clearly show the survey centerline – about every 200 to 400 ft.

c. For cross sections (nearby elevations at right angles to the route), simply take elevations at points that will show the shape of the adjacent terrain – local peaks, low points, and other points of special interest. The width of the required cross section will be dictated by the character of the terrain, right-of-way ownership, and distance needed to show local drainage and topographical features. It is not necessary for cross sections to be of equal distance on each side of the route centerline or of equal width at each station along the route.

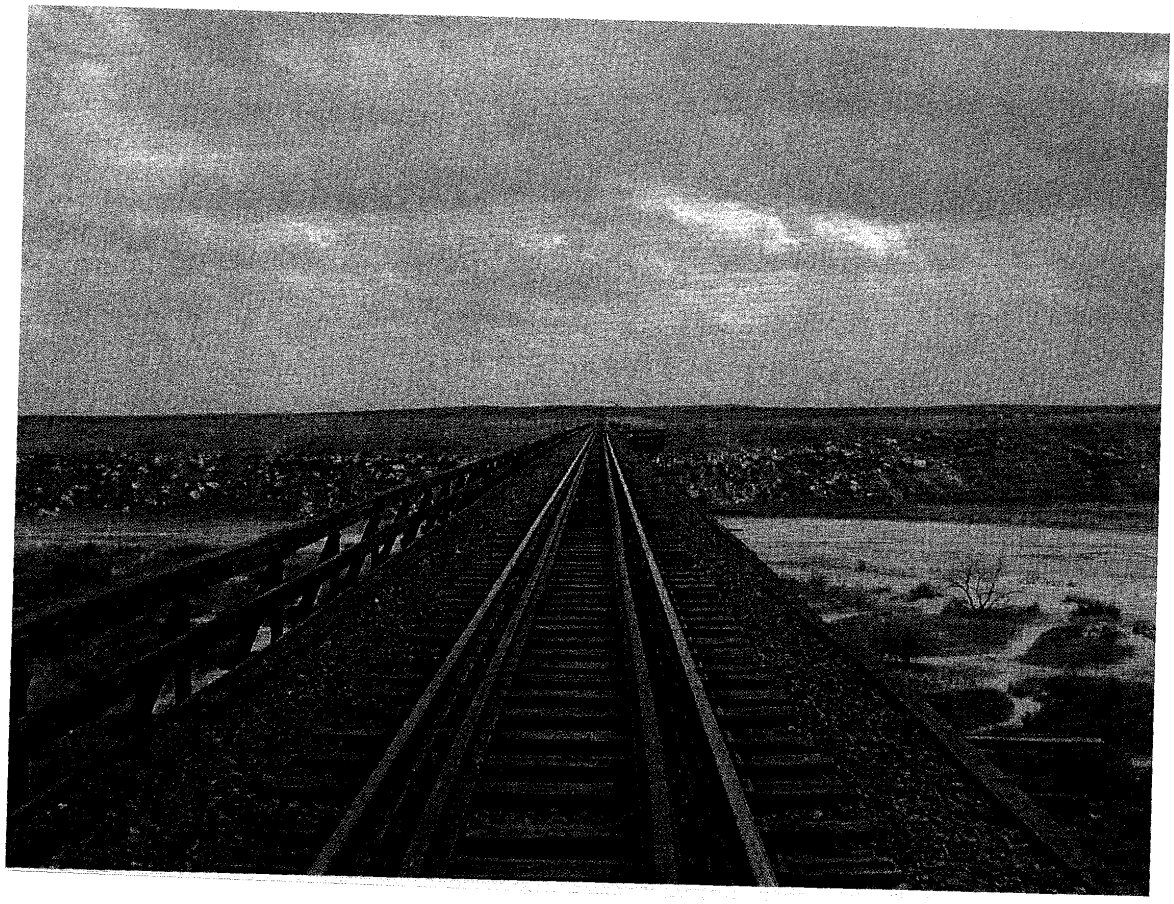
d. Where terrain is open (and easily accessible) cross section data is often taken from 300 to 500 ft on each side of the route centerline. In areas where the route location is fairly well defined, cross sections may be much narrower; sometimes only a 50-ft wide strip is needed. The situation should govern the choice of width.

For AEP's 1168 route:

- Making a survey measurement every 175 feet (the average of the 100 to 250 ft range recommended in the above specifications) would require 35,240 individual cross sections along the route, *without* considering the additional shots that would be required around curves, in rail yards, at rail junctions, etc.
- Each one of these areas would require dozens or hundreds of surveying measurements. Aggressively, a single crew likely could complete five shots per day (assuming each survey crew requires two hours per shot (to move, set up and take 1 complete set of shots, breakdown and prep to move to the next location) and 10 hours of daylight (6 months of summer)
- At this level of productivity, surveying would require over 7,000 survey crew days
- AEP proposes to complete field survey in two months (a minimum one month of AEP's total three months allocated for "Survey, Mapping and Alignment" would be required for post-survey data handling as noted below) .
- To meet this schedule would require 135 crews (each crew working 52 days based upon 6 days per week for 2 months). Additional work associated with rail yards, mountainous region, Canadian River Bridge area, other difficult surveying locations, could easily require 10-20 more crews, for a minimum total of 150 crews.
- Even ignoring resource constraints, a surveying force of this size would be unmanageable without a huge oversight structure, a structure AEP does not propose to establish.

The most aggressive, but feasible schedule, Mercer projects AEP could complete would be six months – e.g., approximately 50 surveying crews – plus a month for post-field survey data analysis.

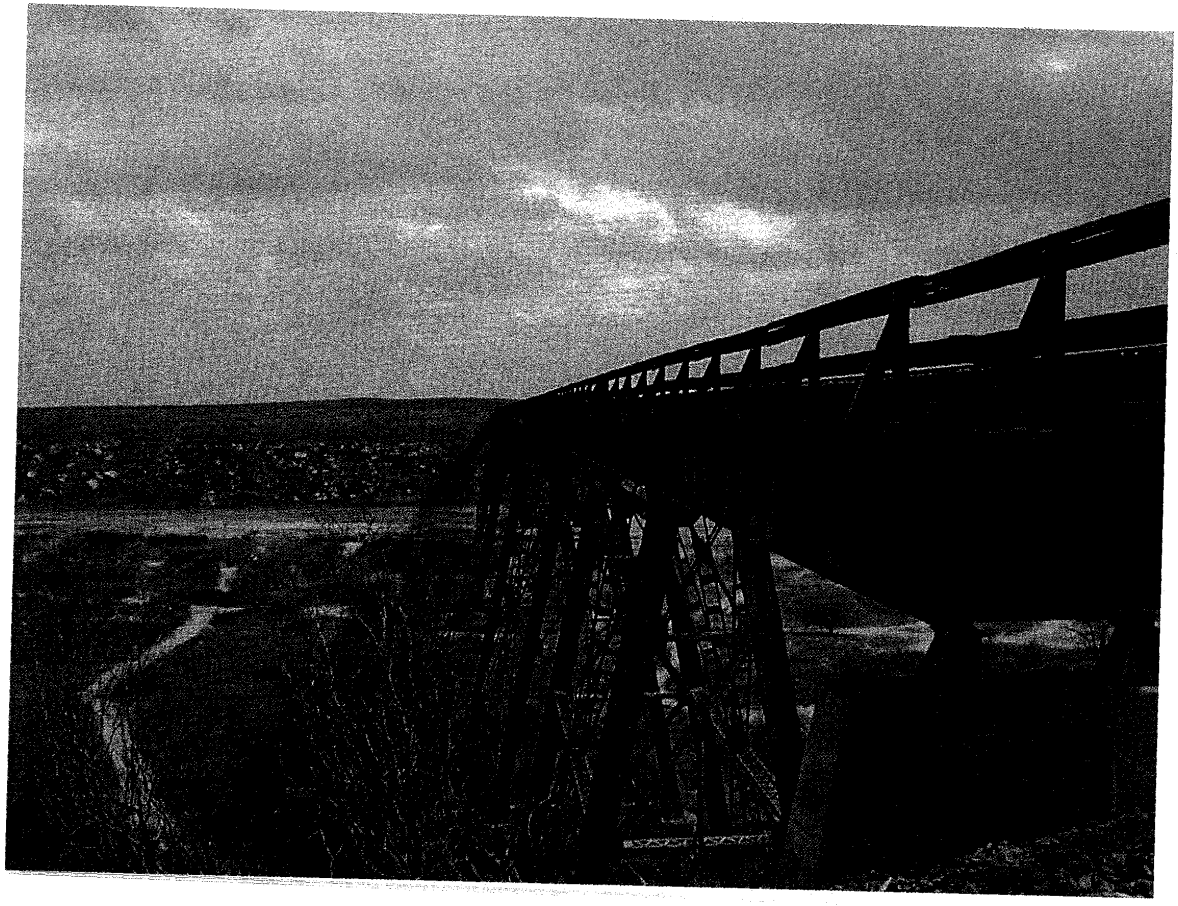
Attachment III-4A
Canadian River Bridge (1 of 3)



Attachment III-4B
Canadian River Bridge (2 of 3)

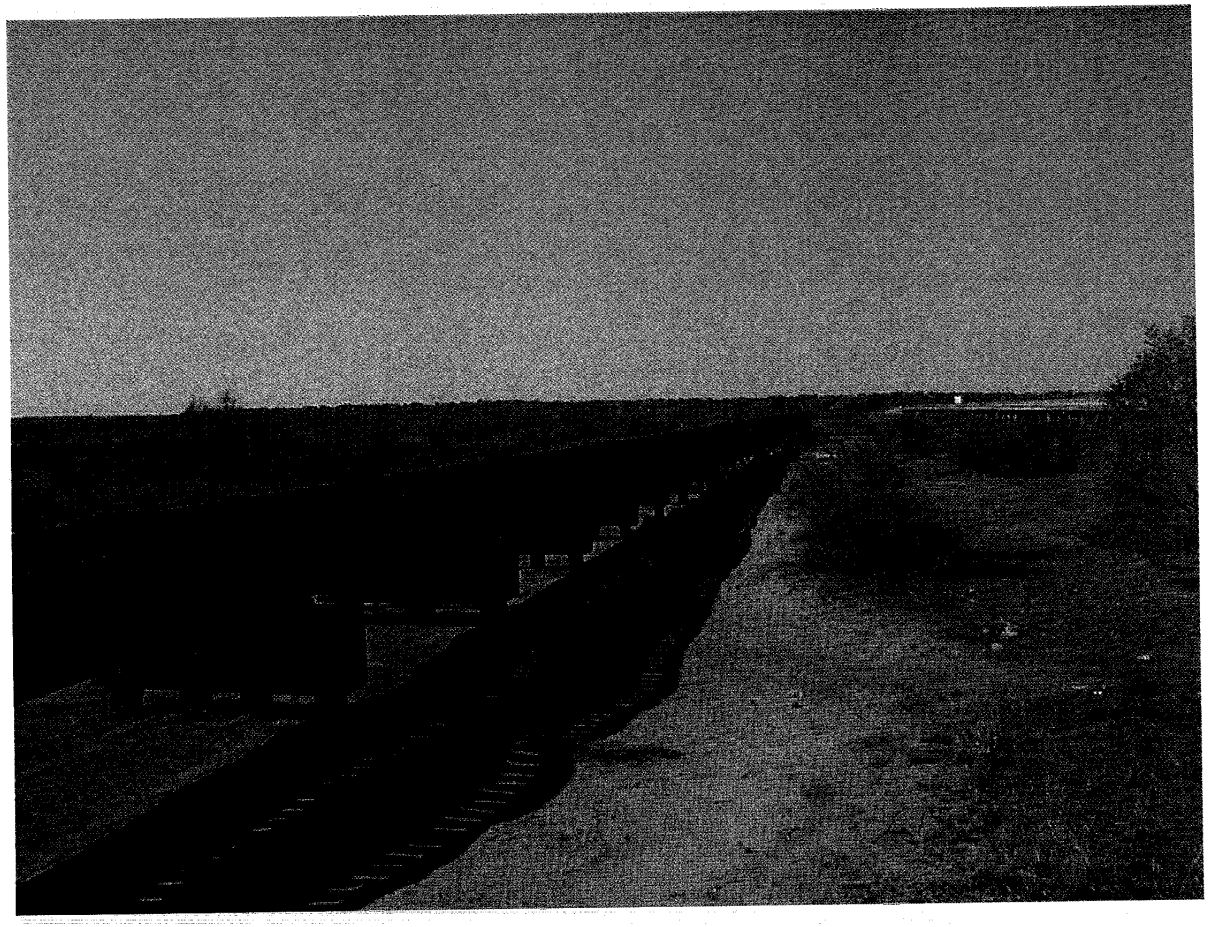


Attachment III-4C
Canadian River Bridge (3 of 3)



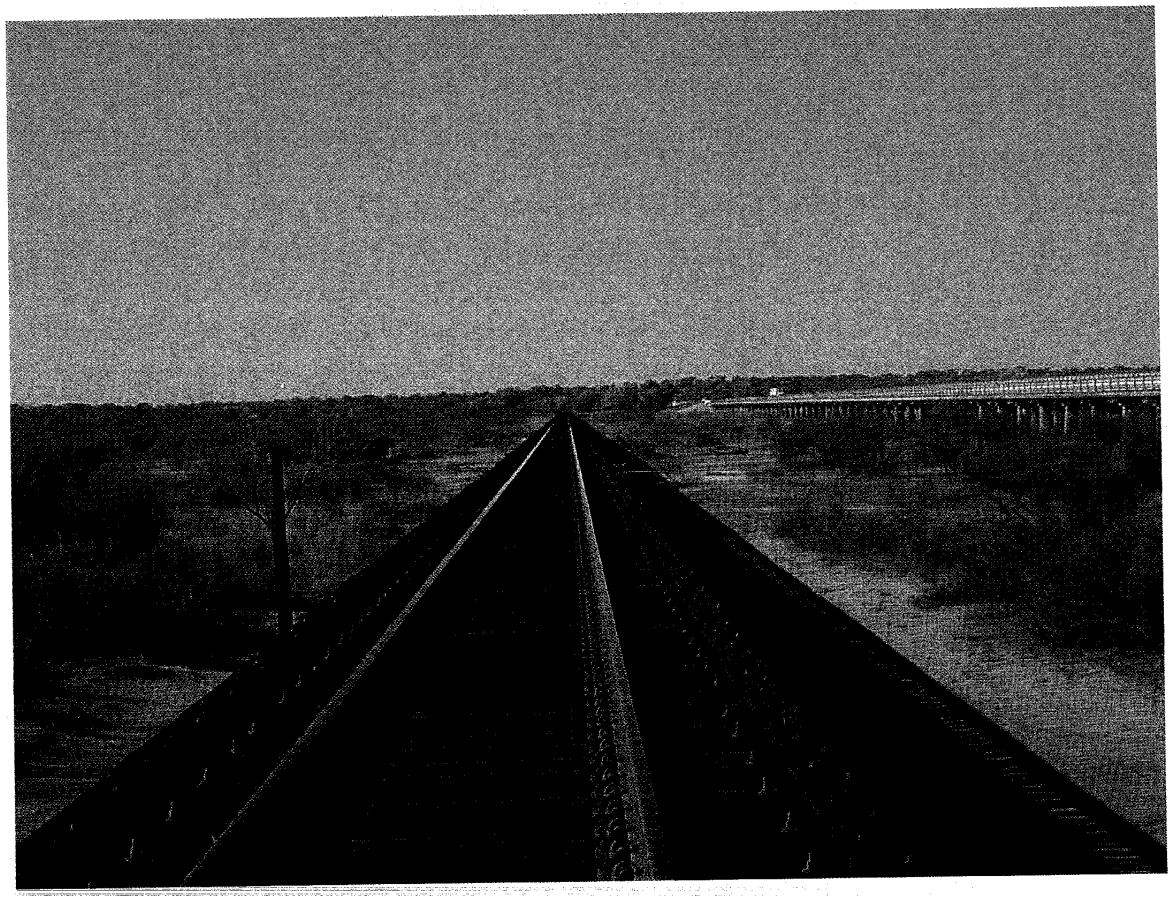
Attachment III-4D

Prairie Dog Fork (Red River Valley) Bridge (1 of 3)



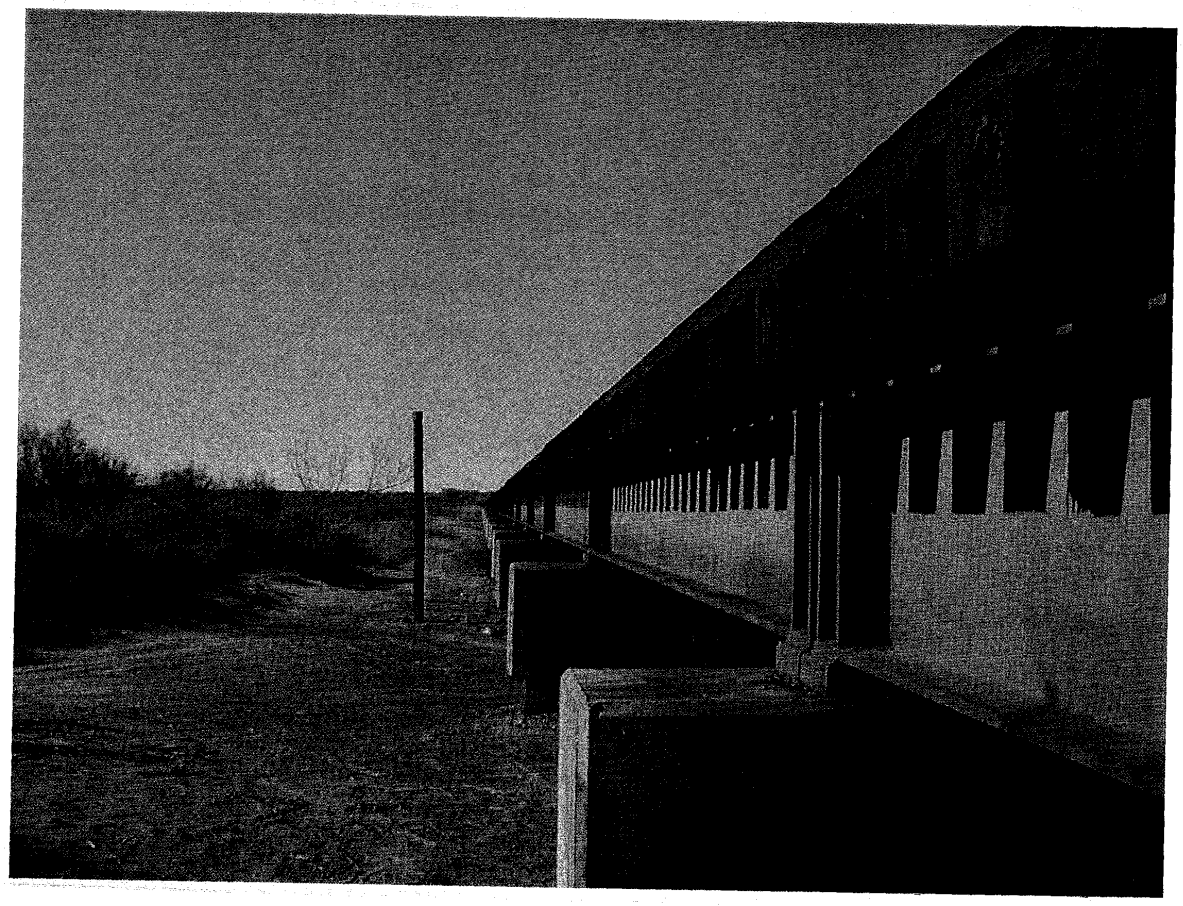
Attachment III-4E

Prairie Dog Fork (Red River) Bridge (2 of 3)



Attachment III-4F

Prairie Dog Fork (Red River) Bridge (3 of 3)



Attachment III-5 (1 of 2)

Monte Carlo simulation methodology and its uses in construction estimation

- Monte Carlo Simulation as used to determine schedule risk overcomes the limitation of traditional more simplistic schedule development procedures.
- Estimated activity duration tends to be the first driver of expected project duration, in particular in the use of the Critical Path Method of scheduling.
- Activity duration is typically represented by a single number and thus represents the estimators single point value for the duration of a project task. A schedule using only a single value for each project task therefore will lead to a deterministic answer, sometimes confused with and perceived as the "right answer."
- That solution represents only one solution for one particular simulation of ALL possible outcomes. In view of the complexity and uncertainty surrounding most of the estimated durations this is clearly not a solution generating a high degree of confidence.
- Monte Carlo Simulation improves on the basic simplistic approach by repeatedly and randomly selecting a task duration within the estimators prescribed duration limits and according to the prescribed likelihood of a particular duration actually occurring and applying these values to the project schedule model.
- A Monte Carlo Simulation repeats this process hundreds of thousands of times thus "building the project" according to the model in millions of possible combinations generating a distribution of possible outcomes, some better than the single point estimate, some worse.
- By building the project in this way, millions of times on paper, it is possible to see and record the effect of not meeting all the milestones, durations and so on. The result is that one may see the effect of this myriad of combinations on the total project duration and assess the probability of a particular outcome.
- This information in return allows the project stakeholders to realistically set their expectations with regard to good and bad outcomes.

Attachment III-5 (1 of 2)

A simple example.

- A simple example will serve to illustrate the point.
- If a project consisted of only one task and that task were determined to range anywhere between 1 to 6 days, and it was equally likely that it could take anywhere from 1 to 6 days it would have a uniform distribution. The duration of such a task could be modeled with a die.
- Any roll of the die would produce one of the possible durations, 1 - 6. Because each roll of the die is independent, therefore equally likely to produce any one of the numbers, after an infinite number of rolls the number of times 1 occurs would be equal to the number of times 5 occurs and so on.
- Nothing would be gained by running the simulation in a one task, uniform distribution environment.
- Think now about two tasks having the same uniformly distributed duration possibilities ranging from 1 – 6. If task A comes up with a duration of 6 and task B with a duration of 3 you get a project duration of 9. Repeat this process a million times and you will end up with a distribution of likely outcomes that centers around the number 7. This is because there are more ways to make 7 than any other combination. (1-6) (6-1), (2-5) (5-2), (3-4) (4-3). Thus your single highest probability project duration will be duration 7. (Think CRAPS)
- One should quickly grasp that even only slightly more complex systems immediately benefit from this type of simulation since it quickly becomes nearly impossible to arrive at a reasonably quantitative solution by the "seat of the pants" single value estimate.

III.G: Discounted Cash Flow Analysis

EXHIBIT III.G-1

MAY 18, 2004

DECLARATION OF RICHARD S. HIGGINS AND FRED S. McCHESNEY

I. INTRODUCTION

In this declaration, we address the proposal made to the Board by American Electric Power (AEP) for a reduction in rates charged by The Burlington Northern and Santa Fe Railway Company (BNSF) in the event the Board should conclude that revenues for the TNR exceed its stand-alone costs. The report begins by introducing the concepts concerning Ramsey pricing that are relevant to Board decisions on this issue. Given that Ramsey pricing is supposed to ensure revenue adequacy while constraining prices, it is critical to understand that BNSF is not revenue-adequate. Moreover, any reduction in rates will only add to the current inadequacy. The threats to optimal Ramsey pricing and revenue adequacy are even greater when a complaining shipper is permitted to use cross-over traffic revenues in the application of the stand-alone cost (SAC) test. Even if cross-over traffic were not an issue, AEP's proposed reduction method yields rates that are inconsistent with the Ramsey rule, as we demonstrate in Appendices A and B.

II. RAMSEY PRICING: THEORY[1]

A. Ramsey Pricing Without Entry or Exit Costs

The STB has adopted Ramsey pricing as the theoretical underpinning of its standard of reasonableness for rail rates that exceed the statutory thresholds (rates that create revenue/variable cost margins in excess of 180%). To quote its 1983 Interim Coal Rate Guidelines decision, "It is only through a demand-based pricing system that the non-attributable costs can be allocated in an efficient manner."[2] And "Ramsey pricing analysis yields economically efficient rates, because the resulting rates do not bias the demand patterns that would be achieved under marginal cost pricing."[3] Ramsey prices have desirable properties that are particularly important for natural monopoly enterprises in ways we now explain.

Natural monopoly enterprises exhibit substantial economies of scale and scope; as a result, a single such multi-product enterprise is capable of supplying all demanders at least cost. However, because of fixed sunk costs, an unfettered natural monopoly would charge prices in excess of marginal cost, creating the familiar welfare losses associated

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[1] The theoretical discussion in this section is based on the following texts: W. J. Baumol, J. C. Panzar and R. D. Willig, Contestable Markets and The Theory of Industry Structure, Harcourt Brace Jovanovich, Inc., New York, 1982, and K. E. Train, Optimal Regulation, MIT Press, Cambridge, Mass., 1994.

[2] Coal Rate Guidelines, Nationwide, ICC Decision, Ex Parte No. 347 (SUB-No. 1), February 8, 1983, p. 9.

[3] Ibid., p. 9.

with monopoly. In such instances, various government regulations have been used to restrain the monopolist's pricing.

In a first-best world, all private enterprises would charge marginal cost prices; marginal-cost pricing is first best because, given a distribution of wealth, marginal cost pricing maximizes social welfare (the sum of consumer and producer surplus). The hitch is that even if it were possible to force natural monopolies to price at marginal cost effectively, these enterprises would soon disappear without subsidy because long-run marginal cost is below average cost for such enterprises due to economies of scale and scope. That is, such enterprises are not able to cover all of their costs when their prices equal marginal cost. Some policy makers have advocated marginal cost pricing anyway, with provisions to subsidize the nonviable enterprise with tax revenues raised with special lump-sum taxes. Most public-policy economists have eschewed such advice as impracticable.[4] In its place other forms of regulation have been advocated. That adopted by the Board seeks to induce Ramsey pricing.

Formally, Ramsey prices are determined as solutions to a mathematical constrained optimization problem. Specifically, the regulator seeks to enforce prices that create revenues that (a) just cover the total costs of the enterprise, and at the same time (b) maximize social welfare. It has been found that the prices that satisfy the conditions for such a constrained welfare maximum have some appealing properties. For instance, each customer pays a price that is at least equal to marginal cost. Moreover, based on the rates charged a group of customers, no group generates revenues short of the incremental costs of serving them (their long-run forward-looking attributable costs). In other words, Ramsey prices assure no cross-subsidization; every shipper (or group of shippers) covers its own marginal (incremental) costs and contributes to common costs in proportion to its willingness to pay. That is, the shippers with the least elastic demands will contribute most to defray the burden of common costs.

This no-cross-subsidization proposition applies to all customers of the enterprise. More important for the present proceedings, the no-cross-subsidization proposition applies to all subgroups of customers of the enterprise. Therefore, with Ramsey pricing, no stand-alone railroad (SARR) could be formed that could possibly serve a group of customers at rates lower than existing rates without requiring a subsidy to its viability.[5]

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[4] Even lump-sum transfers are likely to have distortionary allocative effects as lump-sum taxes are rarely used, and the most widely used taxation method, income taxes, distort individuals' work/leisure choices.

[5] To see why this is so, recognize that an existing firm in a market without entry and exit costs will add additional movements (and the facilities to handle these movements) whenever the revenues generated by the movement exceed the marginal costs of handling the movement; conversely, it will eliminate the movement whenever the marginal costs it would save by doing so are higher than the revenues generated by the movement. In a long run steady state environment, therefore, this participant will evolve to a point at which net revenues will be reduced by *either* adding or eliminating a movement, and overall revenues will be just sufficient to cover the long run forward-looking costs of the participant's system. At that point, eliminating any movement or group of movements from the system would raise the total cost of handling the remaining movements, because whatever contribution is being made to joint and common costs by the eliminated movements would be lost, requiring the remaining movements to defray these costs in their entirety.

This crucial point follows from the fact that Ramsey prices are sustainable prices. Even if entry and exit were costless, a natural monopoly charging Ramsey prices could not be displaced by an entrant of equal efficiency. Under these zero-cost assumptions, a natural monopoly would charge rates that enabled it just to cover the long-run costs of an optimally scaled enterprise, including the relevant cost of capital, and these rates would nullify any incentive for entry by any rival because the Ramsey rates reflect a complete absence of cross-subsidization.

Markets exhibiting such performance are called "contestable" markets: "in order to avoid competitive entry, an enterprise operating in contestable markets must set its prices so that all categories, subcategories and groups of outputs are priced in a compensatory fashion [Ramsey prices are "compensatory." (Authors' insert)], to yield incremental revenues between stand-alone and incremental cost. In this way the mere possibility of competitive entry can prevent all cross subsidies (pp. 355 – 356)."[6] That is, a potential entrant could not engage in "cream skimming," because there simply is no cream relative to the long-run incremental costs. Again, the implications for creation of a putative SARR are clear: with Ramsey pricing, no (SARR) could be established to serve a group of customers at rates lower than existing rates without requiring a subsidy to its viability.

B. Ramsey Pricing With Costly Entry and Exit

Of course, conditions of zero entry and exit costs are virtually non-existent in the real world, because the capital costs of facilities and infrastructure are usually sunk. For railroads in particular, once the track is laid and other necessary facilities are built, they cannot be diverted economically to other uses in other markets. These sunk costs act as entry barriers even in the face of monopoly pricing; thus, they sustain monopoly prices even when there are no regulatory prohibitions on entry. The reason is that a potential entrant cannot rationally rely on pre-entry prices when calculating the profitability of entry; it must look to post-entry prices.

Unless there is a shortage of capacity in the market prior to entry, post-entry prices will fall below long-run costs because the incumbent and the entrant will face each other in competition with sunk capital investments whose costs need not be covered in the short run. One might think that the potential entrant could simply sign customers up to long-run contracts at more favorable rates than those charged by the monopolist absent entry. However, the incumbent would be able to beat the prices being offered by the potential entrant, which would effectively bar entry whenever these prices were below long-run average costs.

Without zero entry and exit costs, true contestability is unattainable. So, absent the necessary conditions for contestability, regulators sometimes attempt to simulate contestability. This is just what the STB intends with the "Constrained Market Pricing"

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[6] See Baumol, Panzar and Willig, Op. cit., pp. 355– 356. The proof that Ramsey prices will sustain an incumbent natural monopoly against complete or partial entry—that is, that Ramsey prices are subsidy-free--is given in Chapter 8, pp. 192-217.

(hereafter, CMP) principles that it codified in its Coal Rate Guidelines of 1983 and 1985.[7] The Board reasoned that it could simulate contestable markets through regulation by allowing captive shippers subject to market dominance to show evidence that at existing rail rates a hypothetical stand-alone railroad (a SARR) capable of serving the complaining shipper could be constructed whose revenues would exceed its stand-alone costs (SAC).

Because no actual entry would be required, the presence of sunk costs would not prevent the complaining shipper *qua* hypothetical entrant from demonstrating that existing rates are not sustainable rates. The Board further presumed that application of this SAC test in response to shippers' complaints and evidence advanced by the relevant shippers would act to simulate contestability conditions, which in turn would discipline incumbent railroads to price according to Ramsey principles.

In other words, the STB envisioned that incumbent railroads would view the threat of rate hearings in which a SAC test would be applied as the effective equivalent of the threat of costless entry and exit. Thus, to the extent that the regulatory apparatus worked quickly and with minimal friction, natural monopoly railroads would be led as if by an "invisible hand" to set Ramsey optimal rates.

III. ASSIGNING CROSS-OVER REVENUES TO THE SARR DISCOURAGES RAILROADS FROM CHARGING RAMSEY RATES

A. The Revenue Adequacy Constraint

Based on the foregoing discussion, there are two properties of Ramsey pricing that make it an attractive solution to pricing by a natural monopolist. First, buyers (here, shippers) pay in accordance with their willingness to pay. Second, those payments are sufficient to cover sellers' (here, railroads') sunk costs, thus generating revenues adequate to sustain optimal capacity levels over time.

These advantages of Ramsey pricing are not just a matter of economic theory. The STB has a statutory obligation to promote the revenue adequacy of U.S. railroads, and has stated its adherence to the concepts of Ramsey pricing, which should foster an environment in which revenue adequacy would be achievable by an efficient railroad. It might be expected therefore that, whenever a defendant railroad in a rate-challenge case demonstrates it is not earning adequate revenues, the case would be over, because the rates charged must already, by Ramsey standards, be too low. Instead the Board appears to be concerned that revenue inadequacy could be caused by the existence of excess capacity, *i.e.*, capacity associated with sunk-cost facilities that would be abandoned when fully depreciated. For this reason the Board determined to apply a stand-alone cost (SAC) test to selected portions of the overall railroad as a way of testing shippers' claims that the railroads were using an "inflated rate base" to justify unreasonably high rates that were cross-subsidizing rates on other traffic.

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[7] See Op cit, Coal Rate Guidelines, 1983 and Coal Rate Guidelines, Nationwide, ICC, Ex Parte No. 347 (Sub-No. 1), August 8, 1985.

It is important first to observe that while the existence of such excess capacity was likely at the time the Coal Rate Guidelines were established, we understand that the railroads have engaged in substantial plant rationalization since that time through abandonments and other measures. This strongly suggests that today a railroad's revenue adequacy is more likely to be influenced by factors, including the threat of rate regulation, that lead railroads to price at sub-Ramsey levels than by the existence of excess capacity. Furthermore, even if some excess capacity continues to exist, there is no evidence of which we are aware that the existence of this excess capacity is the result of managerial inefficiencies. The very fact of sunk costs means that, with exogenous changes in demand and other conditions, investments that made economic sense when they were made may come to be less profitable over time. Sunk cost in the presence of changing supply and demand conditions, including those that derive from changes in regulations, or the way regulations are applied, means that capacity will not be scaled perfectly to the current conditions at every moment and, even after allowing for anticipated ups and downs in the economy and the rail transportation sector in particular, there may be over-capacity from a long-run perspective. In short, existing excess capacity does not indicate inefficiency; quite to the contrary, BNSF would be acting irrationally to forego revenues that cover specific variable costs and in addition contribute some amount -- however small -- to defraying sunk costs, whether attributable or not attributable to the services generating the revenues.

Revenue inadequacy implies that either the entire BNSF system would be abandoned were all costs variable, or that some part of it would. We are unaware of any credible evidence that abandoning the entire BNSF rail network would be efficient if there were no sunk costs. If continued investment in some part of the BNSF is inefficient, there are Ramsey prices that will sustain the complementary, efficient part absent a downward regulatory bias.

In the next section, we explain how permitting cross-over revenues to be claimed by plaintiffs in applying the SAC test almost certainly contributes to the revenue inadequacy of the railroads. We wish to be clear, however, that we recognize that there may be limited circumstances in which reduction of existing rates – and the consequent exacerbation of revenue inadequacy – could be justified. Existing rates may not be Ramsey rates, even on those parts of the incumbent railroad that are viable in the long run and in some instances railroads might be able to exercise undue market power over captive shippers. In addition, existing rates may through long-run contracting reflect competitive conditions that were present several ago but which do not any longer apply.

Instead, our concern is that an improper implementation of the SAC test may reduce the revenue adequacy of the *efficient* portions of the incumbent railroad, even when the railroad is charging Ramsey prices to all the shippers using the SARR facilities. In particular, allowing cross-over traffic revenues to be employed in implementing the SAC test presents this potential for social harm, and undermines the Board's regulatory goals to induce approximate Ramsey pricing.

B. Cross-Over Revenues and Revenue Adequacy

The harmful effects of allowing cross-over traffic revenues in the SAC test is most readily illustrated by assuming that initially the incumbent railroad is charging Ramsey rates on the long-run viable portion of its system. Under these circumstances the railroad is doing just what the Board desires that it accomplish through application of its CMP principles. Furthermore, for the reasons articulated above, in the absence of any cross-over traffic revenues, no SARR exists that would generate revenues in excess of stand-alone costs. If Ramsey rates are in effect over the entire rail system, then no sub-part of the line offers any incentive for a different railroad to enter and begin to ship over the line (or sub-part of the line).

However under these same circumstances, a shipper that is permitted to use cross-over traffic in constructing a SARR could almost certainly define a shipper group to which it belongs, and create a hypothetical SARR to serve that shipper group, whose revenues would exceed the stand-alone costs of the hypothetical SARR. This would predictably happen because, by virtue of our threshold presupposition of Ramsey rates for the incumbent railroad overall, the total-system contribution of the cross-over traffic is at least equal to its attributable incremental cost. But when the gross revenues generated by the cross-over traffic are allocated to the complainant's SARR, the protesting shipper is allowed to claim net revenues without being held responsible for the attributable fixed costs required to achieve those net revenues.

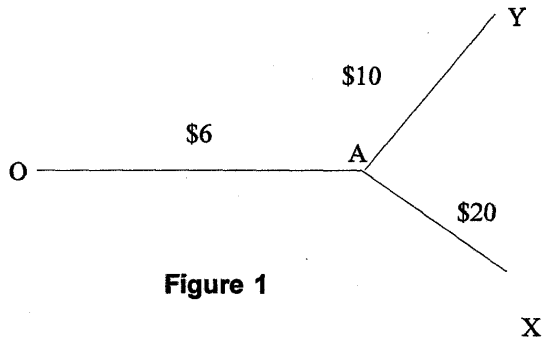


Figure 1

C. Illustration

We here provide a simple schematic example. In Figure 1, the incumbent system is represented by two freight movements, *i.e.*, (1) from O to Y, via A, and (2) from O to X via A. Shipper X ships to point X; shipper Y ships to point Y. The long-run costs to the railroad are $6 for OA, $10 for AY and $20 for AX. (Neither shipper is located at A.)

Suppose that initially Ramsey rates are charged; thus, the rate charged the shipper at Y provides revenues net of the railroad's variable operating cost at least as large as $10, Y's incremental cost, and the variable margin at X is at least as large as $20, X's incremental cost. Further, *rates* charged to the two shippers, are sufficient to generate contributions at Y in excess of $10 and at X in excess of $20 so that combined the excess just defrays the common costs associated with the segment 0A. Thus, the shippers at Y and X will share

in defraying the common costs, $6, in proportion to their inverse elasticities of demand. That is, the shipper less able to substitute away from using the railroad at the rates that cover its attributable costs will shoulder a larger burden of the common cost component. Assume that shipper is shipper Y, who pays $5 of the common costs of $6. Shipper X, with greater demand elasticity, pays $1. Total shipping costs are thus $15 for Y and $21 for X. Under the terms of our hypothetical, the rates thus are Ramsey prices, even though one shipper is paying more to defray the railroad's common costs than another.

From this starting point, suppose that the shipper at X is free to protest its rate. It creates a SARR with costs equal to $6 + $20 plus the variable operating costs of meeting its demand at X. Based on existing revenues, it follows from the Ramsey assumption that the SARR's revenues will cover all variable operating costs plus the attributable incremental cost of serving X, $20, and also some portion of the common segment's cost. Clearly, no such SARR would be proffered by a plaintiff because there would be under-recovery of SAC, which contains the entire common cost of $6.

Suppose however that the SARR could provide transportation to shipper Y from 0 to A, which traffic would then be carried from A to Y by the so-called residual railroad, *i.e.*, suppose the SARR can be constructed using cross-over traffic. The Ramsey pricing premise dictates that all of 0Y revenues exceed variable operating cost by at least $10, which in our illustration is $15. Thus, if the complaining shipper can persuade the Board to allocate a sufficiently large portion of the $15 contribution from shipper Y to its SARR, it would be able to convert under-recovery to over-recovery. Specifically, if shipper X were successful in arrogating to itself more than $5 of Y's $15 in cross-over contribution, it would be able to demonstrate that revenues exceed SAC.

The implication of allowing cross-over revenues then is to encourage shippers to bring cases without merit before the Board. The impact of rate relief for the incumbent railroad's revenue adequacy under such circumstances is clear whenever its rates are Ramsey rates for a part or all of the system: the incumbent railroad's financial viability will suffer. Thus, allowing cross-over revenue to defray the SAC of the SARR enables a complaining shipper to manipulate the SAC test, which is at the heart of the Board's CMP principles, which were designed to enforce a competitive outcome in the absence of any real competitive alternatives.

Professor Ordover has termed such manipulation, "strategic revenue shifting." Plaintiffs will doubtless respond that when shippers on some portion of the incumbent railroad are cross-subsidizing others, the inclusion of cross-over revenues will allow these harmed shippers to obtain more reasonable rates. But it is more important to recognize that if rates were truly unreasonably high, these shippers should be able to obtain the appropriate relief under the hypothetical conditions without being allowed to claim any cross-over revenues.

If the Board is unwilling to prohibit the use of cross-over traffic revenue in plaintiffs' SAC tests, perhaps it should at least requiring complainants to conduct their SAC test both with and without cross-over revenues. In this way the Board would build a record relevant to evaluating the principled basis of shippers' formal complaints. We note that

in the recent CP&L decision, for example, over 85 percent of the CP&L's SARR revenues derived from cross-over traffic[8]. In the past, Professor Baumol has suggested that at the very least the Board should establish a maximum percentage of total SARR revenues that are allowed to be cross-over revenues.

IV. AEP'S RATE REDUCTION PROPOSAL IS FOUNDED ON FALSE PREMISES AND ITS IMPLEMENTATION WOULD HARM THE PUBLIC GOOD

Two propositions established above should cause the Board to reject AEP's proposal for rate reductions in the event revenues are shown to exceed SAC. First, with true Ramsey pricing there would be no incentive to create a SARR, absent the possibility of gaming the regulatory system. Second, permitting complaining shippers to claim cross-over revenues in the course of implementing the SAC test encourages them to seek imposition of below-Ramsey rates.

AEP proposes a novel way to reduce rates if stand-alone revenues are found to exceed SAC. In the past, the Board has reduced a successful complainant's rates in proportion to the extent of over-recovery according to the SAC test. Specifically, in the SAC test, if $R = (VC + F)(1 + \beta)$ for the plaintiff's SARR, the Board would conclude that revenue exceeds the sum of variable and long run, forward-looking cost by β percent.[9] Under these circumstances, using the so-called "percentage reduction" method, the Board would order the complaining shipper's rates to be lowered by $[\beta/(1 + \beta)]$ percent. (See Appendix A for the derivation.)

In contrast, AEP proposes to reduce rates in proportion to a specific shipper's existing percentage contribution margin.[10] Specifically, using the terminology set forth in Appendix A, the complaining shipper's rates would be reduced by $[\beta/(1+\beta)]$ multiplied by CMi/CM. (See Appendix B for the derivation.)[11]

AEP argues that this approach has two advantages over the percentage reduction method. First, AEP contends that under the percentage reduction method, the railroad has an incentive to select a common carrier rate for the complaining shipper, after rate negotiations between them have broken down, that is larger than the rate levels contemplated during negotiations in order to assure that a successful complainant will not

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[8] Carolina Power & Light Company v. Norfolk Southern Railway Company, STB Decision, STB Docket No. 42072, December 22, 2003.

[9] R denotes revenues based on existing rates, VC denotes variable and avoidable fixed operating costs, and F denotes long-run incremental cost of the SARR.

[10] Contribution margin is revenue minus total variable (and fixed avoidable) cost: R – TVC, and percentage contribution margin is (R – TVC)/R, which may also be written in terms of rate and marginal cost as (ri – mci)/ri. To simplify, we denote the latter by CMi.

[11] In fact, AEP's verbal description does not track precisely with its more formal mathematical derivations. Specifically, in Exhibit III-G-11, AEP provides a formula that indicates it would reduce rates by a percentage that is proportional to CMi/(1 – CMi). In Appendix B, we start with each alternative premise and demonstrate that the resulting rates are not consistent with Ramsey pricing principles under either premise.

ultimately result in any effective rate reduction. AEP calls this "gaming" the system.[12] Second, AEP maintains that its proposal is consistent with Ramsey pricing because the revenue burden of successful plaintiffs would be reduced in proportion to its contribution to long run, non-attributable costs which, according to AEP, must reflect its relative demand elasticity.

There are two fundamental flaws with AEP's proposed approach, however. First, as we have demonstrated in Section III, when cross-over traffic revenues are assigned to the Plaintiff's SARR, the SAC test is biased towards finding over-recovery. Thus, a rate reduction method designed to provide specific rate relief for the complaining shipper in excess of the Board's percentage reduction method serves merely to exacerbate the railroad's revenue inadequacy.[13]

Second, AEP's rate reduction proposal presumes that the reduced rate it would enjoy as a result of applying its proposed method is consistent with Ramsey pricing. There are two assumed factual predicates for this presumption: (1) relative percentage contribution-margins incorporating AEP's reduced rates are equal to existing relative percentage contribution-margins; and (2) relative existing percentage contribution- margins are equal to relative inverse elasticities. As we demonstrate below, both assumptions are factually incorrect.

(1) ***CM*i/CM*j is not equal to CMi/CMj***[14]

We prove this proposition in Appendix B. The crux of the proof is that AEP derives a percentage rate reduction for a specific shipper based on the assumption that shipment volumes do not change in response to rate reductions. At the same time that this assumption is implicit in its derivations, AEP also assumes that shipment demand elasticities are not zero. These two assumptions are mutually contradictory.

In Appendix B, we adopt the complainant's assumption of constant shipment volume and then demonstrate that the percentage contribution-margins implied by AEP's reduced rates cannot be proportional to existing percentage contribution margins. Specifically, we find in Appendix BI that CM*i/CM*j = CMi/CMj times [(1 - K CMj)/(1 – K CMi)].[15] Obviously, in general, the latter ratio is not equal to unity, unless CMi = CMj, for all i and j. But, in the latter case, CMi = CM, and the Plaintiff's rate reduction method is identical to that traditionally used by the Board, whereby all rates are reduced by the same percentage, $\beta/(1 + \beta)$. This suggests that the Board's proportional reduction

[12] We understand that in this proceeding, the BNSF rate challenged by AEP is in fact a rate prescribed by the Board in an earlier regulatory proceeding. Under these circumstances, there appears to be no basis for a claim that BNSF is "gaming" the system

[13] It is true that AEP's rate-reduction method appears to be even-handed in the sense that CMi is not generally greater than CM, which is an average of the CMi; however, obviously no complainant will advocate use of AEP's generalized percentage reduction method when its specific CMi falls below average.

[14] CM* refers to the rate-cost margins based on the reduced rates, and CM denotes the rate-cost margins based on existing rates.

[15] We also demonstrate in Appendix BII, starting with a different premise, that AEP's rate reduction method is inconsistent with Ramsey pricing principles.

method is in fact appropriate under the assumption that volumes on the stand-alone railroad will remain unchanged.

(2) CMi/CMj is not equal to ei/ej

The principal reason that existing CMi are not proportional to inverse demand elasticities, as called for by the Ramsey rule, is that the Board has heretofore adopted the position that protesting shippers are free to use as much cross-over traffic in forming its stand-alone shipper group as it chooses. We have shown in Section III that even if an incumbent railroad were using Ramsey pricing on all the long-run viable parts of its system, a protesting shipper would be highly likely to be able to construct a SARR whose SAC is exceeded by its assigned revenues when it is permitted to claim some portion of cross-over revenues. As a result, an incumbent railroad cannot expect to avoid rate protests even if it is charging Ramsey rates that the Board presumes will result from assiduous application of the SAC test based on its CMP principles. To avoid rate litigation, the railroad thus must lower rates below Ramsey rates in an effort to placate shippers. As a consequence, the railroad is encouraged to set rates in a way that causes it to be chronically revenue inadequate in order to avoid becoming even less viable still.

There are other reasons why existing CMi may not reflect relative demand elasticities. As noted earlier, the existence of contracts of 3 to 5 year's duration means that at any given point in time, rate-cost ratios may not be consistent with demand elasticities for individual shippers. In addition, calculation and ranking of the CMi are highly dependent on the accuracy of the marginal cost calculations that are used in the development of these ratios, and unless those marginal costs are developed on a movement-specific basis, they will also cause the CMi to diverge from "true" demand elasticity relationships.

Finally, the specific rate-cost margins, which are essential for implementation of AEP's proposed generalized percentage reduction method, are themselves distorted because the cross-over traffic rates are arbitrary allocations of revenue that tell nothing about the shipper's demand for the through service.

V. CONCLUSION

In summary, adopting AEP's proposed generalized percentage reduction method for determining reasonable rates will have the principal effect under current CMP procedures of compounding errors inherent in the Board's treatment of cross-over traffic in the SAC test. U.S. railroads will as a result be encouraged to deviate further from Ramsey pricing principles. Moreover, even if cross-over traffic were not an issue, AEP's proposal yields rates inconsistent with the Ramsey rule.

APPENDIX A

In this appendix we provide a simple algebraic derivation of the percentage rate reduction that is appropriate based on the Board's "percentage reduction" method. For the SARR, VC is variable and fixed avoidable costs, R is revenue based on existing incumbent rates, F is the long-run attributable and nonattributable costs of the SARR, and β is the percentage of over-recovery. Thus, for the SAC test, we have

(A1) $R = (VC + F)(1 + \beta)$.

The equation in (A1) simply indicates that revenues are beta percent larger than the long-run attributable and non-attributable costs of the SARR. For these same shipment volumes, rates could be reduced so that the new revenues are equal to long-run attributable and non-attributable costs:

(A2) $R^* = VC + F$.

The difference between A1 and A2 is $R - R^* = \beta\ (VC + F)$. Because revenue is rate times volume and volume is assumed to be the same before and after rate reduction, the left-hand-side (LHS) of this latter expression can be rewritten as $\Sigma\ i\ [\ Qi\ (ri - r^*i)]$, where Qi is volume, ri is existing rate and r*i is breakeven rate. We then divide and multiply each term in the summation by ri and total revenue, R. As a result, we obtain

(A3) $\Sigma\ i\ [\ Si\ (ri - r^*i)/ri] = \beta\ (VC + F)/R$, where Si is the pre-rate reduction revenue share of shipment i.

The LHS of A3 is the revenue-weighted average percentage difference between current existing rates and the desired breakeven rates. If we substitute in for VC + F from A1, the RHS of A3 becomes $[\beta/(1 + \beta)]$. Thus, if the Board's percentage reduction method were used whereby all rates are reduced by the same percentage so that the SARR just breaks even, the complaining shipper's rates would be reduced by $\beta/(1 + \beta)$ percent.

APPENDIX B

AEP proposes a different method it calls the "generalized percentage reduction" method. We demonstrate here without the use of differential calculus that the reduced rates derived using Plaintiff's method do not conform to Ramsey principles, as incorrectly alleged by AEP. We provide two derivations because we are unclear precisely which rate reduction formula the Plaintiff here advocates.

BI. (ri – r*i)/ri is proportional to CMi.

Expression A3, above, is the starting point for our analysis. AEP suggests that the appropriate percentage rate reduction for a specific movement, (ri – r*i)/ri, is proportional to (ri – ci)/ri , which they assume is equal to k ei consistent with Ramsey principles. This is equivalent to assuming that there is some constant, γ, times CMi for each (ri – r*i)/ri in A3:

(B1) Σ i [Si γ CMi] = γ CM = [β/(1 + β)].

In B1, the constant, γ, can be factored out, and the remaining share-weighted summation is equal to CM, the share-weighted average contribution margin based on existing rates and costs. Solving B1 for γ, we obtain γ^* = (1/CM) [β/(1 + β)]. Thus, since by assumption (ri – r*i/ri = γ CMi, we find that the implied percentage reduction for rate, ri, is equal to [CMi/CM] [β/(1 + β)]. Moreover, according to AEP assumptions, CMi/CM is equal to ei/E. (ei is the inverse demand elasticity on movement I, and E is the share-weighted overall inverse demand elasticity for the SARR.). Thus, unlike the Board's percentage reduction method, AEP proposes to have its rates reduced more or less as its CMi exceeds or falls short of the overall average contribution percentage margin for the SARR. This illustrates the complainant's generalized rate reduction method.

The principal justification that AEP proffers for its generalized percentage rate reduction method is wrong: the rates that result from application of AEP's method are inconsistent with Ramsey rates. Specifically, the rate-cost (percentage) margins implied by the reduced rates, CM*i, do not satisfy CM*i/CM*j = ei/ej. First, CM*i/CM*j is not equal to CMi/CMj and, second, CMi/CMj is not equal to ei/ej. As explained in the text, there are two principal reasons for these failures: (1) shipment volumes will not be the same before and after rate reduction as assumed by the Plaintiff unless all demand elasticities are zero, and (2) existing rates are unlikely to be Ramsey rates because of the distortions created by permitting cross-over traffic revenue in the SAC test.

If shipment volumes do not respond to changes in rates, as assumed by the complainant, then demand elasticities must all be the same, which would call for all rates to be the same or, at least, that all rates be reduced by the same percentage. Counterfactually, if we suppose along with the complainant that somehow zero volume changes were reconciled with non-zero demand elasticities, the new rates determined by AEP's proposed method can still be demonstrated to be inconsistent with Ramsey rates.

Consider: As demonstrated above, $(ri - r^*i)/ri = [CMi/CM]\ [\beta/(1 + \beta)]$. To simplify we let $[\beta/(1 + \beta)]\ [1/CM] = K$. If we add and subtract marginal cost, mci, from the numerator of the LHS, the LHS and the equation overall are left unchanged, and we obtain

(B2) $ri - mci - (r^*i - mci) = ri\ K\ CMi.$, or $r^*i - mci = ri - mci - ri\ K\ CMi.$

If we divide both sides by r^*i, we then obtain

(B3) $CM^*i = (ri/r^*i)\ CMi\ (1 - K).$

Thus, the ratio of CM^*i and CM^*j is

(B4) $CM^*i/CM^*j = [CMi/CMj]\ (ri\ r^*j / rj\ r^*i) = [CMi/CMj]\ [(1 - K\ CMj)/(1 - K\ CMi)].$

Clearly, CM^*i/CM^*j is not equal to CMi/CMj, as required by Ramsey principles. Thus even if CMi/CMj were equal to ei/ej, there is no principled basis for AEP's so-called generalized rate reduction method. Moreover, as indicated in the text, there is substantial reason to doubt that CMi/CMj = ei/ej, as well.

BII. $(ri - r^*i)/ri$ is proportional to (ri/mci) CMi

AEP proposes to reduce rates in a situation of over-recovery according to equation (7) in their Exhibit III-G-11:

(B5) $[(ri - r^*i)/ri]/[(rj - r^*j)/rj] = \%r^*i / \%r^*j = (ri/mci)\ (mcj/rj)\ CMi/CMj$ for all

i and j and subject to the break-even condition,

(B6) $\Sigma\, i\ (R^*i - TVCi) = F.$

B5 can be written equivalently as

(B7) $\%\ r^*i = \gamma\ CMi/(1 - CMi) = (ri = mci)/mci = Mi$

For our purposes, it is immaterial whether $\%r^*i$ is assumed to be proportional to CMi or to CMi/(1 – CMi). As in BI above if we substitute into A3 for $\%r^*i$ from B7, we obtain the analog to γ^* in BI:

(B8) $\gamma^{**} = [\beta/(1 + \beta)]\ (1/M) = [\beta/(1 + \beta)]\ [(1 - CM)/CM].$

Thus, each specific rate should be reduced by $[\beta/(1 + \beta)]\ (Mi/M) = [\beta/(1 + \beta)]\ [(1 - CM)\ CMi/(1 - CMi)\ CM]$. If we continue as in BI, it is easy to demonstrate that when rates are reduced according to this formula, which is implied by Plaintiff's proposal, CM^*i/CM^*j will not equal CMi/CMj, as called for by the Ramsey rules.

III.H: Results of SAC Analysis

BNSF Reply Exhibit III.H-1

Has Been Redacted