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May 7, 2010

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BY HAND DELIVERY

Ms. Cynthia Brown
Chief, Section of Administration
Office of Proceedings
Surface Transportation Board
395 E Street, SW
Washington, DC 20423-0001

Re: *Arizona Electric Power Cooperative, Inc. v. BNSF Railway Company and Union Pacific Railroad Company*,
STB Docket 42113

Dear Ms. Brown:

Enclosed for filing in the above-captioned matter are the original and ten copies of the public version of the Joint Reply Evidence and Argument of Defendants BNSF Railway Company and Union Pacific Railroad Company.

Defendants' Joint Reply Evidence and Argument consists of two Narrative volumes and one volume of Exhibits. Please note that Narrative Volume I and the Exhibit volume contain color images. In addition, we are including two DVDs that contain the workpapers cited in Defendants' Joint Reply Evidence and Argument. Also attached are three copies of a CD that contains a PDF version of Defendants' Joint Reply Evidence and Argument.

We have included one unbound copy of the public volumes to be uploaded onto the Board's webpage.

We are filing under separate cover the Highly Confidential version of Defendants' Joint Reply Evidence and Argument.

Please date stamp and return the extra copy of this letter to our messenger.

If you have any questions, please do not hesitate to contact me.

Regards,



Anthony J. LaRocca

Enclosures

cc: Counsel of Record

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PUBLIC

BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Docket No. 42113

ARIZONA ELECTRIC POWER COOPERATIVE, INC.
v.
BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

JOINT REPLY EVIDENCE AND ARGUMENT OF DEFENDANTS BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

NARRATIVE

VOLUME I OF II

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May 7, 2010

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ABBREVIATIONS

Terms:

AAR	Association of American Railroads
AEI	Automatic Equipment Identification
AEO	Annual Energy Outlook
AEPCO	Arizona Electric Power Cooperative, Inc.
AFE	Authority for Expenditure
AMTO	Assistant Manager-Train Operations
ANR	Arizona & Northern Railroad
ANR-NM	Arizona & Northern Railroad-New Mexico
ANR-PRB	Arizona & Northern Railroad-Powder River Basin
Apache Station	Apache Generating Station
ATC	Average Total Cost
BN	Burlington Northern Railroad
BNSF	BNSF Railway Company
CPA	Certified Public Accounting
CTC	Centralized Traffic Control
DCF	Discounted Cash Flow
DOT	Department of Transportation
DP	Distributed Power
DTL	Direct-to-Locomotive
EDI	Electronic Data Interchange
EIA	U.S. Energy Information Administration
EAP	Employee Assistance Program
EOTD	End-of-Train Device
EPA	Environmental Protection Agency
FED	Failed Equipment Detector
FELA	Federal Employers Liability Act
FRA	Federal Railroad Administration
FXE	Ferrocarril Mexicano, S.A. de C.V.
G&A	General and Administrative
GWR	Gross Weight on Rail
HDF	On-Highway Diesel Fuel Index
HR	Human Resources
ICC	Interstate Commerce Commission
ICCTA	Interstate Commerce Commission Termination Act 0f 1995
IRS	Internal Revenue Service
ISS	Interline Settlement System
IT	Information Technology
KCS	Kansas City Southern
LAN	Local Area Network
LRP	Long Range Plan
LUM	Locomotive Unit Mile
MLO	Manager of Locomotive Operations
MNA	Missouri & Northern Arkansas Railroad

MOW	Maintenance of Way
MRL	Montana Rail Link
MTM	Manager of Track Maintenance
MTO	Manager-Train Operations
NKCR	Nebraska Kansas Colorado Railway
NROI	Net Railway Operating Income
OJT	On the job training
PRB	Powder River Basin
PTC	Positive Train Control
RCAF-U	Rail Cost Adjustment Factor-Unadjusted for Changes in Productivity
RCL	Remote Control Locomotives
ROW	Right of Way
RSIA	Rail Safety Improvement Act of 2008
RS Means or Means	RS Means Heavy Construction Handbook
RTC	Rail Traffic Controller
SAC	Stand-Alone Cost
SARR	Stand-Alone Railroad
SEC	Securities and Exchange Commission
SOX	Sarbanes-Oxley Act of 2002
SWRR	Southwest Railroad
T&E	Train and Engine Crew
UP	Union Pacific Railroad Company
URCS	Uniform Rail Costing System
USDA	U.S. Department of Agriculture
WAN	Wide Area Network
WTI	West Texas Intermediate Crude Prices
WTU	West Texas Utilities

CASE NAMES

AEPCO I	*Arizona Electric Power Cooperative Inc. v. Burlington Northern & Santa Fe Ry.*, 6 S.T.B. 322 (2002)
AEP Texas	*AEP Texas North Company v. BNSF Railway Company*, STB Docket No. 41191 (Sub-No. 1) (STB served May 15, 2009)
Bottleneck I	*Central Power & Light Co. v. Southern Pacific Transportation Co.*, 1 S.T.B. 1059 (1996)
Bottleneck II	*Central Power & Light Co. v. Southern Pacific Transportation Co.*, 2 S.T.B. 235 (1997)
Burlington Northern	*Burlington Northern Railroad v. STB*, 75 F.3d 685 (D.C. Cir. 1996)
Coal Rate Guidelines	*Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520 (1985)
Coal Trading	*Coal Trading Corp. v. Baltimore & Ohio R.R..*, 6 I.C.C. 2d 361 (1990)
Duke/CSXT	*Duke Energy Corp. v. CSX Transportation, Inc.*, STB Docket No. 42072 (STB served Feb. 4, 2004)
KCPL	*Kansas City Power & Light Company v. Union Pacific Railroad Company*, STB Docket No. 42095 (STB served May 19, 2008)
Major Issues	*Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006)
PSCo/Xcel I	*Pub. Serv. Co. of Colorado v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42057 (STB served June 8, 2004)
TMPA	*Texas Mun. Power Agency v. Burlington N. & S.F. Ry Co.*, 7 S.T.B. 803 (2004)
West Texas	*W. Tex. Util. Co. v. Burlington N.R.R..*, 1 S.T.B. 638 (1996)
WFA/Basin I	*Western Fuels Ass'n & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088 (STB served Sept. 10, 2007), on appeal, *BNSF Ry. v. Western Fuels Ass'n & Basin Elec. Power Coop.*, Case. No. 09-1092, 09-1190, 09-1234 (consolidated) (D.C. Cir.)

WFA/Basin II	*Western Fuels Ass'n & Basin Elec. Power Coop v. BNSF Ry.*, STB Docket No. 42088 (STB served Feb. 18, 2009), on appeal, *BNSF Ry. v. Western Fuels Ass'n & Basin Elec. Power Coop.*, Case. No. 09-1092, 09-1190, 09-1234 (consolidated) (D.C. Cir.)
Xcel	*Pub. Ser. Co. of Colorado v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42057 (STB served June 8, 2004)

I. COUNSEL'S ARGUMENT AND SUMMARY OF EVIDENCE

This is the Joint Reply Evidence and Argument of Defendants BNSF Railway Company ("BNSF") and Union Pacific Railroad Company ("UP") in *Arizona Electric Power Cooperative, Inc. v. BNSF Railway Company and Union Pacific Railroad Company*, STB Docket No. 42113. In this Joint Reply Evidence and Argument, defendants explain why the Board should dismiss the complaint filed in this case by Arizona Electric Power Cooperative, Inc. ("AEPCO"). The Stand-Alone Cost ("SAC") evidence filed by AEPCO is fundamentally flawed and cannot be used to evaluate the reasonableness of the challenged rates. If the flaws are corrected, a SAC analysis of the challenged rates would show that AEPCO is not entitled to any rate relief.

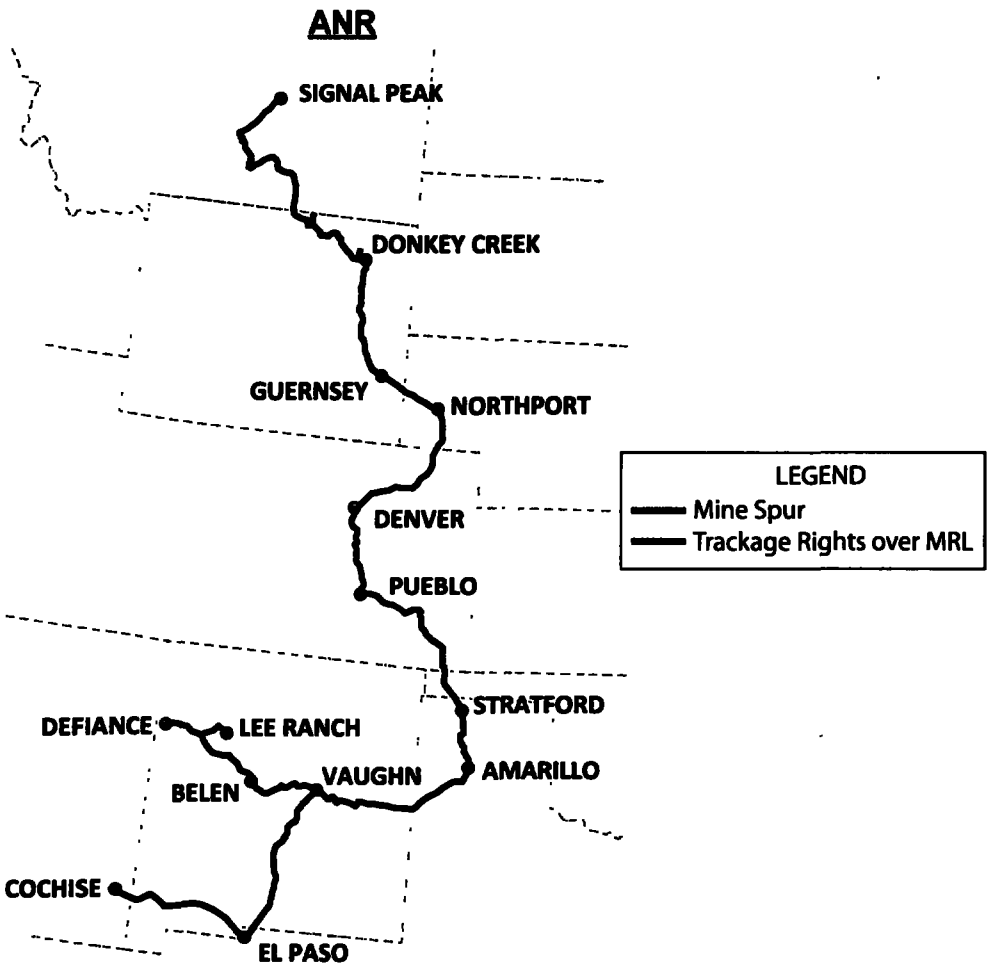
A. INTRODUCTION

Eight years ago, in *Arizona Electric Power Cooperative Inc. v. Burlington Northern & Santa Fe Ry.*, 6 S.T.B. 332 (2002) ("*AEPCO I*"), the Surface Transportation Board ("Board") warned AEPCO not to "game" the SAC process by combining into a single complaint what are essentially separate rate challenges in order to include traffic and revenues "that could not have been treated in the same manner had AEPCO filed a separate complaint for [each] set of rates." *Id.* at 329-30. AEPCO has not heeded the Board's warning in this case.

In this case, AEPCO combined into a single complaint, and a single SAC presentation, challenges to defendants' rates for transporting coal from two separate coal-producing areas that are hundreds of miles apart: BNSF-served mines in New Mexico, and BNSF-served mines in the Powder River Basin ("PRB") of Wyoming and Montana. Specifically, AEPCO challenges common carrier rates for interline service established by BNSF and UP that are set forth in three BNSF Common Carrier Pricing Authorities. The first, designated as BNSF 57966, governs the transportation of coal in unit trains from certain coal mines in New Mexico to AEPCO's Apache

Generating Station ("Apache Station"), located near Cochise, Arizona. The second, designated as BNSF 57988, governs the transportation of coal from five mines in the Gillette, Wyoming, area of the PRB (Eagle Butte, Buckskin, Rawhide, Clovis Point and Dry Fork) and two mines in the Montana PRB (Spring Creek and Decker) to Apache Station. The third, designated as BNSF 58039, governs the transportation of coal from the Signal Peak Mine at Peaks, Montana, to Apache Station. All three common carrier pricing authorities provide that the origins will be served by BNSF and the destination will be served by UP. Each pricing authority specifies the location where the interchange will take place between BNSF and UP.

To assess the reasonableness of the challenged rates, AEPCO posits a single SARR, which it calls Arizona & Northern Railroad ("ANR"). ANR extends from Central Montana in the north through the PRB in Wyoming and south along the Front Range of the Rocky Mountains to Pueblo, Colorado, and southeast to Amarillo, Texas. From Amarillo, ANR continues westward to Defiance, New Mexico, with a line that branches south at Vaughn, New Mexico, and extends to El Paso, Texas, and then westward to AEPCO's coal fired electric generating station near Cochise. See the schematic of AEPCO's ANR below.



ANR handles an amount and variety of traffic that is unprecedented in recent SAC cases. AEPCO assumes that ANR moves almost 240 million tons of freight in 2009.

The north-south portion of ANR, from Montana to Amarillo, is dominated by coal traffic, which is assumed to constitute over half of ANR's overall traffic volume. The east-west portion of ANR is dominated by intermodal traffic. That portion of ANR consists of carved out segments of BNSF's and UP's transcontinental lines that move huge volumes of traffic to and from Southern California.

The north-south portion of ANR and the east-west portion of ANR do not logically fit together to form a common rail network. The two distinct geographical portions of ANR meet at Amarillo, but they share virtually no traffic. In fact, no issue traffic ever travels through Amarillo in the real world. Moreover, the mix of traffic types on the two portions of ANR is different, the traffic densities are different, and, consequently, the operating dynamics are different.

The Board has seen this situation before. In 2000, AEPCO filed a challenge to certain joint rates established by BNSF and UP for transportation from New Mexico mines to Cochise. A few months later, AEPCO expanded its case to include a challenge to joint rates established by BNSF and UP for transportation from certain PRB mines to Cochise and to single-line rates established by UP for transportation from Colorado mines to Cochise. BNSF and UP asked the Board to require that AEPCO challenge each set of rates – New Mexico, Colorado and PRB – using a separate SAC analysis so that cross-subsidies relevant to each set of rates could be evaluated independently. Defendants' concern was that AEPCO would use a single SARR to create cross-subsidies among subsets of the disparate traffic groups, thus making the issue traffic rates appear to be unreasonable. The Board acknowledged defendants' concerns and warned:

> [A] party is not permitted to 'game' the SAC process in attempting to gain a substantive advantage by combining into a single, consolidated complaint what are essentially three separate rate challenges. Thus, for each of the three sets of challenged rates, AEPCO may not include any traffic or revenues (or exclude any costs) that could not have been treated in the same manner had AEPCO filed a separate complaint for that set of rates.

AEPCO I, 6 S.T.B. at 329-30.

In the current case, AEPCO has disregarded the Board's warning. If AEPCO had filed a separate complaint challenging the defendants' rates for Wyoming and Montana coal, it would have had no basis for including traffic from BNSF's transcontinental line in the SAC analysis.

Traffic grouping is permitted in a SAC analysis among traffic that shares facilities and therefore shares common costs. But there is no sharing whatsoever of facilities between BNSF's transcontinental traffic and the Wyoming or Montana issue traffic. The Wyoming and Montana issue traffic moves on a north-south UP line through Vaughn, New Mexico, that does not even touch any BNSF transcontinental facilities. BNSF's transcontinental traffic has nothing at all to do with the Wyoming or Montana traffic and does not belong in any SAC analysis of those rates.

By disregarding the Board's warning not to include traffic that would not have been included in a separate rate complaint, AEPCO creates an impermissible cross-subsidy in favor of the issue traffic. AEPCO compounds this form of cross-subsidization by another cross-subsidization device, discussed in detail in Section I.B below, which involves the rerouting of issue traffic over interchanges different from those established by the defendant carriers, which in the case of the New Mexico traffic, is the route that has been used by defendants for decades. As a consequence of that rerouting, most of the revenue in the SAC analysis from BNSF's transcontinental traffic is attributable to movements over the portion of BNSF's transcontinental line east of Belen that has nothing to do with the New Mexico issue traffic, or for that matter, with the PRB or Signal Peak traffic.

AEPCO's pursuit of cross subsidies through impermissible means yields nonsensical SAC results. AEPCO's SAC analysis results in maximum revenue-to-variable cost ratios for all SARR traffic, including the issue traffic, of 76% in 2009, declining to 70.2% in 2018. It is an understatement for AEPCO to note that these results "may appear counterintuitive." AEPCO Opening Nar. at III-H-14. A properly designed SARR would not yield such results.

The implausibility of AEPCO's SAC results is highlighted by comparing them with the results in another recent SAC case that did not involve the cross-subsidization devices employed

by AEPCO. The north-south portion of ANR is not substantially different from the SARR that was used by AEP Texas to assess the reasonableness of BNSF's PRB coal rates in *AEP Texas North Company v. BNSF Railway Company*, STB Docket No. 41191 (Sub-No. 1) (STB served May 15, 2009) ("*AEP Texas*"). The north-south portion of ANR replicates the same basic lines that AEP Texas replicated and uses the same basic traffic group that AEP Texas used. But in the *AEP Texas* case, the SAC analysis produced maximum R/VC ratios of between 195% and 263%. *AEP Texas* at 17, Table 2. By extending the SARR to the west and southwest and including large amounts of BNSF's and UP's intermodal traffic on that extended segment, AEPCO, in this case, drove the maximum SAC rates down to an R/VC ratio of 75%.

That unregulated intermodal traffic should play a prominent role in producing such implausible results underscores the extent to which AEPCO has engaged in impermissible cross-subsidization. Intermodal traffic is exempt from regulation precisely because the Interstate Commerce Commission ("ICC") found that shippers of intermodal freight are not subject to abuses of market power by market dominant railroads. In exempting intermodal traffic from regulation, the ICC explained that "continued regulation is not needed to protect shippers from abuses of market power. . . . No one has seriously questioned the existence of vigorous competition between TOFC/COFC and motor carrier service."[1] The rates for the intermodal traffic are constrained to competitive levels by market forces. Yet AEPCO uses this competitive traffic to create the appearance that BNSF and UP are overcharging the SARR's traffic group to such a degree that the rates for all SARR shippers should be reduced to levels below variable costs. The Board has rejected SAC presentations in other contexts where it recognized that they produced anomalous results, and it should do so here as well. *See Rate Guidelines – Non-Coal*

[1] *Improvement of TOFC/COFC Regulation*, 364 I.C.C. 731, 732, 734 (1981), *aff'd sub nom. American Trucking Ass'n v. I.C.C.*, 656 F.2d 1115 (5th Cir. 1981).

Proceedings, ICC Ex Parte No. 347 (Sub-No. 2) (ICC served Dec. 1, 1995), at 10-15 (rejecting a simplified stand-alone cost model on grounds that it produced anomalous results).

In their SAC evidence presented as part of this reply filing, defendants eliminate the cross-subsidization devices employed by AEPCO. First, defendants present separate SAC analyses for the New Mexico and PRB rate challenges. Defendants thus eliminate the cross subsidies that AEPCO realized by using a single SARR to challenge multiple rates. Second, defendants preserve as part of the SARR configuration the real-world interchanges established by BNSF and UP. Defendants thus eliminate the cross subsidies that AEPCO realized by rerouting issue traffic over assumed interchanges.

B. AEPCO'S SAC EVIDENCE IS FATALLY FLAWED BECAUSE IT ASSUMES THAT BNSF AND UP INTERCHANGE ISSUE TRAFFIC AT LOCATIONS OTHER THAN THOSE ON WHICH THE CHALLENGED RATES ARE BASED

AEPCO's SAC evidence is based on an assumed rerouting of the issue traffic over routes that could not be used in the real world without changing the interchange locations that are specified in the pricing authorities that set out the challenged rates. This is a fatal flaw in AEPCO's evidence. On an interline movement, the interchange point is a key determinant of the "rate charged or collected." 49 U.S.C. § 10704(a)(1). The governing statute specifically instructs rail carriers to establish rates applicable to particular routes. *See* 49 U.S.C. § 10703 ("Rail carriers ... shall establish through routes ... [and] rates ... applicable to those routes ... ."). Thus, the specification of an interchange location by interline carriers has legal consequences that cannot be assumed away or ignored by positing alternative interchanges. Moreover, altering the interchange locations of the issue traffic turns the SAC test into a meaningless exercise because it produces SAC results that do not show whether the challenged rates are cross-subsidizing other traffic of the defendants. If the Board were to allow the rerouting of the issue

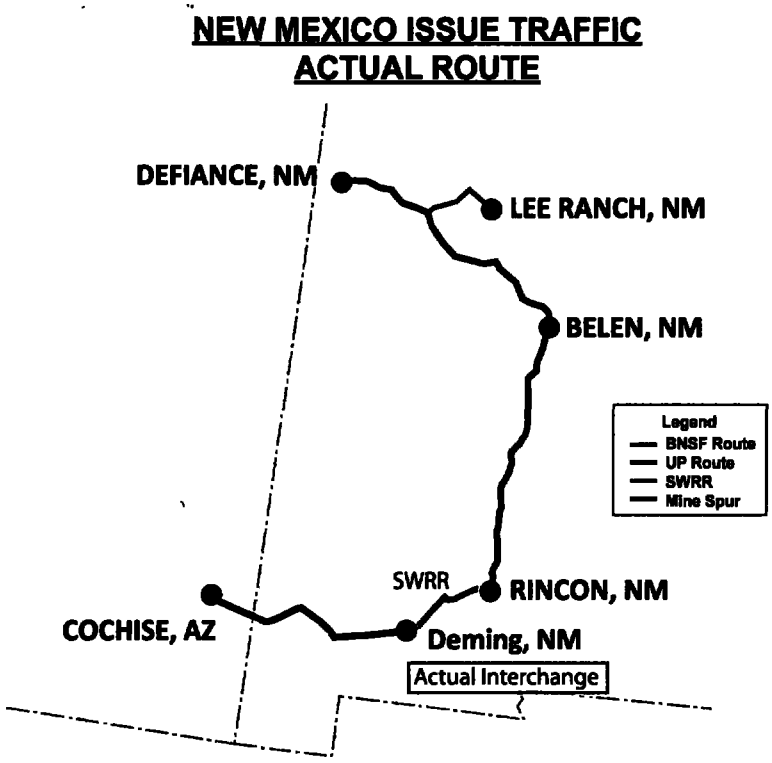
traffic using a different interchange point based on the theory that defendants *could* establish such an alternative interchange (even though they established a different, more efficient interchange), then, as discussed below, the jurisdictional threshold would have to be calculated based on the alternative routing that the defendants are assumed to provide.

1. The Rates At Issue In This Proceeding Specify That Interchanges Between BNSF And UP Will Occur at Deming, New Mexico, And Pueblo, Colorado

AEPCO challenges common carrier rates for interline service established by BNSF and UP that are set forth in three BNSF Common Carrier Pricing Authorities. Each pricing authority defines the portion of the through movement for which each defendant is responsible by specifying the interchange point between BNSF and UP.

BNSF 57966. The first pricing authority, designated as BNSF 57966, governs the transportation of coal from three mines in New Mexico to Apache Station. The New Mexico mines are served exclusively by BNSF, and Apache Station is served exclusively by UP. BNSF 57966 specifies that the interchange between BNSF and UP necessary to provide the service will take place at Deming, New Mexico.

The issue traffic's current route of movement under BNSF 57966 is from the New Mexico mines to Belen, New Mexico, where the traffic turns south and moves on a BNSF line between Belen and Rincon, New Mexico. At Rincon, BNSF hands off the traffic to Southwest Railroad ("SWRR"). SWRR handles the traffic for BNSF to Deming, where it is interchanged with UP for movement to Apache Station. AEPCO Opening Nar. at III-A-9. See the schematic of the actual route of movement below.

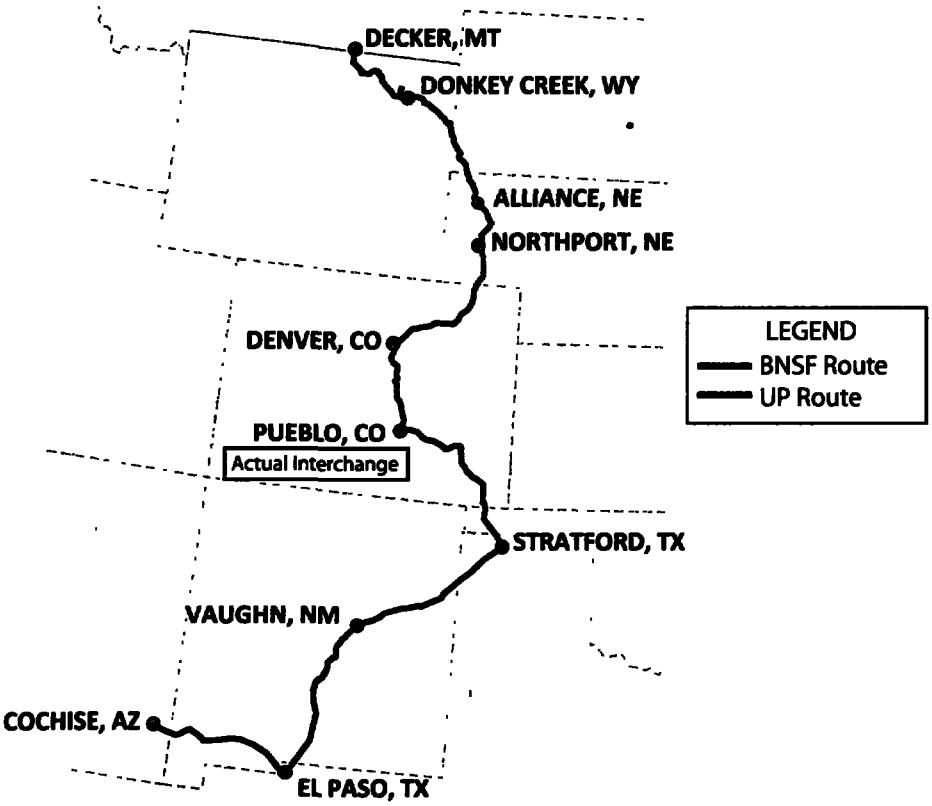


BNSF 57988. The second pricing authority, designated as BNSF 57988, governs the transportation of coal from five mines in the Gillette, Wyoming, area of the Powder River Basin (Eagle Butte, Buckskin, Rawhide, Clovis Point and Dry Fork) and two mines in the Montana portion of the PRB (Spring Creek and Decker) to Apache Station. All seven mines are served exclusively by BNSF. BNSF 57988 specifies that the interchange between BNSF and UP for this traffic will take place at Pueblo, Colorado.

As discussed below, there have been very few movements of issue traffic under BNSF 57988. The routing for those few movements has been from the Decker Mine in Montana through Gillette, Alliance, Nebraska, and Northport, Nebraska. From Northport, the traffic moved southwest through Brush, Colorado, and Denver, Colorado, to Pueblo, where it was interchanged with UP. From Pueblo, UP moved the traffic south to Stratford, Texas, then

southwest through Vaughn, New Mexico and El Paso, Texas, and west from El Paso to Apache Station. See the schematic of the actual route of movement below.

PRB ISSUE TRAFFIC
ACTUAL ROUTE



BNSF 58039. The third common carrier rate authority is BNSF 58039, which governs the transportation of coal from the Signal Peak Mine at Peaks, Montana, to Apache Station. BNSF exclusively serves the Signal Peak Mine. BNSF 58039 specifies that the interchange between BNSF and UP will take place at Pueblo, Colorado. As discussed below, there have been no movements of issue traffic under BNSF 58039. However, if such movements were to occur, the most logical route of movement would be from the Signal Peak Mine onto the Montana Rail Link ("MRL") line at Mossmain, Montana, then east on MRL to Huntley,

Montana, where the movement would continue south on BNSF's line and follow the same route as the traffic under BNSF 57988, with an interchange with UP at Pueblo.

2. AEPCO's SAC Evidence Is Based On An Impermissible Assumption That BNSF And UP Interchange The Issue Traffic At Vaughn, New Mexico, Rather Than Deming, New Mexico, And Pueblo, Colorado

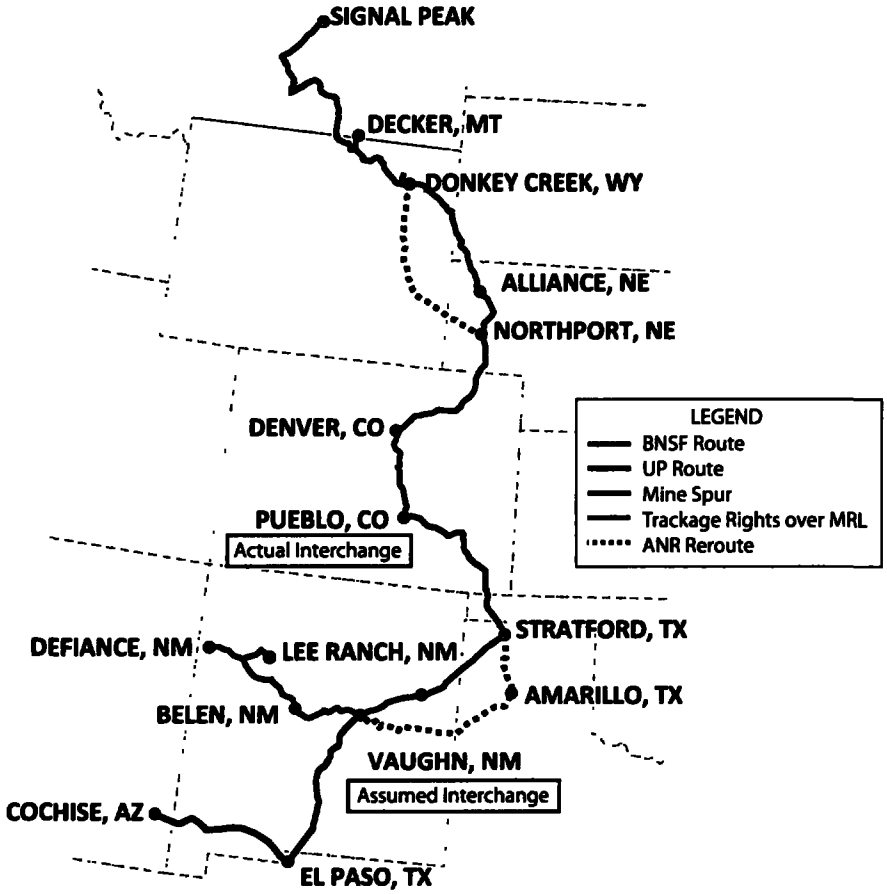
AEPCO's SAC evidence improperly assumes that the issue traffic will move over through routes that are not possible under the challenged rate authorities. AEPCO assumes that BNSF and UP would interchange the issue traffic at a point other than the interchanges specified in the rate authorities – in fact a location where BNSF and UP could not efficiently interchange the traffic today – and that the issue traffic would move over portions of BNSF and UP that actually cannot be used to handle the traffic under the challenged rate authorities.

In a SAC case involving a challenge to a single-line rate, the complainant must design a SARR that serves the origin and destination of the issue traffic, though it generally may assume a rerouting of the issue traffic between the origin and destination points. The same principle must apply when a complainant challenges a joint-line rate: that is, the SARR must be designed to move the issue traffic between the same endpoints as the carrier whose portion of the route is being replicated, though it may reroute the issue traffic between those endpoints. The interchange between two interline carriers represents one of the endpoints of each carrier's movement. In both single-line and joint-line cases, the boundaries of a defendant's responsibility for the issue traffic determine the traffic that is available to the SARR for each portion of the SARR.

AEPCO distorts the SAC analysis by disregarding the boundaries of BNSF's and UP's responsibilities for the issue traffic. It does so in order to increase the amount of non-issue traffic and revenue that is available to its SARR. As to movements of issue traffic originating in

Wyoming and Montana, AEPCO does not replicate a BNSF route from the mines to Pueblo, and a UP route from Pueblo to Apache Station. Instead, AEPCO's SAC evidence assumes that the traffic will move south of Pueblo on a line that replicates BNSF's route to Amarillo, Texas, and then west on a line that replicates BNSF's route through Clovis, New Mexico, to Vaughn, New Mexico. AEPCO's SAC evidence assumes that the traffic will then move south over a line that replicates UP's route from Vaughn to El Paso, and then west over a line that replicates UP's route from El Paso to Apache Station. AEPCO Opening Nar. at III-A-11. The schematic set out below compares the actual route and actual interchange to the route and interchange assumed by AEPCO.

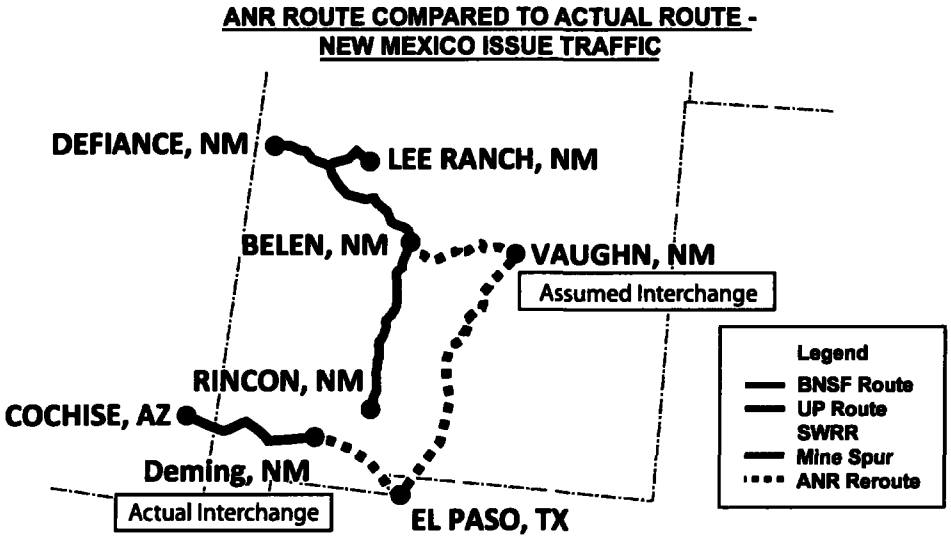
ANR ROUTE COMPARED TO ACTUAL ROUTE - PRB ISSUE TRAFFIC



Thus, AEPCO essentially assumes a BNSF-UP interchange at Vaughn, rather than Pueblo, and AEPCO's SARR includes revenues from BNSF traffic that moves from Pueblo to Amarillo and from Amarillo to Vaughn – revenues that are not actually available to UP to offset UP's costs of moving the issue traffic south of Pueblo.

As to movements of the issue traffic originating in New Mexico, AEPCO does not replicate a BNSF route from the mines to the interchange point at Deming, and a UP route from Deming to Apache Station. Instead, AEPCO assumes that, rather than turning south at Belen to the interchange at Deming, the traffic will move on a line that replicates the BNSF transcontinental line eastward past Belen to Vaughn. AEPCO assumes that the traffic then turns

south on a line that replicates UP's route from Vaughn to El Paso, and then west on a line replicating UP's route past Deming to Apache Station. The schematic set out below compares the actual route and the actual interchange to the route and interchange assumed by AEPCO.



Thus, AEPCO assumes a less efficient BNSF-UP interchange at Vaughn, rather than Deming, sending the issue traffic on a circuitous through route that is approximately 47% longer than the actual through route, to take advantage of revenues generated on BNSF's Belen-Vaughan segment that are not actually available to offset BNSF's costs of moving the issue traffic from the origin to Belen.

AEPCO's SAC evidence assumes that the issue traffic will move over through routes that are not possible under the challenged rate authorities. For the issue traffic to move over the through routes replicated by AEPCO, BNSF and UP would have to agree to interchange the traffic at a point other than the interchanges specified in the challenged rate authorities – that is, at Vaughn, rather than at Pueblo and Deming. In fact, BNSF and UP would be unlikely ever to agree to the interchange assumed in AEPCO's SAC evidence because the resulting through routes would be longer and less efficient and because the carriers could not interchange the

traffic efficiently using their existing facilities at Vaughn. And, even in the unlikely event that BNSF and UP did agree to interchange the traffic at Vaughn, the traffic would move under rates that are different than the challenged rates.

In the real world, UP could not move the Wyoming and Montana issue traffic over the lines replicated by AEPCO after receiving the traffic in interchange from BNSF at Pueblo, as specified in the challenged price authorities. From Pueblo, UP could use existing trackage rights on BNSF to Amarillo. But from Amarillo, UP would have no means of moving the traffic to Vaughn, since UP has no trackage rights over the BNSF transcontinental line from Amarillo to Vaughn.

Similarly, in the real world, BNSF could not move the New Mexico issue traffic over the lines replicated by AEPCO to an interchange with UP at Deming. In theory, BNSF could carry the traffic past Belen to Vaughn, and it could even continue on UP's Tucumcari line to El Paso using trackage rights (assuming that facilities existed for such an interchange). However, BNSF could not possibly carry the traffic to Deming for an interchange with UP at the location specified in the common carrier authority establishing the challenged rates because BNSF does not have trackage rights on UP's transcontinental line. Therefore, once again, AEPCO's assumed rerouting of the issue traffic could not occur without a change in the interchange location.

Moreover, AEPCO's assumed rerouting of the New Mexico issue traffic via Vaughn could not occur efficiently using the existing track facilities at Vaughn. As discussed in Section III.C below, BNSF and UP cannot make straight-on movements of AEPCO's New Mexico coal trains at Vaughn, where their lines cross at a 40-foot grade separation. AEPCO itself acknowledges the issue and proposes to construct a connecting track at Vaughn. AEPCO

Opening Nar. at III-B-7, Table III-B-2 n.3. AEPCO therefore assumed a rerouting of the issue traffic that is not practicable using existing facilities.

BNSF and UP do not contest here the general principle that the complainant may assume a reasonable rerouting of the issue traffic. For example, BNSF and UP do not challenge the rerouting of the Wyoming and Montana issue traffic from BNSF's Alliance route to Northport, used in the real world, to BNSF's Guernsey route to Northport, as posited in AEPCO's SAC evidence. See the schematic at page I-13 above. That rerouting is internal to BNSF and has no impact on the boundaries of each carrier's responsibility for the through movement. However, when two carriers combine to provide through service, a complainant may not reroute issue traffic based on an assumed change in the endpoints of the routes – that is, the interchange point between the carriers – specified in the challenged pricing authority. The interchange specified by the carriers is a critical element of the rate because it defines the portions of the through movement for which each defendant is responsible under the rate, and thus the traffic that is available to the SARR for each portion of the SARR.

As discussed in more detail below, AEPCO's assumed change to the BNSF-UP interchange points established in the challenged pricing authorities is impermissible for two reasons. *First*, AEPCO's assumption of alternative interchange locations ignores the legal consequences of the choice by interline defendants of the locations where they will interchange traffic. Congress gave railroads the right to choose in the first instance where they will interchange traffic and the through rate established by interline carriers is a function of the interchange selected. Since the Board is limited to reviewing the reasonableness of a rate that is "charged or collected," 49 U.S.C. § 10704(a)(1), the complainant must respect the carriers' choice of an interchange location. Shippers may challenge the carriers' choice of an interchange

location, but a shipper must meet the Board's "competitive access" rules before it can obtain an alternative routing and interchange of the traffic. 49 U.S.C. § 10705(a); 49 C.F.R. Part 1144. AEPCO does not even attempt to make that showing here. As discussed below, AEPCO could not make the required showing because the alternative routes are much more circuitous and much less efficient than the routes that were actually used. Indeed, the New Mexico route specified in the challenged rate has been used by defendants to provide AEPCO's transportation service for decades. *Second,* AEPCO's SAC presentation distorts the SAC test for cross-subsidy by using longer and less efficient routings and alternative interchange assumptions to create revenue-sharing arrangements that do not exist under the challenged pricing authorities. AEPCO's SARR does not step into the shoes of the defendants for the portions of the route being replicated for each defendant and therefore is not testing for cross-subsidies on the portions of the routes used by the defendants to provide the transportation at issue. BNSF and UP present SAC evidence, based on SARR configurations described in Section III.A that conform to the actual interchanges specified in the challenged common carrier pricing authorities.

3. AEPCO's SAC Evidence Ignores The Legal Consequences Of The Defendants' Right To Choose The Interchange Location On An Interline Movement

The right of rail carriers providing interline service to designate the location of the interchange has legal consequences that cannot be ignored. Under 49 U.S.C. § 10704(a)(1), "[w]hen the Board, after a full hearing, decides that *a rate charged or collected by a rail carrier* for transportation subject to the jurisdiction of the Board under this part ... does or will violate this part, the Board may prescribe the maximum rate, classification, rule, or practice to be followed" (emphasis added). In this case, the through "rate charged or collected" is based on an interchange between BNSF and UP at Pueblo, Colorado, for Wyoming and Montana coal

movements, and Deming, New Mexico, for New Mexico coal movements. AEPCO's SAC presentation is fatally flawed because it does not test the reasonableness of the rates that the defendants "charged or collected" over the agreed upon interchanges.

AEPCO's SAC evidence is based on assumed routings for the issue traffic that could not occur under the terms of the challenged common carrier price authorities. As explained above, BNSF and UP could not move the Wyoming or Montana issue traffic over the assumed ANR route consistent with the requirement that BNSF interchange the traffic with UP at Pueblo. Similarly, BNSF and UP could not move the New Mexico issue traffic over the assumed ANR route consistent with the requirement that BNSF interchange the traffic with UP at Deming. In effect, AEPCO's SAC evidence assumes that the defendants established different rates than those specified in the challenged pricing authorities – rates that include an interchange at Vaughn, New Mexico. AEPCO's SAC case then addresses those straw man rates. The results of AEPCO's SAC analysis are therefore meaningless because they do not reflect the rates that are at issue in this case.

On a joint-line movement, the "rate charged or collected" is a function of the interchange point agreed to and established by the two carriers. The statute recognizes that interline rates are inextricably connected to specific through routes. Section 10703 states that rail carriers must establish through routes and then establish rates "applicable to those routes." 49 U.S.C. § 10703. Indeed, the two carriers cannot establish their revenue requirements for their respective portions of a through movement until they have agreed upon the interchange point. The interchange point determines which segments of its network a carrier will use to serve the traffic. The segments that are used to serve traffic affect the carrier's costs of handling the traffic, including the direct costs of handling the traffic, indirect costs imposed on other traffic, and the opportunity costs

associated with the capacity that will be consumed by adding the traffic to the designated segments. Estimating these costs involves both operating and commercial considerations and affects the amount of revenue that each carrier will reasonably require to participate in the through movement.

The facts in this case illustrate how these cost considerations can directly affect the routes and interchange locations that are chosen by the carriers. For example, BNSF and UP had compelling reasons to establish the interchange for the New Mexico issue traffic at Belen, rather than Vaughn. As discussed below in Section III.C, an interline movement via Vaughn would be extraordinarily inefficient for BNSF and UP. BNSF and UP would have to construct new interchange facilities at Vaughn to connect the tracks, provide for crew facilities and allow for train inspection. But even if there were appropriate interchange facilities at Vaughn, the through route would be extremely circuitous, which means the issue traffic would consume more BNSF and UP resources, including locomotive time, fuel, crews, and maintenance costs. It also means the issue traffic would unnecessarily consume track and terminal resources, thus imposing costs on the other traffic sharing the longer route.

The "rate charged or collected" for an interline movement thus cannot be evaluated except with reference to the interchange specified by the carriers. Any alteration in the interchange between the interline carriers fundamentally alters the nature of the transportation provided by the carriers, which fundamentally alters the analysis of whether rate levels are reasonable. A complainant's SAC evidence must be addressed to the rate "charged or collected," so it is impermissible for the complainant to assume a change in the interchange locations.

Defendants recognize that in *AEPCO I*, the Board stated that a rerouting of issue traffic that is similar to the rerouting of the New Mexico traffic at issue here "would seem to be

permissible." 6 S.T.B. at 327. However, the Board offered that tentative guidance in a preliminary stage of that proceeding, and it was never required to examine all the legal implications of a decision to shift the interchange because it dismissed the case on other grounds. If the Board had fully addressed the issue, it would have reached a different conclusion from that suggested by its dicta.

The Board's rationale for its suggestion that changing the interchange would "seem to be permissible" was that BNSF and UP could agree to a different interchange. *See id.* But this rationale overlooks the fact that BNSF and UP specified in the pricing authority where the interchange would occur. The Board thus never considered whether, by assuming a shift in the interchange point, complainants were properly challenging a "rate charged or collected."

Moreover, the Board never considered how allowing complainants to assume a shift in the interchange point would conflict with fundamental legal principles governing through routes. As the Board acknowledged in the "*Bottleneck*" decisions – *Central Power & Light Co. v. Southern Pacific Transportation Co.*, 1 S.T.B. 1059 (1996) ("*Bottleneck I*"), and *Central Power & Light Co. v. Southern Pacific Transportation Co.*, 2 S.T.B. 235 (1997) ("*Bottleneck II*") – rail carriers have a statutory right to establish in the first instance where the interchange will occur between them:

> Through the [4R Act] and [Staggers Act], Congress ended the "open-routing" system that effectively had required rail carriers to establish and maintain interchanges and through routes "on practically all combinations of railroad tracks between two points." [Citations omitted.] Instead, as an integral part of Congress' goal of revitalizing the rail industry, these statutes largely freed carriers to "rationalize their route structures making maximum use of efficient routings and eliminating others." [Citations omitted.]

Bottleneck I, 1 S.T.B. at 1065.

When a shipper requests service that can be provided only on an interline basis, "the determination of an interchange point for the required through movement is, in the first instance 'a matter of mutual consultation and agreement.'" *Bottleneck II*, 2 S.T.B. at 243 (citations omitted). The origin and destinations carriers "together must provide at least one route to complete the shipper's needed multi-carrier service from the desired origin point. . . . [I]f the carriers cannot agree on an interchange that would act to create that route, we will determine one." *Id.* at 243-44 (citations omitted).

The Board's tentative suggestion that a complainant should be free to assume a shift the interchange because defendants could agree to a change thus overlooks the fact that BNSF and UP have a statutory right to choose where the interchange will occur. It would undermine the existing statutory scheme to give the interline carriers the right to choose the interchange and then allow complainants in a SAC case to disregard the carriers' choice and merely assume different interchange points.

The statutory right of interline railroads to establish where they will interchange traffic is not unconditional. The Board may prescribe an alternative to the through routes established by the carriers themselves "when [the Board] considers it desirable in the public interest." 49 U.S.C. § 10705(a)(1). But there are limits on the Board's authority to prescribe alternative through routes: "[U]nder our competitive access rules we do so only where it '(i) is necessary to remedy or prevent an act that is contrary to the competition policies of 49 U.S.C. 10101a or is otherwise anticompetitive and (ii) otherwise satisfies the criteria of 49 U.S.C. 10705 and 11103, as appropriate.'" *Bottleneck I*, 1 S.T.B. at 1065-66 (citation omitted). In other words, "if a shipper wants a route other than the one currently provided by the bottleneck carrier, it must invoke [the] 'competitive access' regulations and demonstrate that the bottleneck carrier's

refusal to establish such a route would foreclose more efficient service." *Bottleneck II*, 2 S.T.B. at 238. To apply a less stringent standard "would defeat the carrier's initial discretion to choose its routes and protect its long hauls." *Id.* at 237-38.[2]

The mechanism of establishing an alternative interchange under Section 10705 and the Board's competitive access rules is plainly inapplicable here and cannot be used to justify AEPCO's assumption of alternative interchanges for purposes of its SAC evidence. AEPCO does not contend that the Board should establish alternative real-world interchanges to those established by BNSF and UP, nor would it have any basis for such a claim. AEPCO's proposed alternative routes and interchanges for both the PRB and New Mexico issue traffic are much less efficient than the routings and interchanges specified in the challenged pricing authorities. The alternative routes are longer and more circuitous, create operating complexities that do not arise under the existing routings, and involve interchanges at a location where facilities do not currently exist for an efficient interchange to occur.

BNSF and UP had the right, not contested here, to establish the interchange points where the issue traffic is handed off from one defendant carrier to the other. The challenged rates are a function of those interchange points. AEPCO's SAC evidence is based on assumed interchanges

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[2] In one of the cases encompassed by the Board's *Bottleneck* decisions, the defendant railroad indicated that it would provide a rate and service to the complainant through an interchange at Fort Worth, Texas. The complainant requested that the Board require the defendant to provide service through an alternative interchange at Victoria, Texas. The Board dismissed the complaint, noting that the complainant "did not submit evidence addressing comparative efficiencies and/or other factors needed to establish, under our competitive access regulations, its right to obtain from [the defendant] an alternative through route (and rates) for Powder River Basin coal traffic over Victoria." *Bottleneck I*, 1 S.T.B. at 1076; *see also Bottleneck II*, 2 S.T.B. at 237 ("[A] shipper is not entitled, upon request, to an alternative routing from an origin from which it is now served by a bottleneck carrier, either directly or in interline service.").

different from those established by the defendants. That evidence must be rejected because it does not allow a meaningful assessment of the challenged rates.

4. AEPCO's SAC Evidence Distorts The SAC Cross-Subsidy Test By Altering The Interchange Points Between The Defendants

AEPCO's SAC evidence distorts the SAC cross-subsidy test by altering the interchange points between BNSF and UP so that AEPCO can claim revenues from cross-over traffic moving on line segments of the defendant that is not responsible for the portion of the through route being replicated by AEPCO's SARR. Altering the interchange points produces artificial and meaningless SAC results because the results reflect hypothetical and non-existent revenue-sharing arrangements between BNSF and UP.

The SAC test is essentially a test for cross subsidies. The test's purpose is to determine whether the issue traffic, along with other traffic sharing the facilities used by the issue traffic, is cross-subsidizing other traffic that uses a defendant's network. *See Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071, slip op. at 24 (STB served Jan. 27, 2006). The portions of the defendant's network that are used to provide the issue traffic service establish the boundaries for identifying the non-issue traffic that may be included in the search for cross-subsidies. Consequently, the revenues and costs of other railroads' traffic, even on lines that could be used to serve the issue traffic if a different interchange had been established, are irrelevant to the question whether the issue traffic is paying unreasonable rates. As the Board has explained, "the analysis of the reasonableness of a defendant carrier's rate should be based on the extent of the defendant carrier's participation in the movement." *Texas Mun. Power Agency v. Burlington N. & S.F. Ry Co.*, 7 S.T.B. 803, 821 (2004) ("*TMPA*"); *see also Ass'n of Am. R.R. – Petition Regarding Methodology for Determining R.R. Revenue Adequacy*, STB Ex Parte No. 679 (STB served Oct. 24, 2008) at 3 ("[SAC procedures are designed] to estimate the costs associated with

providing service over a specified portion of a carrier's system (for the purpose of determining if a particular rate charged for service over that portion of the system results in a cross-subsidy of other parts of the carrier's system)."). Indeed, the Board recognized this fundamental principle in the prior SAC case brought by AEPCO:

> When the purpose of the SAC exercise is taken into consideration, it becomes clear that a defendant carrier's ability to recover reasonable costs and earn adequate revenues should not be limited by the inclusion in our rate reasonableness analysis of another carrier's traffic and revenue that do not or could not reasonably be expected to pay for the defendant carrier's costs.

AEPCO I, 6 S.T.B. at 328.

Accordingly, in a SAC analysis, the SARR is allowed to step into the shoes of a defendant with respect to the traffic that the SARR may include in the stand-alone traffic group. *See W. Tex. Util. Co. v. Burlington N.R.R.*, 1 S.T.B. 638, 657 (1996) ("*West Texas*"). When a SARR steps into a defendant's shoes for purposes of the SAC analysis, the SARR is entitled to the traffic that is available to the defendant for the portion of the defendant's service that is replicated by the SARR, but it is not entitled to any more traffic than is actually available on the portion of the defendant's route being replicated by the SARR. In SAC cases involving single-line rates, this principle is reflected in the parties' and Board's treating interchange points of a defendant's real-world interline movements as the equivalent of a destination for a movement on the defendant, thus limiting the traffic that is available to the SARR. For example, in recent cases involving BNSF that included the Westar Energy coal traffic destined for the Jeffrey Energy Center in Topeka, Kansas, that BNSF interchanges with UP at Northport, Nebraska, Northport is treated as the destination of a single-line movement on the SARR and the SARR takes BNSF's full division of revenue, but nothing more. *See, e.g., Western Fuels Ass'n & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088 (STB served Feb. 18, 2009) at 16.

In fact, the Board has expressly prohibited the complainant in a SAC case from assuming an artificial interchange between two carriers simply to generate increased SARR revenues. In *West Texas*, the complainant sought to extend the SARR's portions of certain interline movements by ignoring the real-world interchange locations for those movements. The Board recognized that such manipulation of the interchange locations would distort the SAC analysis, and it rejected the complainant's evidence on this issue. *See West Texas*, 1 S.T.B. at 658 n.41. As the Board subsequently explained, the ruling reflected the broader principle that "the analysis of the reasonableness of a defendant carrier's rate should be based on the extent of the defendant carrier's participation in the movement." *TMPA*, 7 S.T.B. at 821.

The same principles, and the same concerns for distortion of the SAC analysis, apply regardless of whether the SAC analysis is being conducted for a single-line rate or a joint-line rate. That is, in an interline case, the SARR steps into each defendant's shoes for the portion of the through route for which the defendant is responsible. Therefore, the interchange point between the defendants determines the traffic that will be available to the SARR on different portions of the SARR. Indeed, the Board appeared to recognize this principle and its application in *AEPCO I* when it provided guidance to the parties on the scope of permissible SAC evidence in an interline case: "[F]or each segment of a route used to test the respective joint rates, only the traffic and revenues of the carrier whose portion of the route is being replicated should be included in the SARR's traffic group." *AEPCO I*, 6 S.T.B. at 329. Ignoring the established boundaries between joint-rate defendants would have the effect of "hypothesiz[ing] non-existent revenue or cost-sharing arrangements." *Id.*

The SAC test would not provide meaningful information about the reasonableness of challenged rates if a complainant could construct its SARR without regard to the portion of the

through route for which each defendant is responsible. A test that is designed to examine whether a defendant is using traffic that moves on a subset of its system to cross-subsidize other parts of its system becomes fatally corrupted if the subset can include traffic from portions of another carrier's network that the defendant does not use to transport the issue traffic. Application of the SAC test might indicate the presence of a cross-subsidy based on revenues that are not actually available to the defendant.

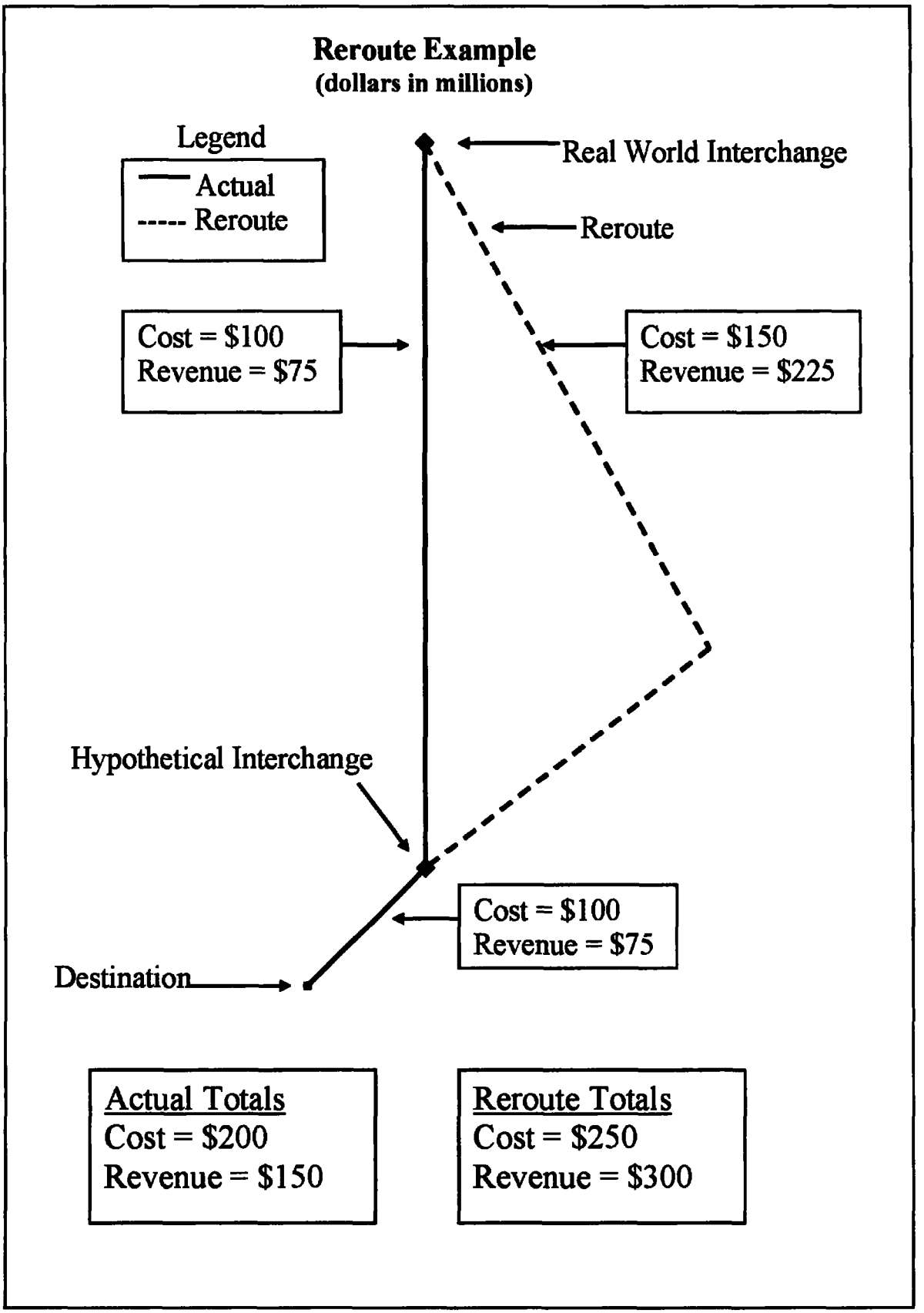
This case illustrates the problem. AEPCO posited an alternative routing for the PRB issue traffic that effectively alters the BNSF-UP interchange point from Pueblo to Vaughn in an attempt to use the revenues generated by BNSF's transcontinental traffic on BNSF's line from Amarillo to Vaughn to offset SARR costs. Those BNSF lines carry far more traffic than the UP lines that are actually used by the issue traffic. AEPCO Opening Nar. at III-A-10 ("The reroute through Vaughn and El Paso contributes to a longer total movement length, but over higher density lines."). But BNSF's revenues and costs for traffic on BNSF's transcontinental line are irrelevant to the reasonableness of the issue traffic rates because UP, not BNSF, is responsible for the issue traffic south of Pueblo. Substituting a BNSF route for a UP route is not an instance of cost sharing that is permitted under SAC principles; rather, it is an instance of AEPCO using traffic from dense portions of BNSF's network that are not relevant to the issue traffic to create the appearance of a cross-subsidy. There is no cost sharing between the PRB issue traffic and the BNSF traffic moving over BNSF's line from Amarillo to Vaughn. The revenues from BNSF's transcontinental traffic from Amarillo to Vaughn are not available to offset UP's costs of providing service south of Pueblo, so they have no relevance to the SAC analysis.

Similarly, AEPCO assumed an alternative BNSF-UP interchange point for the New Mexico issue traffic because UP's Vaughn-El Paso line carries much more traffic than BNSF's

Belen-Deming line that is actually used to provide the issue traffic service. But UP's revenues and costs for traffic on the Vaughn-El Paso line are irrelevant to the reasonableness of the issue traffic rates: BNSF, not UP, is responsible for moving the issue traffic from the New Mexico origins to Deming. The revenues available to UP from traffic moving over the Vaughn-El Paso line are not available to BNSF to cover BNSF's costs to move the traffic to Deming, so those revenues do not belong in the SAC analysis.[3]

The distortion of SAC results that can be produced by altering interchange points in a case involving a joint-line rate can be readily demonstrated. The following hypothetical is a stylized version of AEPCO's proposed rerouting of the Wyoming/Montana issue traffic. It provides a simple illustration of how an issue traffic reroute can generate excess revenues that change the outcome of the SAC test from a revenue shortfall to a revenue overage.

[3] BNSF and UP acknowledge that a challenge to the reasonableness of a joint rate must be carried out on a through basis by examining the SARR's full costs and total revenues. But the total revenues in a SAC analysis do not properly include revenues generated on a segment of a SARR by an interline carrier who is not responsible for providing service over that segment.


Reroute Example
(dollars in millions)
Legend
Actual
Reroute
Real World Interchange
Reroute
Cost = $100
Revenue = $75
Cost = $150
Revenue = $225
Hypothetical Interchange
Cost = $100
Revenue = $75
Destination
Actual Totals
Cost = $200
Revenue = $150
Reroute Totals
Cost = $250
Revenue = $300

In this case, the reroute over a longer, less efficient route contributes an overage of $75 million which is wholly responsible for the combined overage of the SARR (assuming revenue and cost for the first carrier in the route are break even). The change in outcome here is solely attributable to the fact that the SARR has changed the boundaries of each defendant carrier's responsibility for portions of the through movement. By assuming that the defendant originating the movement is responsible for a much greater portion of the movement, the SARR is able to claim revenues from non-issue cross over traffic on line segments of a carrier that is not in the route for the relevant portion of the movement. That non-issue cross over traffic does not and could not share any facilities with the issue traffic because the non-issue traffic is handled by a carrier that is not responsible for the issue traffic movement over that portion of the route.

5. If AEPCO Were Permitted To Assume Alternative Interchange Points, The Board Would Have To Use The Variable Costs Associated With The Proposed Alternative Routes When Determining The Jurisdictional Rate Floor

BNSF and UP believe that AEPCO should not be permitted to base its SAC evidence on alternative interchanges between BNSF and UP for the reasons discussed above. However, if AEPCO were permitted to presume different interchange points for purposes of determining the traffic available to its SARR, logic and fairness require the Board to use the alternative through routes in calculating the variable costs of the issue traffic for purposes of determining the jurisdictional threshold.[4]

The Board suggested in *AEPCO I* that altering the interchange points for an interline move might be permissible because BNSF and UP were "free to alter or vary their routing of AEPCO's movements in this manner at any time (by mutually changing the interchange point)."

[4] The Board would also have to use the variable costs of the alternative routing in applying MMM, as discussed in Section III.H of defendants' reply evidence.

AEPCO I, 6 S.T.B. at 327. However, if BNSF and UP had chosen to alter the interchange points as assumed by AEPCO, they would incur significantly higher variable costs to transport the issue traffic using the new routing. Similarly, if AEPCO obtained a prescribed through route via Vaughn in a proceeding under Section 10705, the resulting routings would have higher variable costs. Those higher variable costs would result in a higher jurisdictional threshold for rates on the alternative service. Thus, if AEPCO is allowed to assume alternative interchanges in presenting SAC evidence, it would be arbitrary for the Board to ignore the higher costs for the alternative service in determining the jurisdictional threshold for any rate prescription.

As a matter of logic and fairness, AEPCO cannot have it both ways. AEPCO should not be able to base its SAC evidence on a theory that presumes the defendants would use different through routes, with different interchanges, than the routes they are using in the real world, while also avoiding the costs the defendants would bear if they in fact used the alternative through routes. If the railroads chose to provide the alternative service on which AEPCO's SAC evidence is based (or if they were required to do so after a proceeding under Section 10705), they would be entitled to charge 180% of the variable costs they would incur on that service without regulatory intervention. As the Board has recognized: "Under 49 U.S.C. 10707(c)(1)(A), a railroad may charge a captive shipper up to 180% of its variable cost of serving that shipper without regulatory intervention, and the Board cannot prescribe a rate that would yield revenues below that level." *TMPA*, 7 S.T.B. at 807. The Board could not award AEPCO a rate prescription based on an assumption that BNSF and UP provide the alternative service, yet prescribe rates at a level below that which the statute would allow on the alternative service. BNSF and UP present in Section II evidence on the BNSF/UP variable costs for the assumed

alternative routings in the event the Board allows AEPCO to present its SAC evidence based on the alternative routes and interchanges.

C. THE BOARD SHOULD NOT PRESCRIBE MAXIMUM RATES FOR FUTURE MOVEMENTS OF COAL FROM ORIGINS IN MONTANA AND WYOMING TO APACHE STATION

The Board should not prescribe maximum rates for future movements of coal from the Montana and Wyoming mine origins covered by BNSF Common Carrier Pricing Authorities BNSF 57988 and BNSF 58039. AEPCO's own evidence establishes that {

}

1. AEPCO's Evidence Establishes That The Challenged Rates Covering Origins in Montana and Wyoming {

}

Defendants did not know AEPCO's coal sourcing plans when they established the challenged common carrier rate authorities. Defendants had their doubts about whether AEPCO actually intended to ship coal from any of the Gillette, Wyoming, area mines covered by BNSF 57988, or the Signal Peak Mine covered by BNSF 58039. However, they established and have maintained the challenged rates to avoid repeating the litigation that occurred in *Arizona Electric Power Coop. v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42058, where AEPCO ultimately moved a small amount of Powder River Basin coal to Apache Station to justify its

demand for rates.[5] BNSF and UP still do not know AEPCO's plans: AEPCO designated its coal sourcing projections as "Highly Confidential." AEPCO Opening Nar. at III-A-20, Table II-A-3.

However, AEPCO's evidence in this proceeding shows that {

} As discussed below in Section III.A, AEPCO obtained a small amount of coal from one of the origins covered in BNSF 57988 – approximately two trainloads of coal from Decker in 2009. {

} AEPCO Opening Nar. at III-A-20, Table II-A-3. {

}[6]

AEPCO's evidence also shows that {

} AEPCO has never obtained coal from Signal Peak. *Id.* {

} *Id.* {

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[5] Documents produced by AEPCO in discovery show that {

} BNSF/UP Reply workpaper "AEPCO Coal Meeting Minutes.pdf." ({"

"}).

[6] BNSF/UP Reply workpaper "AEPCO Coal Meeting Minutes.pdf." {

} AEPCO Opening Nar. at III-A-20, Table III-A-3.

}

{

} AEPCO claims that the coal sourcing forecasts in its evidence "reflect AEPCO's own internal projections." AEPCO Opening Nar. at III-A-19. However, AEPCO never identifies any documents that contain any such internal projections. Indeed, AEPCO's evidence regarding coal sourcing projections is not even sponsored by the AEPCO corporate officer who is responsible for fuel procurement, *id.* at IV.1 (Verification of Garfield G. Grim); instead, it is sponsored by an economic consultant retained for this proceeding, *id.* at IV.5 (Verification of Thomas D. Crowley).

Moreover, AEPCO essentially concedes that the coal sourcing forecast in its evidence

{ }

> "[W]here that coal comes from may be affected in substantial part by such matters as relative mine price, relative transportation costs, relative coal quality parameters, environmental-related restrictions, and other factors prevailing at the time."

AEPCO Opening Nar. at III-A-19.

In sum, AEPCO's evidence demonstrates {

}

2. The Board Lacks The Authority To Prescribe Maximum Rates For Future Movements When {
}

The Board has the authority to prescribe maximum rates for future movements only if it concludes "that a rate charged or collected by a rail carrier . . . does or will violate this part." 49 U.S.C. § 10704(a)(1). Because AEPCO's evidence demonstrates {

} the Board lacks authority to prescribe maximum rates for future movements from those origins.

The limitation on the Board's authority to prescribe rates for future movements reflects a statutory scheme that emphasizes the importance of market-based rates, shipper-carrier negotiations, and the ratemaking discretion of railroads. One of Congress's express goals when it enacted the Staggers Act was to "minimize the need for federal regulatory control over . . . rail transportation."[7] One way this goal was accomplished was by giving railroads, not the regulator, discretion to set rates in the first instance. When Congress enacted the Interstate Commerce Commission Termination Act of 1995 ("ICCTA"), it reiterated "the Staggers Act policy that regulatory intervention should be relegated to a role as a 'safety net' in those relatively rare situations where market forces and shipper-carrier negotiations do not produce a satisfactory business relationship."[8]

{

[7] Staggers Act, Pub. L. No. 96-448, §101(a), 94 Stat. 1895, 1897 (1980).

[8] H.R. Rep. No. 104-311 at 83, *reprinted in* 1995 U.S.C.C.A.N. at 795.

In *Burlington Northern Railroad v. STB*, 75 F.3d 685 (D.C. Cir. 1996), the court addressed a similar set of issues. In that case, West Texas Utilities ("WTU") sought to bring a rate reasonableness case over a year prior to the termination of a coal transportation contract for the express purpose of having a prescribed rate in place when the contract expired. It obtained an order from the Interstate Commerce Commission ("ICC") that required Burlington Northern ("BN") to publish a common carrier rate for its traffic even though there was no imminent prospect of transportation under that rate because the existing contract would remain in effect for several months. WTU's acknowledged purposes in obtaining the rate was to set up a rate challenge that would result in a prescribed rate that could be used in the future, after the contract terminated and common carrier transportation could begin.

BN challenged the ICC's order requiring publication of a common carrier tariff, arguing that the governing statute did not permit shippers to use the Board's processes to obtain prescribed rates for transportation long in advance of when the common carrier transportation would occur. The court agreed. It concluded that the ICC did not have the "statutory authority

to impose upon a rail carrier a current obligation to file a tariff specifying a rate for traffic . . . that would not be ready to move under the rate until months or years down the road." *Id.* at 692.[9]

AEPCO, unlike WTU, is challenging rates that were established voluntarily, but defendants should not be exposed to potential rate prescriptions that would bind them far into the future simply because {

}[10]

The Board lacks authority to prescribe maximum rates for future movements of coal from Montana and Wyoming to Apache Station because AEPCO's own evidence shows that

{ }

[9] The *Burlington Northern* decision was based on the statute prior to the ICCTA, but the court indicated that the authority to require railroads to maintain rates for non-imminent, future transportation solely for purposes of mounting a rate reasonable challenge was even weaker under ICCTA: "any future action by the Board along the lines of the Commission's action here would be on even weaker statutory ground than was the action taken here." *Id.* at 693 n.7.

[10] {

}

See id. at 695.

3. Regardless Of The Board's Authority, The Board Should Exercise Its Discretion Not To Prescribe Rates For Future Movements Of Coal From Origins In Montana And Wyoming To Apache Station

Even if the Board concludes that it has the authority to prescribe maximum rates for future movements from origins covered by BNSF 57988 and BNSF 58039, it should exercise its discretion not to prescribe such rates. "[I]n contrast to reparations – to which a complainant that has paid an unreasonably high rate for past movements has a statutory right to be awarded – the complainant has no similar right to a rate prescription for future movements." *AEP Texas North Co. v. BNSF Ry.*, STB Docket No. 41191 (Sub-No. 1), slip op. at 18 (STB served May 15, 2009). "Rather, the Board has discretion as to whether or not to prescribe rates for future movements," and it "look[s] at the broader context to determine whether or not a rate prescription appears to be warranted and appropriate." *Id.*

In this case, prescription of future rates would be unwarranted and inappropriate. {

} in contravention of federal policy "to minimize the need for Federal regulatory control over the rail transportation system." 49 U.S.C. § 10101(2); *see also AEP Texas North*, slip op. at 19 (explaining that "the prescription of rates is a quasi-legislative act that has the force of law").

AEPCO may argue that the Board should prescribe future rates now {

} As the ICC explained in *Coal Rate Guidelines*, regulatory intervention should be limited "to avoid inhibiting or discouraging contract solutions." *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520, 524 (1985); *see also* 49 U.S.C. § 10101(1) (policy "to allow, to the maximum extent possible, competition and the demand for services to establish reasonable rates for transportation by rail").

Moreover, just like AEPCO's current coal sourcing plans, the stand-alone cost analysis in this proceeding reflects forecasts of future conditions.[11] {

} Efforts to use recent, accurate data are especially important in rate cases because a rate prescription imposes a constraint on railroad pricing that "cannot be undone retroactively by future Board action." *AEP Texas North*, slip op. at 19 (citing *Az. Grocery Co. v. Atchison, Topeka & Santa Fe Ry.*, 284 U.S. 370, 389 (1932)). By contrast, if rates defendants actually charge AEPCO in the future prove to be unreasonable, AEPCO always "could be made whole by an award of reparations under 49 U.S.C. § 11704(b)." *Id.*

AEPCO {

} and thus neither the law nor equity supports the prescription of such rates.

D. AEPCO'S COMPLAINT SHOULD BE DISMISSED

The flaws in AEPCO's SAC presentation should result in dismissal of AEPCO's complaint. AEPCO ignored the Board's warning in AEPCO's prior SAC case that it would be

[11] AEPCO Opening Nar. at III-A-19 ("[W]here that coal comes from may be affected in substantial part by such matters as relative mine price, relative transportation costs, relative coal quality parameters, environmental-related restrictions, and other factors prevailing at the time.").

impermissible to combine what are essentially separate challenges to rates from disparate geographic origins into a single SAC presentation. AEPCO also made the impermissible assumption that the issue traffic could be rerouted in a manner that is inconsistent with the interchange locations specified in the challenged rates. As a result of these flaws in AEPCO's SAC evidence, the Board should dismiss AEPCO's complaint without carrying out a SAC analysis.

Because the burden of proof in a SAC case is on the complainant, defendants should have no obligation to correct the fundamental flaws in AEPCO's case in chief and present alternative evidence based on a valid SAC presentation. Nevertheless, defendants present alternative SAC evidence in this case after correcting the flaws in AEPCO's SAC assumptions. As explained in detail in defendants' reply evidence, when the SAC analysis is done correctly, it is clear that the challenged rates do not exceed reasonable maximum rates.

To correct the flaws in AEPCO's SAC presentation, defendants present SAC evidence based on two stand-alone railroads configured to address separately the reasonableness of the challenged Wyoming/Montana and New Mexico rates. Each of the two SARRs is configured based on the interchange locations specified in the challenged pricing authorities, and the traffic selection for the two SARRs respects the allocation of responsibility between the two defendants for the issue traffic service as specified in the challenged pricing authorities.

1. ANR-PRB

The SARR that defendants use to test the reasonableness of the Wyoming and Montana issue traffic rates is called ANR-PRB. A diagram of ANR-PRB is included as BNSF/UP Reply Exhibit III.A-1, page 1 of 5. ANR-PRB replicates a BNSF route from Huntley, Montana, southeast to Donkey Creek, Wyoming, south to Northport, Nebraska (via Orin and Guernsey,

Wyoming), and then south to Pueblo, Colorado (via Denver, Colorado). On this portion of ANR-PRB, the traffic group consists of BNSF's traffic, consistent with the fact that BNSF is responsible under the challenged pricing authorities for providing the issue traffic transportation to Pueblo.

ANR-PRB then replicates a UP route from Pueblo southeast to Stratford, Texas (via Las Animas, Colorado), southwest to Vaughn, New Mexico, and to El Paso, Texas, and then west to Cochise, Arizona. On this portion of ANR-PRB, the traffic group consists of UP's traffic. ANR-PRB does not construct the Pueblo to Stratford line segment, but rather it uses UP's existing trackage rights over BNSF's line between Pueblo and Stratford. Defendants show that this use of trackage rights is permissible because the trackage rights payment is sufficient to ensure full recovery of the costs of the Pueblo to Stratford line segment.

In 2012, ANR-PRB is assumed to construct a line from Mossmain, Montana, to Walter Jct., Montana, to connect with private track that serves Signal Peak Mine. From Mossmain, Montana, ANR-PRB uses trackage rights over Montana Rail Link ("MRL") to Huntley, Montana. As explained in Section III.A, defendants eliminated from the SAC analysis certain traffic moving over MRL that AEPCO had included in its SAC presentation. The excluded traffic shares no ANR-PRB facilities, and it therefore does not belong in the SAC analysis.

2. ANR-NM

The SARR that defendants use to test the reasonableness of the New Mexico issue traffic rates is called ANR-NM. A diagram of ANR-NM is included as BNSF/UP Reply Exhibit III.A-1, page 3 of 5. Defendants configured ANR-NM to follow the same route as the current route of movement of the issue traffic under the challenged price authority. Specifically, ANR-NM replicates a BNSF route from Defiance, New Mexico, and Lee Ranch, New Mexico, to Belen,

New Mexico, and then south to Rincon, New Mexico, and southwest to Deming, New Mexico. ANR-NM then replicates a UP route from Deming to Apache Station. ANR-NM does not construct the Rincon to Deming line segment; instead, it uses BNSF's existing arrangement with Southwest Railroad ("SWRR"), under which SWRR handles the traffic on the Rincon to Deming line segment.

BNSF is responsible for providing the issue traffic transportation from the New Mexico mines to Deming, therefore ANR-NM includes BNSF's traffic on this portion of ANR-NM. Specifically, ANR-NM includes the same BNSF transcontinental traffic used by AEPCO in its SAC presentation over the portion of ANR-NM between the New Mexico mines and Belen. From Belen to Deming, ANR-NM includes BNSF's traffic moving over that line segment. From Deming to Cochise, ANR-NM includes the same UP traffic that AEPCO included in its SAC presentation over this line segment.

3. Results of SAC Analysis

To carry out the SAC analysis for ANR-PRB and ANR-NM, defendants first corrected several assumptions made by AEPCO in its SAC presentation relating to base year traffic volumes, volume growth, base year revenues and revenue growth. The details are set out in Section III.A and are not repeated here. Defendants also corrected several aspects of AEPCO's operating plan, operating costs and construction costs and applied corrected assumptions to calculate the SAC costs of ANR-PRB and ANR-NM. The details are set out in Sections III.B, C, D and F. Defendants explain in Sections III.G and H that there were also a number of flaws in AEPCO's application of the DCF model that defendants corrected.

When these corrections are made and the SAC analysis is carried out based on proper SAC assumptions, AEPCO's motive for positing a single SARR and disregarding the

interchange location between BNSF and UP becomes clear. The SAC analyses for both ANR-PRB and ANR-NM show that AEPCO's traffic is not cross-subsidizing other parts of defendants' rail networks; rather, AEPCO is attempting to shift responsibility for paying for facilities it uses to other shippers that do not benefit from those facilities.

With regard to ANR-PRB, Exhibit III.H-1 shows that the revenues available to the SARR are not sufficient to cover the full SAC costs of the SARR, and therefore the challenged Wyoming/Montana rates are not being used to subsidize other portions of the defendants' networks. With regard to ANR-NM, Exhibit III.H-2 shows that SAC revenues exceed SAC costs. However, defendants carried out an internal cross-subsidy analysis of the ANR-NM line segment between Rincon and Belen to determine whether the revenues available to ANR-NM on that line segment were sufficient to cover the costs of that line. Defendants used the procedures specified by the Board in *Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071 (STB served Jan. 25, 2006). As shown in Exhibit III.H-3, the revenues available to ANR-NM from traffic using the Rincon-Belen line segment, including the issue traffic, are not sufficient to cover the full costs of that line segment. Therefore, the issue traffic New Mexico rates are also not being used to subsidize other portions of the defendants' networks. Those rates are not even sufficient to cover the costs of facilities that are used to provide the issue traffic service.

Therefore, both sets of challenged rates – those relating to origins in New Mexico and those relating to origins in Wyoming and Montana – do not exceed reasonable maximum rates when a proper SAC analysis is conducted. AEPCO's complaint should be dismissed.

Respectfully submitted,

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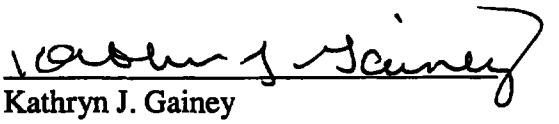
May 7, 2010

CERTIFICATE OF SERVICE

I hereby certify that on this 7th day of May, 2010, I caused a copy of the foregoing Joint Reply Evidence and Argument of Defendants BNSF Railway Company and Union Pacific Railroad Company, including the Narrative, Exhibits and electronic workpapers, to be served on the following Parties of Record by hand delivery or Federal Express:

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II. MARKET DOMINANCE

A. QUANTITATIVE EVIDENCE

Defendants challenge two aspects of AEPCO's variable cost calculations for purposes of determining the jurisdictional threshold under 49 U.S.C. §§10701(d)(1) and 10707.

1. Treatment Of SWRR

The issue traffic originating at New Mexico mines is handled by BNSF on a route through Belen, New Mexico, and south on a BNSF line to Rincon, New Mexico. At Rincon, the traffic is interchanged with the Southwest Railroad ("SWRR") and moved by the SWRR over a BNSF line that has been leased to SWRR to Deming, New Mexico, where it is interchanged with UP. Empty trains returning to the New Mexico mines from the complainant's facilities run the same route in reverse, with UP interchanging the trains with SWRR at Deming, and SWRR moving the trains to Rincon for a further interchange with BNSF. BNSF returns the trains through Belen to the mines for reloading.

AEPCO ignored the interchange between BNSF and SWRR in calculating the variable costs of the New Mexico issue traffic. AEPCO's treatment of SWRR is incorrect for two reasons. First, AEPCO's treatment of the SWRR interchange is inconsistent with precedent. In *Kansas City Power & Light Company v. Union Pacific Railroad Company*, STB Docket No. 42095 (STB served May 19, 2008) ("*KCPL*"), UP used the Missouri & Northern Arkansas Railroad ("MNA") to provide a portion of the issue traffic service over a UP line segment that UP had leased to MNA. *KCPL*, slip op. at 3. The complainant in that case argued that the payments made by UP to MNA should be treated as a division of revenues or, alternatively, that the movement should be treated as a single-line UP movement, ignoring the interchange with MNA. UP argued that the payment to MNA should be treated as a variable cost to UP. The

Board rejected all of these approaches and found that the movement should be costed as an interline movement between UP and MNA, with MNA's costs determined based on Western Regional URCS.

There is no basis for departing from precedent in this case. Here, BNSF interchanges the issue traffic with SWRR at Rincon, just as UP interchanged the issue traffic in *KCPL* with MNA at Kansas City, Missouri. Similarly, SWRR moves the traffic between Rincon and Deming over BNSF lines that have been leased to SWRR for a fee paid by BNSF, which is consistent with the situation in *KCPL*, where MNA moved the issue traffic from Kansas City to the destination over lines that had been leased from UP for a fee paid by UP. In both cases, the SWRR and MNA were not responsible for setting the rates but simply received a fee for providing the service.

AEPCO's treatment of SWRR is also wrong because it seeks to have the Board make a movement-specific adjustment to account for the purported characteristics of the interchange. AEPCO argues that the movement should be treated simply as a BNSF movement with no involvement by SWRR because "the SWRR's involvement at Rincon consists simply of a crew change and that no additional activities are performed at that location." AEPCO Opening Nar. at II-9. But the Board ruled in *Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No.1), slip op. at 50 (STB served Oct. 30, 2006) ("*Major Issues*"), that it would no longer permit movement-specific adjustments to URCS system-average figures in determining URCS variable costs in SAC cases. The fact that an interchange occurs between BNSF and SWRR is not in dispute. BNSF moves the traffic to Rincon and SWRR moves it between Rincon and Deming. And the fact that there is an interchange is the only fact that is relevant to URCS costing in a rate case. The amount of work done at a particular interchange is not relevant. Some interchanges involve more costs than others, but those cost differences are subsumed in the system-average

cost.[1] AEPCO's focus on the amount of work done at the interchange between BNSF and SWRR is an impermissible attempt to reintroduce movement-specific URCS adjustments to get around the use of system-average costs.[2]

Defendants have corrected AEPCO's error. Defendants have included an interchange between BNSF and SWRR in the URCS calculations and used Western Regional URCS to determine SWRR's variable costs of handling the issue traffic over the Rincon-Deming line segment. The correct calculations are set out below.

Table II.A.1
URCS Variable Costs And Jurisdictional Thresholds, 1Q 2010
Based On Actual Routing[3]

	URCS Variable Cost per Ton	Jurisdictional Threshold Level per Ton
New Mexico		
Lee Ranch	$6.94	$12.50
El Segundo	$6.85	$12.33
Wyoming		
Eagle Butte	$17.63	$31.74
Buckskin	$17.66	$31.78
Rawhide	$17.60	$31.68
Clovis Point	$17.56	$31.61
Dry Fork	$17.59	$31.66
Montana		
Spring Creek	$18.91	$34.03
Decker	$18.82	$33.87
Signal Peak	$21.30	$38.35

[1] In fact, the "system-average" URCS costs assigned to the issue traffic movement are reduced by 50% to account for the trainload nature of the shipments.

[2] AEPCO also presents an alternative variable cost calculation based on a full set of purported movement-specific adjustments. *See* AEPCO Opening Nar. at II-6 n.4. Defendants do not address those alternative calculations here since even AEPCO acknowledges that under the Board's current procedures, such calculations are not considered in a SAC case.

[3] BNSF/UP Reply workpaper "Quarterly VC.xlsx."

2. Variable Costs Of The Rerouted Issue Traffic

As explained in the Counsel's Argument, defendants do not believe that AEPCO's presentation of SAC evidence based on assumed alternative interchanges between defendants is permissible. However, as also explained in the Counsel's Argument, if AEPCO were permitted to presume different interchange points for purposes of its SAC evidence, logic and fairness require the Board to use the alternative through routes in calculating the variable costs of the issue traffic for purposes of determining the jurisdictional threshold. Defendants explain below in Section III.C that the alternative movements assumed by AEPCO for the issue traffic are significantly longer and less efficient than the real world movements. Defendants have recalculated the variable costs for the issue traffic movements using the longer routes assumed by AEPCO and present the results of these alternative calculations below.[4]

Table II.A.2
URCS Variable Costs And Jurisdictional Thresholds, 1Q 2010
Based On AEPCO Assumed Routing

	URCS Variable Cost per Ton	Jurisdictional Threshold Level per Ton
New Mexico		
Lee Ranch	$8.86	$15.94
El Segundo	$8.76	$15.77
Wyoming		
Eagle Butte	$19.13	$34.44
Buckskin	$19.16	$34.48
Rawhide	$19.10	$34.38
Clovis Point	$19.06	$34.32
Dry Fork	$19.09	$34.36
Montana		
Spring Creek	$20.40	$36.72
Decker	$20.32	$36.58
Signal Peak	$22.80	$41.04

[4] BNSF/UP Reply workpaper "Quarterly VC.xlsx."

B. QUALITATIVE EVIDENCE

For purposes of their reply evidence, defendants do not contest AEPCO's evidence on qualitative market dominance.

III. STAND-ALONE COST

A. TRAFFIC GROUP

AEPCO challenges the reasonableness of joint rates issued by defendants for transporting unit-train movements of coal to the Apache Generating Station in Cochise, Arizona ("Apache Station"). The challenged rates apply to joint-line service from two separate coal-producing areas that are hundreds of miles apart, *i.e.*, mines at El Segundo and Lee Ranch, New Mexico, and mines in the Powder River Basin ("PRB") of Wyoming and Montana.

Movements from New Mexico and the PRB under the challenged pricing authorities traverse different routes over different combinations of BNSF and UP lines, and the traffic moving over each route shares few or no common facilities with the traffic moving over the other route. The actual route of the issue traffic from the New Mexico mines to Apache Station is approximately 490 miles, with a BNSF/UP interchange at Deming, New Mexico; the actual route from the northern-most mine (Signal Peak) would be approximately 1,800 miles, with a BNSF/UP interchange at Pueblo, Colorado; and the two routes overlap for only the final 150 miles from Deming to Apache Station.

AEPCO's SAC evidence combines the issue traffic from the two origin areas and posits that it would be transported to Apache Station by a single hypothetical stand-alone railroad ("SARR") called the Arizona & Northern Railroad ("ANR"). AEPCO configured ANR to replicate different BNSF and UP routes than defendants actually use to transport the issue traffic and to ignore the boundaries of BNSF's and UP's responsibilities for the issue traffic under the challenged pricing authorities.

ANR is comprised of three legs that pass through parts of eight states:

- "Leg 1" is a north/south line that replicates a BNSF route from the northern-most Montana mine served by ANR to Vaughn, New Mexico.

The route starts at Walter Jct., Montana, then proceeds south to Mossmain (near Laurel), Montana,[1] and uses trackage rights over the Montana Rail Link ("MRL") between Mossmain and Huntley (near Jones Jct.), Montana.[2] From Huntley, the route proceeds south and then southeast to Donkey Creek, Wyoming. From Donkey Creek, the route proceeds south to Northport, Nebraska (via Orin and Guernsey, Wyoming), and then south to Pueblo, Colorado (via Denver, Colorado). From Pueblo, the route extends south to Amarillo, Texas (via Las Animas, Colorado, and Stratford, Texas), and then, finally, west to Vaughn. (AEPCO also posits that ANR will use short segments of trackage rights over MRL from Mossmain to Laurel, and from Huntley to Jones Jct.).

- "Leg 2" is an east/west leg that replicates BNSF's line from Defiance, New Mexico, east to Vaughn.

- "Leg 3" replicates UP's lines from Vaughn south to El Paso, Texas, and from El Paso west to Apache Station.

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[1] AEPCO hypothesizes that, in 2012, ANR would construct a line segment from Mossmain, Montana, to Walter Jct., Montana, to connect with private track that serves the Signal Peak Mine.

[2] AEPCO is vague in describing the eastern endpoint of the MRL trackage rights as "Moran Jct./Jones Jct.," AEPCO Opening Nar. at III-A-2, and the eastern point where SARR-constructed line intersects with the MRL trackage rights as "Jones Jct. and Huntley," *id.* at III-B-1. In fact, Huntley and Jones Jct. are on the MRL line, and they form a triangle with Moran Jct., which is on the BNSF line to Donkey Creek. In the real world, the issue traffic from Signal Peak Mine would move from the MRL trackage rights to BNSF's line at Huntley, and then continue south through Moran Jct. towards Donkey Creek. A schematic showing how the issue traffic would move over MRL trackage rights lines is included as BNSF/UP Reply Exhibit III.A-1 at 5.

A schematic of ANR appears as Exhibit III-A-1 of AEPCO's opening evidence.

AEPCO designed ANR in an improper attempt to take advantage of revenue-sharing and cost-sharing arrangements that are not available to BNSF and UP under the challenged pricing authorities. The impermissible aspects of AEPCO's SARR configuration and traffic selection include the following:

- AEPCO ignored the Board's prior warning against combining New Mexico-related non-issue traffic and PRB-related non-issue traffic that share no facilities into a single SARR when that traffic could not have been treated in the same manner had AEPCO filed separate complaints challenging defendants' New Mexico and PRB rates.

- AEPCO disregarded the boundaries of BNSF's and UP's responsibilities for the issue traffic under the challenged pricing authorities and, as a result, effectively created revenue-sharing and cost-sharing arrangements for ANR that are not available to the defendants, thus distorting the SAC result.

- AEPCO improperly increased ANR's revenues by including in the SARR (i) cross-over traffic that moves only on ANR trackage rights over MRL's line between Laurel, Montana, and Jones Jct., Montana (and not over any ANR-constructed facilities); and (ii) revenue associated with cross-over traffic after it has moved onto MRL's line from ANR-constructed lines (and before a presumed interchange with the residual BNSF).

Defendants correct these serious flaws in ANR's design in this reply evidence. To correct the first two flaws, defendants created two alternative SARRs (or "sub-SARRs"): (i) ANR-PRB, which they use to test the reasonableness of the challenged PRB rates; and (ii) ANR-NM, which they use to test the reasonableness of the challenged New Mexico rates. Defendants were able to discern AEPCO's approach to traffic selection, and thus they applied that approach to identify traffic for the sub-SARRs that would be consistent with AEPCO's approach, but that would not incorporate impermissible revenue-sharing and cost-sharing arrangements.[3] To correct the third flaw, defendants exclude from the SARR all traffic that does not move over any ANR-constructed facilities, and they modify the SARR origin or termination point for the cross-over traffic that AEPCO assumes the SARR would transport before or beyond ANR-constructed portions of the SARR using trackage rights over MRL. Defendants describe their corrections in detail in Section III.A.1.

With regard to the traffic that AEPCO selected for its SARR that is properly included in one or both of the sub-SARRs, defendants accept many of AEPCO's methods for determining SARR volumes and revenues. However, defendants also identify and correct several significant errors committed by AEPCO. With respect to AEPCO's methods for determining volumes, for example, AEPCO understated the impact of the recent economic events, and, consequently, it overstated 2009 traffic volumes. Defendants correct this error by relying on actual 2009 traffic volume data for BNSF and UP. AEPCO also overstated defendants' expected volume growth

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[3] *Cf. Az. Elec. Power Coop., Inc. v. Burlington N. & Santa Fe Ry.*, STB Docket No. 42058 (STB served Nov. 9, 2003) at 4 (criticizing defendants for not correcting complainant's application of apparently intended traffic selection principles in order to submit responsive evidence).

beyond 2009 in various ways, including by using a now-outdated forecast from the U.S. Energy Information Administration ("EIA") to project coal volumes, by forecasting Signal Peak Mine volume growth at a higher level than is assumed in EIA forecasts, and by using a nationwide U.S. Department of Agriculture ("USDA") index rather than BNSF's Long Range Plan to project volume growth for agricultural traffic. Defendants correct these errors by relying on appropriate forecasts.

Similarly, defendants identify and correct several errors in AEPCO's methods for determining the revenues that would be available to a SARR. In particular, AEPCO made systematic errors in projecting fuel surcharge levels and in allocating revenues for UP traffic between base revenues and revenues that are attributable to fuel surcharges. AEPCO also relied on a now-outdated EIA index to project revenues for coal traffic after existing contracts expire.

Defendants provide more detailed descriptions of their corrections to AEPCO's volume calculations below in Section III.A.2, and their corrections to AEPCO's revenue calculations below in Section III.A.3.

Defendants' evidence in this Section III.A is supported by Benton Fisher, a Senior Managing Director of FTI's Network Industries Strategies Division, and Robert Fisher, a Director in FTI's Network Industries Strategies Division. These witnesses analyzed the flaws in AEPCO's traffic selection methods, volume assumptions, and revenue assumptions, and they generated corrected traffic volume and revenue data for use in defendants' reply evidence. The qualifications and verifications for these witnesses appear in Part IV.

1. Stand-Alone Railroad Traffic

This section discusses the fundamental problems with AEPCO's SARR configuration and traffic selection, and it explains how defendants remedy those problems by creating two sub-

SARRs, ANR-PRB and ANR-NM, and correcting AEPCO's treatment of traffic that AEPCO assumes would move on trackage rights over MRL.

First, AEPCO ignored the Board's prior warning against presenting a combined challenge to New Mexico and PRB rates without addressing "the potential distorting effect of including PRB traffic that shares few facilities with the New Mexico . . . traffic in a combined SAC analysis."[4] In *AEPCO I*, the Board expressly recognized that cross-subsidies were likely to result from a single SAC presentation involving challenges to rates from coal-producing areas in New Mexico and the PRB. As the Board explained, unless proper measures were taken to address the problem, the SAC result with respect to issue traffic from one of the areas would be improperly affected by non-issue traffic that could not have been included in a case challenging just that one rate because it shares no common facilities with that issue traffic.[5] The Board thus warned against that type of gaming:

> "[A] party is not permitted to 'game' the SAC process in attempting to gain a substantive advantage by combining into a single, consolidated complaint what are essentially . . . separate rate challenges. Thus, for each of the . . . challenged rates, AEPCO may not include any traffic or revenues (or exclude any costs) that could not have been treated in the same manner had AEPCO filed a separate complaint for that set of rates."[6]

In *AEPCO I*, AEPCO promised to heed the Board's warning by committing to use an approach in which it would create sub-SARRs for each challenged rate and exclude from each

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[4] *Az. Elec. Power Coop. v. Burlington N. & Santa Fe Ry.*, 6 S.T.B. 322, 329 (2002) ("*AEPCO I*").

[5] *See id.*

[6] *Id.* at 329-30.

SAC analysis any revenues from non-issue traffic that shared few or no facilities with the rates being tested.[7]

AEPCO's single, consolidated SAC presentation ignores the Board's warning, and it plainly raises the type of cross-subsidy issues that rightly concerned the Board in *AEPCO I.* For example, ANR includes massive volumes of non-issue traffic that moves over the SARR only in Montana, Wyoming and/or Colorado.[8] This non-issue traffic does not move over any portion of the SARR system traversed by the New Mexico issue traffic and, consequently, the revenue from this non-issue traffic should not be considered in assessing the reasonableness of the challenged New Mexico rates.[9] But AEPCO's consolidated SAC presentation does, in fact, rely on such non-issue traffic revenues in assessing the reasonableness of the New Mexico rates.

Defendants correct this error in AEPCO's SAC evidence by creating ANR-PRB to evaluate the challenged rates for shipments from the PRB, and ANR-NM to evaluate the challenged New Mexico rates. Defendants assign the issue traffic and revenues, and non-issue traffic and revenues, to the appropriate sub-SARR, following AEPCO's approach to traffic selection.

Second, AEPCO's SAC evidence improperly assumed that the issue traffic will move over through routes that are not possible under the challenged pricing authorities. AEPCO's selection of non-issue traffic assumes that BNSF and UP would interchange the issue traffic at a point other than the interchange points specified in the challenged pricing authorities and that the

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[7] *See id.* at 330.

[8] AEPCO Opening Exh. III-A-2 at 1-6.

[9] *See AEPCO I*, 6 S.T.B. at 329.

issue traffic would move over portions of BNSF and UP that actually cannot be used to handle the traffic under the challenged pricing authorities. As discussed in the Counsel's Argument above, and as confirmed by BNSF and UP marketing personnel, the rates that AEPCO is challenging in this proceeding would be different if the interchanges were altered as assumed in AEPCO's SAC presentation.[10]

In general, the corrections that defendants make to address this issue do not result in the complete elimination of a significant amount of traffic or revenue from the case. Instead, the corrections require a reallocation of revenue from cross-over traffic between the SARR and the defendant whose portion of the route was not being replicated by the SARR.[11]

For example, AEPCO assumed that the issue traffic would move from the PRB, via Pueblo, to Amarillo on lines that replicated a BNSF route. AEPCO thus included in its SARR traffic and revenue from non-issue BNSF traffic that moves on BNSF's lines from the PRB to points south of Pueblo. However, UP takes responsibility for the issue traffic at Pueblo, and thus BNSF's non-issue traffic and revenue are not available to help defray the costs of transporting the issue traffic south of Pueblo. Defendants correct AEPCO's evidence by allowing ANR-PRB to benefit from BNSF's non-issue traffic for the portion of the SARR's route between the PRB

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[10] This point is confirmed by Robert A. Brautovich, Assistant Vice President, Coal Marketing for BNSF and Jeffrey Maier, Assistant Vice President – Entergy Marketing for UP. Their qualifications and verifications appear in Part IV.

[11] Defendants' corrections to reflect the specified interchange between BNSF and UP do result in the exclusion from both ANR-PRB and ANR-NM of traffic that moves only over BNSF's route between Belen, New Mexico, and Amarillo, Texas, as well as south-bound traffic that UP interchanges to BNSF at Pueblo, Colorado. *See* BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

and Pueblo, but not to the extent that BNSF transported the traffic on its lines south of Pueblo. We describe the details below.

Third, AEPCO's traffic group improperly included millions of tons of cross-over traffic that never use a SARR-constructed facility. Specifically, AEPCO's SAC evidence improperly included cross-over traffic and revenues that AEPCO assumed would move via ANR trackage rights over MRL's line between Laurel, Montana, and Jones Jct., Montana, but not over any SARR-constructed facility (hereafter "MRL Trackage Rights Traffic"). AEPCO's SAC evidence also improperly includes millions of dollars of revenue associated with cross-over movements that AEPCO assumes will move over portions of ANR and the MRL line before they are interchanged with the residual BNSF (hereafter "ANR/MRL Traffic"). While this second category of traffic may be included in the SARR traffic group, AEPCO overstated the SARR's portion of the revenues for this traffic by improperly assigning ANR a share of revenues associated with the movement over MRL's line segments – segments not constructed by the SARR.

Defendants do not contest AEPCO's right to assume that its SARR steps into BNSF's shoes with respect to BNSF's trackage rights over MRL in order to bridge traffic between the BNSF lines replicated by the SARR. However, AEPCO is not entitled to traffic that moves over MRL, but not any facilities that would be constructed by the SARR (*i.e.*, AEPCO is not entitled to use the MRL line to bridge traffic between portions of the residual BNSF). Moreover, with respect to cross-over traffic that moves over SARR facilities to or from the SARR's connection with MRL, AEPCO is not entitled to any share of that traffic's revenues before or beyond the SARR-constructed facilities. Yet, AEPCO improperly assumed that it is entitled to assign ANR

a share of revenues associated with that traffic's movement over the MRL lines it did not construct, to reach an interchange point with the residual BNSF.

AEPCO may not include MRL Trackage Rights Traffic in its traffic group because that traffic does not share any facilities with ANR and, therefore, should not contribute to the costs of the ANR facilities.[12] Similarly, with respect to ANR/MRL Traffic, AEPCO is not entitled to any share of revenue associated with transportation of that traffic over MRL. AEPCO did not construct any of the MRL facilities. Consequently, revenues associated with the ANR/MRL Traffic's movement over MRL should not contribute to the costs of ANR facilities.

Defendants corrected these errors by (1) excluding the MRL Trackage Rights Traffic from the SARR, and (2) reducing the SARR's share of revenue for ANR/MRL Traffic so ANR does not receive revenues associated with movement of that traffic beyond ANR's origin or termination point, as discussed in more detail below.

a. ANR-PRB

As discussed in the Counsel's Argument above, a SAC analysis of the challenged rates with respect to origins in the PRB is only relevant to evaluating whether AEPCO is entitled to any reparations for the two trainloads of coal that moved from Decker Mine to Apache Station in 2009. Because AEPCO's SAC evidence indicates that {

} the Board should not prescribe future rates for origins that are covered by that pricing

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[12] *Cf. Duke Energy Corp. v. CSX Transp., Inc.*, 7 S.T.B. 402, 419 (2004) ("Inclusion of other traffic is appropriate where that traffic currently shares in the use of the facilities and should therefore contribute to the cost of those facilities.").

authority.[13] Further, because AEPCO's SAC evidence indicates that {

}[14]

As also explained in the Counsel's Argument, a SAC analysis that is used to assess the reasonableness of the challenged PRB rates must respect the boundaries of BNSF's and UP's responsibilities for the transportation of the issue traffic under the challenged pricing authorities. Under the challenged pricing authorities, BNSF interchanges the issue traffic with UP at Pueblo, Colorado. Thus, a SAC analysis of the challenged rates must use a SARR that is configured to replicate a BNSF route from the PRB to Pueblo, and a UP route from Pueblo to Apache Station.

Defendants configure the ANR-PRB sub-SARR to respect the interchange established in the challenged pricing authorities, and they apply AEPCO's traffic selection principles to determine the traffic and revenue that would be available to help defray that carrier's costs of transporting the issue traffic from the PRB, via Pueblo, to Apache Station.

i. ANR-PRB Configuration

Defendants configure ANR-PRB as follows: as of 2009, ANR-PRB replicates a BNSF route from Huntley, Montana, southeast to Donkey Creek, Wyoming, south to Northport, Nebraska (via Orin and Guernsey, Wyoming), and then south to Pueblo, Colorado (via Denver, Colorado). ANR-PRB then replicates a UP route from Pueblo to southeast Stratford, Texas (via Las Animas, Colorado), southwest to Vaughn, New Mexico, and to El Paso, Texas, and then west to Cochise, Arizona. ANR-PRB does not construct the Pueblo to Stratford line segment,

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[13] AEPCO Opening Nar. at I-3, Table I-1; *id.* at III-A-20, Table III-A-3.

[14] *Id.*

but rather it uses UP's existing trackage rights over BNSF, which is how UP would handle the traffic under the challenged pricing authority. In 2012, ANR-PRB constructs a line from Mossmain, Montana, to Walter Jct., Montana, to connect with private track that serves Signal Peak Mine, and from Mossmain, Montana, it uses trackage rights over MRL to Huntley, Montana. A schematic of ANR-PRB route is included as BNSF/UP Reply Exhibit III.A-1 at 1.

ANR-PRB's configuration is the same as the configuration of ANR's Leg 1 and Leg 3, with two exceptions.[15]

Substitution of UP's Stratford to Vaughn (via Tucumcari) Line for BNSF's Stratford to Vaughn (via Amarillo) Lines. Because the SARR must replicate a UP route for the issue traffic south of Pueblo, ANR-PRB does not replicate the Stratford to Amarillo and Amarillo to Vaughn lines that AEPCO replicated for its SARR. AEPCO replicated BNSF's lines from Stratford to Amarillo to Vaughn in order to group the issue traffic with BNSF's non-issue traffic that moves over those lines. In the real world, however, UP is responsible for transporting the issue traffic south of Pueblo, and BNSF's non-issue traffic south of Pueblo is not available to help defray the costs that UP incurs to transport the issue traffic south of Pueblo. The only UP route that a SARR could replicate to transport the issue traffic from Stratford to Vaughn, while sharing costs with non-issue traffic that is available to UP, is UP's actual route from Stratford to Vaughn via Tucumcari (the "Tucumcari route"). Consequently, defendants configure ANR-PRB to replicate UP's line from Stratford to Vaughn.

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[15] A schematic showing the differences between ANR-PRB and the PRB portion of ANR is attached as BNSF/UP Reply Exhibit III.A-1 at 2.

Use of Trackage Rights for UP's Pueblo to Stratford Line. AEPCO's SARR constructed a rail line between Pueblo and Stratford to replicate a line owned by BNSF, over which UP has trackage rights. AEPCO constructed the line under the assumption that its SARR could use revenues from BNSF's non-issue traffic moving over that line to help defray the costs of transporting the issue traffic over that line. However, because AEPCO's SARR must replicate a UP route south of Pueblo, those BNSF revenues are not available to the SARR.

Defendants configure ANR-PRB to use UP's existing trackage rights over BNSF's Pueblo to Stratford line to transport the issue traffic. Defendants determined that the line would not carry sufficient UP traffic to cover construction and operating costs if ANR-PRB were to build that line. However, ANR-PRB is not required to build the line. Contrary to AEPCO's assertion,[16] Board precedent from AEPCO's prior rate case does not preclude a SARR from using UP's trackage rights over the line.

In the prior case, AEPCO sought to re-route the issue traffic using BNSF trackage rights over UP's Vaughn to El Paso line – a line that was not actually used to transport the issue traffic. In that case, the Board correctly expressed concern that the trackage rights payment from BNSF to UP for use of line might not ensure the full recovery of costs over that line.

Unlike the situation in the prior case, UP actually uses its trackage rights over BNSF's Pueblo to Stratford line to transport the issue traffic. Moreover, defendants determined that, if the SARR paid the trackage rights fee currently applicable to UP's use of the line, "the trackage rights charges paid by the SARR would reflect the full stand-alone costs of providing and

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[16] AEPCO Opening Nar. at III-A-11.

maintaining the line."[17] That is, defendants determined that the full SAC costs of the Pueblo to Stratford line are covered by the revenues contributed by BNSF's traffic over that line, plus the trackage rights fees paid by the SARR to move the SARR's traffic over that line.[18] Therefore, the Board's concerns in the prior AEPCO rate case do not preclude the SARR from using UP's and BNSF's existing trackage rights arrangement to replicate UP's portion of the route from Pueblo to Stratford.

ii. ANR-PRB Traffic

As explained above, because the SARR must replicate a BNSF route from the PRB to Pueblo, BNSF traffic is the only traffic that is eligible to be included on the SARR for that portion of the route. Similarly, because the SARR must replicate a UP route from Pueblo to Apache Station, UP traffic is the only traffic that is eligible to be included on the SARR for that portion of the route. The primary changes that defendants make to AEPCO's traffic group to implement the principle that a SARR must respect the interchange established in the challenged pricing authority are to (1) remove UP traffic that AEPCO included on line segments between the PRB and Pueblo and (2) remove the BNSF traffic that AEPCO included on the line segments between Pueblo and Apache Station.

Specifically, ANR-PRB includes the traffic on ANR's Leg 1 and Leg 3, with the following exceptions:

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[17] *Az. Elec. Power Coop. v. Burlington N. & Santa Fe Ry.*, STB Docket No. 42058, slip op. at 11 (STB served Mar. 15, 2005).

[18] Defendants made this determination using the procedures employed by the Board in testing for internal cross-subsidies. BNSF/UP Reply workpapers "Pueblo to Stratford Trackage Rights."

Exclusion of UP Traffic from Denver to Pueblo. Because the SARR must replicate a BNSF route from the PRB to Pueblo, the SARR may include only the traffic and revenues that could reasonably be expected to help defray BNSF's costs to transport the issue traffic from the PRB to Pueblo. However, AEPCO improperly assumed that, for Colorado coal that UP originates west of Denver and moves to Pueblo and beyond, ANR could obtain revenue for the Denver to Pueblo portion of the move by hypothesizing that UP and ANR would interchange the traffic at Denver, and ANR would move the traffic from Denver to Pueblo (and beyond).

Defendants do not dispute that AEPCO's SARR is entitled to a share of revenues from this UP coal traffic when the traffic moves south of Pueblo, where the SARR must replicate a UP route. AEPCO was incorrect, however, to assign ANR a share of revenues associated with the Denver to Pueblo portion of the move, where the SARR must replicate a BNSF route, based on the premise that BNSF and UP operate that section of track as a joint facility.[19] AEPCO should have constructed a Denver to Pueblo line sized appropriately to accommodate the BNSF traffic it selected for the SARR traffic group.[20] Defendants' joint facility arrangement does not provide each defendant with access to the other defendant's revenues from traffic moving over the joint facility.[21] Accordingly, AEPCO may not assume that its SARR is entitled to a share of the revenues UP obtains for transporting traffic between Denver and Pueblo when it is standing in the shoes of BNSF.

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[19] AEPCO Opening Nar. at III-A-12.

[20] Defendants have modified AEPCO's evidence regarding its SARR's Denver Yard to account for the fact that the SARR would not interchange traffic with UP at Denver. BNSF/UP Reply Table III.B.1.

[21] BNSF/UP Reply workpaper "Denver – Pueblo.pdf."

Consequently, ANR-PRB does not include the UP traffic identified by AEPCO as moving from Denver to Pueblo on the portion of ANR-PRB north of Pueblo. Rather, to the extent that UP continues to transport this traffic south of Pueblo, ANR-PRB treats this traffic as cross-over traffic with a SARR origin at Pueblo. This modification results in the exclusion of approximately 284,000 tons of UP traffic entirely from the SARR in 2009 and 264,000 tons of UP traffic entirely from the SARR in 2018.[22] This modification results in shifting the SARR origin from Denver to Pueblo of 735,000 tons of UP traffic in 2009 and 735,000 tons of UP traffic in 2018.[23]

Exclusion of BNSF Traffic from Pueblo to Apache Station. Because the SARR must replicate a UP route south of Pueblo to Apache Station, the SARR may include only the traffic and revenue that could reasonably be expected to help defray UP's costs to transport the issue traffic south of Pueblo to Apache Station. However, AEPCO improperly assumed that BNSF traffic and revenues on line segments south of Pueblo would be available to the SARR. This includes traffic that BNSF transports from the PRB to Pueblo (which is properly included on the SARR north of Pueblo), as well as traffic that BNSF transports on its line between Amarillo and Defiance (which is never properly included in a PRB sub-SARR). Because UP does not have the benefit of revenue from this BNSF traffic in the real world to help defray the costs of

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[22] The UP traffic moving between Denver, Colorado, and Pueblo, Colorado, that is excluded entirely from ANR-PRB is identified in BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

[23] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

transporting the issue traffic from Pueblo to Apache, the SARR is not entitled to that revenue either.[24]

Consequently, ANR-PRB does not include the BNSF traffic that AEPCO identified as moving from the PRB to Pueblo on the portions of the SARR south of Pueblo. Rather, ANR-PRB treats the traffic as cross-over traffic with a SARR termination at Pueblo. ANR-PRB also excludes entirely the BNSF traffic that AEPCO identified as moving between Amarillo and Defiance. These modifications results in the exclusion of approximately 57.9 million tons of BNSF traffic entirely from ANR-PRB in 2009 and 78.3 million tons of BNSF traffic entirely from ANR-PRB in 2018.[25] These modifications result in shifting the SARR destination from points south of Pueblo to Pueblo of 42 million tons of BNSF traffic in 2009 and 41.5 million tons of BNSF traffic in 2018.[26]

Addition of UP Traffic Moving Between Stratford and Vaughn (via Tucumcari). Because the ANR-PRB route from Stratford to Vaughn replicates UP's Tucumcari line rather than BNSF's line through Amarillo, defendants determined that it was appropriate to include in

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[24] UP does benefit from BNSF's traffic south of Pueblo to the extent the traffic helps support BNSF's Pueblo-Stratford line, over which UP has trackage rights. Defendants provided ANR-PRB with the same benefit as UP by placing ANR-PRB in UP's shoes with respect to the trackage rights arrangement. This configuration is appropriate because UP uses those trackage rights to transport the issue traffic in the real world and, as defendants demonstrated above, the trackage rights charges paid by the SARR are sufficient to ensure the recovery of the full stand-alone costs of providing and maintaining the line. BNSF/UP Reply workpaper "Pueblo to Stratford Trackage Rights."

[25] BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx." While this traffic is excluded from ANR-PRB, much of this traffic is in the ANR-NM traffic group.

[26] BNSF/UP Reply workpapers "Coal Traffic Forecast Reply.xlsx" and "BNSF_WAYBILL_200804_200903_MASTER_SUMMARY_ EXTENDED_SELECTION-2Q4Q USDA2 Reply.xlsx."

the ANR-PRB traffic group certain UP non-issue traffic that moves over the Tucumcari line between Stratford and Vaughn to help defray the costs of transporting the issue traffic over that line. Specifically, defendants include movements of automobile traffic that UP transports to a facility at Santa Rosa, New Mexico. Based on their review of AEPCO's approach to traffic selection, defendants believe that AEPCO would have included this traffic in its SARR traffic group had it replicated a UP route south of Pueblo (as it was required to do) because transporting this traffic would help the SARR to defray the costs of transporting the issue traffic on the Tucumcari line. This modification results in the addition of 72,000 tons (5,600 carloads) of traffic to the SARR in 2009 which grows to 98,000 tons (7,700 carloads) of traffic in 2018.[27]

MRL Traffic. ANR-PRB excludes cross-over traffic selected by AEPCO that only uses trackage rights over the MRL from Laurel, Montana, to Jones Jct., Montana, and thus does not travel over any facilities constructed by AEPCO's SARR. In addition, there are other cross-over movements that AEPCO assumed ANR would transport over the MRL line to an interchange with the residual BNSF. For that traffic, defendants adjust the location of the hypothetical interchange to the point of departure from (or entry to) SARR-constructed lines to align the revenues that the SARR receives from this cross-over traffic with the facilities that the SARR is actually providing to serve the issue traffic.

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[27] The UP traffic moving over the Tucumcari line between Stratford, Texas, and Vaughn, New Mexico, that is added to ANR-PRB is identified in BNSF/UP Reply workpaper "UP Stratford Vaughn Traffic.xlsx."

AEPCO's ANR does not construct a line between Laurel and Jones Jct.[28] Rather, AEPCO assumed that ANR would use BNSF's trackage rights over MRL's line between Laurel and Jones Jct. to move traffic over this line segment. Defendants do not dispute AEPCO's right to use the trackage rights to bridge traffic between the BNSF lines replicated by the SARR. However, AEPCO is not entitled to assume its SARR will transport traffic that moves over MRL's line, but not over any facilities that are constructed by the SARR.

Moreover, AEPCO is not entitled to obtain additional revenue for its SARR from traffic that moves over *some* SARR-constructed facilities by positing that the SARR could "keep the meter running" by transporting the traffic over MRL's line to the interchange with the residual BNSF. Thus, for example, for non-issue traffic that AEPCO assumed its SARR would transport from Signal Peak Mine to Mossmain, Montana, and then over MRL's line to an interchange with the residual BNSF at Jones Jct., Montana, the SARR is entitled to revenues for providing transportation from the mine to Mossmain over facilities it constructed, but AEPCO cannot add to those revenues by assuming the SARR will providing service over MRL's line from Mossmain to Jones Jct.

As discussed above, the SARR is not entitled to include in its traffic group cross-over traffic, like the MRL Trackage Rights Traffic, that does not share any facilities with the SARR. The MRL Trackage Rights Traffic is not helping to defray the SARR's cost to move the issue traffic over the MRL segment because the SARR's cost over that segment is limited to the trackage rights payment the SARR makes to MRL for use of MRL's lines. Traffic grouping is

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[28] AEPCO Opening Nar. at III-A-2 & Exhs. III-A-1 and III-F-1 and AEPCO Opening workpaper "Final_AEPCO_RoW_with_Assemblage_Factor,Towers_and_Yards_1_16_10.xlsx."

permitted in a SAC analysis to allow the sharing of the *SARR's* costs among common uses of the SARR. When the SARR's cost is only a trackage rights fee paid to a third party, there is no cost sharing that would justify the inclusion of other traffic moving over that third party. The only reason a complainant would include such traffic in its SARR would be to benefit from an allocation of revenues to the SARR under ATC that is greater than the trackage rights fee paid to the MRL. That is an impermissible gaming of cross-over traffic and the revenue allocation methodology for cross-over traffic. Since there is no sharing of SARR facilities, it is clear a complainant would never include that traffic in the SAC analysis if the complainant were required to build the full SARR. Cross-over traffic is a tool for simplification, not an opportunity to game the SAC test. Any allocation of revenue that the SARR obtains from the trackage rights traffic in excess of the trackage fees it pays would be a windfall to the SARR and thus would impermissibly cross-subsidize the issue traffic.

Excluding from ANR-PRB the traffic that only travels over MRL's line between Mossmain and Jones Jct. results in the exclusion of approximately 4.7 million tons of traffic from ANR-PRB in 2009 and 6.5 million tons of traffic from ANR-PRB in 2018.[29]

In addition, defendants modify the location of the interchange between the SARR and the residual BNSF for cross-over traffic for which AEPCO improperly extended the SARR's haul over MRL track. Rather than assign the SARR revenues for the MRL portion of the movement, the SARR revenues are determined using a point of the interchange between SARR-constructed

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[29] The MRL traffic excluded from ANR-PRB is identified in BNSF/UP Reply workpaper "BNSF_WAYBILL_200804_200903_MASTER_SUMMARY_EXTENDED_SELECTION-2Q4Q USDA2 Reply.xlsx." The following lines in AEPCO's Opening Exhibit III-A-2 would be eliminated: 333, 334, 359, 360, 385 and 386.

facilities and the residual BNSF. This results in changing AEPCO's assumption that SARR traffic moving to the northwest from Donkey Creek, Wyoming, will be interchanged at Laurel, Montana, or Mossmain, Montana, to reflect an interchange at Huntley, Montana, where the ANR facilities used by such traffic end. For the cross-over coal traffic from Signal Peak Mine that AEPCO assumed would move over the SARR and MRL lines to Jones Jct., Montana, defendants change the interchange to Mossmain, Montana, where the traffic would leave ANR-constructed facilities. These modifications results in shifting the SARR interchange points for ANR-PRB of 11.8 million tons of traffic in 2009 and 12.1 million tons of traffic in 2018.[30]

b. ANR-NM

As explained in the Counsel's Argument, any SAC analysis that is used to evaluate the reasonableness of the challenged New Mexico rates must respect the boundaries of BNSF's and UP's responsibilities for the transportation of the issue traffic under the challenged pricing authority. Under the challenged pricing authority, BNSF interchanges the issue traffic with UP at Deming, New Mexico. Thus, a SAC analysis of the challenged rates must use a SARR that is configured to replicate a BNSF route from the New Mexico mines to Deming, and a UP route from Deming to Apache Station.

Defendants configure the ANR-NM sub-SARR to respect the interchange established in the challenged pricing authority, and they apply AEPCO's traffic selection principles to determine the traffic and revenue that would be available to help defray that carrier's costs of transporting the issue traffic from the New Mexico mines, via Deming, to Apache Station.

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[30] BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

i. ANR-NM Configuration

Defendants configure ANR-NM to follow the same route as the current route of movement of the issue traffic under the challenged price authority. Specifically, ANR-NM replicates a BNSF route from Defiance, New Mexico, and Lee Ranch, New Mexico, to Baca, New Mexico, east to Belen, New Mexico, and then south to Rincon, New Mexico, and southwest to Deming, New Mexico. ANR-NM then replicates a UP route from Deming to Apache Station. ANR-NM does not construct the Rincon to Deming line segment; instead, it uses BNSF's existing arrangement with SWRR, under which SWRR handles the traffic on the Rincon to Deming line segment. A schematic of ANR-NM route is included as BNSF/UP Reply Exhibit III.A-1 at 3.

On AEPCO's ANR, the New Mexico issue traffic moves east from the New Mexico mines to Vaughn, New Mexico (Leg 2 of ANR), then south from Vaughn to El Paso (portion of Leg 1 of ANR), and west from El Paso to Apache Station (Leg 3 of ANR) (collectively referred to as "New Mexico Portion of AEPCO's ANR"). ANR-NM's configuration is the same as the configuration of the New Mexico Portion of AEPCO's ANR, with two exceptions:[31]

Substitution of BNSF's Belen to Deming (via Rincon) line for BNSF's Belen to Vaughn, and UP's Vaughn to Deming (via El Paso) Lines. Because the SARR steps into BNSF's shoes to move the issue traffic from the New Mexico mines to Deming, ANR-NM does not replicate BNSF's Belen to Vaughn line, or UP's Vaughn to El Paso and El Paso to Deming lines that AEPCO replicated for its SARR. AEPCO replicated those lines in order to group the issue

[31] A schematic showing the differences between ANR-NM and the New Mexico Portion of AEPCO's ANR is attached as BNSF/UP Reply Exhibit III.A-3 at 4.

traffic with BNSF's and UP's non-issue traffic that moves over those lines. However, in the real world, BNSF is responsible for transporting the issue traffic to Deming, and it cannot deliver the traffic to Deming by transporting the traffic to Vaughn and then via UP's lines to Deming.[32] The only BNSF route to Deming that a SARR could replicate while also sharing costs with non-issue traffic available to BNSF is BNSF's actual route to Deming over its own rail lines from Belen to Rincon and then via SWRR's line between Rincon and Deming.

In addition, as explained in Counsel's Argument, AEPCO's assumed rerouting of the New Mexico issue traffic via Vaughn is also inappropriate because rerouting the traffic is not a viable option for BNSF and UP for several reasons. *First*, BNSF and UP could not practicably route the issue traffic via Vaughn using their existing facilities. As discussed below in Section III.C.3, BNSF and UP cannot make straight-on movements of AEPCO's New Mexico coal trains at Vaughn: BNSF's and UP's lines at Vaughn cross at a 40-foot grade separation. AEPCO itself acknowledges the issue and proposes a new connection at Vaughn.[33]

Second, even if BNSF and UP had facilities that would permit an efficient interchange of AEPCO's New Mexico coal at Vaughn, they would never actually use that routing. As also discussed below in Section III.C.3, routing the traffic via Vaughn would increase the length of haul by 232 miles – an increase of 47 percent.[34] The longer routing would unnecessarily

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[32] BNSF has trackage rights over UP's line between Vaughn and El Paso, but it has no trackage rights between El Paso and Deming.

[33] AEPCO Opening Nar. at III-B-7, Table III-B-2 n.3. The Board did not have this evidence when it first suggested that basing a SAC presentation on an alternative routing via Vaughn "would seem permissible" because BNSF and UP were free to alter their routing "at any time." *AEPCO I*, 6 S.T.B. at 327.

[34] AEPCO Opening Exh. II-A-1 and AEPCO Opening workpaper "BNSF Coal Traffic Inputs.xlsx."

consume valuable resources, including fuel, crews, locomotive power, and track capacity. Moreover, AEPCO's own evidence shows that rerouting the issue traffic via Vaughn would increase transit times of loaded coal trains by approximately 50%.[35] AEPCO is plainly not proposing to reroute the issue traffic as "an appropriate means of removing inefficiencies from a system."[36]

Consequently, defendants configure ANR-NM to replicate BNSF's route from Belen to Deming.

Use of SWRR from Rincon to Deming. In the real world, BNSF moves the issue traffic via SWRR between Rincon and Deming. Consistent with Board precedent, defendants assume that ANR-NM will step into BNSF's shoes and use SWRR to handle the traffic between Rincon and Deming because it provides a lower-cost method of handling the issue traffic between Rincon and Deming than constructing that line segment.

ii. ANR-NM Traffic

As explained above, because the SARR must replicate a BNSF route from the New Mexico mines to Deming, BNSF traffic is the only traffic that is eligible to be included on the New Mexico SARR for that portion of the route. The primary changes that defendants make to AEPCO's traffic group to implement this principle are to (1) shift the SARR origin and termination points for cross-over traffic moving over BNSF's route between the New Mexico

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[35] AEPCO Opening Exh. III-C-3, line 8.

[36] *Duke Energy Corp. v. Norfolk S. Ry.*, 7 S.T.B. 89, 112 (2003). AEPCO asserted that its proposed reroute affects not only the issue traffic, but also some non-issue, interline coal traffic that BNSF originates in New Mexico and moves to Cochise. AEPCO Opening Nar. at III-A-13. In fact, however, AEPCO's traffic group contained no such traffic.

mines and Belen, and (2) remove the UP traffic and revenue that AEPCO included with respect to any portion of the line segments between Vaughn and El Paso, and El Paso and Deming.

Specifically, ANR-PRB includes the traffic and revenue on the New Mexico Portion of AEPCO's ANR with the following exceptions:

Shifting the SARR Termination Point for BNSF Traffic Moving Between the New Mexico Mines and Belen. As described above, ANR-NM's east/west line segment that replicates BNSF's portion of the issue traffic's route does not include BNSF's lines beyond Belen. Consequently, ANR-NM shifts the SARR origin or termination point to Belen for BNSF cross-over traffic selected by AEPCO that moves over the portion of BNSF's route between the New Mexico mines and Belen. This modification results in a shift in the SARR termination point of 57.5 million tons of BNSF traffic in 2009 and 74.5 million tons of BNSF traffic in 2018.[37] In addition, shifting the SARR termination point to Belen results in the exclusion of certain traffic that originates or terminates on BNSF's line between Belen and Vaughn and moves to or from points further to the east.[38]

Exclusion of UP Traffic from Vaughn to El Paso and El Paso to Deming. Because ANR-NM does not replicate UP's lines from Vaughn to El Paso or El Paso to Deming, ANR-NM does not include UP traffic and revenue associated with those lines. Rather, ANR-NM excludes entirely any traffic moving over those lines that does not also move over UP's line between Deming to Apache Station, and it treats any traffic that also moves over UP's line between Deming to Apache Station as cross-over traffic with a SARR origin or termination at Deming.

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[37] BNSF/UP Reply workpaper "Exhibit-III-A-2 Reply.xlsx."

[38] BNSF/UP Reply workpaper "Exhibit-III-A-2 Reply.xlsx."

This modification results in the exclusion of approximately 340,000 tons of UP traffic entirely from the ANR-NM traffic group in 2009 and 470,000 tons of UP traffic entirely from ANR-NM in 2018.[39] This modification results in shifting the SARR origin or termination point UP traffic to Deming of approximately 29.7 million tons of UP traffic in 2009 and 39.1 million tons of UP traffic in 2018.[40]

Addition of BNSF Traffic on the Belen to Rincon Line. For the reasons explained above, ANR-NM replicates the issue traffic's actual route between Belen and Rincon. Defendants therefore apply AEPCO's traffic selection principles and add BNSF traffic that moves over all or part of BNSF's Belen to Rincon line to the extent that AEPCO had not included the traffic in ANR's traffic group. This modification results in the addition of 1.6 million tons (32,000 carloads) of traffic to ANR-NM in 2009 which grows to 2.3 million tons (36,000 carloads) of traffic to ANR-NM in 2018.[41]

2. Volumes (Historical and Projected)

As explained in Section III.A.1, defendants take strong issue with AEPCO's configuration of its SARR. In this section, however, defendants set aside that issue and focus on AEPCO's calculation of the volumes of traffic that would be available to its SARR, and thus to the sub-SARRs that defendants create for this reply. Defendants accept many of AEPCO's methods for determining volumes, but they also correct AEPCO's methods and calculations in

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[39] The UP traffic excluded entirely from ANR-NM is identified in BNSF/UP Reply workpaper "Exhibit-III-A-2 Reply.xlsx."

[40] BNSF/UP Reply workpaper "Exhibit-III-A-2 Reply.xlsx."

[41] The BNSF traffic moving over the Belen, New Mexico, to Rincon, New Mexico, line that is added to ANR-NM is identified in BNSF/UP Reply workpaper "BNSF Belen Rincon Traffic.xlsx."

several instances in which AEPCO overstated 2009 base-year volumes and overstated projected growth over the DCF period. Defendants' corrections to AEPCO's methods and calculations are described below.

a. Coal Traffic

i. Base Year and Projected Tonnages – Issue Traffic

In base year 2009, rather than use data from actual shipments in 2009, AEPCO used what it claimed were its own internal volume projections to determine the number of issue traffic tons that were transported from the PRB and New Mexico origins by its SARR.[42] The volumes in AEPCO's projections exceed the volumes of issue traffic that AEPCO actually shipped in 2009 – for example, AEPCO "projected" that it would receive four trainloads of coal from { } in 2009, when in fact, AEPCO received only two trainloads in 2009.[43] Defendants use actual 2009 volumes as the base year volumes for the issue traffic because AEPCO's volumes are clearly incorrect.

Defendants accept AEPCO's projected volumes for the issue traffic from 2010 through 2018.

The resulting volume projections for the issue traffic are as follows:

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[42] AEPCO Opening Nar. at III-A-17 and AEPCO Opening workpaper "Coal Traffic Forecast.xlsx." AEPCO assumed no issue traffic will originate at Signal Peak in 2009 and defendants accept this assumption.

[43] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

Table III.A.1
AEPCO Coal Shipments
(thousands of tons)

Year	Origin					Total
	Lee Ranch	El Segundo	Colorado	NPRB MT	Signal Peak MT	
2009	462	638	0	28	0	1,128
2010	{					}
2011	{					}
2012	{					}
2013	{					}
2014	{					}
2015	{					}
2016	{					}
2017	{					}
2018	{					}

Source: BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

ii. Base Year Tonnages – Non-Issue Coal Traffic

Defendants make one change to AEPCO's base year tonnages for non-issue coal traffic: defendants revise base year volumes for non-issue coal traffic to reflect actual 2009 volumes.

To calculate 2009 base year volumes for non-issue coal traffic, AEPCO used defendants' actual traffic volumes for 2Q08-1Q09 "indexed down to reflect actual volume changes for SARR shippers."[44] AEPCO used the April 2009 EIA update to its Annual Energy Outlook ("AEO") coal production forecast (hereafter "April 2009 AEO Forecast") as the index to develop 2009 non-issue coal volumes.[45] Although AEPCO claimed that its approach reflects "the full brunt of the recession on the volumes of its shippers,"[46] it does not. AEPCO's methodology understated

[44] AEPCO Opening Nar. at III-A-16.

[45] *Id.* at III-A-18.

[46] *Id.* at III-A-16.

the decline in shipments in 2009 because EIA's forecast prepared in April 2009 understated the extent of the severe economic downturn.

Rather than use AEPCO's methodology, defendants use actual BNSF and UP full year 2009 coal traffic data for the routes in issue to develop corrected base year 2009 coal volumes.[47] More specifically, for the single-line BNSF moves in the ANR traffic group, defendants identify the growth rate from 2Q08-4Q08 to 2Q09-4Q09 for each destination to which AEPCO assumed that ANR would deliver coal from each origin region listed in the table below.

Table III.A.2
Origin Regions

Region[48]	Mines
Campbell PRB	Buckskin, Clovis Point, Dry Fork, Eagle Butte, Rawhide
Orin PRB	Belle Ayr, Caballo, Coal Creek, N Antelope, Cordero, Jacobs Ranch, Antelope, Caballo Rojo, Black Thunder (South, East & West)
Colorado	Arco, Axial, Energy, Somerset
Montana	Decker, Nerco
New Mexico	El Segundo, Lee Ranch, North Tipple
Utah	Wildcat

Source: BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

Defendants next apply these actual growth rates to the AEPCO-selected 2Q08 to 4Q08 traffic to determine 2Q09 to 4Q09 actual ANR traffic. Defendants then add the result to the

[47] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

[48] Orin and Campbell mines were separated due to their different routing out of the PRB. Campbell tons moving to eastern plants typically would exit the ANR at Donkey Creek while tons moving from Orin mines typically travel down the Joint Line (replicated by ANR) to Northport, Nebraska.

1Q09 volumes identified by AEPCO.[49] Notably, by basing growth rates on origin regions rather than specific mines, defendants account for shifts in sourcing coal within a region for a particular traffic group destination between the two periods. For example, AEPCO's traffic group included movements from several PRB mines to a plant in { } In the last three quarters of 2009, however, coal began moving to { } from { } Defendants include the { } so that those tons effectively shift to origins that were already selected to move coal to { } on ANR.[50]

Because origin shifting was not an issue for the handful of single-line UP coal moves that AEPCO included its traffic group, defendants calculate 2009 coal volumes by identifying actual movements between those UP origin/destination pairs in UP's 2Q09 through 4Q09 waybill data and adding those volumes to the 1Q09 volumes identified by AEPCO.

For joint BNSF/UP coal movements in the traffic group, defendants develop 2009 volumes using the same defendant's waybill data that AEPCO used in its opening evidence. Specifically, AEPCO included in the traffic group UP-originated traffic from Colorado mines that BNSF delivered to a destination in Texas.[51] Since AEPCO used BNSF waybill data to identify 1Q09 volumes for this traffic, defendants use BNSF waybill data and use the same

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[49] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx." { }

[50] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

[51] AEPCO Opening workpaper "Coal Traffic Forecast.xls."

origin region/destination methodology that they use for single-line BNSF coal moves to calculate 2009 volumes for this traffic.

AEPCO suggested that the Board should not use actual 2009 volumes beyond 1Q09 because the post-1Q09 traffic data that defendants produced[52] "arrived far too late to be incorporated into AEPCO's analysis."[53] However, even though AEPCO did not request it when the case schedule was extended, defendants produced post-1Q09 data as it became available, given the unusually precipitous decline in the economy in late 2008 and 2009, and the resulting likelihood that published forecasts and other projections based on past data would be inaccurate.

Using actual, full year 2009 traffic data, as defendants have done, is consistent with the Board's recognition that logic and the interests of accuracy compel the use of actual traffic data to the extent available, especially under the circumstances that exist here – (1) AEPCO had access to BNSF and UP data showing that the public forecast it used overstated 2009 volumes but apparently chose to ignore it,[54] and (2) the 2008 to 2009 economic downturn was particularly severe.[55]

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[52] In discovery, UP produced 2Q09 traffic data and BNSF produced 2Q09 and 3Q09 traffic data. Since AEPCO filed its opening evidence, full year 2009 data has become available. Defendants include 3Q09 and 4Q09 UP data and 4Q09 BNSF data in their workpapers. BNSF/UP Reply workpapers "3Q-4Q UP Actuals.xlsx" and "4Q09 BNSF Actuals.xlsx."

[53] AEPCO Opening Nar. at III-A-15.

[54] AEPCO could have seen that the April 2009 AEO Forecast overstated 2009 volumes by reviewing the 2Q09 and 3Q09 traffic data produced by defendants.

[55] *See Duke Energy Corp. v. CSX Transp., Inc.*, 7 S.T.B. 402, 446 (2004); *Az. Pub. Serv. Co. v. The Atchison, Topeka & Santa Fe Ry.*, 2 S.T.B. 367, 382 (1997) (Board used updated actual traffic that showed significant decrease in traffic compared with forecast levels).

iii. Projected Tonnages – Non-Issue Coal Traffic

AEPCO used the April 2009 AEO Forecast to project coal volumes from 2010 through 2018, the end of the DCF period.[56] Although defendants accept use of an EIA AEO forecast to project future coal tonnages, they use the more recent EIA AEO 2010 Early Release forecast, published in December 2009 (hereafter "AEO 2010 Forecast") because it is based on more current information than was available in April 2009 and thus should provide a more reliable forecast of future coal volumes, particularly given the extraordinary downturn in the economy in 2009.[57]

Defendants also make the following corrections to AEPCO's method of using EIA forecast data:

(1) Correction of Southwest Region Technical Error: AEPCO made a technical error in the use of the Southwest Region portion of the EIA's AEO forecast. AEPCO's spreadsheet for the Southwest Region mistakenly referenced the Grand Total tons rather than the Southwest tons, which is the line above the total.[58]

(2) Correction to Signal Peak Volumes: AEPCO assumed the SARR would transport Signal Peak coal beginning in 2012 for two shippers – {

} As explained above, defendants accept AEPCO's Signal Peak volume assumptions for the issue traffic. However, defendants do not accept AEPCO's Signal Peak volume assumptions

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[56] AEPCO Opening Nar. at III-A-18 to III-A-19.

[57] The AEO 2010 forecast is included as a workpaper. BNSF/UP Reply workpaper "AEO 2010.xls."

[58] AEPCO Opening workpaper "Coal Traffic Forecast.xlsx."

for non-issue traffic. AEPCO never explained the basis for its assumptions which, as described below, are unsupportable in any event.

Rather than rely on AEPCO's unsupported volume assumptions, defendants use the Signal Peak volume assumptions made by EIA in its AEO 2010 Forecast. The EIA's Western Montana coal production forecast is based upon specific assumptions regarding the amount of coal that will be produced annually from Signal Peak Mine as well as other Montana coal mines. Defendants obtained those specific assumptions from the EIA.[59] Because AEPCO and defendants use the EIA's AEO forecast to project future coal volumes, the Signal Peak volume assumptions underlying the EIA's forecast are the best evidence of future Signal Peak coal volumes.

(3) Correction of EIA's Western Montana Coal Forecast: As explained above, Signal Peak volume assumptions are one component used by EIA to develop its Western Montana coal production forecast. Because assumptions regarding Signal Peak volumes are broken out separately in the SARR, defendants remove the Signal Peak volume assumptions from the EIA's Western Montana forecast before applying that forecast to develop 2010 through 2018 volumes for other Montana coal movements in the SARR traffic group.[60] It is necessary to remove Signal Peak volumes from the Western Montana forecast in order to prevent a double-count of those volumes when projecting future growth of non-Signal Peak Montana coal tonnages on the SARR.

Table III.A.3 summarizes defendants' revised non-issue coal tonnages:

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[59] The Signal Peak volume assumptions underlying the AEO 2010 Forecast are included as a workpaper. BNSF/UP Reply workpaper "AEO 2010.xls."

[60] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

Table III.A.3
ANR Non-Issue Coal Tonnages
(millions of tons)

Year	AEPCO	Reply ANR	ANR-PRB	ANR-NM
2009	138.0	130.8	125.9	11.6
2010	144.3	132.1	125.8	13.1
2011	149.2	136.8	130.6	13.1
2012	159.3	144.8	137.5	14.3
2013	160.0	145.2	138.0	14.2
2014	160.3	147.4	140.1	14.4
2015	159.2	142.0	134.4	14.3
2016	160.0	144.9	137.1	14.5
2017	160.4	144.6	136.7	14.6
2018	160.6	147.0	139.2	14.6

Source: BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

b. Non-Coal Traffic

As explained in detail in Section II.A.1.a.ii above, defendants remove the MRL Trackage Rights Traffic from the ANR traffic group because that traffic does not share any facilities with the ANR. Defendants also modify AEPCO's non-coal traffic volume assumptions as described below.

i. 2009 Base Year Tonnages – BNSF Non-Coal Traffic

AEPCO divided the BNSF non-coal traffic that it included in its traffic group into three commodity groups: Consumer traffic (Intermodal and Automotive), Industrial traffic, and Agricultural traffic. AEPCO's methodology for developing 2009 base year tons for BNSF non-coal traffic is similar to its methodology for developing 2009 base year tons for coal: AEPCO used actual 1Q09 traffic data and then attempted to estimate 2Q09 to 4Q09 volumes by adjusting 2Q08 to 4Q08 volumes for the traffic.

For Industrial and Consumer traffic, except { } traffic,[61] AEPCO applied a complicated and unnecessary adjustment to reduce 2Q08 to 4Q08 volume levels to purported 2Q09 to 4Q09 levels.[62] Specifically, AEPCO first created a ratio of ANR Consumer and Industrial traffic volumes from 1Q08 to ANR Consumer and Industrial traffic volumes in 1Q09, and compared that ratio with a ratio created using overall BNSF Consumer and Industrial traffic volumes for the same two quarterly periods. AEPCO then adjusted the 2009 growth rates to attempt to determine the growth rates to apply to ANR.[63] The implication appears to be that if ANR Consumer and Industrial traffic volumes grew faster or slower in this 1Q08 to 1Q09 period than overall BNSF Consumer and Industrial traffic volumes in this same period, then the same relationship would hold true for all other 2008 to 2009 quarters. AEPCO offered no justification for this assumption, and its methodology results in an overstatement of 2009 volumes. AEPCO's methodology should be rejected in favor of using defendants' superior methodology described below.

For Agricultural traffic, AEPCO used a table in the 2009 "USDA Agricultural Projections to 2018" report (hereafter "USDA Projections"), published in February 2009, to adjust 2Q08 to 4Q08 BNSF agricultural volumes in the ANR traffic group to purported 2Q09 to

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[61] AEPCO used { } publicly reported volumes to adjust { } traffic. AEPCO Opening Nar. at III-A-23 n.18.

[62] AEPCO Opening Nar. at III-A-22 to III-A-23.

[63] AEPCO Opening workpaper "BNSF Fcst based on 2 BNSF Productions 2Q4Q w USDA.xlsx."

4Q09 levels.[64] AEPCO's methodology again results in an overstatement of base year 2009 volumes and it should be rejected.

As with coal volumes, defendants rely on BNSF's actual 2009 traffic data to develop base year 2009 volumes for Consumer, Industrial, and Agricultural non-coal traffic included in AEPCO's ANR traffic group. For 1Q09, defendants accept AEPCO's approach of using non-coal volumes as reported in BNSF's traffic data. Since AEPCO did not include in its traffic group all non-coal traffic transported by BNSF in 2Q08 to 4Q08 over the BNSF line segments replicated by ANR, defendants use a two-step process to calculate 2Q09 through 4Q09 volumes for non-coal traffic in the ANR traffic group. First, defendants use AEPCO's 2Q08 to 4Q08 selected BNSF train symbols (which show the train origin/destination and train type) and 2Q09 to 4Q09 BNSF waybill records to match-up train symbols selected by AEPCO with actual BNSF shipments on those trains in 2Q09 to 4Q09. Second, defendants compare 2Q08 to 4Q08 BNSF traffic volumes to 2Q09 to 4Q09 BNSF traffic volumes in the traffic lanes over which non-coal traffic in AEPCO's traffic group moved, by non-coal commodity group, to develop an ANR actual growth rate for each non-coal commodity group between 2Q08 to 4Q08 and 2Q09 to 4Q09. Finally, defendants apply the commodity group-specific growth rate on a movement-by-movement basis to the 2Q08 through 4Q08 non-coal traffic in AEPCO's traffic group and add the resulting volumes to the 1Q09 non-coal volumes, to arrive at full-year 2009 volumes for BNSF non-coal traffic.[65]

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[64] AEPCO Opening Nar. at III-A-24.

[65] BNSF/UP Reply workpaper "BNSF_WAYBILL_200804_200903_MASTER_SUMMARY_EXTENDED_SELECTION-2Q4Q USDA2 Reply.xlsx."

Defendants also reject AEPCO's separate adjustment of { } traffic. By treating { } traffic separately from other BNSF intermodal traffic on ANR, AEPCO double counted the impact of { } traffic on BNSF's volumes. If { } volumes were indeed up 8.5% in 2009 as AEPCO asserts,[66] then the decline in volumes of other BNSF intermodal traffic would have been even greater than the total decline in BNSF intermodal traffic (which includes the effect of { } traffic). Rather than try to separate and subtract { } volumes from total BNSF intermodal traffic, defendants simply apply the overall change they derive for 2009 base year volumes for BNSF intermodal traffic in the traffic group to all BNSF intermodal volumes in the traffic group, including { }.

Defendants' analysis shows that 2Q09 through 4Q09 volumes for BNSF non-coal traffic were between { } below 2Q08 through 4Q08 levels, depending on the commodity group involved.

Table III.A.4
BNSF Non-Coal Growth Rates (2Q-4Q08 to 2Q-4Q09)

	AEPCO	Reply	Difference
Consumer	{ }	{ }	{ }
Industrial	{ }	{ }	{ }
Agricultural	{ }	{ }	{ }

Source: BNSF/UP Reply workpaper "BNSF Non-Coal Growth Rates 2009.xlsx."

Defendants' methodology for determining 2009 base year volumes is more reliable than AEPCO's methodology because it relies on actual 2009 BNSF volumes rather than AEPCO's complicated efforts to estimate 2009 volumes for Consumer and Industrial traffic based upon

[66] AEPCO Opening Nar. at III-A-23 n.18.

2008 volumes and AEPCO's reliance on a USDA forecast that is not region-specific or focused on BNSF transportation volumes for Agricultural traffic.[67]

ii. Projected Tonnages – BNSF Non-Coal Traffic

AEPCO's methodology for projecting post-2009 volumes for BNSF Consumer and Industrial traffic differed from its methodology for projecting volumes for Agricultural traffic.

For BNSF Consumer and Industrial traffic in the ANR traffic group, AEPCO developed volumes for 2010 through 2014 by adjusting prior year traffic volumes by the volume assumptions for Consumer and Industrial traffic, respectively, in {

} ("BNSF's LRP").[68] For the years 2015 through 2018, AEPCO adjusted prior year volumes for Consumer and Industrial traffic based upon the 2013 to 2014 growth rate in BNSF's LRP for Consumer and Industrial traffic, respectively.[69] Defendants accept AEPCO's methodology for projecting volumes from 2010 through 2018 for BNSF Consumer and Industrial traffic in the SARR traffic group.

For BNSF Agricultural traffic in the traffic group, AEPCO developed volumes for 2010 through 2018 based upon the forecasted percent change in aggregate crop production as reported in the USDA Projections.[70] However, the USDA Projections report is not a reliable basis upon which to forecast volumes increases for BNSF's Agricultural traffic. Unlike the EIA forecast that is used to project coal volumes, the USDA Projections report does not project future volume

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[67] For a further explanation of the insufficiencies of the USDA Projection to forecast BNSF volumes for agricultural traffic, see Section III.A.2.b.ii.

[68] AEPCO Opening Nar. at III-A-24.

[69] *Id.*

[70] *Id.*

for agricultural products on a region-specific basis; rather, it projects future volume for those products in the United States on an aggregate basis. Further, the USDA Projections report is not reliable because its volume growth projections are not focused on the future volume of agricultural products that will be transported by a particular rail carrier.

Rather than using the USDA Projections report, defendants calculate volumes for BNSF Agricultural traffic in the traffic group from 2010 through 2014 by adjusting the prior year's traffic volumes by the volume assumptions for Agricultural traffic in BNSF's LRP.[71] For the years 2015 through 2018, defendants adjust the prior year's volumes for Agricultural traffic in the traffic group based upon the 2013 to 2014 growth rate in BNSF's LRP for Agricultural traffic.[72] This method is more reliable than AEPCO's method of forecasting Agricultural traffic volumes because it uses BNSF's own forecast of future Agricultural traffic volumes. Further, defendants' reliance on BNSF's LRP to project Agricultural volumes is consistent with both AEPCO's and defendants' reliance on BNSF's LRP to project volumes for Consumer and Industrial traffic.

iii. Base Year Tonnages – UP Non-coal Traffic

AEPCO's methodology for developing base year tonnages for the UP traffic that AEPCO selected for ANR relies on a series of complicated, and inconsistent, assumptions about the

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[71] BNSF/UP Reply workpaper "BNSF_WAYBILL_200804_200903_MASTER_SUMMARY_EXTENDED_SELECTION-2Q4Q USDA2 Reply.xlsx."

[72] BNSF/UP Reply workpaper "BNSF_WAYBILL_200804_200903_MASTER_SUMMARY_EXTENDED_SELECTION-2Q4Q USDA2 Reply.xlsx."

relationship between changes in UP's overall traffic levels and changes in the levels of in ANR's traffic between 2008 and 2009.

Defendants use a straightforward approach to develop UP non-coal traffic volumes for 2009 that focuses on actual volume changes between 2008 and 2009 for the traffic that AEPCO included in the ANR traffic group. Defendants accept the 2Q08 through 1Q09 traffic identified by AEPCO, as well as AEPCO's method of dividing UP traffic into five commodity groups (Agricultural, Auto, Chemical, Industrial, and Intermodal). To calculate 2Q09 through 4Q09 volumes, defendants first identify the origin-destination pairs from which AEPCO selected traffic for ANR. Defendants then use UP waybill data to compare 2Q09 through 4Q09 volumes to 2Q08 through 4Q08 volumes for movements in the identified lanes, separately for each commodity group, to determine the percentage change in volume.[73] Finally, defendants apply the commodity group-specific percentages on a movement-by-movement basis to the 2Q08 through 4Q08 traffic, and add the resulting volumes to the 1Q09 volumes, to arrive at full-year 2009 volumes.[74]

Defendants' analysis shows that 2Q09 through 4Q09 volumes were between { } below 2Q08 through 4Q09 levels, depending on the commodities involved.

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[73] To account for potential shifts in traffic patterns, defendants used only origin-destination pairs and commodity groups that had traffic in both 2Q08 through 4Q08 and 2Q09 through 4Q09 to determine growth rates.

[74] BNSF/UP Reply workpapers "UP 2009 Non-Coal Growth Rates.xlsx" and "UP Selected Traffic Forecast Reply.xlsx."

Table III.A.5
UP Non-Coal Growth Rates (2Q-4Q08 to 2Q-4Q09)

	AEPCO	Reply	Difference
Intermodal	{ }	{ }	{ }
Automotive	{ }	{ }	{ }
Chemical	{ }	{ }	{ }
Industrial	{ }	{ }	{ }
Agriculture	{ }	{ }	{ }

Source: BNSF/UP Reply workpaper "UP 2009 Non-Coal Growth Rates.xlsx."

AEPCO also tried to develop 2009 volumes by adjusting 2Q08 through 4Q08 data to account for volume changes between 2008 and 2009 for the traffic included in the ANR traffic group. However, AEPCO did not use actual changes in volume for traffic in the relevant lanes. Rather, AEPCO attempted to estimate lane-specific changes in ANR volume using comparisons between outdated, inaccurate forecasts of growth rates for traffic moving in lanes replicated by ANR and UP traffic overall.

AEPCO first created commodity group-specific adjustment ratios to show how UP expected the growth of traffic that AEPCO included in the ANR traffic group to differ from UP's overall traffic growth from 2008 to 2009.[75] The numerator of each ratio was based on UP's 2008 forecast of 2009 traffic levels for a subset of the traffic that AEPCO had selected for ANR.[76] For the numerator, AEPCO combined all commodity groups except Agricultural, and calculated that UP expected the subset of traffic to grow by { }. The denominator was based on UP's

[75] AEPCO excluded Agricultural traffic from its analysis and instead used USDA data to adjust 2Q08-4Q08 volumes to 2Q09-4Q09 levels. AEPCO Opening Nar. III-A-27. AEPCO's use of USDA data for this purpose is inappropriate for the reasons discussed in Section III.A.2.b.ii.

[76] AEPCO limited its selection to traffic that originates or terminates in Southern California. AEPCO Opening workpapers "UP Selected Traffic Forecast.xlsx" and "SCLB Sunset 2Q-4Q09.xlsx."

2008 forecast of 2009 traffic levels on a system-wide basis. For the denominator, AEPCO calculated separate figures for each commodity group, which ranged from { } to { }, depending on the commodity group.

AEPCO then created commodity group-specific growth rates by multiplying the commodity group-specific adjustment factors by UP's system-wide rates of traffic loss for each commodity group between 2008 and 2009.[77] UP's rates of traffic loss, as calculated by AEPCO, ranged from { } to { }, depending on the commodity group.[78]

Finally, AEPCO adjusted the 2Q08 through 4Q08 volumes using the commodity group-specific growth rates to arrive at 2Q09 through 4Q09 volumes. As shown in Table III.A.5 above, AEPCO's adjustments to 2Q08 through 4Q08 volumes suggest that volumes in the ANR lanes { }.

AEPCO's methodology is based on an unstated, and unsupported theory: if UP expected higher traffic growth in lanes replicated by ANR than for the UP system overall, then any reduction in traffic due to the economic downturn would be proportionately lower for lanes replicated by ANR than for the UP system overall. However, AEPCO offered no reason to believe that UP forecasts developed in 2008, { } in ANR lanes between 2008 and 2009, can supply meaningful information about the rate at which UP lost traffic due to the economic downturn in 2009.

Moreover, AEPCO appeared to recognize that its theoretical approach is unsound: it manipulated its methodology to avoid revealing that its approach would create absurd results if

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[77] AEPCO did not have actual UP data from 4Q09, so it used UP's 2008 projections of traffic levels in 4Q09.

[78] AEPCO Opening workpaper "UP forecast w 9m trueup.xlsx."

its logic were fully applied. Specifically, although AEPCO purported to develop commodity-specific growth ratios, it actually combined all commodities together in the numerator of its ratio.[79] If AEPCO had created commodity-specific numerators to go along with its commodity-specific denominators, its methodology would have suggested that, in ANR lanes, between 2008 and 2009, UP's Auto traffic increased by { }, Chemical traffic increased by { }, and Industrial traffic increased by { }.[80] AEPCO must have recognized that the Board would have rejected such results as patently absurd.

AEPCO's method of developing 2009 volumes is plainly less accurate and less reliable than the defendants' method. AEPCO's method suggested that Intermodal and Chemical traffic moving over ANR lanes { } from 2008 to 2009, and other commodities { } in traffic levels. However, the centerpiece of AEPCO's methodology is a comparison between demonstrably incorrect traffic forecasts that AEPCO further manipulated to avoid even more absurd results.

Defendants use UP's actual waybill data to quantify changes in volume moving in the relevant lanes between 2008 and 2009. Those data show that traffic volumes for all commodities declined, and they declined significantly more than is suggested by AEPCO.

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[79] AEPCO Opening workpaper "UP forecast w 9m trueup.xlsx."

[80] BNSF/UP Reply workpaper "UP forecast w 9m trueup Reply.xlsx."

iv. Projected Tonnages – UP Non-Coal Traffic

Defendants accept AEPCO's methods of adjusting prior year volumes for UP Auto, Chemical, Industrial, and Intermodal traffic interchanged with ANR for the years 2010 through 2018.[81]

However, for the reasons described in Section III.A.3.b.ii, defendants reject AEPCO's method of developing Agricultural traffic volumes for the years 2010 through 2018 by adjusting prior year volumes using USDA data. Instead, defendants use the same method for Agricultural traffic that AEPCO used for other UP traffic: for 2010, defendants adjust 2009 volumes by the forecasted percentage change in Agricultural volumes as calculated by comparing UP system-wide 2010 { } data to system-wide UP 3Q09 10Q data plus 4Q09 { } data; and for 2011 through 2018, defendants adjust prior year volumes using growth rates that are { }.

Table III.A.6 summarizes defendants' reply non-coal tonnages:

[81] AEPCO Opening Nar. at III-A-27.

Table III.A.6
ANR Non-Coal Tonnages
(millions of tons)

Year	AEPCO	Reply ANR	ANR-PRB	ANR-NM
2009	101.3	86.8	33.6	78.3
2010	103.1	88.2	34.1	79.7
2011	109.0	93.0	36.1	83.6
2012	114.3	97.2	37.9	87.0
2013	118.2	100.6	39.2	89.8
2014	121.5	103.4	40.3	92.3
2015	124.9	106.3	41.4	94.8
2016	128.3	109.3	42.6	97.5
2017	131.8	112.4	43.7	100.2
2018	135.5	115.5	44.9	102.9

Source: BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

c. Volume Summary and Peak Year Traffic

Table III.A.7 compares total SARR volumes developed by AEPCO for ANR with total volumes developed by defendants for ANR-PRB and for ANR-NM for each year of the DCF period. Since one line segment on ANR-PRB and ANR-NM overlap – *i.e.*, the Deming, New Mexico, to Cochise, Arizona, line segment, some of the traffic on ANR-PRB also moves on ANR-NM. BNSF/UP Reply Exhibit III.A-2 provides more detail showing for the ANR-PRB and the ANR-NM separately the traffic projected to move for each year of the DCF period (a) by shipper for coal traffic and (b) by SARR On-SARR and Off-SARR location for non-coal traffic.

Table III.A.7
ANR Tonnage Summary
(millions of tons)

Year	AEPCO	Reply ANR	ANR-PRB	ANR-NM
2009	239.4	217.6	159.5	90.0
2010	247.4	220.3	159.9	92.8
2011	258.2	229.8	166.7	96.7
2012	273.6	242.1	175.4	101.3
2013	278.3	245.8	177.3	104.0
2014	281.7	250.8	180.4	106.6
2015	284.0	248.3	175.8	109.2
2016	288.3	254.2	179.7	112.0
2017	292.3	256.9	180.4	114.7
2018	296.1	262.6	184.1	117.6

Source: BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

Table III.A.8 shows traffic for the peak year – 2018 – on ANR-PRB and ANR-NM by commodity.

Table III.A.8
ANR Peak Year Traffic
(million of tons)

Business Unit	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Coal	160.6	147.0	139.2	14.6
Consumer	82.7	76.8	24.4	76.5
Industrial	36.7	27.7	13.5	16.0
Agriculture	16.1	11.0	7.0	10.4
Total	296.1	262.6	184.1	117.6

Source: BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

3. Revenues (Historical and Projected)

As explained in Section III.A.1 above, defendants disagree with AEPCO's SARR configuration. In this section, however, defendants again set aside the SARR configuration issue and focus on AEPCO's calculation of the revenues that would be available to its SARR and, thus, to the sub-SARRs that defendants create for this reply. While defendants accept many of

AEPCO's revenue assumptions, they also identify errors in AEPCO's evidence concerning rates and revenues and correct those errors as described below. Defendants apply the corrected rates and revenues to the corrected SARR traffic volumes to derive SARR revenue estimates for the ten-year period from 2009 through 2018. The differences between AEPCO's revenue estimates and those developed by defendants with regard to the ANR traffic group are largely explained by differences in traffic volume calculations. However, AEPCO also made systematic errors in projecting fuel surcharge levels for BNSF and UP traffic and in allocating UP revenue between base revenue and revenue that are attributable to fuel surcharges. These issues and others are discussed in more detail below.

a. Single-Line

AEPCO included very little single-line traffic in the ANR traffic group: only the issue traffic and non-issue coal traffic moving from Northern PRB origins to five other power plants served by ANR.[82] Single-line traffic accounts for only 8% of ANR's base-year traffic.[83] In the ANR-PRB traffic group, single-line traffic accounts for 9% of the base-year traffic.[84] In the ANR-NM traffic group, the issue traffic is the only single-line traffic, and it accounts for 10% of the base-year traffic.[85]

Defendants' correction of AEPCO's improper shifting of existing interchanges between BNSF and UP affects the calculation of single-line revenues because much of ANR's local traffic becomes cross-over traffic on ANR-PRB and ANR-NM. Defendants assign single-line

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[82] AEPCO Opening Nar. at III-A-30.

[83] AEPCO Opening workpaper "Coal Traffic Forecast.xlsx."

[84] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

[85] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

revenues to the ANR-PRB or ANR-NM traffic groups, as appropriate, after correcting AEPCO's volume calculations as described above, and correcting AEPCO's rate and revenue calculates as described below in Section III.A.3.d.

b. Divisions – Existing Interchanges

AEPCO included very little traffic in the ANR traffic group that ANR would interchange with other carriers (including the residual BNSF and UP) at the present location of interchange, and it all involved non-issue coal traffic. Traffic in this category accounts for only 7% of ANR's base year traffic,[86] 7% of ANR-PRB's base year traffic, and 0% of ANR-NM's base year traffic.[87]

Defendants' correction of AEPCO's improper shifting of existing interchanges between BNSF and UP does not affect the calculation of revenues for traffic that is interchanged with other carriers at the present location of interchange. Defendants assign revenues from this traffic to the ANR-PRB or ANR-NM traffic groups, as appropriate, after making the corrections to AEPCO's rate and revenue calculations for this traffic that are described below in Section III.A.3.d.

c. Divisions – Cross-Over Traffic

The overwhelming majority of traffic that AEPCO included in the ANR traffic group is cross-over traffic – that is, traffic ANR interchanges with the residual BNSF and UP at a new, hypothetical interchange because ANR handles a shorter portion of the movement than the real-world BNSF or UP. In the base year, cross-over traffic accounts for 85% of ANR's coal traffic

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[86] AEPCO Opening Nar. at III-A-31.

[87] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx."

and nearly all of ANR's non-coal traffic.[88] In the ANR-PRB traffic group, cross-over traffic accounts for 84% of the base-year traffic.[89] In the ANR-NM traffic group, cross-over traffic accounts for 90% of the base-year traffic.[90]

For purposes of calculating revenue divisions, defendants change the cross-over traffic interchange point in some circumstances. *First*, for the reasons explained in Section III.A.1.a.ii above, defendants adjust the location of the hypothetical interchange for the ANR/MRL traffic (traffic that AEPCO's SARR moved over some ANR facilities as well as over the MRL) to the point of departure from (or entry to) SARR-constructed lines to align the revenues that the SARR receives from this cross-over traffic with the facilities that the SARR is actually providing to serve the issue traffic.[91] *Second*, defendants' correction of AEPCO's improper shifting of existing interchanges between BNSF and UP affects the calculation of cross-over revenues. ANR-PRB or ANR-NM will almost always handle an even shorter portion of the real-world movement than ANR, which means ANR-PRB or ANR-NM will almost always be entitled to a smaller allocation of revenues as compared to the residual BNSF and UP.[92]

Like AEPCO, defendants apply the Board's modified ATC method to cross-over traffic and they assign the revenues to the ANR-PRB or ANR-NM traffic groups, as appropriate, after

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[88] AEPCO Opening Nar. at III-A-32.

[89] BNSF/UP Reply Workpaper "Exhibit III-A-2 Reply.xlsx."

[90] BNSF/UP Reply Workpaper "Exhibit III-A-2 Reply.xlsx."

[91] BNSF/UP Reply Workpaper "Exhibit III-A-2 Reply.xlsx."

[92] BNSF/UP Reply workpapers "UP ATC Summary Sc 2.xlsx," "BNSF Intermodal ATC Summary Sc 2.xlsx," "BNSF General Freight ATC Summary Sc 2.xlsx," "BNSF Coal ATC Summary Sc 2.xlsx," "UP Coal ATC Summary PRB.xlsx," "UP ATC Summary Sc 3.xlsx," "BNSF Intermodal ATC Summary Sc 3.xlsx," "BNSF General Freight ATC Summary Sc 3.xlsx," "BNSF Coal ATC Summary Sc 3.xlsx," and "UP Coal ATC Summary NM.xlsx."

making the corrections to AEPCO's rate and revenue calculations that are described below in Section III.A.3.d. However, this case highlights how use of modified ATC can undermine the purpose of adopting ATC. The Board adopted ATC because it recognized the need to take into account economies of density when allocating revenue from cross-over traffic between the SARR and the residual incumbent.[93] Modified ATC reduces the impact of the density-based adjustment because the adjustment under modified ATC is made not to total revenue, but instead to total contribution (that is, revenue in excess of variable cost).[94] In a case like this, where large volumes of relatively low-rated intermodal traffic are included in the SARR, there is little contribution above variable costs to be allocated on the basis of density. Thus, use of modified ATC leaves cross-over revenues to be allocated almost entirely on the basis of mileage-based costs and fails to take account of economies of density. Given the unusually large volume of intermodal traffic in the SARR traffic group, the Board should apply the original ATC method to this case.

AEPCO also made two technical errors to specific ATC workpapers that defendants have corrected on reply. First, in the BNSF general freight URCS input spreadsheet, AEPCO costed the first 2,500 records using destination residual miles rather than SARR miles.[95] As a result, the ATC percentage for these moves is significantly overstated. Second, AEPCO incorrectly set the

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[93] *See Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1), slip op. at 26 (STB served Oct. 30, 2006).

[94] *See Western Fuels Ass'n & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088, slip op. at 14 (STB served Sept. 7, 2007). The Board's adoption of modified ATC is on appeal before the D.C. Circuit in *BNSF Ry. v. Western Fuels Ass'n & Basin Elec. Power Coop.*, Case. No. 09-1092, 09-1190, 09-1234 (consolidated) (D.C. Cir.).

[95] AEPCO Opening workpaper "BNSF_General Freight Inputs.xlsx."

off-SARR fixed costs for many moves at zero even though those movements have significant residual miles.[96] Defendants update these fixed costs where data for these moves could be found in AEPCO's workpapers.[97]

d. Projected Revenues

AEPCO used different methodologies to calculate ANR revenues for 2009 through 2018 for the different categories of traffic included in the ANR traffic group. Defendants identify errors in AEPCO's methodologies and the corrections that must be made for each category of traffic in the sections below.

i. Issue Coal Traffic

AEPCO calculated revenues for the issue traffic based upon the challenged pricing authorities; namely, AEPCO assumed the rates would be adjusted based upon the annual change in the RCAF-U and that a mileage-based fuel surcharge would be applied to the rates.[98]

(a) Issue Traffic – Base Revenues

Defendants accept AEPCO's methodology for calculating of base rates and revenues for the issue coal traffic but note that defendants' issue traffic revenues for the base year differ from those in AEPCO's opening evidence due to defendants' modification of base year issue traffic volumes as described in Section III.A.2.a.i.

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[96] AEPCO Opening workpaper "UP ATC Summary.xlsx."

[97] BNSF/UP Reply workpapers "UP ATC Summary Sc 2.xlsx" and "UP ATC Summary Sc. 3.xlsx."

[98] AEPCO Opening Nar. at III-A-38.

(b) Issue Traffic – Fuel Surcharge Revenues

Defendants do not accept AEPCO's calculation of fuel surcharge revenues for the issue traffic because it contained an error that affects all of AEPCO's fuel surcharge calculations: AEPCO overstated fuel surcharge revenues for the issue traffic, and for all of the traffic in the ANR traffic group, by improperly blending EIA's short-term and long-term fuel price forecasts to create a flawed projection of prices for the period from 2012 through 2018.

AEPCO used EIA's January 2010 Short Term Energy Outlook (1/10 STEO) to determine actual and forecasted HDF or WTI prices for 2009 through 2011, and EIA's early release (December 2009) Annual Energy Outlook 2010 (2010 AEO) to determine forecasted HDF or WTI prices for 2012 through 2018.[99] However, AEPCO combined the two forecasts in a way that inappropriately disregards the actual fuel prices forecasted in the 2010 AEO and thus overstates EIA's projections of fuel prices for 2012 through 2018.

Both the STEO (published monthly) and the AEO (published annually) project fuel prices on a cents per gallon basis and both forecasts are generated by EIA. However, the two forecasts are based on different models and rely on different assumptions. In the most recent available version of the STEO forecast which was published in April 2010 (4/10 STEO), the STEO projects that HDF and WTI prices will grow more quickly through 2011 than does the 2010

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[99] In its narrative, AEPCO incorrectly states that, for non-issue coal traffic, it used the December 2009 STEO to determine actual and forecasted HDF or WTI prices for 2009 through 2010 and the April 2009 AEO to determine forecasted HDF or WTI prices from 2011 through 2018. AEPCO Opening Nar. at III-A-40. However, AEPCO's narrative correctly states that, for non-coal traffic, it used the December 2009 STEO to determine actual and forecasted HDF or WTI prices for 2009 through 2011 and the December 2009 early release AEO to determine forecasted HDF or WTI prices from 2012 through 2018. AEPCO Opening Nar. at III-A-42, III-A-43, III-A-44, III-A-45. *See* AEPCO Opening workpaper "Coal Fuel Surcharge Forecast.xlsx."

AEO: the 4/10 STEO's forecast for HDF prices in 2011 is 13% higher than 2010 AEO's forecast. *See* Table III.A.9, below.

For the years after 2011, the only EIA fuel price forecast is the 2010 AEO – the 1/10 and 4/10 STEO forecasts only project fuel prices through 2011. However, rather than use the cents per gallon fuel prices in the 2010 AEO forecast for 2012 through 2018, AEPCO improperly derived a fuel price for a given year by calculating the percentage change between the 2010 AEO's fuel price for that year and for the previous year and then applied that percentage to the 1/10 STEO forecasted fuel price for 2011 and the AEPCO derived fuel price for 2012 through 2018. Specifically, AEPCO derived a $3.38 fuel price for 2012 by calculating the percentage change between the 2010 AEO's fuel price in 2011 and 2012 and then applying that percentage change to the 2011 STEO fuel price of $3.14. As a result of its improper calculation, AEPCO's 2012 fuel price is $3.38 per gallon rather than the $2.98 per gallon fuel price projected in the 2010 AEO forecast. *See* Table III.A.9 below. Similarly, AEPCO derived a $3.62 fuel price for 2013 by calculating the percentage change between the 2010 AEO's fuel price in 2012 and 2013 and then applying that percentage change to its $3.38 derived 2012 fuel price. *Id.* AEPCO continued the pattern through 2018. The result of AEPCO's approach is to project fuel prices for years 2012 through 2018 that are dramatically higher that those in the 2010 AEO forecast, as shown in Table III.A.9.

AEPCO's approach to combining the STEO and AEO forecasts misused the data. EIA recognizes that the appropriate fuel price forecasts after 2011 are generated by the AEO model, not by applying AEO-based growth rates to STEO-based prices. AEPCO offered no support for mixing and matching the price assumptions of EIA's short-term model with the growth assumptions of EIA's long-term model.

Defendants accept the STEO as the appropriate short-term forecast of fuel prices through 2011 and the AEO as the appropriate long-term forecast of fuel prices from 2012 through 2018, but they reject AEPCO's approach to combining the forecasts. Defendants' reply evidence uses the STEO cents per gallon fuel prices from 2009 through 2011 (using the updated April 2010 release, which varies only slightly from the January figures), and the 2010 AEO cents per gallon fuel prices from 2012 through 2018. The difference between AEPCO's approach and defendants' approach is shown in Table III.A.9. While the HDF prices are shown in the table, the same issue applies to AEPCO's fuel surcharge calculations based on West Texas Intermediate ("WTI") crude oil prices and defendants have made the same correction to the fuel surcharge calculations based on WTI prices.[100]

Table III.A.9
HDF Price Forecast
(cents per gallon - nominal)

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
2010 AEO	379	247	270	276	298	318	334	350	368	384	402
4/10 STEO	380	246	295	312							
AEPCO	381	246	298	314	338	362	380	398	419	437	457
Reply	380	246	295	312	298	318	334	350	368	384	402

Source: BNSF/UP Reply workpaper "HDF Forecast from STEO and AEO Reply.xls."

Table III.A.10 summarizes defendants' revised issue traffic revenue projections:

[100] BNSF/UP Reply "HDF Forecast from STEO and AEO Reply.xls"

Table III.A.10
Issue Traffic Revenues
(millions)

	AEPCO	Reply ANR	ANR PRB	ANR NM
2009	{ }	{ }	{ }	{ }
2010	{ }	{ }	{ }	{ }
2011	{ }	{ }	{ }	{ }
2012	{ }	{ }	{ }	{ }
2013	{ }	{ }	{ }	{ }
2014	{ }	{ }	{ }	{ }
2015	{ }	{ }	{ }	{ }
2016	{ }	{ }	{ }	{ }
2017	{ }	{ }	{ }	{ }
2018	{ }	{ }	{ }	{ }

Source: BNSF/UP Reply workpaper "Exhibit III-A-3 Reply.xlsx."

ii. Non-Issue Coal Traffic

AEPCO determined revenues for non-issue coal traffic based upon the produced traffic data and the terms of the contracts or other pricing authorities under which the traffic moves. AEPCO calculated base revenues – that is, revenues excluding fuel surcharges – and then adjusted those base revenues pursuant to the terms of the contract or pricing authority until the contract or pricing authority expires.[101] When the contract or pricing authority expired, AEPCO took the estimated rate in the last year of the contract or price authority and projected it forward through the end of the DCF period based upon the EIA's April 2009 AEO Update for Transportation Rates Escalator – West (hereafter "April 2009 AEO Update").[102] Since UP's

[101] AEPCO Opening Nar. at III-A-38 to III-A-39.

[102] *Id.* at III-A-39 to III-A-40.

traffic data do not separately identify fuel surcharge revenue, AEPCO developed a methodology to divide UP revenue for non-issue coal traffic into base revenue and fuel surcharge revenue.[103]

With respect to fuel surcharge revenues for non-issue coal traffic, AEPCO claimed to develop such revenues based upon the relevant contract terms.[104] Upon contract expiration, AEPCO assumed the BNSF or UP fuel surcharge program for coal traffic would apply even if it did not apply under the contract.[105] For non-contract coal moves, AEPCO also applied the BNSF or UP fuel surcharge program.[106] AEPCO's errors in developing base revenues and fuel surcharge revenues for non-issue coal traffic and defendants corrections thereto are described below.

(a) Non-Issue Coal Traffic – Base Revenues

Defendants generally accept AEPCO's approach to calculating base revenues for non-issue coal traffic. Defendants' primary adjustment to AEPCO's calculations is to use the AEO 2010 Transportation Rates Escalator-West (hereafter "2010 AEO Revenue Forecast"), rather than the April 2009 AEO Update that AEPCO used to project contractual rates forward after the end of the contract term.

Defendants also correct the revenues forecast for several coal movements where AEPCO failed to take account of the actual rates used to move non-issue coal. First, defendants replace AEPCO's estimate of rates for coal moving from Signal Peak Mine with rates that reflect actual contract terms {

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[103] *Id.* at III-A-39.

[104] *Id.* at III-A-40.

[105] *Id.* at III-A-40 to III-A-41.

[106] *Id.* at III-A-41.

}[107] AEPCO attempted to estimate the Signal Peak rates based on rates for other movements.[108] However, the other movements used by AEPCO were common carrier rates, rather than contract rates, and all but one of the movements were significantly shorter than the movement in question.[109] Defendants' use of actual contract terms for the Signal Peak traffic produces more accurate results than AEPCO's estimated rates. Second, defendants correct AEPCO's use of BNSF's 2008 tariff rates for coal moving to the Laramie River Station plant, rather than the 2009 through 2018 rates prescribed by the Board.[110] Third, defendants correct the revenues attributed to the movements to { } to reflect the contract rates, as adjusted, through the life of the contracts and thereafter pursuant to the 2010 AEO Revenue Forecast.[111]

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[107] Defendants also are producing as workpapers the contracts that govern Signal Peak transportation during the relevant years in the DCF period – 2012 through 2018. *See* BNSF/UP Reply workpaper { } These contracts were not referenced in the traffic data produced by defendants (and, thus, were not requested by plaintiffs in discovery) {

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[108] AEPCO Opening Nar. III-A-40 n.37.

[109] AEPCO Opening workpaper "Coal Revenue Forecast.xlsx." Only one of the 13 common carrier movements used by AEPCO was as long as the assumed Signal Peak to Chicago distance (1,394 miles). The average distance of the common carrier movements was 687 miles and the shortest movement was 172 miles.

[110] BNSF/UP Reply workpaper "Coal Revenue Forecast Reply.xlsx."

[111] Defendants had agreed to produce these contracts in discovery and inadvertently failed to do so. Before submitting its opening evidence, AEPCO never informed BNSF that it had not received these contracts in discovery. Defendants only realized that these contracts had inadvertently not been produced when reviewing AEPCO's opening evidence workpapers which showed that AEPCO used the EIA rate escalator to calculate the rates for these movements rather

(Continued ...)

Fourth, defendants correct the revenues attributed to the { } movements that AEPCO developed based on the EIA rate escalator rather than the contract rates that apply to the traffic.[112]

Defendants also correct two technical errors that they identified in AEPCO's workpapers. First, for movements of coal under contracts that expire before 2018, AEPCO explained that it intended to project forward the estimated rate in the last year of the contract using the April 2009 AEO Update.[113] Defendants correct the few instances when AEPCO mistakenly used a multiple-year index to project forward base rates, rather than adjust the last contract rate by the April 2009 AEO Update for the year after contract expiration.[114] Second, defendants correct multiple instances in which AEPCO developed rates using 2009 data, but indexed those rates forward using 2008 instead of 2009 indices.[115]

Finally, defendants calculate liquidated damages for the two shippers in the traffic group that in certain years did not reach contract minimum tonnages.[116] For these two shippers,

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than the contract rates. Defendants provide these contracts in BNSF/UP Reply workpapers { }

[112] BNSF/UP Reply workpaper { } BNSF traffic data mistakenly indicated that this traffic moved under { } – a contract that was not produced and does not apply to { } movements – when, in fact, the traffic moves under { } – a contract that was produced in discovery.

[113] AEPCO Opening Nar. III-A-39.

[114] BNSF/UP Reply workpapers "Coal Revenue Forecast Reply ANR PRB.xlsx" and "Coal Revenue Forecast Reply ANR NM.xlsx."

[115] BNSF/UP Reply workpapers "Coal Revenue Forecast Reply ANR PRB.xlsx" and "Coal Revenue Forecast Reply ANR NM.xlsx."

[116] BNSF/UP Reply workpaper "Coal Traffic Forecast Reply.xlsx." Those two shippers are {

(Continued ...)

defendants calculate liquidated damages according to the contract terms {

} Liquidated damages over the 10-year DCF period total { } for the ANR-PRB and { } for the ANR-NM.[117]

(b) Non-Issue Coal Traffic – Fuel Surcharge Revenues

AEPCO overstated fuel surcharge revenues for non-issue coal traffic in three ways.

First, AEPCO overstated EIA's projected fuel prices for 2012 through 2018, as discussed above in Section III.A.3.d.i.(b).

Second, AEPCO improperly assumed that BNSF's HDF fuel surcharge program would apply to traffic moving under some contracts or common carrier pricing authorities even though the traffic data produced in this case shows that those movements are not subject to a fuel surcharge. Despite the fact that there is no fuel surcharge in the BNSF traffic data for these movements, AEPCO incorrectly assigned a fuel surcharge to non-issue coal traffic under the following circumstances: {

[118]

}

[117] BNSF/UP Reply workpapers "Coal Revenue Forecast Reply ANR PRB.xlsx" and "Coal Revenue Forecast Reply ANR NM.xlsx."

[118] As explained above, defendants inadvertently failed to produce these contracts in discovery and are producing them in their workpapers. However, these contracts merely confirm what is in BNSF's traffic data for these movements – that this traffic is not subject to a fuel surcharge. Even without the contracts, AEPCO had no basis for disregarding the data in the traffic tapes showing that these movements were not subject to a fuel surcharge.

} and (4) in some instances where the traffic moves under a prescribed rate or common carrier pricing authority that does not include a fuel surcharge (*i.e.* TMPA Price Authority ("PA") BNSF-90042; AEP Texas North PA BNSF-306720; Xcel PSCo prescribed rate incorporated in BNSF-90043). Defendants correct AEPCO's inaccurate fuel surcharge assumptions for these movements.[120]

Third, AEPCO made an unsupportable assumption that all non-issue BNSF coal traffic would be charged BNSF's standard coal fuel surcharge upon the expiration of the current contract or price authority even if the current contract has no fuel surcharge or a non-standard fuel surcharge.[121] This assumption is inaccurate because it ignores the fact that all of BNSF's coal customers without standard coal fuel surcharges have engaged in negotiations with BNSF since 2002 when fuel price volatility began and in those negotiations had the opportunity to press for contract terms that excluded a fuel surcharge or that included non-standard fuel surcharge provisions. If a shipper was able to negotiate a contract without a fuel surcharge or with a non-standard fuel surcharge after fuel prices became volatile, there is no reason to believe that they would agree to BNSF's standard fuel surcharge in the new contract that replaces the expiring

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[119] In its base rate calculations, AEPCO correctly recognizes that contract { } is currently active and actually assumes that { }

[120] BNSF/UP Reply workpapers "Coal Fuel Surcharge Forecast Reply.xlsx," "Coal Fuel Surcharge Forecast Reply ANR PRB.xlsx," and "Coal Fuel Surcharge Forecast Reply ANR NM.xlsx."

[121] AEPCO Opening Nar. at III-A-41.

contract. Consequently, defendants continue to apply the same fuel surcharge term that existed in the expiring contract to that traffic after contract expiration, *e.g.*, if the traffic moved under a contract with no fuel surcharge it will continue to move with no fuel surcharge after the contract expires.[122]

Table III.A.11 summarizes defendants' revised revenue projections for non-issue coal traffic in the traffic group:

Table III.A.11
Non-Issue Coal Revenues
(millions)

	AEPCO	Reply ANR	ANR PRB	ANR NM
2009	$905.1	$845.7	$629.3	$25.6
2010	1,027.7	914.4	672.6	33.2
2011	1,117.9	976.3	725.1	34.0
2012	1,199.6	1,015.4	753.4	39.1
2013	1,287.5	1,079.6	798.0	39.9
2014	1,339.4	1,119.6	829.0	41.8
2015	1,366.0	1,106.3	818.7	43.9
2016	1,452.6	1,166.4	858.3	47.6
2017	1,521.4	1,207.9	885.4	50.3
2018	1,587.3	1,262.7	926.0	51.8

Source: BNSF/UP Reply workpaper "Exhibit III-A-3 Reply.xlsx."

iii. Consumer Traffic

AEPCO calculated ANR's base revenues for the UP and BNSF intermodal and automotive traffic that AEPCO included in the ANR's traffic group using a two-step process that required: (i) calculating 2008 rates per unit, exclusive of fuel surcharges, based upon net revenues for each unique movement and divided by total revenue units and (ii) projecting the

[122] BNSF/UP Reply workpaper "Coal Fuel Surcharge Forecast Reply.xlsx."

rates forward through 2018.[123] For Consumer traffic governed by pricing authorities produced in discovery, AEPCO adjusted the base revenues based upon the adjustment mechanism in the pricing authority for the life of the pricing authority and thereafter through 2014 based upon BNSF's LRP for Consumer traffic, the last year in which BNSF's LRP projects revenues, and from 2015 through 2018 based on the annual change in BNSF's LRP for Consumer traffic between 2013 and 2014.[124] For Consumer traffic not governed by a pricing authority produced in discovery, AEPCO adjusted the base revenues based upon the weighted-average change per revenue unit in Consumer traffic movements governed by produced pricing authorities through the weighted-average remaining pricing authority term.[125] Thereafter, AEPCO adjusted Consumer traffic base revenues through 2014 based upon BNSF's LRP for Consumer traffic and from 2015 through 2018 the annual change in BNSF's LRP for Consumer traffic between 2013 and 2014.[126]

AEPCO calculated fuel surcharges for Consumer traffic as follows. For traffic governed by produced pricing authorities, AEPCO calculated fuel surcharges based upon the fuel surcharge provision in the pricing authority until pricing authority expiration if the produced pricing authority had a fuel surcharge term and, if it did not have a fuel surcharge term, based upon the standard BNSF or UP fuel surcharge program for Consumer traffic.[127] Upon the

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[123] AEPCO Opening Nar. at III-A-41.

[124] *Id.* at III-A-42.

[125] *Id.* at III-A-42 to III-A-43.

[126] *Id.* at III-A-43.

[127] *Id.* at III-A-42; AEPCO Opening workpapers "Pricing Authority Master Summary File BNSF NC v4 x.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

pricing authority expiration, AEPCO assumed the standard BNSF or UP fuel surcharge program for Consumer traffic would apply even if it did not apply under the pricing authority.[128] For traffic not governed by produced pricing authorities, AEPCO calculated fuel surcharges based upon the weighted-average fuel surcharge for Consumer traffic movements governed by produced pricing authorities through the weighted-average remaining pricing authority term, and thereafter AEPCO assumed the standard BNSF or UP fuel surcharge program for Consumer traffic would apply.[129]

AEPCO's methodology for generating base revenues and fuel surcharge revenues for Consumer traffic contains errors that have the effect of overstating base revenues as well as fuel surcharge revenues. Defendants' corrections to AEPCO's calculations of base revenues and fuel surcharge revenues for Consumer traffic are described below.

(a) Consumer Traffic – Base Revenues

2008 Base Rates. Defendants accept AEPCO's method of developing 2008 rates per unit, exclusive of fuel surcharge, for BNSF intermodal and automotive traffic. However, they reject AEPCO's method of developing 2008 rates per unit, exclusive of fuel surcharge, for UP traffic. As AEPCO observed, UP waybill data do not separately report the revenue that is attributable to UP fuel surcharges that apply to intermodal and automotive traffic.[130] AEPCO thus developed UP 2008 rates per unit, exclusive of fuel surcharge, by creating a UP system-wide ratio of total revenues to fuel surcharge revenues, and applying that system-wide ratio to

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[128] AEPCO Opening Nar. at III-A-42.

[129] *Id.*

[130] *Id.* at III-A-41 to III-A-42.

UP's reported revenues for the intermodal and automotive traffic movements that it included in ANR's traffic group.[131]

AEPCO's approach is flawed, however, because UP's system-wide ratio of total revenues to fuel surcharge revenues { } the ratio that applies to the UP intermodal and automotive traffic that AEPCO included in the ANR traffic group. In fact, AEPCO created an ANR traffic-specific means of identifying fuel surcharge revenues when it used UP intermodal and automotive contracts produced in discovery to calculate ANR fuel surcharge levels, and AEPCO could have used that information, rather than the system-wide ratio it created, had it wanted to produce more accurate results.

As AEPCO observed, the UP intermodal and automotive contracts produced in discovery contain percentage-based fuel surcharges.[132] In fact, AEPCO used the contract provisions, together with projected fuel prices, to calculate fuel surcharge revenues for 2009 through 2018.[133] If AEPCO had wanted to be consistent and to use actual ANR traffic-specific data, AEPCO could have used the same contract provisions, together with actual fuel prices in 2008, to calculate fuel surcharge revenues for 2008.[134]

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[131] *Id.* at III-A-41.

[132] *Id.* at III-A-36.

[133] *Id.* at III-A-42.

[134] {

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Defendants use the consistent approach that AEPCO avoided to identify the portion of UP intermodal and automotive revenues that is attributable to fuel surcharges and exclude those revenues to determine 2008 rates per unit for intermodal and automotive traffic.[135]

Projected Rates. Defendants generally accept AEPCO's method of calculating base rates for Consumer traffic from 2009 through 2018, with a few exceptions.[136]

First AEPCO states that it calculated annual rate changes for 2015-18 based on the projected change in Consumer revenues between 2013 and 2014 in BNSF's LRP,[137] but AEPCO made a technical error by using the five-year compound annual growth rate in 2015 (rather than the 2014 rate) and by continuing to use this incorrect rate for 2016-18. Defendants correct the growth rates for 2015-18 by using the 2014 growth rate as detailed below in Table III.A.12.

Table III.A.12
Correction In Calculation Of
Consumer Revenue/Unit Growth Rate

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
AEPCO	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }
Reply	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }

Source: BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC v4.xlsx."

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[135] BNSF/UP Reply workpapers "UP Selected Traffic Forecast Reply.xlsx," "UP Selected Traffic Forecast Reply ANR PRB.xlsx," and "UP Selected Traffic Forecast Reply ANR NM.xlsx."

[136] Contrary to AEPCO's claims (AEPCO Opening Nar. at III-A-42 n.38; *id.*, at III-A-44 n.40), defendants never agreed to produce a "representative sample" of "contracts for traffic moving through the ANR states." Rather, defendants produced contracts and other pricing documents that AEPCO requested based on criteria known only to AEPCO. BNSF/UP Reply workpaper "AEPCO Contract Letters.pdf." However, defendants accept AEPCO's basic approach of using the contracts they produced to develop data that could be applied to movements for which pricing documents were not produced.

[137] AEPCO Opening Nar. at III-A-42 to III-A-43.

Second, AEPCO's weighted-average contract rate increase for BNSF Consumer traffic in 2013 had a minor mathematical error. AEPCO included a rate for { } in the average without its corresponding weighting.[138] Defendants correct this error.[139]

Third, AEPCO incorrectly assumed without explanation that the {

[140]

[141]

[142]

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[138] AEPCO Opening workpaper "Pricing Authority Master Summary File BNSF NC v4 x.xlsx."

[139] BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC v4.xlsx."

[140] AEPCO Opening workpaper "Pricing Authority Master Summary File BNSF NC v4 x.xlsx."

[141] {

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[142] BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC Reply.xlsx."

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(b) Consumer Traffic – Fuel Surcharge Revenues

AEPCO overstated fuel surcharge revenues for Consumer traffic in three ways. First, AEPCO overstated EIA's projected fuel prices for 2012 through 2018, as discussed above in Section III.A.3.d.i.(b).

Second, for certain Consumer movements that were covered by contracts produced in discovery, but for which the produced contracts did not provide details about the method of calculating the fuel surcharge, AEPCO assumed that the defendants' standard intermodal fuel surcharges applied. AEPCO then compounded the effects of that assumption by including those assumed standard fuel surcharge levels when calculating the weighted-average fuel surcharge

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[143] AEPCO Opening workpaper "Pricing Authority Master Summary File BNSF NC v4 x.xlsx."

[144] BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC v4.xlsx."

[145] BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC v4.xlsx."

that it used to adjust forward the fuel surcharge rates for Consumer movements that were not covered by contracts produced in discovery. Rather than risk distorting the weighted-average fuel surcharge calculation by assuming the use of the defendants' standard fuel surcharges in these instances, the better solution is to calculate the weighted-average fuel surcharge calculation for Consumer traffic based only on movements for which detailed fuel surcharge information was available. Similarly, this revised weighted-average fuel surcharge calculation should be applied to Consumer movements covered by a produced pricing authority where the pricing authority did not provide details about the method of calculating the fuel surcharge. Defendants correct the calculation of fuel surcharge revenues for Consumer traffic accordingly.[146]

Third, as in its methodology for non-issue coal traffic, AEPCO improperly assumed that BNSF's and UP's standard intermodal and automotive fuel surcharge terms would apply to traffic that had been moving under pricing authorities with non-standard terms after the pricing authority expired.[147] AEPCO's methodology implicitly assumes that shippers that negotiate non-standard terms would accept agree to different, standard terms once their existing contracts expired. AEPCO never provided any support for this assumption.

Defendants correct AEPCO's approach to developing fuel surcharge revenues for traffic moving under expired contracts by assuming that contractual fuel surcharge terms would continue to apply to traffic even after the initial contracts expire, with fuel prices adjusted forward through 2018 using 4/10 STEO or 2010 AEO forecast as appropriate. *See* Section III.A.3.d.i.(b).

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[146] BNSF/UP Reply workpapers "Pricing Authority Master Summary File BNSF NC v4.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

[147] AEPCO Opening Nar. at III-A-42.

Defendants apply a similar correction to fuel surcharge revenues for movements not covered by provided contracts. For these movements, AEPCO initially calculated fuel surcharge revenues based on the weighted-average fuel surcharge for movements governed by contracts that were produced in discovery. However, AEPCO used the weighted-average method only for a short time, and then assumed that fuel surcharges would revert to standard terms.[148] Defendants continue to use a weighted-average fuel surcharge throughout the SARR period, with fuel prices adjusted forward through 2018 using the appropriate 4/10 STEO or 2010 AEO forecast, rather than assume that the fuel surcharges for this Consumer traffic would revert to standard terms once the weighted-average remaining contract term ends.

Table III.A.13 summarizes defendants' revised revenue projections for Consumer traffic in the traffic group:

Table III.A.13
Consumer Revenues
(millions)

	AEPCO	Reply ANR	ANR-PRB	ANR-NM
2009	$926.9	$841.6	$245.3	$303.1
2010	1,028.5	943.0	286.1	340.9
2011	1,111.1	1,025.7	310.0	370.6
2012	1,205.2	1,070.0	318.0	385.4
2013	1,321.6	1,170.2	346.8	421.2
2014	1,410.7	1,253.2	373.2	451.4
2015	1,516.8	1,339.1	399.7	482.4
2016	1,628.4	1,455.0	435.3	527.0
2017	1,769.8	1,552.0	463.5	561.9
2018	1,902.8	1,666.3	505.0	603.9

Source: BNSF/UP Reply workpaper "Exhibit III-A-3 Reply.xlsx."

[148] AEPCO Opening Nar. at III-A-43.

iv. Carload Traffic (Agricultural and Industrial traffic)

AEPCO calculated ANR's base revenues for the UP and BNSF agricultural, chemical, and industrial traffic that AEPCO included in ANR's traffic group using the same two-step process that it used for intermodal and automotive traffic.[149] AEPCO also calculated ANR's fuel surcharge revenues for the UP and BNSF agricultural, chemical, and industrial traffic that AEPCO included in ANR's traffic group using essentially the same process that it used for intermodal and automotive traffic.[150]

(a) Carload Traffic – Base Revenues

Defendants accept AEPCO's approach to calculating 2008 rates per unit and projecting those rates from 2009 through 2018 for Carload traffic, with the following exceptions. First, defendants correct AEPCO's understatement of UP's 2008 base rates per unit for Carload traffic, exclusive of fuel surcharge, using the methodology described in Section III.A.3.d.iii.(a). Second, defendants correct the technical error made to project the growth rate for agricultural and industrial traffic from 2015 through 2018 which was the same technical error that AEPCO made to project the growth rate for Consumer traffic as described in Section III.A.3.d.iii.(a) above. Table III.A.14 shows the results when this error is corrected.

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[149] AEPCO Opening Nar. at III-A-43 to III-A-44.

[150] *Id.* at III-A-44 to III-A-45.

Table III.A.14
Correction in Calculation Of
Carload Revenue/Unit Growth Rate

AEPCO	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Agricultural	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }
Industrial	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }

Reply	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Agricultural	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }
Industrial	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }	{ }

Source: BNSF/UP Reply workpaper "Pricing Authority Master Summary File BNSF NC v4.xlsx."

(b) Carload Traffic – Fuel Surcharge Revenues

Defendants make three corrections to AEPCO's calculation of fuel surcharge revenues for agricultural and industrial traffic. First, defendants correct AEPCO's projected fuel prices to use the appropriate 4/10 STEO or 2010 AEO forecast, as discussed above in Section III.A.3.d.i.(b).[151] Second, defendants correct AEPCO's assumption regarding fuel surcharges that apply to Carload traffic moving under produced pricing authorities that did not provide details about the method of calculating the fuel surcharge and also correct the weighted-average contract fuel surcharge calculation for Carload traffic in accordance with the methodology discussed above in Section III.A.3.d.iii.(b).[152] Third, defendants correct AEPCO's assumptions regarding fuel surcharge terms for Carload traffic moving under expired contracts and Carload

[151] BNSF/UP Reply workpaper "HDF Forecast from STEO and AEO Reply.xls."

[152] BNSF/UP Reply workpapers "Pricing Authority Master Summary File BNSF NC v4.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

traffic for which contracts were not provided, consistent with the methodology discussed above in Section III.A.3.d.iii.(b).[153]

Table III.A.15 summarizes defendants' revised revenue projections for Carload traffic in the traffic group:

Table III.A.15
Carload Revenues
(millions)

	AEPCO	Reply ANR	ANR PRB	ANR NM
2009	$338.3	$280.9	$157.1	$127.3
2010	371.8	303.1	165.5	134.4
2011	447.7	339.7	194.3	148.7
2012	520.2	365.9	212.2	158.6
2013	560.4	393.6	229.4	169.0
2014	591.6	414.6	242.2	177.1
2015	626.5	446.6	269.7	190.6
2016	663.4	470.0	284.8	199.7
2017	703.8	496.2	300.6	209.6
2018	745.6	524.0	320.4	220.6

Source: BNSF/UP Reply workpaper "Exhibit III-A-3 Reply.xlsx."

v. Contract Adjustment Forecasts

Defendants make one correction to AEPCO's use of indices for non-coal traffic. In its calculation of growth rates for the AII-LF and RCAF indices that it applied to non-coal rates,

[153] BNSF/UP Reply workpapers "Pricing Authority Master Summary File BNSF NC v4.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

AEPCO used First Quarter figures for 2008 to 2011 rather than annual figures.[154] Defendants correct this error by substituting the annual figures.[155]

vi. Traffic Summary

Table III.A.16 presents a summary of the differences in ANR total revenues assumed by AEPCO and ANR-PRB and ANR-NM total revenues calculated by defendants after making the corrections to AEPCO's revenue assumptions described above. BNSF/UP Reply Exhibit III.A-3 provides more detail showing for the ANR-PRB and the ANR-NM separately the revenue forecast for each year of the DCF period by shipper for coal traffic and by SARR On-SARR and Off-SARR location for non-coal traffic.

Table III.A.16
Comparison of AEPCO's ANR Revenues And
Defendants' ANR, ANR-PRB And ANR-NM Revenues

	AEPCO	Reply ANR	ANR PRB	ANR NM
2009	$2,187.4	1,985.6	1,035.8	466.2
2010	2,449.8	2,182.2	1,131.0	531.0
2011	2,700.6	2,365.6	1,237.4	577.3
2012	2,953.0	2,478.8	1,294.7	607.9
2013	3,198.8	2,672.2	1,385.9	656.2
2014	3,372.2	2,817.3	1,456.5	697.4
2015	3,540.8	2,922.9	1,500.6	745.0
2016	3,776.9	3,123.1	1,591.3	803.2
2017	4,028.2	3,288.7	1,662.8	851.5
2018	4,269.8	3,486.4	1,765.0	907.0

Source: BNSF/UP Reply workpaper "Exhibit III-A-3 Reply.xlsx."

[154] AEPCO Opening workpaper "Pricing Authority Master Summary File BNSF NC v4 x.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

[155] BNSF/UP Reply workpapers "Pricing Authority Master Summary File BNSF NC v4.xlsx" and "UP NonCoal Summarized Contracts v5.xlsx."

B. STAND-ALONE RAILROAD SYSTEM

1. Route and Mileage

The ANR network configuration posited by AEPCO consists of 2,231.54 route miles of main line, branch line and spurs, traversing parts of Montana, Wyoming, Nebraska, Colorado, Oklahoma, Texas, Arizona and New Mexico. AEPCO Opening Nar. at III-B-7. This mileage includes a 29.57-mile segment between Laurel, Montana, and Jones Jct., Montana, that is owned by MRL and will be operated by means of trackage rights, consistent with BNSF's current practice. Defendants accept ANR's constructed route of 2,201.97 miles, including the deferral to January 2012 of operations on the segment from Mossmain, Montana, to Walter Jct, Montana, to serve the Signal Peak Mine. However, defendants reduce the length of the MRL segment to 24.24 miles, so that it begins on the western end at Mossmain (rather than Laurel) and ends on the eastern end at Huntley, Montana (rather than Jones Jct.). The only issue traffic that would move over the MRL segment is traffic from the Signal Peak Mine, and that traffic would move over the trackage rights only between Mossmain and Huntley. AEPCO's only reason for positing that ANR would operate over a longer portion of MRL is to increase SARR revenues from non-issue traffic.

As discussed in the Counsel's Argument, defendants do not believe that AEPCO can disregard the actual BNSF/UP interchanges for the issue traffic that are specified in the challenged pricing authorities. Accordingly, in all succeeding sections, defendants include not only a critique of AEPCO's SARR configuration, but also a discussion of the ANR-PRB and ANR-NM networks that the Board should use as the basis for evaluating the reasonableness of the challenged rates.

ANR-PRB consists of 1,867.02 route miles of main line, branch line and spurs, traversing the same states covered by AEPCO's ANR, but over the more direct routing actually used by the PRB issue traffic. ANR-NM consists of 505.14 route miles of main line, branch line and spurs, traversing parts of Arizona and New Mexico, over the more direct routing actually used by the New Mexico issue traffic.

a. Main Line

Setting aside the broader concern that AEPCO's SARR configuration is improper, as discussed above, defendants' major criticism of the main line routing of ANR relates to the trackage rights mileage AEPCO posits over MRL. Defendants correct this overreaching by shifting the western terminus of this segment from Laurel to Mossmain and the eastern terminus from Jones Jct. to Huntley. There are, in addition, three relatively minor differences between the route miles proposed by AEPCO and those sponsored by the defendants:[1]

1. Reno Branch. AEPCO calculates the distance of the Reno Branch from MP 0.00 to the track chart reported ending milepost of 5.76,[2] plus 0.70 miles for the north leg of the Reno Branch wye. However, according to the track chart, the distance between MP 0.00 and 1.00 on the Reno Branch is 18,782 feet. Correcting the length to incorporate the actual distance between MP 0.00 and 1.00 adds 2.56 miles to the Reno Branch.

2. Gallup Subdivision. AEPCO derives its miles for the West Baca to East Defiance segment by calculating the difference between milepost 114.7 at West Baca and milepost 165.34 at East Defiance, a difference of 50.64 miles. However, the actual distance between MP 144.00 and 145.00 near Wingate, NM on the segment is 13,226 feet. Correcting this length to incorporate the actual distance between MP 144.00 and 145.00 adds a total of 1.51 to this segment of the Gallup Subdivsion..

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[1] These differences were discovered during the review of AEPCO's route mile work papers and supporting documentation. There were several other minor difference discovered, as well, some in the nature of overstatement of mileage and some in the nature of understatement of mileage. Although, net, there were more understatements, in the interests of economy, these other differences will not be challenged.

[2] The mileage reported on the track chart is 5.74, but it is assumed that this is a typographical error.

3. Gallup Subdivision. AEPCO derives its miles for the Dalies to East Baca segment by calculating the difference between milepost 27.4 at Dalies and milepost 113.44 at East Baca, a difference of 86.04. Between MP 27.4 and MP 28, there are two additional mileposts, 27A and 27B, which are not accounted for. Correcting this oversight adds a total of 1.99 route miles to the Dalies to East Baca segment.

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ANR-PRB mirrors the route of AEPCO's SARR from Walter Jct., Montana, to Pueblo, Colorado, and, in this respect, replicates a BNSF route. In the ANR-PRB scenario, as in the real world, Pueblo is the "interchange" between the BNSF and UP portions of the route. From Pueblo, ANR-PRB replicates a UP route to Stratford, Texas, using trackage rights over the BNSF (just as, in the real world, UP uses these trackage rights to serve the issue traffic). From Stratford, ANR-PRB replicates UP's Tucumcari line to Vaughn, New Mexico, and thereby avoids the longer and less efficient re-route that AEPCO proposes through Amarillo and Texico, New Mexico. At Vaughn, ANR-PRB, like AEPCO's SARR, continues south through El Paso and then west via Deming to Cochise.

ANR-NM, like AEPCO's SARR, originates in Defiance, New Mexico, and proceeds east through Dalies to Belen, New Mexico. However, ANR-NM avoids the costly re-routing from Vaughn to El Paso, replicating BNSF's actual routing for the New Mexico issue traffic over BNSF's line from Belen to Rincon. At Rincon, ANR-NM interchanges the traffic with Southwest Railroad ("SWRR"), which moves the issue traffic to Deming. From Deming to Cochise, ANR-NM again mirrors ANR's route, replicating UP's Sunset Route line.

b. Branch Lines

Defendants accept AEPCO's proposals for the four branch lines – Dutch, Campbell, Reno and Lee Ranch – serving the Montana, Wyoming and New Mexico Mines. The first three branch lines are also included in the ANR-PRB scenario, and the Lee Ranch Branch is included in the ANR-NM scenario.

c. Interchange Points

AEPCO lists 24 interchange locations for ANR. Because of their modifications to the MRL segment, defendants change AEPCO's proposed Laurel, Montana, interchange to Huntley, Montana, and the Jones Jct., Montana, interchange to Mossmain, Montana. In addition, although AEPCO lists Pueblo as an interchange location, its SARR traffic group does not show ANR interchanging any traffic with UP at that location. *See* AEPCO Opening Exhibit III-A-2.. Further, defendants eliminate AEPCO's proposed interchange with FXE at El Paso. {AEPCO identified a single movement of fewer than five trains that moved over BNSF lines from Grand Junction, Colorado, via Albuquerque, New Mexico, to El Paso and FXE, and AEPCO proposed to reroute that traffic via Vaughn and El Paso on its SARR. AEPCO Opening Nar. III-A-13. However, these shipments occurred only in 2008, and, therefore, were not included when defendants updated AEPCO's traffic selection based on the actual BNSF and UP volumes moved in 2009.

Defendants make all the above changes for the ANR-PRB scenario, as well. Moreover, in that scenario, Pueblo becomes an interchange with both BNSF and UP, the Vaughn interchange with UP is shifted to Stratford, and an interchange with SWRR is added at Deming. There are no interchanges at Las Animas, Amarillo, Texico, Vaughn, Belen, Dalies and Defiance in the ANR-PRB scenario.

In the ANR-NM scenario, the only ANR interchanges that remain are Defiance, Dalies, Cochise and Belen, with two new interchanges added, at Rincon (BNSF and SWRR) and Deming (UP and SWRR).

Table III.B.1 shows the interchange locations for ANR, ANR-PRB, and ANR-NM.

Table III.B.1
Interchange Locations For ANR Cross-Over Traffic

Location	Carrier	AEPCO ANR	Reply ANR	ANR-PRB	ANR-NM
Laurel, MT	BNSF	Yes	No	No	No
Jones Jct., MT	BNSF	Yes	No	No	No
Mossmain, MT	BNSF	No	Yes	Yes	No
Huntley, MT	BNSF	No	Yes	Yes	No
Moran Jct., MT	BNSF	No	Yes	Yes	No
Donkey Creek, WY	BNSF	Yes	Yes	Yes	No
Orin, WY	BNSF	Yes	Yes	Yes	No
Wendover, WY	BNSF	Yes	Yes	Yes	No
Northport, NE (2)	UP, BNSF	Yes	Yes	Yes	No
Sterling, CO	NKCR	Yes	Yes	Yes	No
Brush, CO	BNSF	Yes	Yes	Yes	No
Denver, CO (2)	BNSF	Yes (2)	Yes (1)	No	No
Pueblo, CO	UP, BNSF	Yes	No	Yes	No
Las Animas Jct., CO	BNSF	Yes	Yes	No	No
Stratford, TX	UP	No	No	Yes	No
Amarillo, TX (2)	BNSF	Yes	Yes	No	No
Texico, NM (2)	BNSF	Yes	Yes	No	No
Vaughn, NM	UP	Yes	Yes	No	No
Belen, NM	BNSF	Yes	Yes	No	Yes
Dalies, NM	BNSF	Yes	Yes	No	Yes
Defiance, NM	BNSF	Yes	Yes	No	Yes
El Paso, TX (2)	UP, FXE	Yes (2)	Yes (1) (UP)	Yes (1) (UP)	No
Rincon, NM	BNSF	No	No	No	Yes
Deming, NM	SWRR, UP	No	No	Yes (SWRR)	Yes (UP)
Cochise, AZ	UP	Yes	Yes	Yes	Yes

Although AEPCO states that "[a]ll traffic is interchanged by the ANR with other carriers in intact trainloads," AEPCO Opening Nar. at III-B-5, AEPCO does not provide for handling of the local traffic on those trains. Rather than setting out the local traffic at the eastern and western ends of the SARR (Amarillo and Defiance) for separate delivery to Belen (which would have added costs to ANR), defendants treat this traffic as BNSF does in the real world, simply stopping the trains at Belen to set out the cars. The ANR interchange yard at Belen has sufficient trackage to allow a full train to clear the mainline and switch out local traffic.

d. Route Mileage

But for the slight differences regarding the MRL trackage rights segment and the mile post errors on the Reno Branch and Gallup Subdivision, defendants agree with the ANR mileages. With respect to the MRL segment, defendants shorten the segment to run from Mossmain to Huntley, rather than Laurel to Jones Jct.

As indicated in Table III.B.2, a number of the AEPCO ANR segments are not constructed for the ANR-PRB scenario, including those from Pueblo to Las Animas Jct., Las Animas Jct to Amarillo, Amarillo to Vaughn and Vaughn to Defiance. To move the issue traffic in the ANR-PRB scenario, ANR-PRB uses trackage rights on BNSF from Pueblo to Stratford, and a segment is built from Stratford to Vaughn (replicating UP's Tucumcari line). ANR-PRB extends for 1,867.02 route miles, of which 1,608.68 are constructed. The ANR-PRB routing from Pueblo to Stratford to Vaughn is 91 miles shorter than the ANR routing via Amarillo.

ANR-NM includes only the portion of AEPCO's ANR Vaughn-to-Defiance segment between Belen and Defiance, and only the portion of AEPCO's ANR El Paso-to-Cochise segment between Deming and Cochise. ANR-NM builds the BNSF line from Belen to Rincon and uses SWRR to handle traffic from Rincon to Deming. ANR-NM extends for 505.14 route

miles, of which 451.84 route miles are constructed. The ANR-NM routing is 232 miles shorter than the ANR route via Vaughn and El Paso.

Table III.B.2 provides route mile figures for mainline segments for ANR, ANR-PRB, and ANR-NM.

Table III.B.2
ANR Route Miles

Segment	AEPCO ANR	Reply ANR	ANR-PRB	ANR-NM
Main Lines				
Walter Jct. to Mossmain[1/]	32.95	32.95	32.95	0
Laurel to Jones Jct.[2/]	29.57	24.24	24.24	0
Jones Jct. to Dutch	142.13	142.13	142.13	0
Dutch to Donkey Creek	104.98	104.98	104.98	0
W. Donkey Creek to Bridger Jct.	127.28	127.28	127.28	0
Bridger Jct. to Northport	135.42	135.42	135.42	0
Northport to Denver	203.01	203.01	203.01	0
Denver to Pueblo	118.51	118.51	118.51	0
Pueblo to Las Animas Jct.	83.90	83.90	0	0
Las Animas Jct. to Amarillo	234.59	234.59	0	0
Pueblo to Stratford[3/]	N/A	0	234.10	0
Amarillo to Vaughn	237.60	237.60	0	0
Vaughn to Defiance	259.60	263.10	0	0
Belen to Defiance	N/A	0	0	157.82
Stratford to Vaughn	N/A	0	225.83	0
Vaughn to El Paso	230.62	230.62	230.62	0
El Paso to Cochise	239.53	239.53	239.53	0
Deming to Cochise	N/A	0	0	145.76
Total Main Line Miles	2,179.69	2,177.86	1,818.6	303.58
Branch Lines[4/]				
Dutch Branch	16.53	16.53	16.53	0
Campbell Branch	10.03	10.03	10.03	0
Reno Branch	6.46	9.02	9.02	0
Lee Ranch Branch	0.82	0.82	0	0.82
Belen to Rincon	N/A	0	0	147.44
Rincon to Deming[5/]	N/A	0	0	53.30
Total Branch Line Miles	33.84	36.40	35.58	201.56
Other				
ANR portion of PRB mine spurs	1.90	1.90	1.90	0
ANR portion of destination spurs	16.11	16.11	10.94	0
Total Route Miles (including MRL, SWRR, and Trackage Rights)	2,231.54	2,232.27	1,867.02	505.14

1/ ANR constructs for 2012 operations.
2/ Defendants limit trackage rights over MRL to Mossmain to Huntley.
3/ ANR-PRB uses trackage rights over BNSF.
4/ Mileages include ANR-owned portion, except for Rincon to Deming.
5/ ANR-NM uses handling carrier SWRR.

2. Track Miles and Weight of Track

BNSF/UP Reply Exhibit III.B-1 contains defendants' versions of the detailed schematic track and yard diagrams for the entire ANR system. Table III.B.3 below presents the constructed track miles for AEPCO's ANR and defendants' SARR scenarios. This table excludes the track miles for those portions of the various routes over which ANR operates via trackage rights.

Table III.B.3
ANR Constructed Track Miles

	AEPCO Miles	Reply ANR	ANR-PRB	ANR-NM
Main line track – Single first main track[1/]	2,201.97	2,208.03	1,840.98	448.34
– Other main track[2/]	1,108.07	1,111.38	558.09	309.45
Total main line track	3,310.04	3,319.41	2,399.07	757.79
Helper pocket, setout and MOW equip. tracks	29.02	29.38	24.70	5.94
Yard tracks[3/]	242.93	234.39	139.01	25.02
Total track miles	**3,581.99**	**3,583.18**	**2,562.78**	**788.75**

Source:

a. Main Lines

With respect to the ANR main line, the principal difference between the mileage calculated by AEPCO and defendants relates to the "other main track" category. This difference is made up of the understatement of the Reno Branch and Gallup Subdivsions, described above, and the additional running track to provide the capacity to handle the mainline traffic selected by AEPCO, as identified in defendants' RTC model.

Defendants accept AEPCO's proposed use of 136-pound continuous welded rail ("CWR") for all construction, other than the relay used between Walter Jct. and Mossmain. Defendants accept, as well, AEPCO's proposed use of head-hardened rail for track carrying over 50 million gross tons annually and on curves in excess of 3 degrees. Defendants also agree with AEPCO's specification that track and structures are designed to accommodate a gross weight on

rail of 286,000 pounds per car. Finally, defendants do not contest AEPCO's general parameters regarding train speeds, with the clarification that, although 70 mph is the speed specified on BNSF timetables for intermodal trains, 55 mph – not 60 mph – is the prescribed maximum for all other trains,[3] and ANR must adhere to this lower limit.

b. Branch Lines

There are no differences between AEPCO's and defendants' calculation of branch line mileage, and defendants accept AEPCO's use of second hand 136-pound CWR on the Lee Ranch Branch and AEPCO's determination that passing sidings are required on the Campbell and Reno Branches.

c. Sidings

As AEPCO notes, sidings are considered part of its main tracks for both main and branch lines.

d. Other Tracks

AEPCO proposes two helper districts for ANR, one for the Campbell/Orin, Wyoming, segment and one for the Big Lift/Palmer Lake, Colorado, segment. As explained in detail in Section III.C.1.c.ii.(a), the "standard" locomotive consist of three locomotives in a 2x1 distributed power ("DP") configuration is not sufficient for the BNSF traffic that ANR transports south of Pueblo to Amarillo. This traffic requires a 2x2 locomotive configuration. Adopting this configuration eliminates the need for additional power on the Big Lift/Palmer Lake, Colorado, segment and, therefore, eliminates the need for a helper district at that location. The four-locomotive configuration also reduces the number of trains requiring assistance in the

[3] *See* BNSF_ AEPCO_0004234. This timetable also provides for other restrictions at individual locations or as a function of extreme temperature..

Campbell/Orin, Wyoming, helper district. Further, as explained in Section III.C.1.c.ii.(b), defendants include a helper district for the Sheridan/Parkman, Wyoming, segment, to replicate the real-world locomotive assistance BNSF must provide for the trains AEPCO selected that traverse this route.

Defendants accept AEPCO's provision of 860-foot long, double-ended setout tracks on each side of the Failed-Equipment Detectors ("FEDs"). However, defendants believe that AEPCO's specification of only three FEDs for the Orin line (from Donkey Creek to Bridger Jct) is insufficient. This assumjption is not consistent with BNSF's practices over the line segments being replicated. In order to replicate the detection system used on BNSF, a combination of seven Hot Box and Dragging Equipment detectors should be added in order to provide the necessary coverage.

Defendants also accept AEPCO's provision of 1,000-foot MOW equipment storage tracks at Guernsey, Wyoming; North Amarillo, Texas; Texico, New Mexico; West Vaughn, New Mexico; West El Paso, New Mexico; Donkey Creek, Wyoming, and Denver, Colorado. In the ANR-PRB scenario, the equipment storage tracks at North Amarillo, Texico and West Vaughn will be eliminated and replaced by tracks at Stratford. In the ANR-NM scenario, equipment storage tracks will be provided at Defiance, Belen, Deming, and Cochise.

Defendants' proposed revisions regarding track locations, as well as their layouts for the ANR-PRB and ANR-NM alternative SARRs, are shown in BNSF/UP Reply Exhibit III.B-1.

3. Yards

a. Locations and Purpose

Defendants agree that ANR will require both inspection/fueling yards and interchange yards. As explained below, there are some discrepancies between yard placement as reflected in

the stick diagrams that appear in AEPCO's Opening Exhibit III-B-1 and yard placements as programmed in AEPCO's RTC model. Moreover, some of the yards require additional or re-configured tracks and other facilities, to enable them to perform efficiently the functions designated by AEPCO.

BNSF/UP Reply Exh. III.B reflects all the modifications described below. To avoid unnecessary confusion, diagrams are presented for each of ANR, ANR-PB and ANR-NM, despite the fact that some of the same segments appear in more than one of the scenarios.

b. Inspection/Fueling Yards

i. Guernsey Yard

Defendants accept AEPCO's location and configuration of the Guernsey Yard, and the need for it to provide staging, inspection and fueling functions. As the traffic volumes, yard functions, and track requirements on this portion of the ANR network will remain the same for the ANR-PRB scenario, the yard, as proposed by AEPCO remains the same on ANR-PRB.

ii. North Amarillo Yard

Defendants also accept the configuration of the North Amarillo Yard, and the need for inspection and fueling functions, locomotive servicing and repairs and interchange with BNSF to occur there. AEPCO's proposed location for this important yard does not replicate an existing BNSF yard location. In fact, AEPCO sites North Amarillo Yard on a .7% grade that necessitates tying handbrakes on cars that are in the yard. This .7% grade, which increases to 1.0% beyond the yard to the south, would slow down all trains coming to and from the yard, including the issue traffic. Further, there is a private grade crossing at MP 7.85, in the heart of the yard, that would have to be relocated, and there are bridges at both ends of the yard, that should be dealt

with by building culverts. While for all these reasons this site is not ideal, defendants nonetheless conclude it is workable.

AEPCO has failed to include lead tracks that ANR would need to perform work in this yard and several others. Without such tracks, the process of removing bad ordered cars or inserting repaired cars would block access from the mainline by other trains that need to be refueled and inspected, or block departure from the yard for trains that are continuing their movement. Without such tracks, switching activity at either end of the yard would interfere with access to and from other tracks. Defendants address this problem by adding a lead track at each end of the yard to allow switching activity to take place without interfering with trains entering and exiting the fueling and inspection tracks. The lead tracks should be long enough to accommodate an entire train, so that ANR can set out or insert cars near the rear of the train without impeding traffic on the mainline.

This yard is not included in either the ANR-PRB or ANR-NM scenario.

iii. Texico Yard

Defendants accept, as well, the location of the Texico Yard as proposed by AEPCO for ANR This yard is described as a facility for inspection, block-swapping and interchanging with BNSF. Aside from its role as an interchange site, it effectively performs the functions of the existing BNSF facility at Clovis, New Mexico. At Clovis, a facility larger than that proposed by AEPCO, BNSF performs extensive operations for the traffic selected for ANR.

In two respects AEPCO's yard design at Texico is inadequate. First, it shows no capacity and facilities for fueling. As AEPCO acknowledges, certain intermodal trains originate and terminate at Texico (AEPCO Opening Nar. at III-B-14 to III-B-15) and, as at Clovis, these trains need to be fueled. This will involve the addition of direct-to-locomotive ("DTL") equipment and

the construction of three tracks for fuel unloading and storage, of 2,000, 1,700 and 1,400 feet, respectively. These added tracks would be built on the top side of the yard. Second, AEPCO failed to include lead tracks that ANR would need to perform work efficiently in the yards. As explained above, adding these tracks improves the switching operations and overall flow of trains to and from the fueling and inspection tracks, and helps alleviate the congestion that would affect the mainline operations, by facilitating access for trains entering and exiting the yard. As at the North Amarillo Yard, defendants address this problem by adding a lead track at each end of the yard that is long enough to accommodate an entire train.

This yard is not included in either the ANR-PRB or ANR-NM scenario.

iv. West Vaughn Yard

Defendants accept the location of the West Vaughn Yard as proposed by AEPCO for ANR. AEPCO's decision to site this yard twelve miles west of the BNSF/UP crossing is likely due to the fact that the intervening territory is marked by grades in excess of .6%, which would impede efficient yard operations. AEPCO's chosen location includes a road crossing -- New Mexico Highway 3 -- traversing the BNSF line at the west end of the proposed yard. To avoid vehicular traffic interfering with rail traffic, an overpass must be constructed at MP 804.5.

AEPCO describes West Vaughn Yard as a facility for car inspection and locomotive fueling. AEPCO Opening Nar. at III-B-15. With respect to the latter, AEPCO's design does not provide for sufficient facilities to receive and transfer to tanks the considerable fuel volumes that must be shipped to West Vaughn, a critical issue since this yard is not located near any pipeline or other fuel source.

As AEPCO notes, the trains fueled at Vaughn "include westbound empty coal trains destined to the ANR-served New Mexico mines, and all non-coal trains moving through Vaughn

in both directions on the replicated BNSF 'Transcon' line." *Id.* In the real world, the fueling for the BNSF "Transcon" line, and the trains that AEPCO selected for its SARR, takes place at Belen. Documents produced in discovery show that the average daily fuel consumption at BNSF's Belen Yard approximated { } gallons in 2008.[4] These documents also show that during each of May, June, and October, 2008, average daily consumption exceeded { } gallons. This fuel was consumed by locomotives hauling essentially the same traffic that AEPCO has selected for ANR. In AEPCO's stand-alone world, BNSF's overhead trains do not stop at Belen. Instead, AEPCO assumed that ANR would displace the incumbent for the fueling activities now occurring at Belen, and that the fueling of BNSF's transcontinental trains would occur at Vaughn instead. Therefore, AEPCO must make provision for delivery of sufficient fuel at Vaughn so that an average of { } gallons per day is available.

There is no yard today at Vaughn and there is no available source of such fuel volumes at Vaughn. Therefore, ANR must arrange to deliver sufficient fuel to Vaughn, and it must establish the facilities at Vaughn that will enable it to dispense the fuel that BNSF dispenses today at Belen. Defendants conclude that an efficient approach for ensuring that an adequate supply of fuel is available at Vaughn is to arrange for it to be delivered from Belen, where an existing pipeline supplies BNSF with the majority of its fuel today. Defendants assume that BNSF will deliver the fuel to Vaughn in railroad tank cars. (The additional costs associated with these tank car movements are discussed below in Section III.D.1.)

In order to provide this service for ANR, BNSF would have to construct additional facilities at Belen Yard to load fuel from its existing storage tanks into the tank cars. The daily

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[4] *See* BNSF Fuel Cost Data (BNSF-AEPCO-26337).xls.

fuel shipments would average approximately { } gallons which, as discussed above, is the average daily volume of fuel required by ANR at Vaughn for fueling locomotives. Assuming a capacity of 25,000 gallons per tank car, an average of { } tank car loads per day would be required to transport the { } gallons of fuel. To accommodate these { }-car sets, the loading facilities at Belen would have to be expanded to include three tracks, totaling about 5,000 feet. Since these are costs that the incumbent does not incur today, AEPCO would be responsible for them and the costs are therefore included in this SAC evidence.

In addition, facilities to unload the fuel would have to be included at West Vaughn Yard. These unloading facilities should have the same capacity as the loading facilities at Belen Yard (*i.e.*, the capacity to unload { } tank cars). Specifically, AEPCO will have to construct three tracks for fuel unloading and storage, of 2,000, 1,700 and 1,400 feet, respectively. In addition, AEPCO has provided for at most { } gallons of fuel storage at West Vaughn Yard. BNSF's Belen Yard has storage capacity of approximately { } million gallons today. Since ANR will perform the Belen fueling functions at Vaughn, storage capacity there should be comparable. Defendants have therefore added 3,000,000 gallons of storage capacity, resulting in a total capacity of { } million gallons, a roughly ten-day supply of fuel. This would ensure an adequate supply of fuel to meet the requirements at Vaughn in the case of a short-term interruption of deliveries due to weather or other causes.

The piping and other ancillary facilities necessary to move the fuel between the tank cars, storage tanks and fueling platforms also have to be added at West Vaughn Yard. The costs for

these improvements have been included, as well, in defendants' assessment of the costs for West Vaughn Yard.[5]

As with North Amarillo Yard and Texico Yard, AEPCO has again failed to include lead tracks to facilitate yard operations, which defendants address by adding one at each end of the yard.

This yard is not included in either the ANR-PRB or ANR-NM scenario.

v. West El Paso Yard

AEPCO proposes to build an inspection and fueling yard for ANR "in southeastern New Mexico just west of El Paso." AEPCO Opening Nar. at III-B-16. According to AEPCO, all westbound non-coal trains and also eastbound non-coal trains that move to the Vaughn interchange with UP will be inspected and fueled at West El Paso Yard. AEPCO assumes that eastbound non-coal trains interchanged with UP at El Paso are delivered to UP's Dallas Street Yard and do not require inspection or fueling at El Paso. Some eastbound (empty) coal trains would be re-fueled at El Paso Yard.

AEPCO locates its West El Paso Yard on both sides of the mainline, with the mainline tracks bisecting the north and south portions of the yard. It states that the yard includes eight relay tracks where trains are inspected, one track (and associated equipment) for loading and unloading intermodal trains that originate/terminate at El Paso, tracks for repairing bad-order cars and storing repaired cars, a MOW equipment storage track, and four fueling platforms. AEPCO Opening Nar. at III-B-16; AEPCO Opening Exh. III-B-1 at 22A. AEPCO also states

[5] BNSF/UP Reply workpaper "III F Facilities.xls," Tab "Locomotive Fuel - Vaughn."

that it provides a track for ramping or de-ramping containers and trailers to or from intermodal trains, along with a parking lot for tractors and chassis. *Id.*

There are numerous problems with AEPCO's design of West El Paso Yard. First, AEPCO's evidence regarding location of the yard is internally inconsistent. Its track schematic shows the yard at milepost locations MP 1280.0 to MP 1291.45 on the Lordsburg Subdivision, an area just to the west of the Rio Grande River. The topology and track curvature in this area make it an unsuitable location at which to build a major yard. This is a very hilly area, near the edge of a cliff adjacent to the Rio Grande River.[6] In addition, this section of the line is very close to the Mexican border. One of the UP mainline tracks (which AEPCO is replicating) is approximately 500 yards from the Mexican border. This leaves little room for placement of a major yard and presents various security issues.

In its RTC model, AEPCO has placed West El Paso Yard at a different location, several miles further to the west than the location shown in the track schematic. Defendants place West El Paso Yard at a similar location, approximately 15 miles west of the Rio Grande River, around MP 1277.4 on the Lordsburg Subdivision. This location, which is relatively flat, is far better suited to the yard activities AEPCO assumes than the location that appears on its track schematic.

Second, AEPCO's configuration for West El Paso Yard is highly inefficient. Under AEPCO's operating plan, most trains that will be inspected and fueled at El Paso will be westbound trains. However, AEPCO has divided the eight inspection and fueling tracks and other operations evenly between the two sides of the mainline tracks. As a result, trains and

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[6] *See* BNSF/UP Reply workpaper "Murphy Trip Summary.doc" at page 14 (photograph of terrain).

equipment will be moving across the mainline tracks, causing delays. For example, when the two fueling stations on the north side are serving trains, an incoming westbound train will have to cross the eastbound mainline track to reach the fueling stations on the south side of the yard, delaying runthrough operations. Or, unless AEPCO locates bad order repair tracks on both the north and south portions of the yard, some bad order cars will have to be transferred across both mainline tracks for repair and perhaps transferred again after repairs are made. This design would require AEPCO to have one switch engine on each side of the mainline tracks in order to perform the described work efficiently.

Defendants have corrected this problem by redesigning the yard to place all fueling and inspection tracks and other yard activities to the south of the mainline tracks. This design permits through trains to operate on the northern mainline track (Track 1), while the other mainline track (Track 2) is used to operate trains into the yard.

Third, AEPCO has failed to include lead tracks that ANR would need to perform work in the yards. Without such tracks, the process of removing bad ordered cars or inserting repaired cars would block access by mainline trains that need to be refueled and inspected, or departure from the yard by trains that are continuing their westward movement. And without such tracks, switching activity at either end of the yard would interfere with access to and from other tracks. The lead tracks are also needed to switch the intermodal facility, which should be open 16 hours per day. Defendants address this problem by adding a lead track at each end of the yard to allow switching activity to take place without interfering with trains entering and exiting the fueling and inspection tracks. The lead tracks should be long enough to accommodate almost an entire train so that the ANR can set out or insert cars near the back of the train without blocking the mainline.

Fourth, to fuel westbound trains interchanged with UP at El Paso, eastbound manifest trains operating to Vaughn, and certain eastbound (empty) coal trains, AEPCO has located four permanent fuel racks at West El Paso Yard, two on the north side of the mainline tracks and two on the south side. AEPCO Opening Exh. III-B-1, at 22A. AEPCO's narrative states that the fueling platforms will be located at the west end of the yard, but its track schematic shows two platforms at the west end and two at the east end. *Compare* AEPCO Opening Nar. at III-B-16 *with* AEPCO Opening Exh. III-B-1 at 22A. There is no indication that AEPCO has provided for fueling of DPU rear units, which needs to be done with direct-to-locomotive ("DTL") fuel trucks, or through respotting the trains for rear engine fueling. (Use of DTL would require a fuel storage area, which is not included on AEPCO's track schematic.) AEPCO Opening Exh. III-B-1 at 22A.

With just two fuel racks on the north side of the yard, ANR will be unable to fuel all westbound trains without causing significant delays to mainline operations. Each ANR fuel rack can fuel only two westbound trains at one time. According to AEPCO's dwell time assumptions, those trains will remain on the tracks served by the racks for an average of 3.0 hours while they are inspected by yard forces, bad-ordered cars are removed, etc. This will prevent other westbound trains from proceeding onto the same tracks for inspection and fueling. As noted above, these other trains will have to move to the fuel racks on the south side of the yard.

This will not be an isolated occurrence. The problem is that westbound trains will not arrive in West El Paso Yard at an even pace. Each day an average of 20 westbound trains that require fueling and inspection will arrive at the yard. Those trains will likely arrive in bunches, not evenly spaced. Such surges will occur for various reasons, for example, due to engineer curfews affecting trains arriving from UP. If the fuel tracks on the north side of the yard are full

when additional westbound trains arrive, the new trains will either have to wait until the next track is available or cross over to the south side tracks, a process that lengthens the dwell and reduces mainline capacity. Such movements would delay eastbound run-through trains. In addition, there are approximately ten eastbound Vaughn trains needing fueling and inspection at West El Paso Yard each day, and these trains would encounter similar delays. This would create a significant bottleneck at this yard.

Apart from the inefficiencies of locating the fuel racks on both sides of the mainline tracks, defendants believe AEPCO has provided too few fuel racks. In view of the volume of trains moving through West El Paso Yard, and in the absence of the use of DTL fueling, there should be at least eight fuel racks, four at the east end of the yard and four at the west end of the yard. Defendants have provided for the additional fuel racks.

Fifth, AEPCO fails to specify the fuel supply arrangements for West El Paso Yard. There is no fuel pipeline at the yard location 15 miles west of El Paso. (There is no yard at this location today.) Thus, ANR would have to arrange for construction of a pipeline into the yard, or arrange to bring fuel to the yard from El Paso via tank car.

Defendants estimate that the ANR trains that would require fueling at West El Paso Yard would use approximately 50 million gallons of fuel annually. Defendants assume that this fuel would be delivered to West El Paso Yard by rail in tank cars, from a pipeline at UP's Dallas Street Yard in El Paso. (The additional costs associated with these tank car movements are discussed below in Section III.D.1.)

In order to provide this service for ANR, UP would have to construct additional facilities at its Dallas Street Yard to load fuel from its existing storage tanks into the tank cars. The daily fuel shipments would average approximately { } gallons, which is the average daily

volume of fuel required by ANR at West El Paso Yard for fueling locomotives. Assuming a capacity of 25,000 gallons per tank car, five to six tank car loads per day would be required to transport the fuel. One set of equipment would load at Dallas Street Yard while the other was unloading at West El Paso Yard. To accommodate the car sets, the loading facilities at Dallas Street Yard would have to be expanded. Since these are costs that the incumbent does not incur today, AEPCO would be responsible for them, and the costs are therefore included in this SAC evidence.

In addition, facilities to unload the fuel would have to be included at West El Paso Yard. These unloading facilities should have the capacity to unload six tank cars. Specifically, AEPCO will have to construct two 200-foot tracks for fuel unloading and storage. AEPCO has provided for at most 800,000 gallons of fuel storage at its proposed West El Paso Yard. This represents approximately {six days'} fueling requirement, which would be inadequate. By adding four fuel racks, as described above, defendants have increased the fuel storage at West El Paso Yard to 1.4 million gallons, equal to approximately a ten-day supply of fuel. (The same ten-day assumption of fuel storage needs was utilized at West Vaughn). This would ensure an adequate supply of fuel to meet the requirements at West El Paso Yard in the case of a short-term interruption of deliveries due to weather or other causes.

The piping and other ancillary facilities necessary to move the fuel between the tank cars, storage tanks and fueling platforms also must be added at West El Paso Yard. The costs for these facilities have been included in defendants' assessment of the costs for West El Paso Yard.

Sixth, while AEPCO's narrative refers to tracks for repair of bad-ordered cars at West El Paso Yard (AEPCO Opening Nar. at III-B-16), AEPCO has not provided a facility for this work. AEPCO Opening Exh. III-B-1 at 22A. ANR will need to be able to make basic repairs so

that cars will be in compliance with federal regulations governing car repair and safety appliances. The West El Paso Yard therefore needs a repair track, so that ANR's contractors could make minor repairs. Defendants have provided for such a track.

Seventh, AEPCO has not provided for any capability to perform federally-mandated 92-day inspections on locomotives at West El Paso Yard. AEPCO assumes that all ANR locomotives will be cycled through its North Amarillo locomotive shop for all purposes. However, locomotives arriving at West El Paso Yard may need inspection sooner than the time required to move the 470 miles to North Amarillo. Moreover, AEPCO has not provided for any dwell time in West El Paso Yard for its empty coal trains or the two trains that originate at El Paso, which would be necessary if power were to be swapped to facilitate inspections at North Amarillo.[7] It would be far more efficient to perform these inspections at El Paso. Defendants have added a locomotive inspection pit on one track in West El Paso Yard to perform the required activity.

Eighth, AEPCO's traffic group includes a substantial amount of intermodal traffic that originates or terminates at El Paso. Originating traffic includes one train per day headed for Long Beach and one train per day headed toward Vaughn; on average, one train per day terminates at El Paso. UP handles this local intermodal traffic at its Alfalfa Yard, to the east of El Paso. AEPCO states that the West El Paso Yard will contain a track for ramping/deramping containers and trailers to/from intermodal trains, and a parking lot for tractors and chassis.

[7] Even with a locomotive inspection pit at El Paso, the ANR locomotives will still need to be shuttled to North Amarillo for most maintenance and repair work. AEPCO's calculations of cycle times do not take this into account.

However, AEPCO's narrative provides no detail about these facilities, and its track schematic does not show any intermodal facilities.

Defendants agree that any local intermodal traffic would be handled at West El Paso Yard. (There appears to be no feasible location for an intermodal yard on ANR east of the Rio Grande River.) This would require customers to transport their containers and trailers to or from the yard location, approximately 15 miles west of the Rio Grande River. At the West El Paso Yard, defendants have provided for two intermodal gates at the east and west ends of the yard for entry and exit of trucks, an intermodal ramp, and five acres of parking space for trailers, containers and chassis. Defendants believe that one track would be insufficient to provide an efficient loading/unloading operation for the volume of local El Paso intermodal traffic in AEPCO's traffic group. They therefore have provided for two intermodal tracks, as well as an adjacent run-around track. The tracks are spaced so as to allow room for the cranes used for loading and unloading. In view of the proximity to the Mexican border, the yard will need a robust security system in place.

Ninth, because El Paso is a crew change point and a home base for crews, it should have a crew facility and office space for crew management. In addition, there should be a building for car department personnel. AEPCO's track schematic does not show such facilities. Defendants have provided for a small crew building and a small car department building.

For ANR-PRB, defendants provide for the same West El Paso Yard at the same location as they provide for ANR. ANR-NM does not extend to El Paso, so there is no similar yard for that SARR.

c. Interchange Yards

Of the interchange yards proposed for ANR, defendants accept both the location and configuration of those at Pueblo, Las Animas, West Amarillo, Belen and Dalies. Differences for the remaining ANR interchanges are discussed next, both in the context of ANR and any modifications to those yards in the ANR-PRB and ANR-NM scenarios. Also discussed is the new Stratford interchange, as located and configured for ANR-PRB, and the new Rincon and Deming interchanges, as located and configured for ANR-NM.

i. Mossmain Interchange

Because of the MRL-related changes noted above, a new 8,000 foot interchange track should be constructed at Mossmain, at mileposts 8.3 to 9.8. This track would allow the SARR to interchange with BNSF loaded and empty non-issue traffic moving from and to Signal Peak Mine.

ii. Huntley Interchange

As also discussed above in the context of the MRL, in lieu of an interchange track at Laurel, two 8,000 foot interchange tracks should be constructed at Huntley, at mileposts 826.6 to 829.15. These tracks would allow the SARR to interchange traffic to BNSF, before the traffic moves on the MRL. This BNSF traffic then heads due west, towards Laurel and Bozeman, Montana or northwest towards Great Falls, Montana, two different BNSF routes. Defendants note that AEPCO failed to build any tracks at Laurel, despite its inclusion of train shipments to and from Laurel.[8]

iii. Moran Jct. Interchange

[8] AEPCO also failed to include any payments for ANR's use of Laurel Yard, payments BNSF makes to MRL in the real world, as explained in discovery materials produced to AEPCO. *See* Letter of September 18, 2009 from Brooke Gaede to AEPCO Counsel.

As a final consequence of the changes noted in the MRL discussion above, in lieu of an interchange track at Jones Jct., two 8,000 foot interchange tracks should be constructed at Moran Jct, at mileposts 823.15 to 824.95. These tracks would allow the SARR to interchange traffic to BNSF that is headed east, towards Jones Jct. and destinations such as Chicago and Minneapolis.

iv. Donkey Creek Yard

Defendants accept AEPCO's location and configuration of Donkey Creek as an interchange yard. However, the yard needs to be expanded to perform inspection and fueling functions as well. This is because a number of the trains AEPCO selected follow routes that do not traverse any of the five ANR fueling/inspection facilities. In the real world, BNSF performs these functions at Donkey Creek. In order to accomplish these necessary tasks on ANR, the interchange at Donkey Creek would need to be modified by constructing (1) one additional track that is long enough to hold an entire coal train (including locomotives) without blocking the yard lead, and (2) a set-out track of at least a 1,000 feet to place and repair the bad order cars that come out of inspection. There would need to be 25-foot track centers for any tracks adjacent to the identified Inspection/Fueling track to allow car inspectors to drive their inspection vehicles alongside the train during the inspection process. The 25-foot track centers allow, as well, room for the fuel trucks that would be used for DTL fueling to pull up alongside of the locomotives on each end of the train. Access roads at each end of the inspection track are also required to allow the DTL fuel trucks access to the track. Additionally support staff such as carmen would need to be located at Donkey Creek to perform the FRA-mandated inspections of these trains. This, in turn, would require the building of a small office/restroom facility. Vehicles for car inspection would also be required.

v. Wendover Interchange

Defendants accept the location of the Wendover interchange as proposed by AEPCO for ANR. In terms of configuration, defendants have added a connection track (wye) to allow locomotives that are decoupled from coal trains to travel to Guernsey for periodic servicing by BNSF. AEPCO configured ANR with only one connection at Wendover, and that connection is in the wrong direction for the trip to Guernsey; put another way, without the addition of the connection track, these locomotives would unnecessarily block mainline traffic.

vi. Northport Interchange

Defendants also accept the location of the Northport interchange as proposed by AEPCO for ANR. In terms of configuration, defendants have added a short set out track for BNSF helper locomotives, when they are not helping to push trains en route to Alliance. Defendants also added another interchange track to deal with the fact that, on a regular basis, both loaded and empty UP trains must be handled at Northport simultaneously.

vii. Sterling Interchange

There is some confusion with respect to the Sterling interchange as well. While the stick diagram at page 12 of AEPCO's Exhibit III-B-1 shows an interchange at milepost 115, AEPCO's RTC model does not show this as an active interchange. In this instance, defendants have accepted AEPCO's stick diagram location. An interchange at Sterling is necessary to handle interchange traffic with the Nebraska Central Railroad, as well as to effectuate crew changes for the coal trains. In order to accomplish the latter, the lead track at the west end of the yard, identified as "TO NKCR," would need to be connected back to the main line.

viii. Brush Interchange

Defendants accept the location of the Brush interchange as proposed by AEPCO for ANR. In terms of configuration, defendants eliminated one of the designated tracks, because some of the coal trains AEPCO indicated would be interchanged at Brush would actually be interchanged at Northport.

ix. Denver Interchange

There is, once more, some confusion with respect to the configuration of the Denver interchange. While the stick diagram at page 13 of AEPCO's Opening Exhibit III-B-1 shows two tracks between mileposts 1.95 to 3.55, AEPCO's RTC model does not show these tracks as being "in service." In this instance, defendants have accepted AEPCO's stick diagram. Moreover, at the second Denver interchange, depicted at page 12 of Exhibit III-B-1 between mileposts 539.67 and 541.20, defendants included an additional track because one of the proposed tracks would be occupied most of the time by parts of the train serving the Arapahoe Power Plant, thereby reducing the number of interchange tracks that are available for other traffic.

x. Pueblo Interchange

Defendants accept the location and configuration of the Pueblo interchange as proposed by AEPCO for ANR. However, in the ANR-PRB scenario, Pueblo would become a major interchange, handing off loaded trains to and receiving empty trains from both BNSF and UP. Given the increased volume of activity, defendants have added six 8000-foot interchange tracks.

xi. Stratford Interchange

Stratford, Texas, is not an interchange point on ANR, so no facilities are needed there for ANR. However, on ANR-PRB, PRB coal moves from Pueblo, Colorado, to Stratford, then moves southwest on a line that replicates a portion of UP's Tucumcari line. Therefore, ANR-

PRB would interchange with UP at Stratford and thus would need to build an interchange yard there. Defendants have located the Stratford interchange yard west of the grade crossing of the UP and BNSF lines, to the north of the east-west mainline tracks. The yard would need enough capacity to interchange 13 to 15 trains per day. In order to accommodate surges (bunching of the trains arriving from UP), the yard should have four 10,000-foot tracks. The interchange yard would require a small building (approximately 2700 square feet) for crews to pick up their paperwork.

The ANR-PRB crews would either dead head to their home base at Pueblo or Vaughn, turn on available trains, or tie up for rest at Stratford, depending on availability of trains. UP crews (which would have their home terminal at Pratt, Kansas) would need lodging at Stratford in almost all cases. It would not be economic to construct a crew lodging facility at Stratford, so both ANR-PRB and UP crews would stay at a motel in Stratford.

xii. East Vaughn Interchange

For ANR, East Vaughn is the location where loaded trains carrying the issue traffic from New Mexico mines move off the line that replicates part of the BNSF Transcon route and onto the line that replicates part of UP's Tucumcari line to El Paso. In the opposite direction, empty trains headed back to the New Mexico mines move from the line replicating the Tucumcari line and enter the track replicating the BNSF Transcon line, headed west toward the mines. In the real world, trains do not make such movements at Vaughn. However, AEPCO has re-routed the trains that ordinarily head south at Belen, taking them on a 232 mile detour, thus requiring the movement from one major route to the other.

AEPCO states that it will build a connection in the southwest quadrant of the crossing of the Vaughn-El Paso line and the Transcon line. AEPCO assumes that traffic headed northeast

from El Paso and east at Vaughn moves onto the Transcon line by means of a connection in the northeast quadrant.

ANR would interchange traffic with UP at East Vaughn, and thus would need to build an interchange yard at that location. AEPCO's track schematic is unclear on the location of interchange tracks in the East Vaughn area. AEPCO's RTC model shows four interchange tracks adjacent to the connection it constructs in the northeast quadrant.

Defendants believe it would be preferable to site the interchange yard at the current location of UP's yard at Vaughn. The yard would need enough capacity to interchange 13 to 15 trains per day. In order to accommodate surges (bunching of the trains arriving from UP), the yard should have four 10,000-foot tracks. The interchange yard would require a small building (approximately 2700 square feet) for crews to pick up their paperwork. The ANR crews would have their home terminal at Vaughn; thus, a crew lodging facility would not be needed at East Vaughn.

For ANR-PRB, traffic moves through Vaughn, but none of it moves to or from a line that replicates BNSF's Transcon at that point. Thus, there is no need for connections or an interchange yard at East Vaughn. For ANR-NM, traffic does not move to or through Vaughn, so no connection or interchange yard is needed there. The issue traffic (and coal trains bound for Tucson Electric) move via Belen and Deming, as they do in the real world.

xiii. Defiance Interchange

According to the stick diagram at page 20 of AEPCO's Exhibit III-B-1, Defiance is sited between mileposts 166.2 and 167.8. Defendants do not accept the quantity or length of the tracks proposed and, consequently, do not accept the location of this yard. More specifically, AEPCO's two track design is insufficient and the tracks proposed are too short. As a result,

ANR would not be able to handle the volume of traffic interchanged on a daily basis without delaying time sensitive intermodal trains and negatively impacting the operation of other traffic as well. Defendants therefore add four interchange tracks, assuming the two main lines are also used for interchange. These tracks would need to be 10,000 feet long, given the size of some of the intermodal trains run on this territory. Because there is not enough room between the mileposts designated by AEPCO to both add and lengthen tracks, the Defiance interchange must be relocated between mileposts 163.46 and 167.5. (Further, as part of the track reconfiguration, mainline crossovers are strategically placed to permit access from any main track to any yard track regardless of train direction.)

In addition, for coal trains moving west from the mines at Lee Ranch and El Segundo, DTL fueling must also take place at Defiance. This modification is required to accomplish the function performed in the real world by the BNSF at its yard at Gallup, New Mexico. As with Donkey Creek, there would need to be 25-foot track centers for any tracks adjacent to the fueling track to allow room for fuel trucks to pull up alongside of the locomotives on each end of the train. Access roads at each end of the fueling tracks are also required to allow the DTL fuel trucks access to the track.

xiv. Belen Interchange

Defendants accept AEPCO's location and configuration of the Belen interchange for ANR. As noted previously, this yard will also handle the switching of local traffic.

However, in the ANR-NM scenario, the functions of this facility are expanded, because the West Vaughan Yard ceases to exist as a facility for 1,500-mile and 1,000-mile car inspections and locomotive fueling. The expanded Belen Yard, performing these two operations, is located on the site of the current BNSF yard, which performs these operations in the real

world. Defendants provide that ANR-NM will handle only the fueling and inspecting for all westbound BNSF traffic ANR-NM carries, and that BNSF will handle the fueling and inspecting for all eastbound BNSF traffic ANR-NM carries. In effect, in the ANR-NM scenario, defendants are replicating half of the functionality assumed for ANR at Vaughn, providing for the construction of nine tracks, fueling facilities and 25-foot track centers to allow for inspections. Because Belen is sited near a fuel pipeline, there is no need to add the fuel unloading and staging tracks or ancillary facilities that were necessary when fueling was performed at West Vaughn Yard.

xv. Rincon Interchange

For ANR, there is no interchange in Rincon, New Mexico, and thus no need for a yard at that location. However, for ANR-NM, there is a need for two 8,000 foot interchange tracks.

xvi. Deming Interchange

For ANR, there is also no interchange at Deming, New Mexico, and thus no need for a yard at that location. However, for ANR-PRB, the trains carrying the New Mexico issue traffic would operate into Deming on SWRR, just as they do in the real world. And this will require the construction of interchange tracks for exchanging traffic with SWRR. For ANR-NM, Deming will be the location at which ANR will receive westbound UP trains and hand off eastbound trains to UP. ANR-NM will also interchange the New Mexico issue traffic with SWRR at Deming. Thus, for ANR-NM, it will be necessary to construct interchange tracks at Deming, as well. Because of the large volume of interchange traffic in ANR-NM, the facility for this scenario will be larger than that for ANR-PRB.

Defendants provide four interchange tracks to the north of the mainline tracks and parallel to them, between MP 1207 and MP 1209. Defendants construct the yard all on one side

of the mainline for a more efficient operation. (Interstate 10 is within 100 yards of mainline Track 2 at this location, so the yard must be constructed on the north side.) Crossovers, signaling, and power switches would be installed at Deming, similar to those described below for Cochise.

The interchange yard at Deming would require a small building (approximately 2700 square feet) for the crews to pick up their paperwork. Because ANR-NM crews have their home base at Deming, no separate crew lodging facility is needed for this location.

Location of an interchange at Deming will impose extra crew costs on UP. UP crews dropping off and boarding trains at Deming would operate from their El Paso home terminal, about 100 rail miles from Deming. UP crews would either dead head home to El Paso, turn on available eastbound trains, or tie up for rest at Deming, depending on availability of trains.

xvii. Cochise Interchange

Cochise (Apache), Arizona, is the west end of ANR, at MP 1063.1. While AEPCO assumes that ANR will interchange an average of 40 trains per day with UP at Cochise, it has not provided for the facilities needed to support such an interchange. AEPCO's evidence on this point is inconsistent. Its track schematic shows a single track mainline and two yard tracks at Cochise. AEPCO Opening Exh. III-B-1 at 22. AEPCO's RTC model, however, shows a double-track mainline and four yard tracks, two on each side of the mainline tracks.

Defendants agree that four interchange yard tracks would be needed to accommodate an interchange between ANR and UP at Cochise. Splitting the yard between the two sides of the mainline is less efficient, due to impacts on mainline operations, and it might be infeasible. The single road leading to the Cochise Stronghold Recreational Area is parallel to and just 100 yards north of the mainline tracks. (The road and the recreation area have historical significance.)

However, defendants accept AEPCO's configuration for purposes of their RTC model. Each of the four tracks should be 10,000 feet long. In addition, two universal cross-overs should be constructed to the east and west (at MP 1065 and MP 1049), with a minimum of #20 turn outs for the yard switches.[9]

The west entrance to the yard tracks would require construction of an interlocker and signaling, in order to facilitate the handoff between the ANR dispatchers and UP's Harriman Dispatch Center. Trains would enter and leave under signal indication at 20 mph. Power switches should be installed in order to avoid delays on the mainline tracks that would result if switches had to be set manually.

The yard would also require a small building (approximately 2700 square feet) for the crews to pick up their paperwork. In addition, since crews would need to be ready to board eastbound trains as soon as UP delivers them, some sort of crew lodging facility would be needed.[10] (The home base for ANR crews in this district is El Paso, approximately 237 rail miles to the east.) The Cochise area is remote, with no restaurants or other accommodations. Thus, if crews were lodged at Cochise, it would be necessary to provide for a lodging facility with a 24-hour restaurant. The alternative to constructing a crew lodging facility and restaurant at Cochise would be to transport crews to the town of Willcox (approximately 12 miles away) and pay for motel rooms. This arrangement would require upgrading a portion of the road between Cochise

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[9] One of the cross-overs would be on UP's tracks. ANR would be responsible for the cost of constructing this cross-over, as well as the cross-over on its own tracks.

[10] Crew lodging would be needed because AEPCO assumes that there would be no delay in crew availability when trains arrive. *See* AEPCO Opening Nar. at III-C-29, III-C-34. Most ANR crews arriving at Cochise could not simply turn around and serve as crew on trains interchanged from UP, since they must comply with the hours of service law. In addition, timing of arrival of the UP trains would be unpredictable. Moreover, ANR has more westbound trains than eastbound trains, so extra crews would need to be available at Cochise.

and Willcox at ANR's expense. The six-mile stretch between Cochise and Highway 197 is currently a dirt road, which would become impassable during the rainy season.

AEPCO's decision to locate the west end of ANR at Cochise will saddle UP with additional crew costs. UP would have to taxi its crews between Cochise and their home base at Tucson, Arizona, and it would need to construct a small crew building at Cochise. (It is unlikely that unionized UP crew personnel would be willing to share a crew building with the non-unionized ANR crews.)

The volume of traffic interchanged by ANR and UP at Cochise would be similar for ANR, ANR-PRB, and ANR-NM. The track and facilities needed at Cochise would therefore be the same for ANR-PRB and ANR-NM as for ANR.

d. Miles and Weight of Yard Track

Defendants accept the use of 136-pound relay CWR for the ANR yards, and use the same track weight in their ANR-PRB and ANR-NM alternatives. With respect to yard track mileage, for the reasons set forth above in the discussion of the North Amarillo, West Vaughn, Texico, and the West El Paso yards and certain interchange yards, there are additional track miles required. In the Reply ANR, there are 234.39 miles of yard track. In the ANR-PRB scenario, there are 139.01?? miles of yard track. And in the ANR-NM scenario, there are ??25.02 miles of yard track.

4. Other

a. Joint Facilities

Defendants agree that ANR can make use of trackage rights over MRL, paying MRL on the same basis that BNSF does under its trackage rights agreement with MRL. As noted previously, the end points of that route are Huntley and Mossmain.

In the ANR-PRB scenario, defendants propose that ANR-PRB make use, as UP does, of the BNSF line from Pueblo to Stratford, paying BNSF on the same basis that UP does under its trackage rights agreement with BNSF. In the ANR-NM scenario, defendants propose that ANR-NM make use of SWRR on the same basis that BNSF does, to handle traffic between Rincon and Deming.

b. Signal/Communications System

Defendants do not take issue with the signal/communications system, as described in AEPCO's narrative. However, AEPCO failed to signal some track correctly in its RTC model, and defendants have revised the model to confirm with AEPCO's description. As discussed at III-???, if one-man crews are being used, the yards and switch locomotives must be equipped with power switches and other sophisticated technology so the crews can perform their tasks efficiently.

In the ANR-PRB scenario, because ANR-PRB operates under trackage rights on the BNSF segment from Pueblo to Stratford, it will not be responsible for equipping that portion of the line with CTC. Defendants supply CTC on the segment from Stratford to Vaughn.

In the ANR-NM scenario, because ANR-NM operates on the SWRR segment from Rincon to Deming, it will not be responsible for equipping that portion of the line with CTC. Because the Belen to Rincon segment has relatively low density, there is no need to equip this portion of the line with CTC.

c. Turnouts, FEDs and AEI Scanners

Defendants accept AEPCO's specifications for turnouts and AEI scanners. As described previously, defendants' only issue with the FEDs is the need for additional detectors on the Orin line, to provide adequate protection for such a high volume traffic area.

III. C. STAND-ALONE RAILROAD OPERATING PLAN

AEPCO designed ANR to transport a volume and mix of traffic that is unprecedented in recent SAC cases. ANR carries the issue traffic from two mine origins in New Mexico and several mine origins in the Powder River Basin of Wyoming and Montana to AEPCO's Apache Station. It also handles much larger volumes of non-issue coal, some of which moves in local service to other power plants located on the SARR, and some of which is interchanged with the residual BNSF or UP.[1]

In addition, AEPCO handles a tremendous volume of non-coal traffic. Virtually all of this non-coal traffic is overhead traffic that both originates and terminates off-SARR. This intermodal and general freight traffic moves on portions of the BNSF and UP transcontinental lines that AEPCO has carved out and chosen to replicate for its SARR. AEPCO has positioned ANR to act as a bridge carrier for these long-haul moves. The only non-coal, non-overhead traffic on ANR is a modest amount of intermodal traffic that ANR originates or terminates at El Paso, Texas, as does the real-world UP.[2]

AEPCO states that ANR will interchange most of its traffic with other carriers, primarily BNSF or UP, at 24 interchange points. AEPCO Opening Nar. at III-C-5. AEPCO assumes all of the crossover traffic is handled in overhead service, without intermediate switching, with one exception.[3] However, the ANR operating plan fails to take into account that some of the trains

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[1] In addition, AEPCO provides for an ANR interchange with NKCR at Sterling, Colorado. AEPCO Opening Nar. Table III-B-1.

[2] AEPCO describes these El Paso intermodal originations and terminations as BNSF traffic (AEPCO Opening Nar. at III-A-4), but that is incorrect.

[3] AEPCO Opening Nar. at III-C-3 to III-C-4. AEPCO acknowledges that there would be some block swapping of intermodal cars at ANR's Texico Yard (*id.* at II-C-3 n.2), but fails to account properly for that activity, as described in Section III.C.2.c.vii.

AEPCO selected to handle its traffic group pick-up and set-out cars at points along the SARR route for delivery to local customers. In particular, the BNSF trains AEPCO takes include some cars that BNSF removes at Belen and moves to various customers in the southwest. Defendants have modified the ANR operating plan to include the resources and additional transit time needed to pick-up or set-out these local cars.

As discussed above in Section I, the ANR operating plan departs from the real-world routing of AEPCO's coal traffic in several significant ways. First, as in *AEPCO I*, rather than route New Mexico traffic over the north-south line from Belen to Deming, ANR carries this traffic east to Vaughn, then south to El Paso and west to Deming, adding 232 miles to the existing route. Second, rather than moving the PRB coal from Pueblo to Stratford, then to Vaughn over a route that follows UP's Tucumcari line, AEPCO routes this traffic from Pueblo through Las Animas, Amarillo, and Texico, carrying these coal trains on a line that replicates the BNSF Transcon line to reach Vaughn. This reroute adds 91 miles to the existing route. In addition to being longer and less efficient than the existing routes, both of these reroutes depart from the interchange points BNSF and UP have agreed on for movement of the issue traffic.

As discussed above, AEPCO is not free to disregard the interchange points BNSF and UP use to carry the issue traffic. Moreover, in creating a SARR that combines routes for the New Mexico coal traffic and the PRB coal traffic, AEPCO has violated the Board's earlier directive (in *AEPCO I*) that sub-SARRs must be developed in order to analyze properly the rates for these two groups of traffic. The combination of routes for the New Mexico coal and the PRB coal results in a cross-subsidy between different portions of ANR that renders AEPCO's SAC results unusable. Defendants therefore not only address the operating plan for AEPCO's ANR, but also develop operating plans for two sub-SARRs – one to evaluate the challenged rates for shipments

from New Mexico mines (ANR-NM) and one for the challenged PRB rates (ANR-PRB). These sub-SARRs maintain the interchange points agreed upon by BNSF and UP for the issue traffic.

Table III.B.1 above identifies the segments and corresponding route miles for ANR, ANR-NM, and ANR-PRB. Table III.C.1 below shows peak-year traffic volumes (cars/containers) separately for ANR, ANR-NM, and ANR-PRB. For all three railroads, the traffic group consists of coal, intermodal, and general freight traffic. However, the traffic mix for the three railroads differs, depending on the traffic carried on the lines replicated for each SARR.

Table III.C.1
ANR 2018 Traffic Volume in Carloads/Containers

	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Coal				
Local	106,787	163,299	223,241	11,111
Forwarded	1,239,453	1,072,113	953,014	66,277
Received	2,374	431	0	2,030
Overhead	13,277	9,353	0	45,639
Total Coal	**1,361,891**	**1,245,195**	**1,176,255**	**125,057**
Intermodal				
Local O or T	99,663	82,374	82,392	0
Overhead	5,763,207	5,456,753	1,795,651	5,518,556
Total Intermodal	**5,862,870**	**5,539,127**	**1,878,043**	**5,518,556**
General Freight				
Overhead	**737,507**	**453,019**	**242,540**	**397,739**
Grand Total	**7,962,268**	**7,237,341**	**3,296,838**	**6,041,352**

Source: BNSF/UP Reply workpaper "Exhibit III-A-2 Reply.xlsx."

In analyzing AEPCO's operating plan for ANR and developing operating plans for ANR-PRB and ANR-NM, defendants relied on several experts who are highly familiar with the routes at issue.

Mark Kotter was a long-time BNSF employee. From 1996 until March 2008, the positions he held included Assistant Vice President – Network Operations, Assistant Vice President – Coal Operations, Vice President – North Operations, and Vice President – Central Region Operations. In all of these capacities his responsibilities included the oversight of coal movements from the PRB to numerous destinations. In the role of Vice President – Central Region Operations Mr. Kotter was responsible for the territory from Gillette, Wyoming, to Lincoln, Nebraska, and from Gillette through Guernsey, Denver, Amarillo, Houston, and New Orleans, including lines AEPCO replicated for its SARR. In the role of Assistant Vice President – Network Operations he was responsible for oversight of the BNSF dispatching center in Fort Worth, Texas.

Thomas Murphy was a long-time employee of UP and the Chicago and North Western Railway Company. From 1999 to 2009, Mr. Murphy held the position of Assistant Vice President for UP's Western Region. His responsibilities in that position included the territory between Herington, Kansas, and El Paso, Texas, and between El Paso and Los Angeles, which includes all the UP lines AEPCO has replicated for ANR. Prior to that, Mr. Murphy served for approximately 18 months as the General Manager of UP's Harriman Dispatch Center.

David Wheeler, President of Rail Network Analytics, held a number of positions with UP before starting his own business. Among other positions, Mr. Wheeler served as UP's General Director, Capacity Planning and Analysis. He also led teams within UP's Finance, Network and Capital Planning, and Network Design and Integration Departments. Messrs. Kotter and Murphy worked with Mr. Wheeler to identify the operating requirements for ANR and for ANR-NM and ANR-PRB, so that Mr. Wheeler could perform an accurate simulation of peak-period operations for these three SARRs using the Rail Traffic Controller ("RTC") model.

1. General Parameters

In the sections below, defendants analyze, and in some cases revise, the parameters AEPCO developed for ANR. Defendants also provide parameters for ANR-PRB and ANR-NM. Analysis and data for the SARR and each sub-SARR are presented under each section.

In its introduction to discussion of general parameters, AEPCO asserts that most trains ANR interchanges with other railroads are run-through trains and that locomotive power stays with the train at interchange points. AEPCO Opening Nar. at III-C-3. AEPCO has overlooked the fact that, in the real world, at points along the route ANR uses, locomotives are added to some of the trains it has chosen for its traffic group. Defendants address this issue below in the discussion of locomotive consists.

AEPCO also asserts that the run-through trains are transported intact, with no classification or switching activities performed at interchange points (except for block swapping of intermodal cars at Texico and occasional switching of bad-order/repaired cars). *Id.* at III-C-3 to III-C-4 & n.2. In fact, as noted above, some of the trains AEPCO identified for its traffic group carry local cars that in the real world are set-out or picked up along the SARR route for delivery to customers. Defendants have revised the ANR operating plan to add the facilities and activities required to switch out such cars at Belen, allowing them to be delivered by BNSF to their final destinations.

a. Traffic Flow and Interchange Points

AEPCO used traffic data for the second quarter of 2008 through the first quarter of 2009 to select traffic for its SARR, and then attempted to adjust the volumes to reflect full-year 2009 levels. As explained in Section III.A above, defendants used actual full-year 2009 traffic data to determine 2009 traffic volume levels. In a few cases, use of actual 2009 data resulted in removing from the traffic group shipments that occurred only in 2008. For the most part,

however, there was no impact on traffic flows (or interchange points). As discussed above, defendants followed AEPCO's practice of taking traffic carried in UP or BNSF trains that travel on the routes replicated by ANR. Where trains chosen for the traffic group include local cars that the real-world BNSF sets out at Belen, defendants have provided the necessary facilities to set out these cars at Belen for pick-up by the BNSF.

As explained in Section III.A. above, AEPCO included in its SARR traffic group shipments that would share no SARR-constructed facilities with the traffic at issue in the case. Defendants have excluded such shipments from the ANR traffic group. AEPCO also improperly extended the haul for many shipments over MRL that ANR interchanges with the residual BNSF. For that cross-over traffic, defendants move the location of the interchange between ANR and the residual BNSF to an earlier point, at the end of the ANR-constructed facilities. Thus, defendants provide that ANR traffic that AEPCO assumes would move to/from Laurel or Mossmain in fact will be interchanged with the residual BNSF at Huntley; in addition, defendants provide that the cross-over coal traffic from Signal Peak that AEPCO assumes will move over ANR and MRL lines to Jones Jct. will be interchanged to the residual BNSF at Mossmain, where the ANR facilities used by this traffic end.

Because ANR-PRB and ANR-NM cover some routes different from those of ANR, there are differences in the traffic group for each SARR. Exhibit III.C-1 shows the trains included for each of the three SARRs Mr. Wheeler modeled. Table III.C.2 below shows traffic density by line segment in the peak year for ANR, ANR-PRB, and ANR-NM.

Table III.C.2
ANR 2018 Traffic Density By Line Segment[4]

Line Segment	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Walter Jct. to Mossmain	12.0	12.3	12.3	0
Laurel to Jones Jct.[5]	55.5	1.1	1.1	0
Jones Jct. to Dutch	83.5	68.7	68.7	0
Dutch to Campbell	56.9	46.2	46.2	0
Campbell to Donkey Creek	94.2	78.5	78.5	0
Donkey Creek to Orin Jct.	131.3	140.3	140.3	0
Orin Jct. to Northport	125.2	109.0	109.0	0
Northport to Denver	77.4	68.3	68.3	0
Denver to Pueblo	73.9	64.0	64.0	0
Pueblo to Amarillo	69.2	61.5	0	0
Pueblo to Stratford[6]	N/A	0	1.2	0
Amarillo to Texico	165.7	132.7	0	0
Texico to Vaughn	177.7	143.8	0	0
Vaughn to Baca[7]	178.9	143.2	0	143.2
Baca to Defiance	189.0	155.3	0	155.3
Belen to Rincon	N/A	0	0	6.6
Stratford to Vaughn	N/A	32.0	32.0	0
Vaughn to El Paso	40.3	32.0	32.0	0
El Paso to Cochise[8]	112.6	87.8	87.8	87.8

Source: BNSF/UP Reply workpaper "ANR Service Units RR Reply.xlsx."

ANR – For the purpose of analyzing AEPCO's SARR, defendants accept most of AEPCO's description of the ANR traffic flows. AEPCO's description of traffic flows at El Paso appears incorrect in certain respects, which defendants address below.

AEPCO identifies 24 interchange locations for ANR in its Table III-B-1. Defendants accept most of these interchange locations. As described above, defendants changed the location

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[4] Table III.C.2 shows maximum tonnage moving over any part of the line segment.

[5] This segment involves use of trackage rights over MRL.

[6] This segment involves use of trackage rights over BNSF.

[7] This segment includes only from Belen to Baca for ANR-NM.

[8] This segment includes only from Deming to Cochise for ANR-NM.

of ANR's interchange with the residual BNSF for certain traffic that moves over MRL. In addition, AEPCO states that ANR will interchange cars with FXE at El Paso. AEPCO Opening Nar. at Table III-B-1. {

} Exclusion of this movement eliminates one interchange point, along with the facilities and resources associated with that interchange. Also, AEPCO identified Pueblo as the location of an ANR interchange with the residual UP, but did not interchange any traffic there in its analysis.

ANR-PRB – The sub-SARR referred to as ANR-PRB would carry coal traffic from all of the PRB mine origins AEPCO chose to serve on its SARR. ANR-PRB would deliver some of this traffic to power plants AEPCO included on its SARR and would interchange the rest to the residual BNSF or UP. North of Pueblo the ANR-PRB route would be the same as that of ANR. However, between Pueblo and Vaughn, traffic on ANR-PRB would move to Stratford over a BNSF line via UP trackage rights, then southwest to Vaughn, over a track that replicates a portion of UP's Tucumcari line. The traffic would then move south to El Paso and west to Cochise, again using the same route as ANR. A map showing the ANR-PRB route is included as BNSF/UP Reply Exhibit III.A-1.

A number of the ANR-PRB interchange points will be the same as those on ANR. However, Las Animas, Amarillo, Texico, Vaughn, Dalies, Belen, and Defiance will not be ANR-PRB interchange points. Pueblo, Stratford, and Deming will be added as interchange points on ANR-PRB. ANR-PRB will interchange with UP at Pueblo and Stratford and with SWRR at Deming.

In addition to the PRB coal traffic, ANR-PRB will carry overhead non-coal traffic on various BNSF lines AEPCO replicated for ANR north of Pueblo, and between Stratford and Cochise. Stratford, El Paso, and Cochise will be interchange points with UP for non-coal traffic. In addition to the intermodal traffic AEPCO selected that would be originated or terminated locally by ANR at El Paso, certain ANR-PRB trains will pick-up and set-out local cars at Santa Rosa, New Mexico, on the Stratford-Vaughn line.

ANR-NM – The sub-SARR referred to as ANR-NM would carry the issue traffic between the New Mexico mines and Cochise using the existing route for this traffic. The issue traffic would move from the mines to Belen, then from Belen south to Rincon. Between Rincon and Deming, Southwestern Railroad (SWRR) crews would move this traffic over a portion of the BNSF line that is leased to SWRR. From Deming, the traffic would move west to Apache Station at Cochise. A map showing the ANR-NM route is included as BNSF/UP Reply Exhibit III.A-1.

ANR-NM would carry primarily non-coal traffic in overhead service between Defiance and Belen and between Deming and Cochise, the same traffic and trains AEPCO selected for movement between Defiance and Vaughn or between Cochise and El Paso. In addition, defendants used the train movement and revenue waybill records produced to AEPCO in discovery to identify the trains and traffic that would move over ANR-NM's Belen-Rincon line. ANR would interchange with BNSF at Defiance, Dalies, Belen, and Rincon; with SWRR at Rincon and Deming, and with UP at Deming and Cochise. Consistent with AEPCO's choice for ANR, defendants have not taken local traffic (other than the issue traffic) as part of the traffic group for ANR-NM.

b. Track and Yard Facilities

The track and yard facilities for ANR and the two sub-SARRs are described in Section III.B.2 above. Schematics of the track and yard facilities are shown in BNSF/UP Reply Exhibit III.B.1. As explained in Section III.B.2, defendants generally accept AEPCO's decisions about what portions of the route are double track or single track. At some points where defendants' RTC simulations showed that there was insufficient capacity to accommodate the traffic AEPCO chose for ANR, Mr. Wheeler added passing sidings.[9]

Defendants accept AEPCO's standards for track construction corresponding to various train speeds and for maximum GWR. In addition, defendants accept most of AEPCO's decisions concerning what lines should be equipped with CTC and power switches. Mr. Wheeler added power switches at some locations where AEPCO appears to have mistakenly omitted them. He also added power switches and other remote control equipment in yards where AEPCO assumed one-person crews in order to avoid the excessive dwell times that would result if the single crew person had to set switches manually.

Defendants accept AEPCO's use of wood crossties. Defendants made some changes to AEPCO's specifications for ballast and turnouts where they concluded that these specifications were insufficient. These changes are described in Section III.F.3 below.

The inspection/fueling yards and additional interchange yards or locations for ANR and each of the sub-SARRs were described in Sections III.B.1.c and III.B.3 above. The activities at these yards are described below in Section III.C.2.c.vii.

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[9] BNSF/UP Reply workpaper "Dutch_Siding.ppt."

c. Trains and Equipment

i. Train Sizes

Defendants accept AEPCO's assumptions regarding trains sizes and its methodology of adding "growth" trains to reflect anticipated traffic growth. AEPCO Opening Nar. at III-C-7 to III-C-8. Defendants disagree with AEPCO's assertion that it has assigned sufficient locomotives to adequately power the trains it has included in the ANR traffic group. *Id.* at III-C-8. As discussed in the next section, AEPCO has undercounted its locomotive needs in several significant respects.

ii. Locomotives

Defendants accept AEPCO's choice of locomotive types. AEPCO Opening Nar. at III-C-8. However, as described further below, they disagree with AEPCO's determination of the number of locomotives needed. *Id.* at III-C-9.

(a) Road Locomotives

AEPCO has underestimated the number of road locomotives ANR will need in several respects.[10]

First, AEPCO developed locomotive hours for ANR through analysis of peak-period operations using the RTC model. As described below, Mr. Wheeler identified a number of errors in AEPCO's use of this model. When those errors are corrected, the simulation shows that ANR operations would require a greater number of locomotive hours than AEPCO assumes. As a result, ANR needs a higher number of locomotives for peak-period operations than AEPCO developed.

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[10] In addition, there are discrepancies between the locomotive counts shown in AEPCO's Exhibit III-C-1 and the locomotives AEPCO used in its RTC model. *See* BNSF/UP Reply workpaper "Locomotive_count_discrepancies.xlsx."

Second, AEPCO disregarded certain locomotives used to move the trains it chose for its traffic group. AEPCO states that it used the train sizes of actual BNSF and UP trains, and it apparently attempted to use actual locomotive consist information as well. AEPCO Opening Nar. at III-C-7 to III-C-8. It appears, however, that AEPCO witnesses looked only at the locomotive consist at the point where a train was assumed to enter ANR. Defendants' train data produced to AEPCO in discovery reveal that, for some trains, a locomotive was added at some point during the time the train moved over the route ANR uses. These locomotives were added to minimize delay and otherwise to achieve desired transit times for the traffic AEPCO chose, much of which is highly service sensitive. Thus, they should be part of the ANR fleet. Defendants' experts have reviewed the train records and have confirmed that addition of the locomotives is necessary in order to ensure fluid and efficient movement of trains on these routes.

Third, AEPCO describes the "'standard' road locomotive consist for ANR's trains [as] three locomotives in a 2x1 distributed power ('DP') configuration." AEPCO Opening Nar. at III-C-9. Although AEPCO concedes that certain trains may have larger consists, there is no systematic coding of locomotive power in its RTC model. Defendants believe a 2x2 DP configuration is more appropriate for certain PRB coal trains. Until recently, BNSF used a 2x1 configuration for all of its coal trains from the PRB. However, in 2008 it studied the benefits and detriments of using a 2x2, or four-locomotive, consist (with two locomotives at the front and two at the rear) for PRB coal trains traversing the route to Pueblo and south. As a result of that study, BNSF changed the locomotive configuration for all such traffic. The advantages of that change included the following:

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In light of this analysis and BNSF's positive experience since changing its locomotive configuration, defendants have assumed a 2x2 consist for all BNSF traffic ANR carries south to Amarillo.[12] As explained below, defendants have removed the Colorado helper district AEPCO assumes, as it is unnecessary when the 2x2 consist is used.

Similarly, BNSF uses six locomotives for its coal and heavy grain traffic on the transcontinental route, in order to maintain maximum speed and thereby avoid impeding time-sensitive intermodal traffic. These movements have been coded into defendants' RTC model to match BNSF's actual practice.

Fourth, AEPCO has incorporated a five-percent spare margin and a 5.7-percent peaking factor in computing its locomotive requirements. AEPCO Opening Nar. at III-C-10 to III-C-11. Defendants do not accept the peaking factor AEPCO calculated. AEPCO claims to follow STB precedent from the *PSCo/Xcel* case, in which the Board calculated the ratio of the number of trains in the "peak week" to the average. In that case, the STB determined that ratio to be 20.1

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[11] This helper was used on BNSF lines AEPCO replicated. As discussed below, use of the 2x2 configuration eliminates the need for a dedicated helper consist.

[12] Were this traffic hauled by three-locomotive consists, in addition to providing helpers, ANR would be required to absorb the cost of adding locomotive power for movement on the residual BNSF beyond Amarillo.

percent.[13] In this case, AEPCO adjusted the number of trains in the peak week, without making similar adjustments to the number of annual trains from which it determined the average, and produced a peaking factor that is *less than one-third* what the Board adopted in the *PSCo/Xcel* case. Specifically, AEPCO removed from the peak-week list certain trains it identified as duplicates,[14] which reduced the peak-week count. But AEPCO did not remove such duplicates from the average. The result was that it understated the peaking factor.

Further, AEPCO removed a number of loaded and empty coal trains from its peak-week list, claiming that the trains were outside the peak period. AEPCO's Exhibit III-A-1 indicates that many of the train dates for its peak-period coal trains are "RTC generated;" thus, it is difficult to assess whether AEPCO's removals were proper, and whether other shipments subsequent to the peak period would be associated with a prior loaded or empty train, and should be added to its peak-week list. Defendants have used the BNSF and UP train movement records produced to AEPCO in discovery to identify the train date, and properly determine the peak week by number of trains, and the total annual train count in the same fashion. This analysis resulted in peaking factors of 18%, 19%, and 17% for ANR, ANR-PRB, and ANR-NM, respectively.[15]

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[13] *Public Serv. Co. of Colo. D/B/A Xcel Energy v. Burlington N. & Santa Fe Ry.*, STB Docket No. 42057, slip op. at 13 (STB served Jan. 19. 2005).

[14] AEPCO work paper "ANR Peak Train List vF follow-up 10610pv_wRTCresults.xlsx."

[15] BNSF/UP Reply workpapers "ANR Service Units RR Reply.xlsx," "ANR-PRB Service Units UP-BNSF Reply.xlsx," and "ANR-NM Service Units RR Reply.xlsx." Defendants note that in none of the three SARR and sub-SARR scenarios does the SARR traffic's peak seven-day period fall in the October period modeled by Complainants. Rather than re-determine the growth period trains and model other periods, defendants accept the use of the October period for RTC modeling and apply the actual peaking factors necessary to account for the traffic that each SARR would handle in its respective peak week.

In addition, a five-percent spare margin is too small. AEPCO incorrectly concludes that a { } translates to a 5.0-percent spare margin. In fact, the spare margin is applied not to total time, but to a measure that excludes unavailable time, in order to account for the additional locomotives that would be required. Thus, a spare margin based on a { } would be calculated as { }, or { }. As the total locomotive hours are developed in a SAC analysis without accounting for unavailable time, a spare margin calculated as a proportion of total time does not account fully for the spare locomotive requirement. AEPCO commits the same arithmetic mis-step in its attempt to support its 5.0-percent figure by pointing to { } that BNSF produced to AEPCO in discovery. From those data, AEPCO developed a "spare margin" of { } that included shop and other unavailable time. AEPCO Opening Nar. at III-C-11. For this calculation, AEPCO also divided a measure of some of the time that the locomotives were unavailable, by the "Total Measurable" time, an amount that includes the unavailable time.[16]

In order to determine the additional spare power that is needed, the unavailable time must be excluded from the Measurable Time (the denominator of the spare margin ratio). Making only this modification to AEPCO's calculation produces a spare margin of { [17]}, which defendants use to develop the locomotive requirements of ANR, ANR-PRB, and ANR-NM.

Fifth, AEPCO states that its road locomotive requirements take into account the need to equalize locomotive power used in run-through service. AEPCO Opening Nar. at III-C-8 to III-

[16] AEPCO workpaper "BNSF Loco Spare Margin 2006-2009.xls."

[17] { }

C-9. In other words, it purports to have considered the horsepower debt it will owe connecting carriers whose locomotives ANR uses when it moves run-through trains. However, AEPCO has failed to take into account that, as an overhead carrier, it will share the costs of the imbalance in horsepower between eastbound traffic and westbound traffic.[18] All in all, ANR would be responsible for repositioning locomotives as well as providing additional locomotives to ensure that it had enough power at all times.[19] In addition, ANR would need enough locomotives to pay back horsepower hours owed to the residual BNSF and UP.

Defendants have adjusted ANR road locomotive requirements to correct for the understatements described above. For the ANR-NM and ANR-PRB sub-SARRs, defendants have provided the requisite number of road locomotives to cover the locomotive hours generated by Mr. Wheeler's RTC simulations for those railroads, following the same approach used to correct AEPCO's inputs and assumptions for ANR.

Table III.C.3 shows the 2009 peak locomotive requirements for ANR, ANR-PRB, and ANR-NM.[20]

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[18] For example, UP uses westbound trains to move excess locomotives to Los Angeles, California (a location that operates at a "power deficit"). UP intermodal westbound trains are of lower tonnage and require fewer locomotives than the eastbound trains.

[19] This is typically not an issue for SAC traffic groups comprised of unit coal trains, as their 100% empty return ratio generally results in a balanced flow of locomotives. Here, where most trains on many ANR segments are non-coal – and exhibit imbalances between eastbound and westbound flows – all railroads participating in the move will share in the additional costs.

[20] AEPCO's Table III-C-3 refers to "ANR Peak Locomotive Requirements." However, the numbers shown in that table are for 2009.

Table III.C.3
ANR 2009 Locomotive Requirements

Type of Service	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Road/Helper – ES44-AC	336	440	269	105
Switch/Work Train – SW1500	15	18	12	3
Total	**351**	**458**	**281**	**108**

Source: BNSF/UP Reply workpaper "ANR Operating Statistics RR Reply.xlsx."

(b) Helper Locomotives

AEPCO provides two helper districts for ANR—the Campbell/Orin Helper District in the Wyoming PRB and the Big Lift/Palmer Lake Helper District in Colorado. AEPCO Opening Nar. at III-C-11 to III-C-13. Defendants agree that helper assistance is needed for loaded coal trains on the Wyoming line, and they have provided for helper locomotives to assist both southbound and northbound trains in a Campbell/Orin Helper District. Defendants have also added a helper district on the line between Campbell and Moran Junction to reflect the requirements for northbound trains over 1.2 HTP at this location. BNSF uses helpers for such trains on this line, as identified in materials produced to AEPCO in discovery.[21] The helper locomotives would be located at Sheridan, Wyoming. Defendants have provided for helper locomotives in these districts for both ANR and ANR-PRB.

Defendants believe a Colorado helper district is unnecessary for either ANR or ANR-PRB. Because Defendants have equipped the PRB coal trains with a 2x2 locomotive consist, there is no need for dedicated helper assistance between Big Lift and Palmer Lake. Elimination

[21] BNSF_AEPCO_0036521, included as BNSF/UP Reply workpaper "BNSF Helpers.pdf."

of this helper district avoids the delay entailed in attaching and removing helper locomotives, thereby reducing congestion and transit times.

AEPCO assumes that two 2-unit helper consists will be used to move trains through the helper districts. Defendants accept this assumption for both ANR and ANR-PRB. These locomotives are included in the road locomotive count shown in Table III.C.3 above.

(c) Switch/Work Train Locomotives

AEPCO provides ANR with 15 locomotives for switching at five inspection/fueling yards. AEPCO Opening Nar. at III-C-13 to III-C-14. These locomotives are used for switching of bad-order and spare cars and for switching of blocks of intermodal cars at Texico Yard. AEPCO assumes one-person switch crews with two 24x7 crew assignments at Guernsey, one at North Amarillo, one at Texico, four at West Vaughn, and three at West El Paso. *Id.* at III-C-14. Each switch crew assignment uses one switch locomotive, and a spare switch locomotive is included for each location except Texico. *Id.*

Defendants believe that AEPCO has failed to provide all the switch assignments needed for ANR. In particular, an additional 24x7 assignment would be needed to handle the block switching of intermodal cars at Texico. In addition, in view of the service sensitivity of the intermodal traffic that is switched at Texico, it would not be prudent to rely on the spare switch locomotive at North Amarillo as a back-up for the Texico switch locomotive. Defendants therefore have added a spare locomotive for Texico. In addition, defendants have determined that the train volumes at North Amarillo and location of the major locomotive shop there would require a second assignment. Similarly, given the coal train volumes at Guernsey and the bad order set-outs and return of repaired cars to trains, defendants have added another assignment during the day Monday to Friday.

Because defendants' traffic group does not include any traffic interchanged with FXE, they have not provided for any switch locomotive associated with such an interchange. In total, defendants' ANR will require 20 switch locomotives, including spares.

Because the routes, traffic groups, and interchange locations of ANR-NM and ANR-PRB differ from those of ANR, the switch locomotive needs are also different. Defendants have calculated the need for switch locomotives for these sub-SARRs, as follows. There will be one switch locomotive for each switch crew assignment, and one spare for each location. For ANR-PRB, there will be the same three 24x7 crew assignments at Guernsey as in defendants' ANR, for a total of eight switch locomotives. For ANR-NM, there will be two 24x7 crew assignments at Belen,[22] for a total of three switch engines.

Defendants note that AEPCO has assumed one-person switch crews at all yards. It would be impractical for a one-person crew to handle switching unless power switches and remote control technology were installed in each yard. Otherwise, switches would have to be set by hand, requiring the single crew person to climb on and off the switch locomotive. It would not be physically possible for a single individual to operate the locomotive while at the same time performing the necessary switching functions on the ground. Defendants have accepted one-person switch crews for the yards, but have provided for power switches and remote control technology for the locomotives in ANR yards and the yards of the two sub-SARRs, in order to minimize train dwell times in the yards. *See* Section III.F.3 below.

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[22] As explained below, while ANR-NM handles the same BNSF Transcon trains that ANR handles between Vaughn and Defiance, ANR-NM is not responsible for inspecting and fueling the eastbound trains delivered to BNSF at the Belen interchange. (ANR handles inspecting and fueling at Vaughn for trains moving in either direction.)

Table III.C.2 shows defendants' calculation of the number of switch locomotives needed for ANR, ANR-NM, and ANR-PRB.

iii. Railcars

AEPCO properly notes that the majority of ANR traffic will move in shipper-provided equipment. AEPCO Opening Nar. at III-C-14. AEPCO developed ANR system car requirements based on peak-year traffic and transit-time output from its RTC model with application of a 5.0-percent spare margin and a 5.7-percent peaking factor. *Id.* at III-C-15.

Defendants' calculation of car requirements for ANR is higher than AEPCO's figures, primarily due to corrections to the RTC model that result in increased transit times. The higher transit times require an increase in the number of cars needed to support the traffic AEPCO has chosen. Defendants accept the spare margin AEPCO developed for ANR railcars, but correct the peaking factor to 18 percent, as described above.

Defendants have also calculated car requirements for ANR-PRB and ANR-NM, using the traffic groups and output of their RTC model for these two sub-SARRs. The peaking factors applied for these sub-SARRs differ from the ANR peaking factor due to different traffic volumes. Defendants applied a 19 percent peaking factor for ANR-PRB car requirements and a 17 percent peaking factor for ANR-NM car requirements. Defendants also applied AEPCO's 5.0-percent spare margin to develop car requirements for the sub-SARRs.

The car requirements defendants calculated for ANR, ANR-PRB, and ANR-NM are summarized in their work papers.[23]

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[23] BNSF/UP Reply workpapers "ANR Car Costs RR Reply.xlsx," "PRB Car Costs RR Reply.xlsx," and "NM Car Costs RR Reply.xlsx."

2. Cycle Times and Capacity

a. Procedure Used to Determine Configuration and Capacity

In determining the capacity of ANR, AEPCO started with traffic data for a base year that covered 2Q08 through 1Q09, and determined the growth trains that would be required to handle the 2018 volumes it projected for the ANR traffic group. As explained in Section III.A. above, defendants corrected AEPCO's base-year traffic levels to account for actual shipment volumes in 2009, and corrected other elements of AEPCO's projections to 2018 levels.

As described above, defendants' operating witnesses are former BNSF and UP employees who are highly knowledgeable about the routes covered by AEPCO's SARR, as well as the routes defendants have used for the sub-SARRs. In advising Mr. Wheeler on the proper track configuration and the locations and configurations for yards and interchange locations, Messrs. Kotter and Murphy drew on their years of experience with the BNSF and UP lines and facilities located on these routes. In addition, in March 2010 Messrs. Kotter and Murphy visited key locations on the routes and conducted in-person interviews with current BNSF and UP operating personnel. Mr. Kotter visited Amarillo, and Mr. Murphy visited Cochise, Deming, El Paso, and Vaughn and drove along the UP routes connecting these locations.[24] Based on the information they gathered, as well as their long experience with the relevant routes and locations, Messrs. Kotter and Murphy advised Mr. Wheeler regarding the track configurations, yard facilities, and other equipment needed for ANR operations, as well as operations on the two sub-SARRs, ANR-PRB and ANR-NM.

[24] *See* BNSF/UP Reply workpapers "Kotter Trip Summary.doc" and "Murphy Trip Summary.doc."

Mr. Wheeler started with the ANR routes and trains AEPCO chose and reviewed AEPCO's RTC model. He used the information and recommendations from Messrs. Kotter and Murphy, as well as data from BNSF and UP track charts and timetables, as input for his RTC model simulations, including corrections to AEPCO's model assumptions. Mr. Wheeler performed separate simulations for ANR, ANR-PRB, and ANR-NM, using the routes and trains chosen for each SARR or sub-SARR. For each SARR or sub-SARR, the simulation included the peak train volume week in the 10-year DCF period.

AEPCO states that it input random "outage" events as part of its RTC simulation. As discussed below at Section III.C.2.c.xi, Mr. Kotter thoroughly analyzed the BNSF outage data produced in discovery and developed a much higher number of random outages than AEPCO's witness. Mr. Wheeler used the random outage information developed by Mr. Kotter in running the RTC model for each SARR or sub-SARR.

b. Development of Peak-Period Trains

Defendants accept AEPCO's choice of a peak seven-day period (October 15-21, 2018) for ANR. They also accept AEPCO's development of 3,192 trains for this period as a starting point for their analysis. Defendants adjusted this train count downward based on the differences between their 2018 volume levels and AEPCO's. First, as described above in Section III.A above, actual 2009 traffic volumes were lower than the 2009 levels that AEPCO forecast. In addition, while they accept AEPCO's general approach of adding "growth" trains to reflect traffic growth over time, defendants have used more current and more accurate forecasts of traffic growth, which are less optimistic than the forecasts AEPCO used, as described in Section

III.A above. Scaling downward based on the combination of lower base-year traffic volumes and less optimistic growth forecasts resulted in a lower number of peak-period trains for ANR.[25]

Defendants also developed the number of peak-period trains for ANR-PRB and ANR-NM, using the traffic groups and routes specific to these two sub-SARRs. For the sake of simplicity, defendants accept AEPCO's peak period for modeling all three SARRs, incorporating different adjustments required for each, *e.g.*, identifying the traffic moving over the different lines that are included. As noted above, defendants address differences in the traffic patterns across the three scenarios by calculating separate peaking factors for each SARR.

The numbers of peak-period trains for ANR, ANR-PRB, and ANR-NM are shown in Table III.C.4.

Table III.C.4
2018 Peak Period Trains in RTC Model

	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Peak Period Trains Modeled	1,517	1,312	755	932

Source: BNSF Reply workpapers "AEPCO Reply Scenario.zip," "AEPCO PRB Reply Scenario.zip," "AEPCO NM Reply Scenario.zip"

c. Operating Inputs to the RTC Model

The elements discussed in this section are inputs to the RTC model. While defendants agree with a number of AEPCO's inputs for ANR, defendants found it necessary to adjust some of the inputs for reasons described below. These adjustments in turn affected the results of the simulation of ANR's peak period operations and the resulting transit times for ANR trains.

[25] Defendants determined that AEPCO's peak-period trains should be reduced by 294, before further adjustment to remove trains AEPCO moved only over MRL segments. *See* BNSF/UP Reply workpaper "Reply_train_adjustments.xlsx."

In addition, defendants have developed appropriate operating inputs for ANR-PRB and ANR-NM. Mr. Wheeler used these inputs and ran the RTC model to produce separate simulations for each of these sub-SARR's.

i. Road Locomotive Consists

As described in Section III.C.1 above, AEPCO has underestimated ANR locomotive requirements in various respects. Two of these errors involve AEPCO's development of locomotive consists. As discussed above, AEPCO used a 2x1 distributed power configuration for most trains. While AEPCO states that it attached an extra locomotive for some heavy trains, defendants' operating experts believe that all PRB coal trains should have a 2x2 configuration, consistent with BNSF's current practice and its conclusion that this is the most efficient way to move these trains. In addition, as discussed above, AEPCO failed to recognize that in defendants' real world operations locomotives were added to some trains as they moved over the routes AEPCO replicated for ANR. Defendants have altered the locomotive consists of certain ANR trains to correct for these oversights.[26]

The locomotive consists provided for the trains included in the traffic groups for ANR-PRB and ANR-NM are the same as consists defendants used for the equivalent trains chosen for the ANR traffic group.

ii. Train Size and Weight

Defendants accept AEPCO's assumptions regarding train size and weight. Defendants also accept AEPCO's decision not to assume extra horsepower when the train movement data showed six or more locomotives. *See* AEPCO Opening Nar. at III-C-22 n.11.

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[26] The power assignments defendants used appear at BNSF/UP Reply workpaper "AEPCO_Opening_Trains_Stats.xlsx."

iii. Helpers

As discussed above in Section III.C.1.c.ii.(b), defendants agree that helper assistance will be needed for loaded coal trains on the Campbell and Orin Subdivisions. Defendants accept AEPCO's definition of this district, from the Campbell Subdivision mines to MP 10.46 on the Orin Subdivision for southbound trains, and between Orin Subdivision MP 15.4 and MP 6.95 for northbound trains. AEPCO Opening Nar. at III-C-23. Defendants also accept AEPCO's description of the helper consist and positioning of the helpers. In addition, like AEPCO, defendants have allotted 20 minutes for each train requiring helper assistance to add helper locomotives at the beginning of the helper district and 15 minutes to detach helper locomotives at the end of the helper district. *Id.* at III-C-24. Defendants accept AEPCO's description of light helper movements. *Id.*

Defendants have added a helper district on the line between Campbell and Moran Junction to reflect the requirements for northbound trains over 1.2 HTP at this location. (BNSF uses helpers for such trains on this line.) The helper locomotives would be located at Sheridan, Wyoming.

As discussed above at Section III.C.1.c.ii(b), defendants have not included a Big Lift/Palmer Lake helper district in their RTC model. With use of a 2x2 locomotive consist for PRB coal trains, BNSF has found it unnecessary to use helper assistance between Denver and Pueblo. Eliminating this helper district reduces delay on the Colorado portion of the ANR route, by avoiding the need to build in time for adding and detaching helper locomotives.

For ANR-PRB, defendants incorporate the same Wyoming helper operations as they use for ANR. As with ANR, Defendants use a 2x2 locomotive configuration for loaded coal trains and therefore do not need a Colorado helper district. There are no helper operations on ANR-NM.

iv. Maximum Train Speeds

Defendants generally accept AEPCO's decisions regarding maximum permissible train speeds to be input into the RTC model, with several exceptions. As noted in Section III.B.2.a above, 55 mph, rather than 60 mph, is the specified maximum on BNSF timetables for trains other than intermodal trains. In addition, it appears that AEPCO disregarded maximum speed limits for trains over 100 tons per operative brake (loaded coal trains). The BNSF timetable sets a limit of 40 mph for these trains,[27] but AEPCO permitted those trains to move at 50 mph in its RTC model. Defendants corrected for this error.

AEPCO's maximum train speeds require adjustment for the portions of the ANR route where AEPCO has established yards that do not exist on today's BNSF or UP routes. For example, ANR has major yards at West Vaughn and West El Paso, and interchange yards at Cochise and Defiance, in locations where there are no such yards today. AEPCO's RTC model fails to include the appropriate speed limit reductions for approach to and departure from these yards. Defendants have corrected for this error by inputting the appropriate speed restrictions in their RTC model.

Defendants input AEPCO's maximum train speeds into their RTC model (with appropriate corrections) when they ran simulations for ANR-PRB and ANR-NM. Where applicable, defendants have added the appropriate speed reductions for new yards used by ANR-PRB and ANR-NM. For example, speed limit reductions were added in connection with the West El Paso Yard and the Cochise interchange yard on ANR-PRB and the Defiance and Cochise interchange yards on ANR-NM.

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[27] *See, e.g.,* BNSF/UP Reply workpaper "Timetables Part 2 (BNSF-AEPCO-4075 to 4306).pdf at page 145 of 232 (Orin sub).

v. Dwell Times at Power Plants and Other Destinations

AEPCO provides dwell times for unloading at five power plants located on ANR. AEPCO Opening Nar. at III-C-26. Defendants accept AEPCO's use of 10.0 hours as the dwell time for trains delivering coal to Apache Station at Cochise. For the other four power plants served by ANR, AEPCO assigned dwell times based on maximum unloading free time allowed under rail transportation contracts or pricing authorities. However, contractual free time is not a good reflection of the actual time spent at a plant location. For these four plants, and also for PPL Montana Power's Corrette power plant near Billings, Montana,[28] defendants have substituted figures derived from data on real-world dwell time at the plants. Defendants used BNSF records to obtain an average dwell time for each of these plants.[29] Table III.C.6 below shows the dwell times defendants used for each plant.

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[28] AEPCO does not assign any dwell time for delivery of these trains, other than the time required for an interchange with MRL. According to AEPCO, ANR delivers loaded trains to MRL at MRL's Billings Yard; MRL delivers them to the Corrette plant and picks up the empty trains for delivery back to ANR at Billings Yard. AEPCO Opening Nar. at III-C-26 n.13. As AEPCO's ANR does not construct the line to serve the Corrette plant, however, the SARR would be subject to the same MRL operations that BNSF encounters in the real world, including congestion and delay. Defendants therefore use the actual BNSF time for unloading at Corrette.

[29] The Board has accepted use of actual dwell times based on BNSF records in other cases. *See, e.g.*, *Western Fuels Ass'n & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088, slip op. at 17-18 (STB served Sept. 10, 2007) (accepting BNSF historical evidence regarding plant dwell time because it was "based on real world experience"). AEPCO acknowledges that actual dwell times {
}. AEPCO Opening Nar. at III-C-26 to III-C-27. AEPCO argues, however, that the BNSF dwell times reflect instances in which there was a delay of several hours between the time the shipper released an empty train and the time BNSF called a crew and the train departed the plant, and that ANR would not delay calling crews in such instances. *Id.* However, defendants did not include the time between release of a train and its departure as part of the actual dwell times they used.

For ANR-PRB and ANR-NM, Defendants use 10.0 hours for train dwell times at Cochise. For ANR-PRB, defendants use the average BNSF dwell times listed below for the five local coal destinations.

vi. Dwell Times at Mines and Other Origins

AEPCO states that ANR will directly serve and originate coal trains at 20 coal mines, as follows:

> Montana – Signal Peak, Spring Creek and Decker Mines.
>
> Wyoming – Eagle Butte, Rawhide, Buckskin, Dry Fork, Clovis Point, Caballo, Belle Ayr, Caballo Rojo, Cordero, Coal Creek, Black Thunder, Jacobs Ranch, Black Thunder South, North Antelope/Rochelle and Antelope Mines.
>
> New Mexico – Lee Ranch and El Segundo Mines.

AEPCO assigns four hours of train dwell times at each of these mines based on the maximum free time allotted in a BNSF tariff, with certain exceptions. AEPCO assigns six hours of train dwell time for mines on the Campbell Subdivision and 5.5 hours of dwell time at other Wyoming mines located on the Orin Subdivision of the Reno Branch, to allow for the presence of non-ANR trains at these mines. AEPCO asserts that the Board accepted these average dwell times in *Psco/Xcel I, AEP Texas,* and *WFA/Basin I.* AEPCO Opening Nar. at III-C-28.

Defendants have analyzed real-world BNSF data to determine actual dwell times at each mine origin AEPCO selected for ANR. Based on that analysis, defendants have substituted average dwell times for each of the mine origins. Defendants accept AEPCO's allotment of 4.0 hours of dwell time for the Signal Peak Mine.

For ANR-PRB, defendants use the average BNSF dwell times for the Montana and Wyoming mine origins, listed below. For ANR-NM, defendants use the average BNSF dwell times for the New Mexico mine origins, listed below.

Table III.C.5 shows dwell times for the locations served by ANR, ANR-PRB, and ANR-NM.

Table III.C.5
Dwell Times For Locations Served By ANR

Location	AEPCO	Reply ANR	Location	AEPCO	Reply ANR
Mines					
Belle Ayr	5.5	{ }	Eagle Butte	6.0	{ }
Caballo	5.5	{ }	Rawhide	6.0	{ }
Caballo Rojo	5.5	{ }	Decker	4.0	{ }
Coal Creek	5.5	{ }	Spring Creek (Nerco Jct.)	4.0	{ }
Antelope (Converse Jct.)	5.5	{ }	Signal Peak	4.0	{ }
Cordero	5.5	{ }	El Segundo	4.0	{ }
N. Antelope (Nacco Jct.)	5.5	{ }	Lee Ranch	4.0	{ }
S. Black Thunder	5.5	{ }	*Utility Destinations*		
Black Thunder	5.5	{ }	Billings, MT (Corrette)	{ }	{ }
Black Thunder W.	5.5	{ }	Pawnee, CO	{ }	{ }
Jacobs Ranch	5.5	{ }	Denver, CO (Arapahoe)	{ }	{ }
Buckskin	6.0	{ }	Pueblo, CO (Minnequa)	{ }	{ }
Clovis Point	6.0	{ }	Amarillo, TX (Harrington)	{ }	{ }
Dry Fork	6.0	{ }	Cochise, AZ	10.0	10.0

Source: BNSF/UP Reply workpaper "Mine_Plant_Dwell.xlsx."

vii. Dwell Time at Yards

(a) ANR

AEPCO assigns 30 minutes of dwell time for interchanges when no other activities are performed. This dwell time applies to all yards at which only interchanges take place.[30] In

[30] The ANR yards that handle just interchanges are Laurel, Jones Jct., Donkey Creek, Orin, Wendover, Northport, Brush, Denver, Pueblo, Las Animas, East Vaughn, Dalies, Defiance, Rincon, and Cochise/Apache. As explained above, defendants' traffic group does not include any traffic that interchanges with FXE { }. Thus, defendants have not included any dwell time for an FXE interchange for ANR or either of the sub-SARRs.

addition, 30 minutes of dwell time is assigned for interchange of trains that do not require inspection or fueling at the North Amarillo and West El Paso Yards. Defendants accept 30 minutes of dwell time for such simple interchanges. As discussed further below, defendants believe the blockswapping operations at Texico Yard are more complex and will require some trains to dwell there for more than 30 minutes.

AEPCO allows 15 minutes of dwell time for a crew change for trains that are neither inspected nor fueled at the crew-change location. Defendants note that crew changes would be unlikely to average only 15 minutes throughout the year across the ANR's 2,200-mile network, but defendants accept this figure for purposes of this case.

For the five inspection/fueling yards that AEPCO locates on ANR, AEPCO assigns various dwell times for those trains that will require inspection and/or fueling. AEPCO Opening Nar. at III-C-29 to III-C-34. Defendants have analyzed the activities at each of these yards and have accepted AEPCO's train dwell times for all yards except the Texico Yard.

Guernsey Yard. AEPCO assumes that for trains carrying empty cars at Guernsey Yard ANR will (a) perform 1,500-mile car inspections, with associated switching of bad-order and spare cars; (b) remove all locomotives and replace them with fresh locomotives; and (c) stage the trains for movement to the mines for loading. Defendants accept AEPCO's assignment of six hours of dwell time for these trains.

For most trains carrying loaded cars, AEPCO assumes that ANR will top off fuel at Guernsey Yard. Defendants accept AEPCO's assignment of one hour for this fueling activity and for a crew change.

Beginning in 2012, AEPCO assumes that for loaded trains originating at Signal Peak Mine, ANR will (a) perform a 1,500-mile inspection; (b) perform associated switching of bad-

order cars (and presumably spare cars as well); and (c) top off fuel during the inspection process. Defendants accept AEPCO's assignment of three hours for those activities.

North Amarillo Yard. AEPCO assumes that at North Amarillo Yard all northbound empty coal trains and all southbound loaded coal trains destined for power plants in Arizona receive a 1,500-mile inspection and locomotive re-fueling and that northbound non-coal trains receive a 1,000-mile inspection. In addition, ANR will remove locomotives requiring 92-day inspection or other maintenance and replace them with fresh locomotives. Defendants accept AEPCO's assignment of three hours' dwell time for those trains. Defendants also accept AEPCO's assumption that southbound loaded coal trains and non-coal trains interchanged to BNSF at Amarillo will not be inspected or fueled by ANR and that these activities will instead occur on BNSF.

While it does not directly affect the yard dwell time, defendants note that AEPCO has chosen to construct the North Amarillo Yard adjacent to a portion of the route that includes a steep grade, in a location seven miles north of Amarillo, where no yard exists today. As a result, southbound trains that stop in the yard are unable to gain speed as quickly as they otherwise would when they resume their journey. Mr. Wheeler has adjusted defendants' RTC model to reflect the slow acceleration that trains will experience as they move from this yard.

Texico Yard. AEPCO's narrative states that at Texico Yard ANR will perform 1,500-mile inspections and fueling of outbound trains. In addition, AEPCO states that ANR will use Texico Yard for block-swapping of certain intermodal trains – activity that BNSF performs at its yard at Clovis, New Mexico. Blocks of cars from some eastbound intermodal trains, which ANR receives from BNSF at Defiance, New Mexico, are placed on other trains at Texico Yard for continued movement eastward either via ANR (in the case of trains destined to/beyond Amarillo)

or via BNSF (in the case of trains interchanged to BNSF at Texico for movement toward Houston, Texas, via Lone Star Jct.). Similar block-swapping occurs at Texico Yard for some westbound intermodal trains, which ANR receives from BNSF at either Amarillo or Texico and moves west to the interchange with BNSF at Defiance. The road locomotives from the inbound trains are transferred to waiting outbound trains for movement out of Texico, and the switch locomotive stationed at Texico Yard assembles blocks from inbound trains into outbound trains.[31] AEPCO Opening Nar. at III-C-31.

Despite acknowledging the extensive activities that BNSF performs today at Clovis, which AEPCO assumes will occur at ANR's Texico Yard, AEPCO failed to include adequate dwell times for these activities in its RTC model. AEPCO input only 30 minutes for an interchange and no dwell time to cover the activities of fueling, inspection, and block swapping at Texico.

Defendants have developed dwell times for the activities ANR will perform at Texico Yard, based on actual dwell times for trains at BNSF's Clovis Yard. As a result of this analysis, defendants have allotted an average of { } of dwell time for intermodal trains for which block-swapping occurs at Texico Yard.[32] Defendants have allotted three hours of dwell time for outbound trains other than intermodal trains

West Vaughn Yard. AEPCO assumes that at ANR's West Vaughn Yard all non-coal trains moving in both directions (except for intermodal trains originating or terminating at

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[31] ANR treats these intermodal trains as extended-haul trains (thus permitting inspection every 1,500 miles rather than the "standard" 1,000 miles) because they operate intact, in both directions, between Los Angeles-area port facilities or yards and Texico or between points such as Houston or Kansas City and Texico, with no intermediate classification, pick-ups or set-outs en route.

[32] BNSF/UP Reply workpaper "Clovis_Work_at_Belen.xlxc."

Texico Yard) and westbound empty coal trains destined for New Mexico mines are inspected and fueled. Defendants accept the three hours of dwell time AEPCO has allotted for these activities. Defendants also accept AEPCO's 15 minutes of dwell time for eastbound/southbound trains that are assumed to stop only for a crew change at West Vaughn Yard.

West El Paso Yard. AEPCO assumes that inspection and fueling will occur at ANR's West El Paso Yard for all westbound non-coal trains moving through El Paso, and for all eastbound non-coal trains that move to and/or beyond Vaughn on ANR. In addition, eastbound (empty) coal trains are refueled at West El Paso Yard. Eastbound non-coal trains that are interchanged to the residual UP at El Paso are not inspected or fueled by ANR; AEPCO assumes that UP will inspect and fuel these trains after they are delivered by ANR.

AEPCO provides for three hours of dwell time for trains that will be both inspected and fueled at West El Paso Yard and one hour for eastbound coal trains that will only be refueled there. Defendants accept these dwell times. For eastbound trains that are interchanged to UP at El Paso, AEPCO failed to provide 30 minutes of dwell time. Defendants have corrected that omission.

AEPCO's narrative does not explain how eastbound intermodal trains that continue eastward beyond El Paso will be interchanged to the residual UP. Defendants believe it would not be efficient for ANR to interchange these trains to UP at West El Paso Yard or to build an interchange track on the east side of the Rio Grande River. Instead, defendants assume that ANR and the residual UP would develop a reciprocal arrangement under which ANR would run over the residual UP tracks and bring the eastbound intermodal trains directly into UP's Dallas Street Yard. For westbound intermodal trains ANR receives from the residual UP, defendants assume

that UP would bring the trains directly into West El Paso Yard.[33] Defendants have incorporated into their RTC model the adjustments needed to reflect these operations.

In addition, AEPCO's traffic group includes a significant volume of intermodal containers and trailers that originate or terminate at El Paso. Two intermodal trains per day originate at El Paso, one destined for Long Beach, California, and the other moving through Vaughn to the midwestern United States. An average of one intermodal train per day terminates at El Paso. AEPCO fails to explain how ANR would handle this local traffic. UP originates and terminates these containers and trailers at a ramp at Alfalfa Yard, several miles east of downtown El Paso, a point ANR does not reach (as built by AEPCO). Rather than construct an additional facility in El Paso, defendants assume that this local El Paso intermodal traffic would be handled at West El Paso Yard, along with other ANR trains.

As discussed above in Section III.B.2.b, in order to handle this local intermodal traffic, ANR would require a ramp and associated facilities and equipment for drop-off and pick-up and a parking facility for storage of containers, trailers, and chassis. The containers and trailers would be transferred between the ramp and trains in the yard.

(b) ANR-PRB

As described above in Section III.B.2.b, ANR-PRB will have fueling/inspection locations at Guernsey and West El Paso Yards. The activities at these yards are essentially the same as the activities at these locations for ANR. Thus, defendants have provided for the same dwell times for trains at these locations. ANR-PRB will also have a fueling location at Donkey Creek for northbound trains bound for the PPL Corrette plant and Otter Tail Power's Big Stone plant.

[33] This reciprocal arrangement would require UP to taxi its crews back from West El Paso Yard to Dallas Street Yard, an expense UP does not incur today. Likewise, ANR would incur expense to taxi crews back from Dallas Street Yard.

Defendants have provided for two hours of dwell time for DTL fueling of these trains at Donkey Creek.

ANR-PRB will have 12 interchange yards, located at Huntley, Moran Junction, Mossmain, Orin, Wendover, Northport, Brush, Denver, Pueblo, Stratford, Deming, and Cochise. Consistent with AEPCO's allotment for interchanges on ANR, defendants have provided for 30 minutes of dwell time for interchanges at these ANR-PRB yards.

(c) ANR-NM

As described above in Section III.B.2.b, ANR-NM will have only one fueling/inspection location, at Belen. ANR-NM will inspect and fuel all westbound trains received from BNSF at Belen. In addition, empty coal trains destined for the New Mexico mines will be inspected and fueled at Belen. Further, defendants determined that some ANR westbound New Mexico coal trains would not traverse a major fueling/inspection location, and would be fueled at Defiance. Defendants assume that BNSF will fuel and inspect any eastbound trains it receives from ANR-NM at Belen. Defendants have not provided for any fueling or inspection facilities between Belen and Cochise. For trains interchanged with UP at Deming or Cochise, defendants assume that UP will handle these activities at off-SARR locations.

In addition to the yard at Belen, ANR-NM will have three interchange yards, located at Defiance, Deming and Cochise. Consistent with AEPCO's allotment for interchanges on ANR, defendants have provided for 30 minutes of dwell time for interchanges at these ANR-NM yards.

viii. Crew-Change Locations/Times

AEPCO provides for nine crew districts for ANR. AEPCO Opening Nar. at III-C-34 to III-C-35. Defendants agree with Crew Districts 2 through 9, as described in AEPCO's Narrative. In light of the changes defendants have made to the origin and termination of the MRL track used by ANR, the description of Crew District 1 for ANR would be modified as follows:

- Crew District 1: Crews based in Huntley, Montana (home terminal) operate in turn around service out of Huntley and taxi to Mossmain where they would pick up empty coal trains from BNSF and handle the train to Signal Peak Mine, load the train and return the loaded train to deliver back to BNSF at Mossmain and taxi back to Huntley. Crews handling Signal Peak trains destined to the south (Cochise) operate in turn around service from Huntley (home terminal), getting on the train at Huntley, operate over MRL to Mossmain, up to Signal Peak and load the train and return the loaded train over the same route to Huntley.[34]

For ANR-PRB, Crew District 1 would be as described above, and Crew Districts 2 to 4 would be the same as for ANR. The remaining crew districts would be described as follows:

- Crew District 5. Crews based in Denver (home terminal) operate in straightaway service between Denver and Pueblo.

- Crew District 6. Crews based in Pueblo (home terminal) operate in straightaway service between Pueblo and Stratford.

- Crew District 7. Crews based in Vaughn (home terminal) would operate in straightaway service between Vaughn and Stratford, and straightaway service between Vaughn and West El Paso.

- Crew District 8. Crews based in West El Paso (home terminal) would operate in straightaway service between West El Paso and Cochise (including Apache Station).

For ANR-NM, the crew districts would be as follows:

- Crew District 1. Crews based in Belen (home terminal) would operate in straightaway service between Belen and Defiance, Belen and Lee Ranch and El Segundo Mines, and turnaround service between Belen and Dalies.[35]

- Crew District 2. Crews based in Belen (home terminal) would operate in straightaway service between Belen and Rincon.

- Crew District 3. Crews based in Deming (home terminal) would operate in straightaway service between Deming and Cochise (including Apache Station).[36]

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[34] Crews attempting to run from Huntley to Signal Peak to load and return to Huntley with a loaded train would likely reach their hours of service limit often, due to congestion and delays on MRL or at the mine beyond ANR's control.

[35] In light of the relatively shorter crew districts on ANR-NM, defendants assumed that the higher train volumes on the Transcon line would permit a crew to make a return trip with a second train, *i.e.*, turnaround service, 50 percent of the time.

AEPCO states that its crew districts and crew assignments reflect ANR's ability to operate in a manner not constrained by prior mergers or union work rules. While AEPCO acknowledges that ANR crews must operate within the constraints of the federal hours of service law, it states that ANR has more flexibility than Class I railroads in scheduling crews and maximizing their use. AEPCO Opening Nar. at III-C-36. Defendants note, however, that AEPCO assumes that the ANR crews will cover routes in multiple directions. As a result, it will be necessary for ANR to have managers who are qualified on multiple crew districts. Moreover, since all ANR crew members will be certified as Class I Engineers, additional managers will be required to perform the tasks necessary to maintain the crew members' FRA qualifications. This would include, for example, on-the-job training, overseeing testing related to efficiency standards, random and reasonable drug testing. and testing related to remote control operator qualifications. Thus, ANR will need more Managers of Locomotive Operations than AEPCO has assumed. *See* Section III.D below. In view of the number of training and testing functions required, defendants conservatively estimate that one Manager of Locomotive Operations would be required for every 60 crew members.

AEPCO acknowledges that some of its crews will expire under the hours of service law and will need to be taxied to their next terminal. AEPCO Opening Nar. at III-C-36. When crews outlaw, there is additional delay and cost; a second crew must be called, and both crews must be taxied between the train and their home terminal. Outlawed crews will occur more frequently on ANR than AEPCO assumes. Historical recrew experience for UP and BNSF support the conclusion that, despite a railroad's best efforts, there will be delays that cause crews to outlaw.

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[36] Between Rincon and Deming, SWRR crews would handle the ANR-NM trains.

Causes of recrews include, for example, broken rails, engine failure, bad order cars identified by an FED, and line congestion.

ANR will also incur additional deadheading and taxi costs due to the imbalance in train movements on its system. For example, because there are more eastbound trains than westbound trains on the line between Defiance and Amarillo, ANR will need to reposition crews to Defiance on a regular basis.[37] In addition, ANR will need to have crews ready to board eastbound trains at Cochise, and this will require facilities for crews to wait in that vicinity. Defendants include costs for such crew accommodations in their operating expenses for ANR.

ix. Time for Trains to Reverse Directions

AEPCO states that at El Paso some trains must reverse direction in connection with their interchange, including non-coal trains interchanged with UP and moving to or from UP points east of El Paso. AEPCO assumes that the reversal of direction would occur at West El Paso Yard, and it states that it allocates 30 minutes for this activity. AEPCO Opening Nar. at III-C-36 to III-C-37. However, AEPCO's narrative appears inconsistent with its RTC model and workpapers. Defendants believe that reversal of direction is not necessary for the trains to which AEPCO refers, in view of the location of West El Paso Yard.

AEPCO also describes a reverse movement of coal trains to or from an FXE interchange at El Paso. *Id.* at III-C-37. Because defendants do not include any FXE interchange traffic in their traffic group, they do not include time for this activity.

x. Track Inspections and Maintenance Windows

AEPCO allots no separate time for FRA-prescribed track inspections in its RTC model, based on its assumption that such inspections would be performed between train movements, or

[37] See BNSF/UP Reply workpaper "T&E Crew Overnights Hotel and Taxi.xlsx."

in the wake of a train during periods of heavy traffic. AEPCO Opening Nar. at III-C-38. AEPCO also does not budget time for program maintenance based on its assumption that such maintenance will occur during periods other than the peak traffic period it models. *Id.* Defendants accept AEPCO's assumption regarding track inspections for purposes of their RTC simulations for ANR, ANR-PRB, and ANR-NM. However, it is unrealistic to assume that there will be no program maintenance on a 2,200-mile network during any two-week period. In any given year, it is impossible to forecast with certainty what week will be the peak. Thus, most railroads schedule program maintenance windows throughout the year without taking some weeks out of the maintenance cycle. It is reasonable to assume that a SARR would do the same. Defendants therefore have provided for program maintenance windows in their RTC simulations for ANR, ANR-NM, and ANR-PRB.

xi. Time for Random Outages

AEPCO acknowledges that random events that affect rail operations would inevitably occur during the peak period used for its RTC simulation. AEPCO Opening Nar. at III-C-38. It purports to allot time for random outages based on review of 2008 data produced by BNSF and UP during discovery. *Id.* at III-C-39. Using the BNSF data, AEPCO's operating witness selected 52 outages on the "BNSF-replicated" lines of ANR for input into AEPCO's RTC model. *Id.* For the UP lines replicated by ANR, however, AEPCO assigned no delay events from the UP Train Delay Reports produced in discovery. AEPCO asserts that only one of the { } delay events shown in the UP data (an event involving a broken rail) was an unplanned outage that was likely to affect train operations and that that event occurred in a yard that AEPCO is not replicating. *Id.* at III-C-40.

AEPCO's analysis of random outages is deficient. For the "BNSF-replicated" lines, AEPCO's witness (Mr. Reistrup) omitted a number of outages that would have delayed train

operations and affected transit times. Mr. Kotter analyzed the BNSF Dispatcher Delay Report produced in discovery. He began by isolating all of the incidents in the report for ANR's peak week that related to routes replicated for ANR. He found { } such incidents that could have had a delay impact, including all 52 of the outages Mr. Reistrup had selected. Mr. Kotter discovered { } additional outages of exactly the same type as those selected by Mr. Reistrup, as well as another { } outages that were described differently from Mr. Reistrup's selections but nonetheless resulted in train delays. Of the remaining { } incidents listed on the report, many others could have resulted in train slowdowns or stoppages, but in an effort to be conservative, Mr. Kotter did not count them.

Listed below are the number, category and description of the { } BNSF outages that were of exactly the same type as those Mr. Reistrup selected and that would have resulted in train delay, but were somehow overlooked. Also noted below are the number of outages in that category that were included in the 52 AEPCO selected:[38]

{

[38] The 52 outages Mr. Reistrup selected are: {

}.

}

In addition, the following list shows { } additional items from the BNSF Dispatcher Delay report relating to types of incidents such as CTC failures, switch problems, and derailments, that Mr. Reistrup did not select at all. This list includes the number, category and description of these { } outages, all of which would cause delays to trains.

{

[39] "Signals dropping" indicates that a crew sees one signal on approach, but as they get closer the signal changes color, typically to a more restrictive signal.

}

Thus, the very source AEPCO used for its random outage analysis revealed { } BNSF incidents causing delay during the peak period that AEPCO did not include in its modeling. Defendants have corrected this error by adding the delay for all { } incidents to their RTC model for ANR. For ANR-PRB and ANR-NM, defendants added the delay incidents to the RTC model for the relevant portions of track.

AEPCO's decision to input no outages on the "UP-replicated" lines is wholly unrealistic. The data UP produced in discovery may have lacked the detail needed to draw definitive conclusions about the relationship of train delay to particular incidents. But on its face, the assumption that there would be no random outages that would affect operations over 470 miles of track during the peak period is implausible. At a minimum, it would be reasonable to assume that the "UP-replicated" lines would have approximately the same rate of outages affecting train operations as the "BNSF-replicated" lines. Defendants therefore applied the delay rate obtained from the BNSF data to all portions of the lines for ANR, ANR-PRB, and ANR-NM.

d. Results of the RTC Simulations

Mr. Wheeler reviewed AEPCO's RTC model and analyzed the assumptions AEPCO made in developing the model. As discussed above, Mr. Wheeler identified a variety of problems with AEPCO's model and the output of its RTC simulations. In addition, as explained above, Messrs. Kotter and Murphy identified a number of respects in which AEPCO's operating plan is not feasible or consistent with efficiency, safety, and customer requirements.

Mr. Wheeler used the RTC model to run a corrected simulation of ANR operations. He used AEPCO's peak week for modeling purposes, but corrected for the errors he identified. With the advice of Messrs. Kotter and Murphy and defendants' engineering experts, Mr. Wheeler incorporated appropriate track and yard configurations and various revisions to AEPCO's operating parameters, as described above. Mr. Wheeler ran defendants' RTC model and obtained outputs in the form of running times for each line segment and transit times and cycle times for ANR trains. These outputs were used to develop locomotive and car hours and train crew counts.

Mr. Wheeler concluded on the basis of his RTC simulation that defendants' ANR system configuration and operating plan are feasible. Defendants used the output of Mr. Wheeler's RTC simulation to develop revised operating cost information for the SAC analysis of ANR.

Mr. Wheeler developed separate RTC models for ANR-PRB and ANR-NM, using information from Messrs. Kotter and Murphy and defendants' other experts to modify the routes and to incorporate appropriate operating assumptions for these sub-SARRs. Mr. Wheeler provided the outputs from these separate RTC simulations to defendants for use in developing operating costs for ANR-PRB and ANR-NM.[40]

3. Other

a. Rerouted Traffic

In its opening evidence, AEPCO proposes four separate reroutes: one involving a portion of the route used to move shipments of coal between mines in New Mexico and Cochise,

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[40] Schematic diagrams of the tracks for ANR, ANR-PRB, and ANR-NM as they appear in defendants' RTC model are attached as BNSF/UP Reply Exhibits III.B-1, III.B-2, and III.B-3 respectively. The electronic files containing defendants' RTC model runs, output, and case files are included in BNSF/UP Reply workpapers "AEPCO NM Scenario Reply.zip, AEPCO Reply Scenario.zip, AEPCO PRB Scenario Reply.zip."

Arizona; two involving portions of the route used to move shipments of coal between PRB mines and Cochise; and one involving a portion of the route used to move shipments of coal to El Paso, Texas, for interchange with FXE. The New Mexico reroute and the PRB reroutes AEPCO proposes are inefficient and at least the New Mexico reroute would fail to meet the needs of shippers whose traffic would be rerouted. Two of the proposed reroutes are longer and more difficult to traverse than the existing route, and would necessarily result in longer cycle times, higher levels of fuel consumption, and additional crew, railcar, and locomotive costs.

i. New Mexico Coal Reroutes

Defendants currently route AEPCO's coal and certain other coal traffic moving from mines in New Mexico to destinations in Arizona via BNSF's line from Belen to Deming.[41] In its opening evidence, AEPCO proposes to reroute that coal via a line that replicates the portion of UP's Tucumcari line between Vaughn, New Mexico and El Paso, Texas, which would add 232 miles to the overall route. It would make little sense to implement such a reroute, and shippers would not accept it, because a Vaughn-El Paso route would be less efficient than the existing Belen-Deming route by every operational measure, and would increase the costs of handling both the rerouted traffic and other traffic currently using the affected lines.[42] Moreover, the proposed reroute would unnecessarily add traffic to lines and facilities — defendants' east-west mainlines and UP's Tucumcari line — that already rank among the busiest in each railroad's respective system. Furthermore, defendants could not reasonably implement a Vaughn-El Paso

[41] BNSF has leased the portion of its line between Rincon, New Mexico, and Deming to SWRR, and SWRR handles that portion of the move.

[42] AEPCO acknowledges that coal movements between the New Mexico mines and Tucson Electric Power's Sundt Generating Station near Tucson, Arizona, would be subject to similar rerouting. AEPCO Opening Nar. at III-C-44 n.29.

route without first significantly upgrading the interchange facilities at Vaughn, a considerable investment that defendants would not make given the route's demonstrable inferiority.

It would not make sense to institute a Vaughn-El Paso routing for traffic that could move via Belen and Deming because the former route would be both significantly longer and more difficult to traverse than the latter. Instead of turning south at Belen, ANR trains and other rerouted traffic would remain on a major transcontinental east-west mainline for an additional and unnecessary 105 miles between Belen and Vaughn. Instead of using BNSF's lightly-used, lower-grade 200-mile Belen-Deming line down the Rio Grande Valley, the trains would climb a 20- to 25-mile grade east of Belen through Abo Canyon to Mountainair, New Mexico. At Vaughn, the trains would have to wait to enter UP's Tucumcari line for transit between Vaughn and El Paso. They would then have to negotiate 230 miles of single-track mainline to El Paso, climbing another grade as they moved south to Corona, New Mexico. The rerouted trains would then continue on a major east-west mainline for an additional and unnecessary 95 miles from El Paso to Deming.

In order to better quantify the inefficiencies associated with a Vaughn-El Paso reroute, defendants modeled operations for the current and proposed routes using RTC simulations.[43] The simulations showed that, compared with a loaded AEPCO train moving from Lee Ranch Mine to Apache Station using the Belen-Deming route, a loaded AEPCO train using the Vaughn-El Paso route would consume at least 4,700 additional gallons of fuel, an increase of 69 percent over the current route. In addition, transit times for the rerouted traffic would increase substantially on the new route. The slow coal trains would travel longer distances over routes

[43] BNSF/UP Reply workpapers "Route Comparisons.xlsx," "AEPCO NM Scenario Reply-TPC.TPC" and "AEPCO Reply Scenario-TPC.TPC."

that are more difficult to traverse than the current route, and they would have lower priority than the many intermodal, automotive, and manifest trains handling service-sensitive traffic on the busy lines that they would unnecessarily occupy. The RTC simulations demonstrate that the estimated minimum cycle time using the Vaughn-El Paso route to move coal from the Lee Ranch Mine to Apache Station would be approximately 41 percent longer than the estimated minimum cycle time for the current Belen-Deming route. AEPCO acknowledges that its own RTC simulation showed that the transit time for a rerouted train (Lee Ranch to Cochise) exceeded the average real world transit time by 3.5 hours. AEPCO Opening Nar. at III-C-45 n.30 & Exh. III-C-3.

These operational inefficiencies would be reflected directly in increased variable costs. Costs that rise with increases in gross ton-miles, locomotive unit-miles, train miles, or cycle time would all increase significantly due to the rerouting. These include the railroads' maintenance-of-way costs, road property ownership costs, and locomotive capital, maintenance, and fuel costs, as well as costs that shippers would bear, such as car ownership and maintenance costs. The railroads would also incur higher wage costs as a result of the longer mileages, and would face an increased likelihood that crews would time-out under the Hours of Service regulations in some of the larger crew districts.

In addition, the rerouted traffic would unnecessarily add traffic to high-density east-west mainlines and UP's Tucumcari line. Adding coal traffic to transcontinental east-west mainlines would increase cycle times for all traffic and interfere with existing operations on those lines. AEPCO trains departing from Lee Ranch Mine currently move over a congested transcontinental mainline before turning south at Belen. Under AEPCO's proposal, these and other rerouted trains would occupy valuable track capacity on this mainline for an additional 105 miles until

they reach Vaughn. Moreover, the applicable timetable rules limit coal trains to 50 MPH over this segment compared with the 70 MPH maximum applicable to intermodal traffic, adding to congestion that would affect all traffic on the line.

Adding rerouted traffic to the Vaughn-El Paso line would create operating difficulties for the rerouted traffic. At Vaughn, the low-priority coal trains would have to wait for a suitable window before moving onto the line, further increasing cycle times. Once on the line, these relatively slow-moving trains would compete for track capacity with a significantly higher number of trains—mainly carrying time-sensitive intermodal and automotive traffic—than they would encounter on the shorter Belen-Deming line. The rerouted trains would more frequently be placed in sidings, and thus delayed even further, in order to avoid causing delays (to the extent possible) to oncoming or overtaking intermodal and auto trains. These low-priority trains would incur further delays and increase congestion while traveling 95 miles along the heavily utilized east-west mainline from El Paso to Deming.

Even if they were inclined to handle New Mexico coal trains via Vaughn and El Paso, defendants could not efficiently implement such a reroute because they cannot currently make straight-on movements to make the requisite turns at East Vaughn. Defendants' mainlines cross at a 40-foot grade separation at Vaughn.[44] Defendants have an existing connection in the northeast quadrant of the crossing, but it is aligned to allow straight-on movements from east to south, not from west to south. As AEPCO appears to acknowledge, construction of a new

[44] *See* BNSF/UP Reply workpaper "Murphy Trip Summary.doc," page 10 (photograph of crossing). (The photograph refers to West Vaughn because this is how the crossing location is described in the UP track chart.)

connection to accommodate traffic moving from west to south therefore would be necessary before a Vaughn-El Paso reroute could realistically be implemented.[45]

ii. PRB Coal Reroutes

Defendants currently route AEPCO's coal and certain other coal traffic moving from mines in the PRB to destinations in Arizona via UP's line from Stratford, Texas, to Vaughn. In its opening evidence, AEPCO proposes to reroute that coal over BNSF's line from Stratford, through Amarillo, Texas, and Texico, New Mexico, to Vaughn. As AEPCO acknowledges, the proposed reroute is 91 miles longer than the existing route. AEPCO Opening Nar. at III-C-47.

In order to better quantify the inefficiencies associated with the reroute from Stratford to Vaughn, defendants modeled operations for the current and proposed routes using RTC simulations.[46] The simulations showed that, compared with a loaded coal train moving from Stratford to Vaughn using UP's line, a loaded coal train using the BNSF line through Amarillo and Texico would consume at least 2,400 additional gallons of fuel, an increase of 35 percent over the current route. In addition, transit times for the rerouted traffic would increase on the new route. The RTC simulations demonstrate that the estimated minimum transit time for AEPCO's proposed Stratford to Vaughn route would be approximately 24 percent longer than the estimated minimum transit time for the UP route. The terrain of the BNSF route includes the significant uphill move as trains move southwest out of the location where AEPCO has sited its North Amarillo Yard.

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[45] For a discussion of AEPCO's proposal regarding construction of a new connection at the East Vaughn location, *see* Section III.B.2.c. above.

[46] *See* BNSF/UP Reply workpaper "Route Comparisons.xlsx," "AEPCO PRB Scenario Reply-TPC.TPC" and "AEPCO Reply Scenario-TPC.TPC."

For present purposes, defendants do not contest AEPCO's selection of the longer route via Orin Junction, Wyoming, Wendover, Wyoming, and Guernsey, Wyoming, for the movement of coal trains between Donkey Creek, Wyoming and Northport, Nebraska. (AEPCO admits that this route is 6.1 miles longer than the route BNSF uses in the real world. AEPCO Opening Nar. at II-C-46.) The case AEPCO cites as support for its position on this re-route, *WFA/Basin II*, is now under appeal, and BNSF in that proceeding has challenged routing similar to that AEPCO advocates here. Were BNSF to prevail in that challenge, it reserves the right to argue here for the rejection of AEPCO's re-route to Northport of the PRB traffic.

iii. FXE Coal Reroute

AEPCO proposes to reroute what it characterizes as a BNSF-handled coal movement interchanged with FXE at El Paso, Texas, for delivery to destinations in Mexico. As explained above in Section III.A., however, {

} Any issues regarding rerouting of this traffic are therefore moot.

b. Fueling of Locomotives

Defendants believe that each locomotive fueling facility should have sufficient tanker trucks to accommodate direct-to-locomotive ("DTL") fueling in addition to permanent fueling platforms.[47] Given defendants' assumptions regarding use of a standard DPU configuration, efficiency concerns dictate that DTL be used at all fueling locations for fueling of DPU rear units (rather than respotting each train for rear engine fueling).

Moreover, as explained above in Section III.B.3.b., in view of AEPCO's proposal to use West Vaughn Yard and West El Paso Yard as significant refueling locations and the fact that

[47] For a discussion of issues relating to the location and adequacy of fueling facilities for ANR, ANR-PRB, and ANR-NM, *see* Sections III.B.3.b and III.C.1.b.

currently there is no pipeline at these locations, ANR will have to make some provision for the delivery of sufficient fuel to West Vaughn Yard and West El Paso Yard. An average of { } thousand gallons per day would be required for fueling operations at West Vaughn and { } thousand gallons per day for fueling operations at West El Paso. In order to provide for such operations, ANR would need to ensure a sufficient number of tank cars and locomotives for the transportation of fuel from Belen to West Vaughn and from UP's Dallas Street Yard to West El Paso Yard, as well as sufficient fuel unloading, storage, and ancillary facilities at West Vaughn Yard and West El Paso Yard.

c. Car Inspections

i. Inspection Locations

For a discussion of issues relating to the location of railcar inspection facilities for ANR, ANR-PRB, and ANR-NM, *see* Sections III.B.3.b and III.C.1.b.

ii. Inspection Procedures

Defendants accept AEPCO's assumptions set forth in its discussion of railcar inspection procedures. AEPCO Opening Nar. at III-C-52 to III-C-54.

d. Train Control and Communications

i. CTC/Communications System

Defendants accept AEPCO's assumptions set forth in its discussion of Centralized Traffic Control ("CTC") and communications systems (AEPCO Opening Nar. at III-C-54 to III-C-55), with several caveats.

First, while AEPCO states that its operating plan provides for "appropriately-spaced wayside signals" in its proffered CTC system (AEPCO Opening Nar. at III-C-54), AEPCO failed to incorporate any intermediate signaling into its RTC model on the tracks for which CTC has been designated. AEPCO's failure to input the complete CTC system called for by its operating

plan generates unrealistic RTC results by simulating train movements as if trains did not have to slow for signals. Trains must operate with some type of safe control system, either verbal radio blocks or an automated system such as CTC. The absence of signals in the RTC model allows trains to follow one another closely and increase capacity in a manner not practical on a real world railroad. In other words, the apparent oversight by AEPCO's experts improperly increases ANR's effective capacity. Moreover, without the correct signaling, AEPCO's RTC model cannot accurately determine whether (or where) passing sidings ought to be sited to maintain safe and fluid train operations. Such a simulation does not comport with real-world operating conditions. AEPCO's coding error results in artificially short cycle times, as well as an artificially low number of locomotives and railcars needed to serve the ANR traffic group, making ANR appear artificially more efficient.

Defendants have included intermediate signaling for CTC-qualified tracks in their RTC simulations. As a result of this (and other corrections), defendants' cycle times are greater than those produced by AEPCO's RTC model.

As explained above in Section III.B.4.b., for defendants' RTC simulations for the sub-SARRs, (1) the ANR-PRB line from Stratford to Vaughn will be equipped with a full CTC system; and (2) the ANR-NM line from Belen to Rincon will not be equipped with a CTC system, and will in effect be "dark" territory. The BNSF line between Pueblo and Stratford, over which ANR-PRB is assumed to use UP trackage rights, has approximately 47 miles of CTC and 37 miles of TWC/ABS; the balance is "dark" territory.

While defendants accept AEPCO's assumptions regarding one-person switch crews, such an assumption requires that each yard be equipped with power switches and remote control technology (as explained above in Section III.C.1.c.). Defendants therefore provide for

installation of power switches and remote control technology at all yards on ANR and the two sub-SARRS. This is both physically necessary and essential for minimizing yard dwell times.

ii. Dispatching Districts

Defendants accept some of AEPCO's proposed dispatching districts, but have revised AEPCO's proposal in some respects. Based on their experience with dispatching the traffic assumed by ANR, defendants provide for the following ANR dispatching districts:

Desk 1: *Huntley/Jones Junction, Montana to Campbell, Wyoming, plus the Dutch and Campbell Branches (267.1 miles).* This mileage figure, which is 26.1 miles greater than that stated in AEPCO's Narrative, is based on BNSF track charts. When trains from the Signal Peak Mine come online, this desk will also handle the segment from Mossmain, Montana to Walter Junction, Montana (an additional 32.95 miles). It is preferable to consolidate this activity on a single desk, rather than assign it to Desk 8, as AEPCO proposes. AEPCO Opening Nar. at III-C-56. This consolidation keeps continuity with the flow of traffic, and is feasible, since the additional traffic over this segment would not be of overwhelming volume.

Desks 2&3: *Campbell to East Guernsey, Wyoming (172 miles plus Reno Branch).* The addition of a second desk for this segment is based on BNSF's historical experience when it was the only railroad operating in this territory. As in the AEPCO proposal, the territory involved both single- and double-track lines. At that time, BNSF required two dispatchers to manage this territory efficiently.

Desk 4: *East Guernsey to Brush Center, Colorado (208 miles).* Same as AEPCO Desk 3.

Desk 5: *Brush Center to La Junta, Colorado (280 miles).* Same as AEPCO Desk 4.

Desk 6: *La Junta to Amarillo (254 miles).* Same as AEPCO Desk 5.

Desk 7: *Amarillo to Vaughn (242 miles).* Same as AEPCO Desk 6.

Desk 8: *Vaughn to Defiance, New Mexico (250 miles plus Lee Ranch Branch).* Same as AEPCO Desk 7.

Desk 9: *Vaughn to El Paso (229 miles).* Same as AEPCO Desk 8, except that the mileage has been reduced to reflect the shift to Desk 1 of the segment between Mossmain and Walter Junction.

Desk 10: *El Paso to Cochise (233 miles).* Same as AEPCO Desk 9.

For ANR-PRB, dispatching desks 1-4 would be the same as Desks 1-4 above. The remaining desks would be as follows:

Desk 5: *Brush Center to Pueblo, Colorado (207 miles).*

Desk 6: *Stratford to Vaughn*[48] *(250 miles).*

Desk 7: *Vaughn to El Paso (229 miles).*

Desk 8: *El Paso to Cochise (233 miles).*

For ANR-NM, the three dispatching desks would be as follows:

Desk 1: *Defiance to Belen (210 miles plus the Lee Ranch Branch).*

Desk 2: *Belen to Rincon (145 miles).*

Desk 3: *Deming to Cochise*[49] *(145 miles).*

AEPCO assumes that each dispatching desk will be responsible for dispatching in a single district, with one dispatcher three shifts per day, seven days per week. AEPCO Opening Nar. at III-C-55. Defendants accept these assumptions.

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[48] BNSF would have dispatching responsibility for ANR-PRB movements using trackage rights over the BNSF line between Pueblo and Stratford.

[49] SWRR has dispatching responsibility for ANR-NM movements between Rincon and Deming.

AEPCO contends that "[t]he ANR's operations are highly repetitive," again resting on the assumption that it "moves only complete trains with no intermediate switching (pick-ups or set-outs), [and] no local or wayfreight trains." AEPCO Opening Nar. at III-C-56. As discussed above in Section III.C.1., that assumption is overly simplistic.

iii. PTC Implementation Under RSIA

AEPCO admits that ANR is required under the Rail Safety Improvement Act of 2008 ("RSIA") to install a Positive Train Control ("PTC") system by December 31, 2015, but it included no capital or direct operating costs for implementation of RSIA's PTC requirements in its SAC analysis. AEPCO Opening Nar. at III-C-60. Instead, AEPCO posits that ANR would merely have a "PTC Implementation Group," supported by four employees with full-time responsibilities for PTC implementation. *Id.* at III-D-20 to III-D-21. AEPCO asserts that it excluded all other costs associated with implementing PTC because of the likelihood that the law will change. *Id.* at III-C-60. Defendants do not accept AEPCO's assumptions regarding PTC implementation. Defendants face a statutory mandate under RSIA to install PTC systems by December 31, 2015.[50] Moreover, defendants are currently taking substantial steps and

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[50] Specifically, Congress has required each Class I railroad to implement a PTC system by the end of 2015 on:

> (A) its main line over which intercity rail passenger transportation or commuter rail passenger transportation, as defined in section 24102 [of U.S. Code Title 49], is regularly provided;
>
> (B) its main line over which poison- or toxic-by-inhalation hazardous materials, as defined in parts 171.8, 173.115, and 173.132 of title 49, Code of Federal Regulations, are transported; and
>
> (C) such other tracks as the Secretary [of Transportation] may prescribe by regulation or order.

(continued...)

expending substantial resources to meet the statutory deadline. Defendants recently filed with the Federal Railroad Administration ("FRA") their federally mandated PTC compliance plans describing how they intend to fulfill their statutory obligations and install PTC as required by the end of 2015.[51] In fact, defendants have already committed significant funds to their PTC implementation efforts.[52] AEPCO could have chosen to configure its SARR not to trigger the statutory requirement to install PTC. Having chosen to benefit from traffic that triggers the requirement to install PTC, AEPCO cannot, consistent with SAC principles, avoid the associated costs merely by assuming away the statutory requirement.[53]

Rail Safety Improvement Act of 2008, Pub. L. No. 110-432, § 104(a), 122 Stat. 4848, 4856-57 (2008) (codified at 49 U.S.C. § 20157(a)(1)). Congress has defined the term "main line" to mean "a segment or route of railroad tracks over which 5,000,000 or more gross tons of railroad traffic is transported annually." *Id.*, 122 Stat. at 4858 (codified at 49 U.S.C. § 20157(i)(2)).

[51] BNSF submitted its PTC compliance plan on April 15, 2010. UP submitted its PTC compliance plan on April 16, 2010. These plans are included as BNSF/UP Reply workpapers "UP PTCIP.pdf" and "BNSF PTCIP.pdf."

[52] *See, e.g.*, http://www.up.com/investors/attachments/secfiling/2010/upc10k_021710.pdf at 26 (last visited Apr. 19, 2010) (SEC filing indicating that, "[i]n response to a legislative mandate to implement PTC by the end of 2015," UP intends "to spend approximately $200 million during 2010 on the development of PTC" out of a total implementation cost of $1.4 billion, which includes costs for installing the new system along our tracks, upgrading locomotives to work with the new system, and adding digital data communications equipment so that all parts of the system can communicate with each other); http://www.bnsf.com/investors/secfilings/10K_corp_2009.pdf at 15 (last visited Apr. 19, 2010) (SEC filing showing PTC investments as part of BNSF's total 2010 capital commitment of $2.4 billion).

[53] AEPCO acknowledges that "[t]he ANR will . . . fall under RSIA's PTC requirements" because it will be a Class I railroad whose traffic group includes "toxic-by-inhalation hazardous materials as defined by applicable DOT regulations," and because the December 31, 2015 deadline for PTC installation is three years before the end of the ten-year DCF period applicable to ANR. AEPCO Opening Nar. at III-C-57.

Defendants provide for capital investment to create an "overlay" PTC system in their calculation of road property investment for ANR, ANR-PRB, and ANR-NM.[54] The cost estimates that defendants include in their evidence reflect cost data developed by one of the defendants in the ordinary course of business to estimate the costs of complying with the congressional mandate to install PTC. However, a SARR would have important advantages over the defendants because it is being built with the most modern technology available. As one significant example, a substantial part of defendants' costs to install PTC will involve costs associated with installing PTC at locations that currently have older, relay-based signal systems rather than more modern, solid state technology.[55] Defendants' evidence in this proceeding assumes that AEPCO's SARR starts with modern signal and communications systems, so the costs of installing PTC on the SARR will be much lower than the costs that defendants are facing with respect to their own systems in the real world.

For the sake of simplicity, defendants have excluded the operational impacts of PTC installation from their RTC modeling efforts. As noted above, defendants provide for an "overlay" PTC system, which is the same type of system they will install to comply with the congressional mandate. An overlay PTC system is one that is overlaid on a railroad's standard signal systems, as opposed to a "standalone" or "moving block" PTC system.[56] While the latter

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[54] Defendants' cost calculations relating to PTC installation are discussed in Section III.F.6. PTC-related staffing issues are discussed in Section III.D.3.a.

[55] *See* BNSF/UP Reply workpaper "UP PTCIP.pdf" (UP PTC Compliance Plan, p. 7-5).

[56] Under a standalone PTC system, a train could receive movement authority between any two locations, rather than being constrained to the fixed block boundaries of conventional signaling. This might, at least in theory, allow reduced train spacing when one train is following another, thus effectively increasing train capacity. However, according to FRA, "the potential [economic] benefits of [a standalone system] have not yet been proven by actual implementation and field testing," and thus remain entirely theoretical. Federal Railroad Administration, North

(continued...)

type might be preferable in an ideal world – at least theoretically it has the potential to create economic benefits by increasing track capacity and reducing operating costs – the technology required for development of a pure standalone system does not yet exist.[57]

In contrast to a standalone PTC system, an overlay PTC system does not have the potential to increase track capacity because it does not remove the constraints on train operations imposed by existing signal systems; in fact, such a system can only degrade capacity because it imposes additional operating constraints. As FRA has explained:

> It should be noted that while moving block ('standalone') PTC has the potential to increase railway capacity and reduce headways, the integrated mode (or an overlay PTC system) cannot increase capacity—it can only degrade capacity and headway (due to braking algorithm margins and system delays) because it imposes additional constraints beyond those imposed by the conventional signaling system.[58]

The principle that a PTC overlay will degrade capacity and, as a result, imposes an additional economic cost on (rather than generating an economic benefit for) the installing railroad is uncontroversial. Inclusion of such a system in the RTC modeling process, however, would have introduced an unnecessary level of complexity to that exercise. In addition, the magnitude of the operational impact of the PTC overlay system is still uncertain at this stage.

American Joint Positive Train Control Project (Apr. 2009) at 14, *available at* http://www.fra.dot.gov/downloads/Research/ord0904.pdf (last visited Apr. 19, 2010).

[57] *See id.* (explaining that two enabling technologies necessary for obtaining the most significant (theoretical) economic benefits of standalone PTC are "unavailable," thereby necessitating reliance on conventional track circuits associated with the signaling system "to address train consist/integrity and broken rail detection in standalone mode").

[58] *Id.* at 17.

Defendants also exclude from their SAC analysis any potential safety-related benefits that installation of a PTC system might generate,[59] because it is clear that any such savings would be vastly outweighed by the future costs associated with the maintenance of such a system, and defendants have also excluded maintenance costs to simplify the analysis. FRA has systematically studied the costs and benefits of PTC, and its analysis shows that the costs to maintain PTC will outweigh any safety benefits that would potentially accrue to railroads from installing PTC.[60]

e. Miscellaneous Aspects of the Operating Plan

In Section III.D below defendants analyze and revise AEPCO's assumptions about locomotive maintenance facilities and procedures, equipment maintenance and procedures, operating personal requirements, and a maintenance-of-way plan. As discussed further in Section III.D.9.e below, defendants' method of developing operating statistics is more reliable than AEPCO's approach. AEPCO's method involves calculating operating statistics for the year 2018, then reducing those statistics back to 2009 levels. This approach introduces extra forecasting error. Defendants generate more reliable operating statistics because they derive 2009 statistics by adjusting from the April 2008 to March 2009 period.

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[59] Such savings may include reduced casualties, equipment damage, track damage, hazardous materials cleanup, evacuations, loss of lading, wreck clearing, and train delays.

[60] *See* Federal Railroad Administration, Positive Train Control Systems: Economic Analysis at 144 (July 10, 2009), *available at* http://www.fra.dot.gov/downloads/PTC_%20RIA_%20Final.pdf (last visited Apr. 19, 2010) (estimating annual maintenance costs and benefits and concluding that "[o]nce PTC is fully implemented, annual maintenance costs will be approximately $860 million, and the annual railroad accident prevention benefits will be approximately $90 million"); *cf.* AEPCO Opening Nar. at III-C-59 (noting the high cost-to-benefit ratio).

f. Differences in Operating Plan Prior to Start-Up of Operations North of Mossmain, Montana

AEPCO describes ways in which its ANR operating plan will differ in the first three years of service, before ANR begins to serve traffic north of Mossmain, Montana (the Signal Peak Mine). While each of AEPCO's proposed modifications appears reasonable, defendants question whether proposed modification one, the elimination of operating expenses for such trains, is entirely valid. As AEPCO concedes (AEPCO Opening Nar. at III-C-62 n.46), it has not re-run its RTC model to reflect the absence of these operations. Thus, it may be overstating the impacts on congestion and transit times. For similar reasons, AEPCO's evidence is insufficient to support its proposed modification six (the reduction of locomotive requirements by five units).

D. OPERATING EXPENSES

In Section III.D, AEPCO summarized the annual operating expenses of its SARR. AEPCO calculated total expenses for the base year of ANR operations (2009) of $753 million.[1] This amount equates to an operating expense of $0.007 per net ton-mile for the ANR traffic group, which is comprised of a wide variety of commodities traveling across different portions of the 2,200-mile ANR network. ANR's 2009 operating expense – seven mills per net ton-mile – is less than one-half of that adopted by the Board in past SAC cases. In this section, Defendants identify multiple understatements and omissions from AEPCO's evidence, and determine that total operating expenses for the ANR traffic group and network are $1.11 billion for 2009. Table III.D.1 summarizes the results by operating expense item for the NR, ANR-PRB, and ANR-NM networks.

[1] AEPCO Opening Nar. at Table III.D.1 and III.D.3; AEPCO Opening electronic workpaper "ANR Operating Expense.xls."

Table III.D.1
ANR 2009 Operating Expenses

($ in Millions)	AEPCO	REPLY ANR	ANR-PRB	ANR-NM
Locomotive Lease	{ }	{ }	{ }	{ }
Locomotive Maintenance	{ }	{ }	{ }	{ }
Locomotive Operations	266.2	336.6	163.9	75.7
Railcar Lease	81.5	84.0	49.6	46.4
Materials & Supply Operating	1.5	3.8	2.7	1.7
Train & Engine Personnel	122.1	141.5	87.7	30.3
Operating Managers	49.3	68.6	38.5	22.4
General & Administrative	28.3	62.2	40.8	45.5
Loss & Damage	2.7	2.7	2.2	2.1
Ad Valorem Tax	18.7	36.5	18.0	5.1
Maintenance of Way	60.2	142.0	83.9	33.6
Trackage Rights and Handling Charge	0.1	0.0	1.1	0.1
Intermodal Lifts	2.4	2.0	2.0	0.0
Texico Train Expense	0.1	0	0	0
Insurance	12.8	51.7	29.1	15.1
Startup and Training	35.4	60.4	40.9	18.8
Total	**$752.8**	**$1,113.3**	**$626.8**	**$325.4**

Source: BNSF/UP Reply electronic workpaper "ANR Operating Expense RR Reply.xls"

1. Locomotives

As explained in Section III.C above, Defendants accept AEPCO's proposal to use GE ES44-AC locomotives for road and helper service, and to use SW1500 units for yard switching and work-train service. As explained in detail in that section, however, AEPCO's understatement of the number of locomotives on a train, transit times, dwell times, peaking factors, and spare margins all resulted in lower locomotive counts than would be required to adequately power ANR trains carrying the freight in the SARR traffic group.

a. Leasing

AEPCO proposes that ANR would acquire all of its ES44-AC locomotives under the terms of a UP lease for this type of locomotive, and calculated an "annual average lease cost stated in 2009 dollars" of { }.[2] Defendants note that AEPCO initially calculated a much higher average annual lease payment,[3] which it then discounted to year 2009 dollars. Defendants accept the lower figure in 2009 dollars, with the understanding that it is to be input to the operating expense calculations in the SAC cost model and escalated for inflation throughout the SAC analysis period, *i.e.*, through 2018.

Defendants also accept AEPCO's annual lease price of $36,433 for SW1500 locomotives.[4] In light of Defendants' acceptance of AEPCO's annual lease costs, differences in the parties' locomotive acquisition costs relate solely to the calculation of the number of locomotives that are required, which Defendants explain in Section III.C. Applying AEPCO's lease costs to Defendants' fleets results in 2009 locomotive lease costs of { } million for ANR, { } million for ANR-PRB, and { } million for ANR-NM.[5]

b. Maintenance

AEPCO assumes that ANR will not provide the maintenance for its locomotives, but that a contractor will do so.[6] Having relied upon the costs from a UP lease to acquire ANR's ES44-

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[2] AEPCO Opening Nar. at III-D-4.

[3] AEPCO Opening electronic workpaper "ANR Loco Lease 20yr.xls."

[4] AEPCO Opening Nar. at III-D-4.

[5] BNSF/UP Reply electronic workpaper "ANR Operating Expense RR Reply.xls."

[6] AEPCO Opening Nar. at III-D-5–III-D-6.

AC units, AEPCO developed annual maintenance expenses for these units based on a *BNSF* agreement with GE Rail Service. In applying those costs, AEPCO significantly understated the amounts that it would pay GE for maintaining ANR's units under the terms of the agreement. Specifically, AEPCO used an annual total of { }, which is based on a contract rate of { } per mile, multiplied by the monthly minimum of { } miles, multiplied by 12 months.[7] While AEPCO calculated the minimum payment due, in fact, the ES44-AC units on its SARR would run significantly more miles than the monthly minimum.[8] As the contract on which AEPCO based its maintenance costs indicates, BNSF makes additional payments for mileages in excess of the minimum.[9] When the specific terms of the contract are applied to the actual mileages that AEPCO determined its ES44-AC units would run, ANR's annual maintenance cost for such locomotives { }.[10] The Board has previously adopted the approach of calculating the payments based on all the miles that SARR units will run, and not just the contract minimum, to determine the SARR locomotive maintenance expense.[11]

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[7] AEPCO Opening electronic workpaper "Copy of Maintcontrsummary.xlsx."

[8] AEPCO's operating expense workpaper identifies that its 336 ES44-AC units would generate more than 75 million LUMs in 2009, or an average of 18,000 miles per month, { } the mileage minimum on which it based its costs. AEPCO Opening electronic workpaper "ANR Operating Expense.xls."

[9] BNSF_AEPCO_0073772 through BNSF_AEPCO_0073786, included as BNSF/UP Reply electronic workpaper "GE BNSF Loco Mtce.pdf."

[10] BNSF/UP Reply electronic workpaper "ANR BNSF Contract Maintenance Reply.xls."

[11] *Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071 (STB served Jan. 27, 2006), at C-4.

For ANR's SW1500 units used for switch and work-train service, Defendants accept AEPCO's assumed annual maintenance cost of { }.[12]

AEPCO included a cost for locomotive overhauls, in addition to normal locomotive maintenance costs. Specifically, AEPCO developed an annual cost of { } per unit, based on an overhaul cost of { } from the same GE agreement that it used to develop the mileage-based expense.[13] While Defendants accept the cost of performing overhauls, they reject AEPCO's claim that ANR units will be overhauled every eight years. As indicated above, AEPCO's assumptions are that its locomotives will achieve significantly higher utilization than BNSF units actually experience. As the agreement on which AEPCO relies indicates that the timing of overhauls is a function of usage,[14] ANR can expect the frequency of overhauls to increase. Applying the contractual formula to AEPCO's locomotive usage suggests there will be { } years between overhauls, which would more than double AEPCO's annualized overhaul cost, to { }.[15] Applying the same contractual formula to Defendants' ANR-PRB and ANR-NM fleets results in overhaul frequencies of { } years.[16] As with the use of the actual SARR miles, calculating the overhaul costs associated with the higher usage of the SARR units follows Board precedent.

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[12] AEPCO Opening Nar. at III-D-5.

[13] AEPCO Opening Nar. at III-D-6.

[14] The GE agreement states that an overhaul will occur when a locomotive has been operated { }. BNSF_AEPCO_073786, included as BNSF/UP Reply electronic workpaper "GE BNSF Loco Mtce.pdf."

[15] AEPCO Opening electronic workpaper "ANR Loco Overhaul.xls."

[16] BNSF/UP Reply electronic workpaper "ANR Operating Expense RR Reply.xls."

Applying the corrected contract maintenance costs to the Defendants' ANR locomotive fleets results in the total locomotive maintenance costs shown in Table III.D.2 for ANR, ANR-PRB, and ANR-NM.

Table III.D.2
ANR 2009 Locomotive Maintenance Expenses

	AEPCO	REPLY ANR	ANR-PRB	ANR-NM
Number of ES44-AC Units	336	440	269	105
Annual Maintenance Cost per ES 44-AC Unit	{ }	{ }	{ }	{ }
Annual Overhaul Cost per ES-44AC Unit	{ }	{ }	{ }	{ }
Total Locomotive Maintenance Costs ($ in Millions)[17]	{ }	{ }	{ }	{ }

Source: BNSF/UP Reply electronic workpaper "ANR Operating Expense RR Reply.xls"

c. Fuel

As shown in Table III.D.1, fuel costs are the single-largest SARR operating expense, representing more than one-third of the total operating expenses for AEPCO's ANR. In determining this cost, however, AEPCO understated both the price ANR will pay for fuel at its fueling locations and the amount of fuel that will be consumed in powering ANR trains.

i. Fuel Costs

AEPCO calculated an average fuel cost from data provided in discovery regarding BNSF fueling locations "on the ANR route," and produced a result that was more than { }% below BNSF's reported fuel cost for the First Quarter 2009.[18] Although AEPCO's narrative suggests

[17] Totals in this line also include costs associated with SW1500 units.

[18] AEPCO Opening Nar. at III-D-7.

that AEPCO identified the cost for each of the ANR fueling locations based on BNSF's fueling cost for the same location, in fact AEPCO used BNSF costs from locations that are different from those where AEPCO proposed to fuel ANR locomotives.[19] Further, despite AEPCO's claim that it developed a weighted-average cost that reflects costs from a variety of locations,[20] its calculations reveal that *three-quarters of its average* is driven by the cost of fuel at BNSF's Belen Yard,[21] which is not even one of AEPCO's proposed ANR fueling locations. As explained in Section III.B above, the SARR's fuel costs were the subject of significant dispute in the earlier SAC case between AEPCO and the Defendants, with a primary focus on the difference between the costs of fuel that BNSF incurs in Belen – where BNSF's fueling activities are quite near a pipeline source – and the costs that would be required to get significant quantities of fuel to Vaughn – where most of the SARR locomotives were to be fueled under AEPCO's operating plan.[22]

As many of the circumstances remain the same today as they were at the time of the prior case – namely the challenges and costs of supplying a large volume of fuel in Vaughn, and the inapplicability of BNSF's fuel cost from Belen – Defendants follow a similar approach in this case to address the inadequacy of AEPCO's assumptions regarding the fuel costs ANR would

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[19] AEPCO Opening electronic workpaper "Fuel Consumption Summary.xls," tab "Price per Gallon."

[20] AEPCO Opening Nar. at III-D-7.

[21] Records produced to AEPCO in discovery indicate that the cost of fuel reported at Belen was more than { }% below the BNSF system average for the First Quarter 2009.

[22] Similarly, AEPCO's calculations in this case rely upon the assumption that half of its ANR trains are fueled at Vaughn.

incur. In addition, Defendants also address the specific costs associated with fueling ANR units in El Paso and fueling from DTL trucks, which AEPCO failed to incorporate into its calculations.

Vaughn. AEPCO has designated Vaughn as a major fueling location. In fact, given its location in the middle of the BNSF Transcon line that ANR replicated, and plan to fuel all non-coal trains in both directions, on the busiest line on its system, ANR would fuel more trains there than anywhere else. Notwithstanding these factors, and this issue's presence in the earlier case, AEPCO provided no plan (or costs) for fuel supply – and instead sought to use BNSF's fuel cost from Belen. ANR, like the "ACE" SARR that came before it in the earlier rate case, cannot simply assume that it could obtain the vast amount of fuel it would need at a *below-average* cost, without accounting for the 100-mile distance to Vaughn. Thus, in order to obtain fuel for BNSF's costs at Belen, ANR must also provide the necessary transportation, and facilities, to supply its Vaughn location. As in the earlier AEPCO case, Defendants determined that a tank-car operation from Vaughn would provide an effective solution. In order to accomplish this plan, and provide adequate fuel supply for ANR at Vaughn, ANR must pay for:

(1) the additional tracks at BNSF's Belen Yard necessary to load the tank cars;

(2) the tank-car shipments from Belen to Vaughn; and

(3) sufficient fuel storage capacity at Vaughn.

The first and third items on the above list were discussed in Section III.B above. Regarding the second item, Defendants identified a BNSF tariff applicable to shipments of

diesel, which indicated a rate of $1,620 per carload to ship from Belen to Vaughn.[23] As ANR would need to receive considerable volumes of fuel, Defendants reduce the rate to reflect a contract level.[24] This reduction resulted in an effective contract rate that ANR would incur of $1,411 per carload. Based on a tank-car capacity of 25,000 per carload, this charge equates to $0.056 per gallon. In addition to this cost, Defendants add the cost of the tank car, for which it used the same figure on which AEPCO relied to calculate the costs it would incur for moving ANR's traffic in tank cars. Defendants use a $0.011 per mile figure, loaded or empty, from AEPCO's workpaper, based on BNSF's 2008 private car hire amounts reported in the R-1.[25] For the 200-mile round trip to Vaughn, this represents $2 per carload, or less than $0.001 per gallon. In summary, to account for the additional transportation expense ANR would incur to ship BNSF's fuel from Belen, where BNSF obtains it at lower costs, to Vaughn, where ANR will be fueling locomotives on its trains, Defendants add $0.057 per gallon to the Belen cost.[26]

El Paso. AEPCO assumes extensive fueling operations in its El Paso Yard, through which significant volumes of ANR trains will move. El Paso was one of the ANR locations for which AEPCO used BNSF's fuel cost at Belen as a proxy.[27] In discovery, UP provided AEPCO

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[23] BNSF/UP Reply electronic workpaper "Diesel Tariff.pdf."

[24] Defendants reduce the rate by a 14.8% common-carrier adjustment that the Board adopted to account for differences between tariff and contract rates. *See U.S. Magnesium v. Union Pacific Railroad*, STB Docket No. 42114 (STB served January 28, 2010), at 18.

[25] AEPCO Opening electronic workpaper "ANR Car Costs.XLS."

[26] BNSF/UP Reply electronic workpaper "Vaughn and El Paso Fuel Supply Costs.xlsx."

[27] In its workpaper, AEPCO apparently seeks to support this substitution by referring to Belen as "the closest location to El Paso." In fact, the BNSF discovery materials from which

detailed records identifying the cost of fuel delivered to UP's existing fueling location in El Paso – Dallas Street Yard.[28] However, AEPCO did not construct ANR's lines to extend as far east as Dallas Street Yard. Because ANR's West El Paso Yard is 15 miles west of the Dallas Street Yard location, across the Rio Grande in New Mexico, to calculate the cost of fuel at West El Paso Yard, the additional cost of transporting the fuel to West El Paso must be added to UP's cost of fuel at Dallas Street Yard. To calculate the total costs associated with fueling at West El Paso Yard, Defendants follow a similar approach to the one they use to determine the costs ANR would incur to supply fuel to its Vaughn Yard; that is, they determine the amount of fuel that would need to be stored at West El Paso Yard and the costs of providing the fuel and the necessary transportation to get it there. UP records produced in discovery indicate that { } million gallons were delivered to Dallas Street Yard in 2008.[29] As ANR would fuel most of the UP trains that are currently fueled in El Paso, Defendants conservatively assume that ANR will be responsible for supplying one-half of that quantity, or { } million gallons.[30] Maintaining a 10-day supply at West El Paso Yard will require ANR to provide tank capacity for { } million

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AEPCO develop the fuel cost for Belen also included a fuel cost for El Paso, which was nearly { }% higher than that for Belen in the First Quarter 2009.

[28] UP-AEPCO-0059755 to UP-AEPCO-0059758, included in Defendants' workpaper "UP El Paso Fuel Purchases.pdf."

[29] BNSF/UP Reply electronic workpaper "UP El Paso Fuel Costs.xls."

[30] As with the fuel supply at Belen, this transported amount does not equal the total fuel for which ANR is responsible, as the fuel it pays for is based only on the LUMs traversed on ANR segments. ANR will need to have on-hand, however, an amount adequate to fuel trains for their through movement on the lines replicated by the ANR and beyond (*e.g.*, to Los Angeles or Kansas City), as UP does today.

gallons. Also, shipping { } million gallons of fuel in 25,000-gallon tank cars will require { } annual carloads. For each shipment, ANR will incur a $470 rate for shipping the fuel,[31] and also a $0.011 cost per mile, loaded or empty, for the tank car.[32] In total, ANR will incur costs of { } million to ship { } million gallons of fuel from downtown El Paso to its West El Paso Yard location. Defendants add this expense of { } per gallon to UP's actual cost of fuel in El Paso, as reflected in documents produced in discovery.[33]

(a) DTL

In addition to fueling trains at its West Vaughn and West El Paso yards, ANR will also employ DTL fueling for units on certain trains that along their route of movement do not traverse a fixed fueling location, either on the ANR's or the residual Defendants' lines. As explained in Section III.B and III.C, certain northbound PRB coal trains will receive DTL fueling at Donkey Creek, and westbound New Mexico coal trains will be fueled from trucks at Defiance. Transportation costs can contribute significantly to the total cost of lower-volume fueling operations; for example, BNSF materials produced to AEPCO in discovery indicate that transportation added { }% to the total fuel cost at Gallup in the First Quarter 2009.[34] To

[31] Defendants assume that the transportation rate for shipments to West El Paso Yard is one-third the adjusted tariff rate for shipments from Belen to Vaughn, described above.

[32] As explained above, Defendants use an average BNSF tank car cost per mile from AEPCO's Opening electronic workpaper "ANR Car Costs.xls."

[33] BNSF/UP Reply electronic workpaper "Vaughn and El Paso Fuel Supply Costs.xlsx."

[34] BNSF discovery file "BNSF Fuel Cost Data (BNSF_AEPCO_0026337).xlsx," included as BNSF/UP Reply electronic workpaper.

develop ANR's fuel expense, Defendants incorporate the BNSF fuel costs at such locations from the same discovery materials on which AEPCO relied to develop its ANR fuel expense.

For their ANR-PRB and ANR-NM scenarios, Defendants apply the site-specific fuel costs produced in discovery for each fueling location, *i.e.*, Guernsey, West El Paso, and Donkey Creek (DTL) for ANR-PRB, and Belen and Defiance (DTL) for ANR-NM.[35]

ii. Fuel Consumption

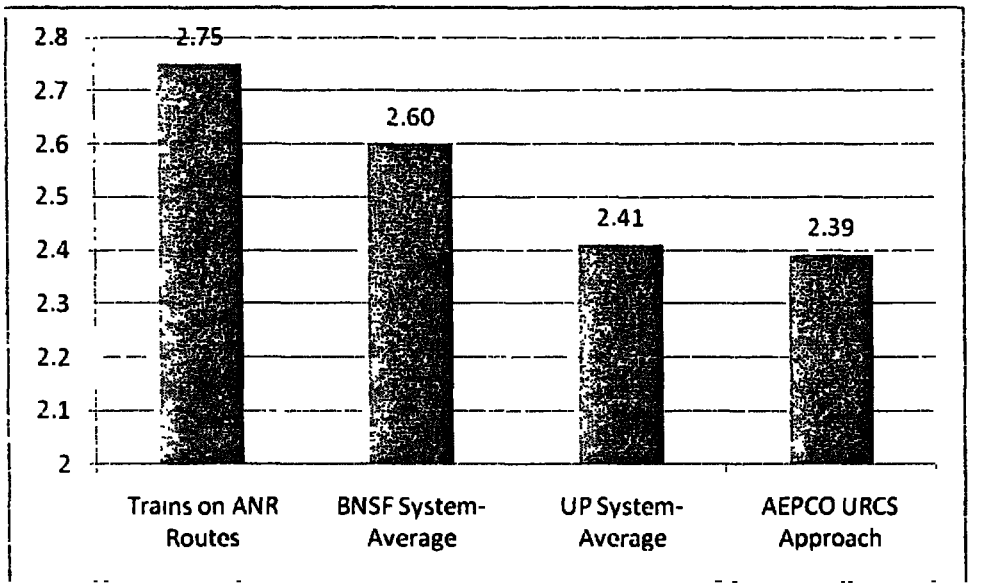
AEPCO developed fuel consumption factors based on URCS inputs that resulted in a fuel consumption rate of 2.39 gallons per locomotive unit-mile.[36] AEPCO failed to explain why its calculated BNSF and UP system-average URCS-based factors are relevant for estimating fuel consumption for the units powering ANR trains, let alone preferable to the specific fuel consumption amounts for the units that power the Defendants' trains that AEPCO selected – information that Defendants produced to AEPCO in discovery. The fuel consumption records produced in discovery incorporate the actual consist sizes, train sizes, and terrain of the specific routes that AEPCO replicated for its SAC analysis. The following table shows that when the discovery records for train movements on the ANR routes are summarized, ANR trains – dominated by heavy coal trains and high-speed intermodal trains, each of which requires sufficient power to meet the operating and service requirements – consume more fuel than system-average levels, not less, as AEPCO somehow managed to conclude from using non-specific URCS factors. The Board has previously rejected the use of non-specific URCS factors in favor of more specific figures for the actual trains handling the SARR traffic group moving

[35] BNSF/UP Reply electronic workpaper "Locomotive Operating Expenses.xlsx"

[36] AEPCO Opening Nar. at III-D-8.

over the lines replicated by the complainant as more reflective of the fuel consumption rates that the SARR would experience.[37]

Table III.D.3
Fuel Consumption per LUM



Source: BNSF/UP Reply electronic workpaper "Locomotive Fuel Consumption Rates.xlsx."

d. Servicing (Sand and Lubrication)

AEPCO relies upon locomotive servicing expenses reported in the BNSF 2008 R-1 report to produce costs for its SARR of $0.063 per LUM for road units and $0.610 per LUM for switch units.[38] As AEPCO applied these costs to corresponding LUM totals, which were virtually all (99%) generated by road units, its overall ANR locomotive servicing cost was $0.067 per LUM. AEPCO offered no explanation for why it excluded UP's servicing costs. Further investigation revealed two factors that indicate that AEPCO's costs are understated. First, under the same R-

[37] *AEP Texas North Co. v. BNSF Ry.*, STB Docket No. 41191 (Sub-No. 1) (STB served Sept. 10, 2007), at 46.

[38] AEPCO Opening Nar. at III-D-7.

1-based approach, the UP servicing expenses were $0.157 per LUM, or more than twice the costs on which AEPCO relied.[39] Second, review of the BNSF R-1 figures that AEPCO used indicate that the servicing expense (a) understates the expense for "Materials, Tools, Supplies, Fuels, or Lubricants," in part because BNSF does not report its Lube Oil expense to that line; and, (b) due to the fact that the "costs" for all other servicing activities are reported as a net credit to BNSF, suggests that AEPCO presumes that ANR *would be paid* to service locomotives.[40] When the Materials, Tools, Supplies, Fuels, or Lubricants expense is adjusted to include BNSF's Lube Oil costs, the BNSF-based expense is much closer to UP's reported expenses. Specifically, BNSF confirmed that it incurred { } million in lube oil expenses in 2008. These amounts are reported not to the R-1 locomotive servicing expense accounts on which AEPCO relies for its cost, but to Line 202 of Schedule 410, Locomotive Repair & Maintenance.[41] As described above in the prior section, AEPCO uses certain costs from the GE maintenance agreement in lieu of BNSF system locomotive maintenance expenses. As that agreement indicates that {

}. Thus, the cost of lube oil must be included with ANR's servicing expense. Adding BNSF's lube oil costs to the 2008 BNSF expenses that AEPCO used results in a First Quarter 2009 servicing cost of { } per LUM, within { } of UP's

[39] BNSF/UP Reply electronic workpaper "III-D-1 Servicing cost RR Reply.xls."

[40] AEPCO's servicing cost is based on a BNSF account total of $36.4 million, which reflects $48.6 million in salary and wage expenses, $2.2 million in Materials, Tools, Supplies, Fuels, or Lubricants, and a $14.3 million *credit* for Purchased Services. AEPCO incorporates this credit to produce a lower ANR servicing expense.

[41] BNSF/UP Reply electronic workpaper "BNSF Lube Oil.pdf."

figure. Defendants rely upon this figure to develop the locomotive servicing expenses for road units in their ANR, ANR-PRB, and ANR-NM scenarios.[42]

2. Railcars

AEPCO develops the costs of freight cars by presuming owned, foreign, and private equipment.[43] Defendants accept the full service lease rates that AEPCO used for owned equipment, and the mileage rates it developed for foreign and private equipment. Defendants also accept AEPCO's spare-margin requirement for freight cars, but they reject AEPCO's understated peaking factor, as explained above in Section III.C. Applying AEPCO's approach and the corrected peaking factors to Defendants' traffic groups for ANR, ANR-PRB, and ANR-NM produces the car costs summarized in Table III.C.1 above.

3. Personnel

a. Operating

i. Staffing

(a) Train & Switch Crew Personnel

As described in Section III.C, Defendants accept AEPCO's crew districts for ANR. Defendants also generally accept AEPCO's approach to develop the personnel necessary to meet ANR's road crew requirements, with two exceptions. First, AEPCO fails to account for the

[42] Further confirmation that AEPCO's ANR costs do not include lube oil expenses is provided by the BNSF-GE maintenance agreement from which AEPCO developed ANR locomotive maintenance expenses, {

}. BNSF/UP Reply electronic workpaper "GE BNSF Loco Mtce.pdf."

[43] AEPCO Open Nar. at III-D-8-11.

directional imbalance of trains on the ANR lines. Second, AEPCO has understated the proportion of crews that will exceed the Hours of Service law, and require a relief crew.

Unlike unit-coal trains, the non-coal trains that ANR selected do not move in equal proportions across a crew district in each direction. As AEPCO relies extensively on ANR crews' working in "straightaway" service – where the crew works a shift in one direction, from Point A to Point B – a different number of trains by direction creates considerable logistical challenges, and additional costs, for crew assignment. Further, AEPCO's assumption that crews work 270 shifts a year – a very high level of utilization – does not allow crews much if any time to frequently be re-positioned.[44] To address this challenge, and avoid the infeasible outcome of an excess of crews ending up on one end of the network, while a shortage exists on the other, Defendants determined the number of crewpeople necessary to work the number of trains in the predominant direction for each segment, and the costs of deadheading crews either back to their home terminal or in the direction of the shortage.[45] AEPCO's failure to account for this significantly understates the costs of providing sufficient road crews to handle the ANR trains.

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[44] In fact, AEPCO's crew staffing calculations make no allowance for the actual locations of the trains, and assume simply that the number of crew people equals the number of trainstarts divided by 270. By ignoring location across a 2,200-mile network, AEPCO's approach employs an infeasible level of fungibility regarding where crews would actually be needed for ANR trains.

[45] This adjustment must consider imbalances on individual segments, as differences in opposite directions would typically not offset, due to the long distance between terminals. For example, if there were an excess of trains moving west between El Paso and Cochise, and moving east between Defiance and Vaughn, the result would be too many crews in El Paso and in Vaughn, not a balanced crew base.

Second, AEPCO incorporated a re-crew percentage of 1.0%,[46] based on the proportion of train runs in the RTC model that exceeded 12 hours. This estimate is understated for a number of reasons. One is that the results of AEPCO's RTC model fail to incorporate properly key factors that affect train time, as described above in Section III.C. Also, the number of trains that AEPCO determined as exceeding the hours of service is further understated through its failure to account for sufficient crew time beyond the actual train departure and arrival. AEPCO's analysis allowed for only 30 minutes of crew time beyond actually operating the train. Crews have extensive check-in requirement, paperwork, and often transport to or from train assignments,[47] that could easily consume more than 30 minutes. Further, the vast majority of ANR trains are interchanged with a foreign road. Thus, ANR must have a significant degree of coordination with their interline partners regarding train deliveries, or allow for crews to be on duty at interchange locations in advance of the train arrival, if not both. Finally, AEPCO's re-crew percentage is understated due to its exclusive reliance on the results of the RTC simulation, a model that optimizes train flows and fails to reflect the day-to-day vagaries of actual railroad operations. In order to address these concerns, and incorporate a more realistic estimate of re-crew requirements, Defendants apply relief crews to 1% of the trains on SARR lines that replicate the BNSF Transcon, *i.e.*, between Amarillo and Defiance, and 4% on the remainder of

[46] AEPCO Opening Narrative at III-D-13.

[47] For example, AEPCO's operating plan assigns crews to work in straightaway service between Guernsey and the PRB mines, which requires each crew to be taxied to or from the mine.

the SARR. These figures are lower than the actual re-crew rates Defendants incur on the same lines in the real world, as identified in the workpapers.[48]

Regarding yard crew assignments, Defendants generally accept AEPCO's assumptions, and add a second yard job 24x7 at N. Amarillo and Texico, and another job during the day shift at Guernsey. Regarding helper crew assignments, Defendants remove the Big Lift/Palmer Lake helper, by operating its coal trains in 2x2 DP configuration, and add the Sheridan/Parkman helper in Wyoming. Regarding helper crews, the frequency of trains requiring help in the PRB is lower for Defendants' ANR, due to the additional power, allowing for the provision of only one helper consist, rather than the two that AEPCO dedicated, at one of the helper locations.

AEPCO provided for twelve-hour shifts for ANR switch crews. However, Messrs. Kotter and Murphy believe that twelve-hour shifts for one-person crews present significant safety concerns. Requiring a twelve-hour shift for an engineer working alone – particularly at the locations where AEPCO assumes only one assignment per shift, leaving only one crew member working the entire yard – would greatly increase the risk of an accident due to fatigue.[49] Further, the Board has previously rejected the assumption that crews scheduled to work twelve-hour shifts each day would work 270 shifts per year.[50] AEPCO has offered no arguments to address the considerable safety concerns associated with a crewperson's working 3,240 hours

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[48] BNSF/UP Reply electronic workpaper "BNSF Recrews.ppt."

[49] Switch locomotives do not have a system that stops the unit if the engineer is disabled or falls asleep.

[50] *AEP Texas North Co. v. BNSF Ry.*, STB Docket No. 41191 (Sub-No. 1) (STB served Sept. 10, 2007), at 48.

annually, alone. Thus, Defendants provide for eight-hour shifts for switch crews. For many of the same safety reasons, Defendants' operating witnesses similarly conclude that ANR's one-person helper crews – who AEPCO also assumes average 270 shifts per year – should work only eight-hour shifts, rather than twelve-hour shifts.

Based on applying the adjustments discussed above to its own train volumes, Defendants determine total crew employees for each of ANR, ANR-PRB, and ANR-NM, as summarized in Table III.D.4 below.

Table III.D.4
ANR 2009 Crew Requirements

	AEPCO	REPLY ANR	ANR-PRB	ANR-NM
Road Crews	874	834	511	195
Switch Crews	32	57	39	9
Helper Crews	12	14	14	0
Work Train Crews	0	10	6	2
Total	918	915	570	206

Source: BNSF/UP Reply electronic workpaper "ANR Operating Expense RR Reply.xls."

(b) Non-Train Operating Personnel

AEPCO concluded that ANR would need 465 non-train operating personnel.[51] AEPCO estimated the 2009 cost of those employees (including a 39.8% fringe benefit factor) to be approximately $121 million.[52] For compensation levels, AEPCO relied largely upon salary data from BNSF's Wage Forms A and B, which it indexed to First Quarter 2009 and added fringe benefits, as was done for T&E crew personnel.

[51] AEPCO Opening Nar. at III-D-14, Table III.D.2.

[52] *Id.* at III-D-24, Table III.D.3.

Defendants' operating experts Murphy and Kotter reviewed AEPCO's staffing level and determined that it would be insufficient to safely manage the operations of a railroad as large and complex as ANR. Defendants have created an Operating management structure that would be the most efficient, least-cost structure for ANR, ANR-PRB, and ANR-NM. The organization is described below.

Vice President-Transportation. Defendants agree with AEPCO's staffing of one Vice President and two administrative assistants for ANR, and would staff identically for ANR-PRB. Staffing for ANR-NM would include one Vice President and one administrative assistant.

Director Operations Control. Defendants agree with AEPCO that two Directors of Operations Control would be required for ANR and ANR-PRB. One Director of Operations Control would be sufficient for ANR-NM.

Managers and Assistant Managers – Train Operations. These positions represent the front line management of ANR. AEPCO provides for a total of fourteen of these positions spread out across the entire 2,200-mile ANR network. AEPCO claims these positions are not 24/7 positions, but would be on call if needed. In fact, ANR does require 24/7 management, which must come from the Managers – Train Operations ("MTO's") and Assistant Managers – Train Operations ("AMTO's"). AEPCO's proposed staffing level of fourteen is insufficient to handle the responsibilities which, in addition to those outlined by AEPCO, would include conducting safety meetings, interpreting rules and policies, managing personal injuries, and managing the drug and alcohol testing of crews. In addition, these positions would be responsible for non-planned activities, including investigations, disciplinary actions, depositions, trials, etc. Staffing levels also need to reflect that AMTO's will be relatively inexperienced

employees with minimal transportation experience. In part, the AMTO position is a training position for operation management employees.

To meet the front line management needs of ANR, Defendants add five MTO's, including one at every location except Denver. Further, Defendants add six AMTO's, including two at each of Guernsey and Vaughn, and one at each of Denver and El Paso. This will allow for better coverage around the clock, as there will be four total in each territory in ANR's northern and southern portions, three in Denver, and five in each of the two territories along the very high-density BNSF Transcon line that ANR replicates. In addition, since these front-line managers will have to respond to unplanned events on the line of road, having more managers available in more locations will mitigate the amount of travel time required. Defendants decrease to 15 total positions – 7 Managers and 8 Assistant Mangers of Train Operations – for ANR-PRB, by eliminating the 10 positions along the BNSF Transcon line. For ANR-NM, Defendants provide an MTO and AMTO in each of Defiance, Belen. and Deming, with only an AMTO in Cochise.

Terminal Managers. AEPCO provides for no management at terminals. Considerable activity takes place within ANR yards and will require supervision and management. Terminal Managers are responsible for all activities within their yard limits, primarily the switching and classification of cars into blocks and trains, the operation of trains through the yard limits, and the removal/replacement of bad-ordered equipment. Defendants provide for five terminal managers for ANR, two for ANR-PRB, and one for ANR-NM.

Manager of Locomotive Operations. AEPCO provides for only six Managers of Locomotive Operations ("MLO's"). AEPCO's proposed staffing suggests that AEPCO does not

understand the regulatory and managerial responsibility of these positions. The FRA requirement for training and riding with locomotive engineers could physically not be met with six MLO's. Qualification on ANR is complicated by the operating plan requirement that engineers be qualified for more than one district. Also adding to the qualification burden is the fact that so many trains employ Remote Control Locomotives (RCL), which have additional qualification requirements. Based on staffing ratios for UP and BNSF, ANR would require one MLO for every 60 engineers, which equates to a minimum of fifteen MLO's to meet the management obligations and FRA requirements of the position. Defendants are extremely conservative in setting the staffing level at fifteen for ANR. Staffing is set at ten for ANR-PRB, and at four for ANR-NM.

Manager of Yard Operations. With the addition of the Terminal Manager positions, Defendants accept AEPCO's proposed Manager of Yard Operation staffing of twenty-five for ANR. For ANR-PRB and ANR-NM, Defendants provide for staffing of ten and five managers, respectively.

Crew Management. AEPCO provides for one Director and nine crew managers to handle the crew calling activities of ANR. This provides insufficient coverage to allow for two people to be on duty 24/7. AEPCO incorrectly assumes that the crew management function involves nothing more than calling crews. In fact, crew management includes significant planning and managerial responsibilities. The managerial responsibilities include not just the management of the individuals, but also issues such as hiring, training, discipline, and testing. Some of these functions are required 24/7, even though Defendants do not provide for 24/7 management coverage in this reply evidence. Defendants provide for two managers of crew management to

assist the Director for ANR and ANR-PRB. AEPCO also ignores that crew management includes a planning function that requires 24/7 coverage. Planners are not crew callers, but plan for the need for crews at different locations. They manage deadheading and balance crew forces to handle surges due to MOW work, derailments, floods, etc. Defendants conclude that ANR and ANR-PRB require a planning position active on a 24/7 basis, which requires a staffing level of five. Due to the size and scope of ANR-NM, crew management staff can be limited to one Director and one 24/7 position, which would require staffing of five.

Dispatch. This function critical to the safe and expeditious operation of a railroad is staffed by AEPCO with forty dispatchers and no managers. Defendants agree with AEPCO's geographical grouping of Dispatch into nine desks, but find that the Guernsey desk (ANR's Desk #2) would need to be split into two separate desks, for a total of ten, because the Guernsey desk would cover ANR's extensive PRB operations, including coordination of mine loading with both BNSF and UP, as well as interchanges with BNSF at different locations, more support is required. Also, AEPCO's staffing of forty people for nine desks 24/7 provides insufficient staff to account for off-duty time, such as illness, vacation, and jury duty. In addition to this unplanned off duty time, there would be planned off-duty time to allow for rules classes, reviews and tests, and road trips to familiarize the dispatcher with territory. Defendants conclude that, as each desk would require individualized knowledge of the specific territory, five employees would be required for each to cover the 24/7 obligation. Thus, fifty dispatcher positions would be required to staff the ten dispatch desks. Similarly, ANR-PRB would require eight dispatch desks, with forty dispatchers, and ANR-NM would require three dispatch desks, with staffing of fifteen.

As mentioned above, AEPCO provides for no management of the dispatch function. As with the crew management function, there are certain planning and managerial aspects that require staffing. There are two specific managerial functions that must be addressed. First there is a need for direct supervision of the people doing the work. This includes direct supervision, scheduling and planning for vacancies, both known and unknown, and filling in to cover unexpected absences. This level of management needs to be on duty 24/7. Defendants conclude that ANR would need two such positions, which would require staffing of nine. ANR-PRB and ANR-NM would each require one position, with a staffing requirement of five. Second, the dispatch function needs to coordinate and interact with operations management to set train priorities as well as understand the tactical needs of the railroad service plan. As with the direct supervisory management, these functions are required 24/7. Defendants conclude that ANR would need two such positions, which would require staffing of nine. ANR-PRB and ANR-NM would each need one position, which would require staffing of five.

Defendants also conclude that the dispatch center would require a manager of Dispatch Practices. This person would be a rules expert who could perform efficiency tests as mandated by FRA, manage hours of service issues with dispatchers, and manage the drug testing program.

Operating Rules, Safety and Training. Defendants accept AEPCO's proposed staffing of one director and two managers for ANR. Defendants propose the same staffing for ANR-PRB, and staff only a director for ANR-NM.

Locomotive Distribution. AEPCO makes no provision for management of ANR's locomotive fleet. Locomotives represent a lease cost to ANR in the neighborhood of $40 million, or nearly 5% of total operating expense. No business would allow that large a portion of

its total cost to go unmanaged. The locomotive fleet needs to be appropriately sized. Planning must be undertaken to be certain that all inspections are met. Routine maintenance must be planned with locomotives being positioned in an appropriate manner to receive maintenance. Since ANR will have nearly all of its power in run through pools, considerable effort would be required to manage and optimize those relations. ANR will perpetually have some part of its fleet off line at all times, but it must have the required number of locomotives on line to originate the coal traffic on its line. Defendants conclude that, at minimum, this function would need to be staffed by a director to handle the strategic aspects of the task, and a 24/7 manager to handle the tactical aspects of locomotive planning. The latter function would require staffing of five.

Vice President - Engineering. Defendants accept AEPCO's staffing of a Vice President – Engineering and an Administrative Assistant, and they also include these two positions for each of ANR-PRB and ANR-NM.

Vice President - Mechanical. Defendants accept AEPCO's staffing of a Vice President – Mechanical and an Administrative Assistant, and they also include these two positions for ANR-PRB. For ANR-NM, this Vice President position will be combined with the Vice President-Engineering immediately above, and only one Administrative Assistant will be needed.

Mechanical Services. AEPCO provides for one Director of Mechanical Services. This is a broad-ranging managerial position with responsibility for managing both the locomotive and freight car service requirements of ANR. ANR leases both locomotives and freight cars, and enters into agreements with contractors to provide the maintenance. This position would be responsible for not just managing the maintenance responsibilities within ANR, but also managing relations with the lessors. To procure the best lease deals requires ANR staff to have

close and managed relations with all the potential lessors. Defendants believe this is too broad a scope of responsibilities for one person to handle effectively. Defendants propose two Directors: one to manage the service requirements of locomotives and manage relationships with the lessors, the second to do the same on the freight car side. Defendants also provide for two Directors for ANR-PRB, and they conclude that one Director would be adequate for ANR-NM. To help manage the maintenance responsibilities, both planned and unplanned, the relationship with the contractor, Defendants also provide for a Manager of Locomotive Maintenance for ANR and ANR-PRB. Maintenance requirements are more complicated for locomotives than for freight cars and require more attention to these details.

Testing & Environment. Defendants accept AEPCO's staffing of two managers of Testing and Environment.

Car Maintenance Management. AEPCO suggests a staff of 352 car inspectors, but provides for no management. It is unreasonable to assume that 352 inspectors with a payroll of $24 million and utilizing over $100,000 in equipment would be allowed to function with no management or supervision. Defendants propose a foreman position to handle all supervisor issues including staffing, scheduling, training, discipline and safety. Each crew would be managed by a foreman. In addition, there would be two foremen to supervise the remote Carmen. This results in total staffing of twenty-two for ANR. Defendants propose nine foremen for ANR-PRB and five foremen for ANR-NM. In addition, AEPCO overlooked that the need to staff a higher-level managerial function to cover issues including management of the foremen, interacting with other operating management for planning purposes, strategic issues, and supporting the operating plan for service. Defendants staff this responsibility with one car

manager per location. That would result in staffing of five for ANR, two for ANR-PRB, and one for ANR-NM.

Car Inspectors. Defendants accept AEPCO's staffing of 352 car inspectors at ANR yards. In addition, Defendants propose that ANR employ crews of remote carmen to respond to cars bad-ordered on the line. These two-person crews would be assigned to the ten districts on ANR, each covering a territory of more than 200 route miles, resulting in staffing of twenty. This function would require staffing of sixteen on ANR-PRB and six on ANR-NM.

The following table summarizes the non-train operating personnel requirements for AEPCO's ANR and Defendants' ANR, ANR-PRB, and ANR-NM.

Table III.D.5
ANR Non-Train Operating Personnel

	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Transportation Department				
Vice President -- Transportation	1	1	1	1
Administrative Assistant	2	2	2	1
Director of Operations Control	2	2	2	1
Manager of Train Operations	6	11	7	3
Assistant Manager of Train Operations	8	14	8	4
Terminal Manager	0	5	2	1
Manager of Locomotive Operations	6	15	10	4
Manager of Yard Operations	25	25	10	5
Director of Crew Management	1	1	1	1
Assistant Director of Crew Management	0	2	2	0
Crew Manager	9	9	9	5
Manager of Crew Planning	0	5	5	0
Director of Dispatch	0	9	5	5
Manager of Dispatch	0	9	5	5
Manager of Dispatch Practices	0	1	1	1
Dispatchers	40	50	40	15
Director of Operating Rules, Safety & Training	1	1	1	1
Managers of Safety & Training	2	2	2	0
Director of Locomotive Distribution	0	1	1	0
Manager of Locomotive Distribution	0	5	5	5
Transportation Total	**103**	**170**	**119**	**58**
Engineering Department				
Vice President -- Engineering	1	1	1	1
Administrative Assistant	1	1	1	1
(other personnel included elsewhere)	xx	xx	xx	xx
Engineering Total	**2**	**2**	**2**	**2**
Mechanical Department				
Vice President -- Mechanical	1	1	1	0
Administrative Assistant	1	1	1	0
Director of Mechanical Services	1	2	2	1
Manager of Testing & Environmental	2	2	2	1

Manager of Loco Maintenance	0	1	1	0
Car Manager	0	5	2	1
Car Foreman	0	22	9	5
Parts Inventory	0	5	2	1
Billing	0	2	2	1
Inspectors	352	373	157	85
Mechanical Total	**357**	**414**	**179**	**95**
Grand Total	**462**	**586**	**300**	**155**

Source: BNSF/UP Reply electronic workpaper "Operating Personnel.xls."

ii. Compensation

AEPCO developed the compensation for ANR train and engine ("T&E") crews using the average that BNSF reported in its 2008 Wage Form A&B. This average, which reflects the salaries of more than 10,000 crewpersons,[53] is not an appropriate basis for ANR compensation, due to the higher utilization that AEPCO assumes its crews will achieve. The Board has found in past cases that "employees working more hours would command more compensation,"[54] and the same logic apples here. Defendants performed a study of the BNSF and UP T&E payroll records to identify the proportion of employees that worked 270 shifts, and the average compensation they received. The study indicated that only approximately { } of BNSF and UP T&E crewpeople achieve 270 shifts in a year, and their average compensation is { }.[55] Defendants follow Board precedent and incorporate the compensation level for extraordinarily

[53] AEPCO Opening electronic workpaper "ANR Salaries.xlsx."

[54] WFA/Basin v. BNSF Railway, STB Docket No. 42088 (STB served September 10, 2007), at 47. *See also PSCo/Xcel v. BNSF Railway*, STB Docket No. 42057 (STB served June 7, 2004) at 68.

[55] BNSF/UP Reply electronic workpaper "RR T&E Crew Salary Data.xls."

highly-utilized BNSF and UP crews as a better estimate of the wage expense ANR would incur in attracting and retaining T&E crewmembers expected to work 270 shifts.

In addition to train and engine crews, AEPCO develop the compensation for other operating personnel, summarized in its Table III-D-3. Defendants accept the per-person compensation figures that AEPCO used for these positions with one exception. As explained in the following section regarding General & Administrative expenses, Defendants conclude that AEPCO's limitation to only salary compensation for the Vice Presidents at KCS Railway is inadequate, and they instead develop a measure of total compensation for these VPs of $1.1 million to apply to similar positions on ANR. For those positions that AEPCO excluded and Defendants added, Defendants rely upon the comparable compensation for other positions at the same level, *e.g.*, all Directors receive the $123,900 figure that AEPCO assumed. Table III.D.6 summarizes total compensation for non-T&E operating department employees.

Table III.D.6
ANR 2009 Non-T&E Operating Department Compensation

($ in Millions)	AEPCO	REPLY ANR	ANR-PRB	ANR-NM
VP Transportation	$0.5	$1.6	$1.6	$1.5
Line Operations	4.9	7.6	4.1	1.9
Operations Staff	4.6	8.6	6.9	3.5
Mechanical	24.8	30.1	13.7	7.9
VP Engineering	0.4	1.2	1.2	1.2
Total	**$35.2**	**$49.1**	**$27.6**	**$16.0**

Source: BNSF/UP Reply electronic workpapers "ANR Personnel.xlsx," "ANR PRB Personnel.xlsx," and "ANR NM Personnel.xlsx."

iii. Materials, Supplies, and Equipment

AEPCO developed a $1.5 million expense for materials, supplies, and equipment for operating personnel.[56] Defendants accept AEPCO's unit costs for these items, but require greater numbers of these items, in light of their larger staffs and fleets. Defendants also include in this expense car trucks for the remote carmen, described above in the section on Car Inspectors. These trucks are hirail-equipped, and carry sets of wheels, hydraulic car jacks, welding equipment, re-railing equipment, blocks, and come-alongs.[57] In addition to the trucks, applying AEPCO's costs per unit to the higher headcounts of the ANR, ANR-PRB, and ANR-NM results in total materials, supplies, and equipment expenses of $3.8 million, $2.7 million, and $1.7 million, respectively.[58]

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[56] AEPCO Opening Nar. at III-D-26.

[57] BNSF/UP Reply electronic workpaper "Cartruck.tif."

[58] BNSF/UP Reply electronic electronic workpapers "ANR Personnel.xlsx," "ANR PRB Personnel.xlsx," and "ANR NM Personnel.xlsx."

b. Non-Operating/General & Administrative

The general and administrative ("G&A") category encompasses essential core functions that support the management of an enterprise, including governance, strategic planning, employee relations, internal controls, and fiscal activity. Most G&A functions are the direct result of a company's need to comply with a legal, regulatory, administrative, or commercial requirement. For example, a major company must track and comply with all federal, state, and local statutes and regulations that pertain to its business. A railroad like ANR must ensure compliance with regulations specific to railroads, such as those governing security procedures and the transportation of hazardous materials. It must conduct its economic activities in accordance with Generally Accepted Accounting Principles and follow the rigorous compliance requirements of the Sarbanes-Oxley Act of 2002 ("SOX").[59]

In addition, a railroad like ANR must manage even ordinary business practices like hiring and firing in compliance with strict guidelines, such as those involving background checks and Homeland Security. It must administer a variety of employee programs, ranging from training to benefits administration to workers' compensation. It will need to acquire customers, maintain customer relationships, sell its transportation services, and administer payments. It must assess and manage risks and control losses. It must monitor, implement, and manage any changes in Federal Railroad Administration ("FRA") safety regulations, such as hours of service rules. It must provide efficient corporate governance, adhere to organizational principles, and manage local relations. A railroad like ANR must create and continually manage a comprehensive and proactive

[59] While not a publicly traded entity, ANR will require significant financing. Investors will very likely require that it conform to SOX requirements.

environmental program, not only to comply with Environmental Protection Agency ("EPA") regulations, but also to ensure good customer and community relations. All companies—and railroads in particular—must provide a high level of security for their assets, employees, and the freight they transport. Managers and employees alike must be trained in legal requirements that affect their work, and information systems are often required to ensure compliance.

These substantial G&A demands apply to any efficient large transportation company. However, AEPCO glosses over them in its opening evidence. AEPCO describes ANR as a small railroad without the need for a large organization to cover functions, and it repeatedly claims — without evidence — that the type of traffic ANR handles (primarily coal unit train and intermodal traffic) requires less G&A activity than other types of traffic. However, ANR is in fact a large Class I railroad that annually transports 5.6 million total carloads, covers 2200 route miles, and generates $2 billion in annual revenue. The $28 million AEPCO posits for ANR's G&A staff, a number that includes all information technology ("IT") costs, is less than 1.2 percent of its total revenue and less than four percent of its total costs. This level is excessively low for a railroad of ANR's size and complexity. As shown below, it is far below the levels for railroads of comparable size, such as KCS. Defendants propose a total G&A expense for ANR of $63 million, a level that still accounts for only 3.2 percent of ANR's gross revenue and less than 6 percent of its total costs.

While AEPCO provides a reasonably complete view of the appropriate G&A functional areas, it fails to identify the work volumes that these functional areas would cover. Nor does AEPCO include any scaling or benchmarking analysis to suggest that the proffered staffing levels could handle the volume of work required. By contrast, Defendants' evidence is grounded in real-world experience and, as much as possible, analyzes the work volume by examining the level of

activity that drives that work volume. Based on that analysis of work volume, Defendants derive the number of individuals necessary to provide G&A staffing for ANR, ANR-PRB, and ANR-NM.

In determining the proper number of employees for these SARRs, Defendants have attempted to minimize layers of management to create a least-cost, efficient railroad. However, some level of management is needed in order to establish direction, allocate tasks, and monitor employee performance, and Defendants have provided for management positions where they appear essential to the efficient functioning of the SARR.

At the staff level, Defendants have identified metrics that, in the judgment of their experts, would drive the need for staff positions. Defendants have not sought to replicate their own staffing philosophies. But their analysis recognizes that the volume of work to be done within various functions drives the number of staff positions needed to produce efficient railroad performance. For example, the volume of car accounting work is ordinarily driven by the number of carloads a railroad handles. Thus, for a number of SARR functions Defendants have performed a scaling analysis (starting with the volume of work a single employee handles at BNSF or UP) to help determine how many workers would be needed to support a particular function for the SARR. For each function, Defendants have considered whether the nature of the SARR's operation (primarily a bridge carrier), its traffic mix (primarily coal and intermodal), its geography (more limited area to cover than BNSF or UP), or other factors would require adjustment to the analysis.

Defendants also assume that the SARRs will include integrated computer systems to support the G&A functions, which is the only way low staff levels can be maintained. AEPCO's ANR, on the other hand, uses out-of-the-box system modules that are not (and cannot be) wholly integrated into a larger system, and thus would require significantly higher levels of manual intervention. Furthermore, Defendants identify all of the external requirements with which ANR would have to

comply — including state and federal laws — and the staff required to conform to those requirements. AEPCO disregards these important external requirements in its opening evidence.

Defendants' analysis of G&A expense requirements was developed by Richard W. Brown. Mr. Brown, a Director with FTI Consulting, has 28 years of experience working in the North American railroad industry, for BNSF and predecessor carriers. While at BNSF, Mr. Brown gained significant experience managing functional reorganizations and implementing technological solutions to streamline administrative functions. For the last ten years, he has managed rail carrier strategic planning and merger and acquisition studies at FTI. In developing Defendants' G&A expense requirements, Mr. Brown relied on extensive interviews and discussions with managers from both Defendants to generate information for the G&A analysis.

i. Staffing Requirements

The table below summarizes AEPCO'S ANR headcounts and Defendants' G&A staffing plan for ANR, ANR-PRB, and ANR-NM.

Table III.D.6
G&A Staffing Summary

Functional Area	Headcount			
	AEPCO	Reply ANR	ANR-PRB	ANR-NM
EXECUTIVE	4	4	4	4
MARKETING	5	28	13	15
Customer Service	14	91	46	70
FINANCE & ACCOUNTING	3	3	3	3
Treasury	3	3	3	3
Controller	10	92	56	58
Car Accounting	2	6	3	5
Purchasing	3	7	7	5
LEGAL & ADMINISTRATION	9	17	7	6
Environmental	0	2	2	1
Police	0	8	7	4
Human Resources	3	13	13	11
IT	13	41	38	33
Total	69	315	202	218

(a) Executive Department

Defendants accept AEPCO's assumptions set forth in its discussion of Executive Department staffing requirements (AEPCO Opening Nar. at III-D-30 to III-D-31).

(b) Marketing and Customer Service

ANR transports over five million cars annually for a customer mix that includes Defendants' most important intermodal customers operating in several of the most important rail corridors. AEPCO nevertheless assumes that ANR could function with a Marketing and Customer Service Department of only 19 employees. Under AEPCO's proposal, a Director of Marketing and Customer Service would manage a department consisting of just four marketing managers and 14 customer service managers. AEPCO asserts that "the bulk of the marketing function" could be outsourced. AEPCO Opening Nar. at III-D-32. This assertion is both unsupported and unreasonable. No railroad of ANR's size and complex mix of traffic could realistically outsource

the marketing function. Moreover, the consulting firm AEPCO identifies to handle ANR's marketing function has no experience handling such an unprecedented outsourcing assignment. And AEPCO's proposed level of resources for ANR's customer service function is plainly insufficient to cover all of the essential daily requirements of an operation of ANR's scope and complexity.

A Marketing and Customer Service staff that is sized adequately to perform the required functions would require the following personnel at a minimum.

Vice President – Marketing and Customer Service. AEPCO proposes that ANR's Director of Marketing and Customer Service report to the Vice President – Transportation. AEPCO Opening Nar. at III-D-31. To ensure that the customer perspective is represented along with that of the internally-focused operations function (which is led by a Vice President), the chief commercial officer should be elevated from the Director level to a Vice President – Marketing and Customer Service. The chief commercial officer would then have a position comparable to the Vice President – Transportation. An organizational relationship of equals between the commercial and operating functions is a key characteristic of all railroads with annual revenues in excess of $100 million, as well as virtually all other types of network transportation businesses in North America, such as less-than-truckload and truckload motor carriers, inland barge, and third-party logistics providers.[60] Major railroads that depend on significant flows of intermodal traffic (such as ANR) require a greater focus on the customer service function than a Director level chief commercial officer would provide

[60] Kansas City Southern, for example, has an Executive Vice President of Sales and Marketing. http://www.kcsouthern.com/en-us/KCS/Pages/DirectorsandOfficers.aspx (last visited Apr. 27, 2010).

As the chief commercial officer, the Vice President – Marketing and Customer Service is responsible for overseeing revenue-generating activities selling customers a transportation service. The Marketing Department supports all aspects of this primary business endeavor, while the Customer Service Department is the customer's main point of contact and directs customers to the appropriate resource to resolve any operational issues.

The Vice President – Marketing and Customer Service will have an administrative assistant to help with the management of the Vice President's substantial responsibilities.

Sales and Marketing Staff. ANR will require a staff of marketing managers to handle strategic and tactical relations with customers. To develop these staffs, Defendants analyzed the experience of the BNSF and UP marketing staffs and scaled the workforce based on the revenue collected in the coal and intermodal business units.[61]

For staffing related to coal transportation, Defendants reviewed { } levels, which are slightly lower than those of { }. This results in a staff of three coal market managers for ANR two for ANR-PRB, and one for ANR-NM.

For intermodal transportation, an analysis based on carload volume might be a better indicator of total workload.[62] However, Defendants again use revenue as a metric, starting with { }levels that are slightly lower than those of { }. These assumptions are quite conservative, given that ANR will need to market to both the UP and the BNSF domestic intermodal customer

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[61] This scaling analysis is reflected in BNSF/UP Reply workpaper entitled "Staffing Levels.xls." In general, Defendants began their analysis by examining the railroad with the smaller staffing level for a particular function.

[62] An analysis based on carload volume would produce significantly higher staffing levels, as ANR and ANR-NM will both handle more containers than either BNSF or UP over the lines in question. The corridors at issue include the BNSF Transcon (which handles all BNSF intermodal traffic to and from all points in California) and the UP Sunset Route (which handles most UP intermodal traffic to and from southern California).

bases which do not overlap. This analysis produces a staff of two intermodal Directors and eleven intermodal market managers for ANR; one intermodal Director and three intermodal market managers for ANR-PRB; and one intermodal Director and four intermodal market managers for ANR-NM.

Defendants assume that the Directors and managers allocated to coal and intermodal will be able to handle the sales and marketing responsibilities for the much smaller agricultural and industrial traffic sectors.

Marketing Administration Managers. ANR's G&A budget includes an annual outsourcing cost of $260,000 for "Marketing and Contract Administration," which AEPCO estimates would be equivalent to the cost of full-time coverage by four marketing and contract administration personnel.[63] Defendants agree that ANR, ANR-PRB, and ANR-NM would need full-time personnel to administer contracts and tariffs, activate prices in internal systems, interface with RAILINC, administer refunds and suspended bills, and maintain reference files. However, this function should not be outsourced. Marketing Administration Managers will have access to highly sensitive commercial data and will need to work closely with BNSF and UP marketing managers to ensure that rates are available to customers in a timely manner. An in-house marketing administration staff, co-located with other commercial employees, will have better access to essential commercial information. AEPCO can point to no rail carrier or other transportation company with revenues in excess of $100 million that outsources this critical function.

Moreover, this function will be particularly important to ANR due to its very significant volume of interline traffic. This requires that all rates be maintained in an electronic format that can

[63] AEPCO Opening electronic workpaper "ANR GA Outsourcing.xls."

be used in the settlement process. Failure to maintain rates in electronic format will result in significant loss of ANR revenues, making ANR totally dependent on BNSF and UP to accurately maintain and properly bill all interline traffic. The fact that ANR traffic is both forwarded and received adds to the complexity of the settlement process and the potential for errors.

Defendants have analyzed Marketing Administration staffing requirements with reference to railcar volume, which is the best metric for determining workload in this area. For most of this traffic other than coal unit trains, each car will be settled separately based on origin, destination, commodity, and customer. Distance that a railcar has traveled is irrelevant for contract and tariff administration purposes; a car handled for a short haul in a run-through intermodal train will require the same amount of work as a car handled for 2000 miles in local service on BNSF or UP. Analysis based on railcar volume results in a staff of nine Marketing Administration Managers for ANR, four for ANR-PRB, and six for ANR-NM.

Customer Communications. AEPCO fails to provide for a customer communication function. However, ANR derives significant revenue from its largest, most service-sensitive intermodal customers, who require up-to-date information. To interact with these customers, BNSF and UP have developed very sophisticated methods of direct pro-active customer communication, including email and internet-based applications, systems that can communicate new or changed service offerings, service problems and embargoes, and other important information that these and other customers require. Defendants have adjusted the staffing requirements for this function by railcar volume, and have also reduced the figures further to reflect a lesser degree of sophistication. This analysis resulted in a staff of one Customer Communications employee for ANR, ANR-PRB, and ANR-NM.

Customer Service Managers. AEPCO proposes an ANR customer service staff of 14 Customer Service Managers. It does not specify what functions these employees will perform, but it is clear that this is far too few employees to meet the needs of ANR's customers, particularly its diverse intermodal customer base. A staff of 14 is barely adequate to cover the problem-solving aspects of customer service, such as addressing lost cars, delays, switching, bad orders, and car supply issues. AEPCO's Customer Service staffing plan overlooks many other essential customer-related requirements, such as preparing work orders for the traffic tendered to ANR, reporting car status information to the transportation and revenue staff, inputting and managing bad orders, preparing and submitting required hazardous materials reports, and other critical information requirements. There is a high volume of such work on a major railroad, and BNSF and UP have over 350 workers assigned to these functions. Defendants have analyzed the customer service function by examining { } staffing levels ({ }'s Customer Service Department is somewhat smaller than { }'s) and adjusted for several factors. Defendants believe that railcar volume is the most accurate metric for analysis of this function (as the work performed by the group is driven by this volume). This factor would dictate a high staffing level, because ANR will handle more intermodal units than either BNSF or UP. However, Defendants have conservatively modified the analysis to reflect the fact that cars are on ANR for less time and fewer miles than is generally the case for UP.[64] Moreover, prior to performing the analysis, Defendants removed from the UP staffing numbers those positions that are not primarily involved with coal and intermodal customer service. Defendants assume that any customer service needs of agricultural or industrial customers can be accommodated by the customer service staff dedicated to the coal and intermodal sectors. Applying

[64] BNSF/UP Reply electronic workpaper "Staffing levels.xls," Tab "Customer Service UP."

these conservative assumptions, Defendants have concluded that ANR will require a total customer service staff of 91, ANR-PRB will require a total of 46, and ANR-NM will require a total of 70.[65]

This total includes an Assistant Vice President – Customer Service to head the Customer Service operation and staff organized into four sub-groups, for intermodal, billing services, call center, and operations support. The intermodal sub-group handles issues that involve the very important intermodal customer base. The billing services sub-group handles accessorial billing, diversions, holds, customer railcar issues, and maintenance of customer master files. The call center sub-group handles manual waybills, resolves electronic data interchange ("EDI") errors or inconsistencies, and functions as the first-level problem resolution unit. The operations support sub-group handles work orders, interline EDI errors or inconsistencies, interchange reporting, and bad orders.[66] These four sub-groups (which function on a 24/7 basis) will be staffed by a total of 69 individuals for ANR, 30 for ANR-PRB, and 51 for ANR-NM. One individual from each sub-group will fill a shift director position, to provide leadership on a 24/7 basis.

The four subgroups will require a variety of support functions. Dedicated e-commerce staff will assist customers with all aspects of ANR's EDI program (involving bill of lading inputs and shipment tracing, for example), and will support the Customer Communications team mentioned above by troubleshooting any issues with the customer website. The e-commerce team will have

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[65] Defendants' assumptions are quite conservative in view of the fact that the majority of ANR and ANR-NM carloads are intermodal, a sector that has the highest demand for service of any traffic. With intermodal traffic, it is theoretically possible that as many as six different parties will be making inquiries: shipper, consignee, beneficial owner at both origin and destination, and dray man at both origin and destination. ANR will have greater customer service demands than either UP or BNSF because it will transport shipments for existing customers of both UP and BNSF, and there is minimal overlap between the domestic customer bases of the two railroads.

[66] Most of the activity supporting coal service customers will be handled by the operations support sub-group.

overall responsibility for the development and implementation of all EDI and internet-based functions (such as maintaining customer log-on profiles and passwords in a secure manner). E-commerce staffing for customer service will be eight for ANR, four for ANR-PRB, and six for ANR-NM.

Defendants also provide for a railcar management support function within Customer Service. This group will handle the management needs of ANR's railcar fleet, including managing private railcars used in coal service, monitoring and scheduling railcar maintenance, negotiating bilateral agreements for car-hire on system railcars, and other railcar management functions. Defendants calculate a railcar management staff of four for ANR, two for ANR-PRB, and three for ANR-NM.

The ANR Customer Service Department also includes an administrative support team that has responsibility for budgets, staffing, training, data security, and hazardous materials certification. Applicable regulations require that even billing clerks dealing with hazardous material commodities be thoroughly trained and certified in the complex rules governing such materials. Another important function is the development, implementation, and maintenance of overall data security measures, as required by SOX and Homeland Security directives. The latter directives require that transportation data be held to the highest level of security to guard against terrorism. Since this data is widely accessed by the customer community, the railroad must be able to determine exactly who is making any particular inquiry. The support sub-group will require a staff of five for ANR, ANR-PRB, and ANR-NM.

(c) Finance and Accounting Department

AEPCO provides for a Finance and Accounting Department consisting of 21 employees. Under its proposal, the Vice President – Finance and Accounting heads the department and has an Administrative Assistant/Secretary, a Treasurer, a Controller, a Director of Budgets and Purchasing,

and a Director of Internal Auditing, with various support positions reporting to these sub-department heads. Defendants agree that AEPCO accurately describes the appropriate functional areas, but it again fails to describe the work volumes that these functional areas would be required to handle and greatly underestimates both the number of staff required and the IT tools the staff would need.

On the IT side (discussed further below), AEPCO suggests that ANR's Finance and Accounting Department will be equipped with an accounting product called Peachtree, which will perform all of ANR's accounting and finance functions (such as the crew calling system and payroll). This product is an off-the-shelf, stand-alone product that would not and could not be integrated with other important ANR functions, and thus would do little to accomplish complete automation of the railroad's accounting functions. Defendants provide for use a fully-integrated software system that will allow ANR's accounting employees direct access to other ANR systems to facilitate their work on taxation, revenue accounting, STB and SEC[67] reporting, disbursements, purchasing, and budgeting functions.

As detailed below, Defendants' experts have concluded that the total minimum Finance and Accounting Department staffing requirement for a company of ANR's size and complexity is 111 employees. ANR-PRB's Finance and Accounting staff should have 72 employees, while ANR-NM's should have 74.

Vice President – Finance and Accounting. Defendants agree with AEPCO that ANR's Finance and Accounting Department should be headed by a Vice President – Finance and

[67] As discussed below, a least-cost efficient ANR would almost certainly issue publicly-traded debt because the significantly lower cost of public debt vis-à-vis private debt would far outweigh the cost of compliance with additional regulatory obligations.

Accounting (or Chief Financial Officer), and that the Vice President should have a dedicated Administrative Assistant. AEPCO Opening Nar. at III-D-34–III-D-35.

Treasury Function. Defendants accept AEPCO's proposal that ANR's treasury function could be managed by a three-person team consisting of a Treasurer, an Assistant Treasurer, and a Cash Manager. *Id.* at III-D-35–III-D-36.

Controller Function. AEPCO proposes that ANR's controller function would be headed by a Controller, who would be assisted by four Assistant Controllers for Revenue Accounting, Disbursements, Taxes, and Financial Reporting. Defendants agree that the Controller and these four Assistant Controllers form an appropriate leadership team for the controller function. However, AEPCO provides for just five "Analyst/Clerks" to execute the substantial responsibilities that fall within the controller function. This is plainly insufficient. AEPCO has produced no benchmark analysis or other comparable railroad data to suggest that such a small staff could handle revenue accounting, financial reporting, taxes, disbursements, and property accounting for a Class I railroad with $2 billion in annual revenue and (by AEPCO's estimate) nearly $7 billion in assets. Defendants describe below how the revenue accounting, disbursements, taxes, and financial reporting functions should be staffed.

AEPCO's failure to staff the controller function adequately will lead to at least one significant problem. ANR would be unable to comply with basic SEC regulations, including Securities Act filing and registration requirements and SOX procedures. AEPCO asserts that ANR would not be a publicly traded company, but even if ANR were a private company it would still be

subject to SEC/SOX regulations and reporting requirements if its debt obligations were publicly traded (as they presumably would be).[68]

Revenue Accounting. AEPCO states that the Assistant Controller – Revenue Accounting "oversees all customer and interline freight billing and collection, and is also responsible for supervising billing for demurrage, storage, and easements and utility crossings, as well as inputting contract and tariff rate and payment terms into the ANR's billing system." AEPCO Opening Nar. at III-D-36. However, AEPCO proposes only one full-time and one part-time clerk to assist with this function. *Id.* at III-D-37. Two clerks could not possibly carry out all these functions for a 2200-mile, $2 billion annual revenue, five million-plus carload railroad, particularly given that AEPCO assumes use of only an off-the-shelf, non-integrated accounting product designed for small or medium-size businesses. ANR, ANR-PRB, and ANR-NM will need sufficient Revenue Accounting staff to ensure the accurate and timely reporting of all operating revenue; to resolve issues and exceptions regarding interline settlements, waybills, and supplemental bills; to interact with auditors assessing SOX-mandated internal controls; and to monitor and estimate all revenue-related and receivable reserves pursuant to Financial Accounting Standards guidelines.

Defendants have reviewed work volumes for these functions at BNSF and UP and developed staffing appropriate to the SARR workloads based on a variety of metrics, including railcar volume,

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[68] By raising capital in public debt markets, a borrower obtains access to dramatically larger investor pools that can buy and sell publicly issued debt instruments. If ANR did not issue publicly traded debt it would face significantly higher interest costs; private debt interest would be at least 0.25% higher than public debt interest (and likely more). For every $1 billion in debt, a 0.25% higher interest rate would equate to annual pre-tax costs of $2.5 million per year, meaning that an entity like ANR that would issue over $2 billion in debt would pay at least $5 million in additional interest costs simply by issuing private debt instead of public debt. The cost of private debt thus far outweighs the incremental regulatory cost of complying with SEC/SOX controls and filing and reporting requirements. The "least cost-most effective" option is for ANR to issue publicly-traded debt.

revenue, assets, miles of track, and number of employees. Experts in the functional area confirmed that each of the metrics Defendants used was appropriate to the analysis. For Revenue Accounting, Defendants provide for a total of 46 employees for ANR, 21 for ANR-PRB, and 37 for ANR-NM.

The primary driver of these headcounts is ANR's choice to be an interline carrier, which entails collecting a revenue division from other Class I railroads, and using the Association of American Railroads' Interline Settlement System ("ISS") to handle intercarrier settlements. AEPCO apparently believes that using revenue components of the ISS system somehow makes it unnecessary to provide for any staffing to assist the billing and settlement process. This is incorrect. The ISS system requires that ANR staff maintain up-to-date rates in computerized form. Originating railroads enter into the ISS system from an automated rate database the revenue billed and the amount the carrier believes is due each shipper on the route. ANR staff will need to review each shipment to ensure ANR is being allocated the correct amount. ANR will also need to maintain a rate database containing information that can be compared to what the originating carrier provides. ANR staff must resolve instances when these amounts do not match (a not infrequent occurrence).

ANR will have a large volume of work relating to the ISS process because it handles such a large number of interline cars. The table below sets forth the number of carloads that UP tracks in ISS compared with the number ANR, ANR-PRB, and ANR-NM will have.

Table III.D.7
Carloads in Interline Settlement System

Railroad	Thousands	Percentage Difference
UP	1,557	
ANR	5,590	+ 359%
ANR-PRB	2,636	+ 47%
ANR-NM	4,593	+ 174%

UP maintains a staff of eight (using a fully-automated system) to handle ISS disputes. Assuming the same rate of non-matched bills, ANR would require 37 people to handle this workload, ANR-PRB would require twelve people, and ANR-NM would require 22 people.

ANR could not afford to reduce this staff because ignoring non-matching bills would cause a significant decline in ANR revenue. The Table below sets forth the amount of revenue captured by UP's ISS dispute staff. Of the more than { } that UP settled through ISS in 2009, over { } was recovered through revenue auditing.

Table III.D.8
Union Pacific 2009 ISS Settlements

Initial Billed Amount	Settlement Amount	Variance Amount	Variance Percentage
{ }	{ }	{ }	{ }

Disbursements. AEPCO provides ANR with an Assistant Controller – Disbursements who will be "responsible for overseeing all accounts payable and payroll processing, issuing vendor payments, advising the Vice President and Treasurer on cash requirements, and reviewing all contracts with outside suppliers." AEPCO Opening Nar. at III-D-36. However, AEPCO provides only one clerk to assist with this function. *Id.* at III-D-37. Defendants' expert team has reviewed comparable work volumes for these functions at BNSF and UP and estimated SARR workloads based on railcar volumes or track mileage, depending on the item at issue. Billing for fuel and other supplies related to train operation unit costs depends on railcar volume. Most other expenditures should be scaled by track mileage, which is a more accurate metric for measuring work volume with regard to payables such as utility bills (utility bills comprise a significant portion of non-unit-cost payables). Each grade crossing or utility bill is charged separately and therefore needs to be paid

separately. Analyzing in light of these factors, Defendants staff the disbursements function with eight individuals for ANR, four for ANR-PRB, and six for ANR-NM.

In addition to vendor payments, the Disbursements group will handle timekeeping and payroll functions. AEPCO suggests that use of the Peachtree and Paychex products would eliminate the need to staff these functions. However, Paychex is a check-writing system that requires specific inputs from the user. Peachtree could handle simple time and attendance, but ANR will require a system for determining various employee entitlements (such as basic pay, overtime) based on a variety of factors (such as number of trains worked). While ANR would not be subject to the complex labor agreements to which most Class I railroads are held, it will still face a wide variety of payroll issues requiring resolution. Railroad retirement requires reporting on all aspects of employee work status, while withholding, garnishment, and other issues all require some level of manual intervention regardless of system sophistication. In order to cover those functions adequately, Defendants have staffed the disbursement function at levels of eleven for ANR, eight for ANR-PRB, and four for ANR-NM.

Tax Function. AEPCO provides that ANR's Assistant Controller – Taxes and one Analyst/Clerk would manage the outsourcing of ANR federal income tax returns, state income tax returns, state sales and use tax returns, and ad valorem property tax returns. Even accepting AEPCO's proposal to use outside tax preparation services, ANR would still require sufficient internal staff to manage this function effectively. ANR will be responsible for filing a large number of tax returns. For reference, BNSF files 90 tax returns covering just the territory of the BNSF lines ANR. [69]

[69] BNSF/UP Reply electronic workpaper "AEPCO SARR tax returns.xls"

ANR will need staff to provide information to outside vendors, respond to information requests, review draft tax returns, and generally oversee the work of outside vendors. More significantly, ANR will need staff to respond to audits by state and federal authorities. The railroads' experience in the western states is that audits are a regular and routine occurrence and that staff must be available to assist. For example, in any given year, BNSF would anticipate about 20 audits (not including IRS) including: state income; sales and use; excise and property.[70] Companies as large as ANR might expect IRS to be on site full time. AEPCO's opening evidence ignores this important function. Staffing required to perform this function is driven primarily by the number of states in which a railroad has rights-of-way. Defendants propose to staff this function at eleven people for ANR, eleven people for ANR-PRB, and two people for ANR-NM.

Property Accounting. AEPCO does not provide any staff to handle accounting for fixed assets, instead simply stating that a "financial accounting computer is used to track all of the ANR's physical assets and asset replacements." AEPCO Opening Nar. at III-D-37. A computer, however, cannot track and account for fixed asset additions and retirements without employees who can properly administer fixed assets and operate the computer system. While an automated system will calculate depreciation expense once assets are established in the system, the system itself cannot set up entries for assets or determine whether an asset entry is correct. Defendants therefore include a Property Accounting group as part of the ANR tax function.

Tracking property depreciation expense is only one of the critical functions for which ANR's Property Accounting group would be responsible. Individual construction projects require monitoring and proper classification to ensure accurate financial reporting, and individual cost

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[70] BNSF/UP Reply electronic workpaper "AEPCO tax audits.pdf."

components must be reviewed to ensure that they are properly classified as operating/maintenance expense or new capital assets. As new assets are constructed, old assets must be identified and properly retired. ANR's Property Accounting staff must perform analysis and prepare account reconciliations to ensure accurate and timely reporting, and must generate journal entries to record depreciation and reconcile adjustments. This work — which will often require coordination with other departments (such as Engineering and Mechanical) — is essential to the process of accounting for fixed asset activity for purposes of financial reporting and taxation.

Furthermore, Class I railroads are required to perform life studies for equipment assets every three years and for road and track assets every six years. *See* 49 C.F.R. Part 1201, Instruction 4-2(b). Development of these studies requires accurate fixed asset addition and retirement records. Once these studies are completed, they are filed with the STB for review and approval. After reviewing UP and BNSF Property Accounting staff levels, Defendants have concluded that ANR and each sub-SARR would require one person each for the property accounting function.

Equipment Accounting. AEPCO proposes one Manager of Equipment Accounting to manage car hire and receivable issues, using RMI as the car hire system. As with many of its other technology assumptions, AEPCO significantly understates the need for human participation in this critical process. RMI provides a car hire system that could track ANR cars off the ANR system and non-ANR cars on the ANR system, and compute charges due ANR from other railroads and the ANR's payables to other railroads, but this system is not automatic. A single individual could not handle the activities involved in the car accounting function, which includes numerous accounting interfaces (accounts receivable, accounts payable, R-1 Schedules 414 & 755, tax reporting, journal entries, general ledger account reconciliations, and SOX and audit requirements); the physical mailing of reports, payments, statements and collection letters; handling of TTX and third-party

billing issues; reconciliation of statements from other railroads; and the resolution of discrepancies and data reporting errors. Human effort is particularly important in connection with handling exceptions and adjustments, maintaining files, and responding to audits and external inquiries. A SARR cannot avoid exceptions (such as disputes about number of miles or days a car was on ANR's system); they are the natural result of differences between internal processing and third-party processing. Based on the number of railcars handled by the SARR, Defendants provide for an Equipment Accounting staff of six for ANR, three for ANR-PRB, and five for ANR-NM.

Financial Reporting. AEPCO provides that an Assistant Controller – Financial Reporting would be supported by one Analyst/Clerk. AEPCO Opening Nar. at III-D-37. This staffing is unrealistic in light of the significant reporting responsibilities that ANR would have as a Class I railroad with over $6 billion in debt. ANR's financial reporting staff would be responsible for complying with the following requirements:

Monthly closing of books. The process of closing the books includes the sub-processes of preparing, reviewing, approving, and posting journal entries; maintaining the financial system and chart of accounts; preparing balance sheet account reconciliations; and preparing financial statements.

STB reporting. Because ANR anticipates annual revenues greater than $1 billion, it would be subject to all of the reporting requirements for Class I railroads. These include the submission of at least 32 separate reports every year, as detailed below:

Table III.D.9
Principal Financial and Statistical Reports Required of Class I Railroads

DOCUMENT	DUE DATE
Form R-1	March 31 of the following year
Form R-1 Schedule 250	April 30 of the following year
Quarterly RE&I	50 days after close of quarter
Quarterly Cbs	30 days after close of quarter
Annual Qcs	90 days after end of year
Quarterly Qcs	60 days after end of quarter
Annual Wage Forms A&B	45 days after end of year
Quarterly Wage Forms A&B	30 days after end of quarter
M-350 Monthly Report of Employees	15 days after end of month

Source: http://www.stb.dot.gov/stb/faqs.html (last visited May 1, 2010).

Financial statement audit. ANR will have an annual financial statement audit prepared by a Certified Public Accounting ("CPA") firm. This audit cannot be completely outsourced to a CPA firm. The financial reporting staff must prepare schedules and analyses requested by the auditors, as well as answer questions, provide documentation for transactions, and assist with the drafting of financial statements.

Benefit plan reporting. IRS regulations require filing of Form 5500 and audited plan financial statements for all pension benefit plans (including 401(k) plans) covered by ERISA, even if benefits no longer accrue, contributions were not made during the plan year, or contributions to the plan will no longer be made. ANR (which anticipates an employee count in excess of 1100) will need to provide a 401(k) plan to remain competitive in the labor market. The Financial Reporting staff will need to maintain records, prepare analyses, and assist with drafting financial statements in support of the Form 5500 filing and audited plan financial statements.

SEC reporting. As discussed above, an efficient railroad would seek out the most cost-effective source of financing, which would be public debt. Section 13 of the Securities Exchange Act of 1934, 15 U.S.C. § 78m, requires a non-public company that issues public debt to register with an exchange and file quarterly and annual financial statements with the SEC.

SOX compliance. An organization that is required to file quarterly and annual financial statements with the SEC must comply with SOX. This includes the preparation and maintenance of financial process documentation, development of key internal controls, and monitoring compliance with these controls.

Bondholder reporting. AEPCO indicates that ANR will require approximately $5.7 billion in bonds to finance its road property investment. AEPCO Opening Exh. III-H-1, Table C.[71] Bond placement agreements ordinarily contain provisions for periodic (often quarterly) reporting of the issuer's financial results so bondholders can monitor the issuer's creditworthiness.

Accounting research. Various accounting standard-setters periodically issue new standards. The Financial Reporting group will be responsible for monitoring new pronouncements and developing accounting policies and procedures to comply with any new standards.

Defendants' experts have used a combination of revenue and asset base to assess the required work volume and determine the staffing level needed for the three SARRs. They have provided for Financial Reporting Department staffing levels of nine for ANR, five for ANR-PRB, and two for ANR-NM.

Purchasing Function. AEPCO proposes a Budget and Purchasing Department consisting of a Director of Budgets and Purchasing who is responsible for preparation of the annual budget and for the company-wide purchasing function. This Director oversees two Managers of Budgets and Purchasing and two Managers of Equipment Accounting. As noted above, Defendants place budgeting responsibility within the purview of an Assistant Controller – Financial Reporting and responsibility for railcar accounting within the purview of an Assistant Controller – Disbursements.

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[71] As discussed below in Part III.F, the road property investment for ANR would be considerably higher.

AEPCO's staffing for the purchasing function is inadequate. Understaffing this function would lead to increased costs for a variety of reasons, including the fact that "stock-out" situations can be quite costly given the urgency of many railroad material purchases.[72] In addition, an entity of ANR's size should have purchasing managers who possess expertise in specific commodity areas. Given the wide range of mechanical, engineering, operating, and administrative products and services that ANR will need to procure, a single purchasing generalist could not manage all of the railroad's complex relationships with thousands of vendors of materials and services. High performance in purchasing is achieved when purchasers develop expertise in a particular area.

Defendants provide for a Purchasing Department headed by one Director overseeing a staff of six specialist Buyers to cover the following areas: fuel; railcar and locomotive parts; rail; ties and ballast; signals and other track material; and miscellaneous. This staffing level would be sufficient for ANR and ANR-PRB. Due to the lower number of track miles, ANR-NM likely could combine some of these functions (*e.g.*, folding miscellaneous into one of the other functional areas and combining rail with ties and ballast), so that a total of four Buyers would be sufficient.

Internal Audit. Defendants accept AEPCO's provision for a Director of Internal Auditing. AEPCO Opening Nar. at III-D-38. One internal auditor should be sufficient to ensure adequate oversight of the company's various accounting and financial activities, provided that ANR maintains a sufficient level of outside auditing coverage.

(d) Law and Administration Department

[72] The cost of one "stock-out" can equal or exceed the cost of employing one Purchasing Manager. A stock-out that effectively shuts down a mechanized rail or tie gang, for example, can exceed a cost of several hundred thousands of dollars which would exceed the annual salary of a Purchasing Manager.

Vice President – Law and Administration. AEPCO provides that a Vice President – Law and Administration would serve as ANR's General Counsel and oversee the legal, human resources ("HR"), and IT functions. AEPCO Opening Nar. at III-D-38. Defendants agree that ANR requires a Vice President – Law and Administration, but a lone Vice President could not effectively manage a broad portfolio spanning ANR's legal, HR, and IT functions. This is particularly so because this Vice President would also need to supervise several essential functions for which AEPCO did not provide, such as environmental and security personnel. For this reason, Defendants have removed IT-related responsibilities from the Vice President – Law and Administration's list of responsibilities and have created a separate IT Department, discussed below.

Legal Function. AEPCO provides that ANR's legal needs will be met by the Vice President – Law and Administration (who is also ANR's General Counsel), assisted by three in-house General Attorneys and two Paralegal/Administrative Assistants. AEPCO proposes that ANR will outsource "[m]ost of the railroad's legal work," but then budgets only $575,000 annually for outside legal spend. AEPCO Opening Nar. at III-D-39.[73]

Defendants' experts have determined that AEPCO significantly underestimated ANR's legal expenses. Any multi-billion-dollar company must have an adequate in-house legal staff and employ adequate outside counsel to handle issues ranging from property disputes to employment litigation, contract negotiation to environmental issues, tax work to regulatory compliance. And Class I railroads face even more significant legal hurdles, given the need to ensure compliance with FRA, TSA, environmental, and STB regulations. Railroads face significantly more regulation than most

[73] AEPCO Opening electronic workpaper "ANR GA Outsourcing.xls."

other industries, and ANR will need sufficient legal staff to navigate the complex regulatory regimes with which it must comply.

ANR also will confront litigation-related expenses not faced by most non-railroads. For example, only railroads are subject to the Federal Employers Liability Act ("FELA"), which supplants state workers' compensation schemes with a fault-based liability mechanism. FELA requires that compensation for death or injury be obtained through individual claims establishing employer fault on a case-by-case basis. Most other major U.S. companies absorb employee injury costs through a no-fault workers' compensation system that does not require the expenditure of significant litigation resources. The fault-based FELA system, however, generates a large employee injury litigation docket that is specific to the rail industry. ANR's legal expenses must reflect the high costs of processing such employee injury claims. Although workers' compensation claims involve some transaction costs, they are lower than litigation expenses.

Defendants' experts have examined total legal expenses as a percent of revenue and used this metric to develop the required staffing levels and the appropriate outside counsel budget for ANR, ANR-PRB, and ANR-NM. The overall legal spend was developed using the benchmark metric of 0.275 percent of revenue.[74] The percentage of spending for in house is set at 60 percent for ANR and 70 percent for ANR-PRB and ANR-NM. That percentage defines the spending for outside counsel, divided between retainer and litigation expense. To determine in house staffing, Defendants assume the Vice President, Administrative Assistant, and the Vice President's travel are constant. The remainder of the budgeted legal spend will provide for attorneys and paralegals on a one-for-one basis. Based on this analysis, Defendants provide for six attorneys and six paralegals

[74] Altman Weil cites 0.275 percent of revenue in a 2007 Benchmarking survey of Corporations in the $1 to 5 billion revenue level.

for ANR, and one attorney and one paralegal for ANR-PRB. For ANR-NM, the staffing analysis devotes the entire budget to the Vice President and Administrative Assistant, so Defendants provide only one paralegal.[75]

Claims. Defendants accept AEPCO's proposal that ANR would have a Director of Claims and two in-house Claims Managers, and would expend $250,000 for outsourcing claim investigations. *See* AEPCO Opening Nar. at III-D-39.

Police Force. AEPCO provides ANR with no railroad police, infrastructure protection personnel, or hazardous material training personnel. These are essential functions that cannot be ignored. The security environment in the United States has changed dramatically in recent years, and the federal government considers securing the freight rail network a critical national security issue. ANR will handle large volumes of intermodal traffic that will be yarded for some period of time on ANR, including in a yard close to the U.S.-Mexico border. It is essential that ANR be in a position to protect this valuable freight. Defendants have staffed the security function conservatively, with one officer per state in which the SARR operates and one Chief to manage the overall force.

Environmental. AEPCO provides no staffing to handle environmental issues, other than two people within the Mechanical Department who will monitor environmental issues related to Mechanical facilities. AEPCO contends that these two individuals alone will be capable of handling all issues related to occasional spills; it attempts to justify this limited staffing by arguing that "[d]erailments are less likely to occur on the ANR than on a Class I railroad such as BNSF or UP because the ANR begins operations in 2009 over a brand-new track structure that includes CWR on

[75] BNSF/UP reply electronic workpaper "Staffing Levels.xls, tab legal spend."

all of its main tracks." AEPCO Opening Nar. at III-D-92. This statement demonstrates a fundamental misunderstanding of the causes of derailments and hazardous material releases. Less than half of all derailments are track-related.[76] Moreover, AEPCO incorrectly assumes that derailments are the cause of all incidents involving the release of hazardous materials, disregarding non-accident release ("NAR") incidents caused by leaks, splashes, improperly secured or defective tank car valves, or other causes.[77]

An efficient railroad would require adequate staff to respond to environmental incidents and manage compliance with applicable safety regulations. The potential costs of failing to comply with such regulations—including fines, heightened risk of accidents, and liability—drastically outweigh the cost of staffing this function at a level required to ensure compliance. Since ANR does not handle large volumes of hazardous materials, Defendants' experts believe that the staff could be relatively small, limited to two Managers of Environmental Compliance. These Managers would be responsible for coordinating environmental issues at the federal and state levels.[78] These positions also would be responsible for hazardous and special waste management; wastewater treatment facility operations; spill prevention and control and countermeasures; petroleum storage tank and

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[76] 2009 FRA data show that only 46 percent of Class I derailments were track-related. Other significant causes of derailments are human error (28 percent of derailments), equipment issues (15 percent of derailments), and extreme weather conditions (3 percent of derailments). *See* http://safetydata.fra.dot.gov/OfficeofSafety/publicsite/Query/inccaus.aspx (2009 derailment data) (last visited May 1, 2010).

[77] The term NAR refers to "the unintentional release of a hazardous material while in transportation (including loading and unloading) and does not involve an accident." NARs consist of "leaks, splashes, and other releases from improperly secured or defective valves, fittings, and tank shells, and also include venting of non-atmospheric gases from safety relief devices." *See* http://nar.aar.com (summarizing AAR North American Non-Accident Release Reduction Program) (last visited May 1, 2010).

[78] DOT regulations would require that ANR develop a security plan that includes an assessment of possible transportation security risks and appropriate measures to address the assessed risks. *See* 49 C.F.R. § 172.820.

transfer facility inspections; cleaning and inspection of above ground tanks; periodic facility environmental inspections, audits, environmental training for field personnel and response to facility spills.

Two Managers of Environmental Compliance would be required for ANR-PRB, based on both the total volume of work and the SARRs' large geographic scope. One such Manager would suffice for ANR-NM due to its smaller geographic scope.

Human Resources and Training Function. The core human resources functions of a railroad require staff to manage recruiting, compliance, compensation and benefits programs, employee relations, and training. AEPCO proposes a Human Resources staff consisting of a single Director of Human Resources[79] and two Managers of Training. It argues that this level of staffing "is sufficient" because most HR functions "will be out-sourced." AEPCO Opening Nar. at III-D-40. However, AEPCO does not provide outsourcing costs for most of these functions.

The only outsourcing cost for which AEPCO provides is a minimal amount associated with finding and hiring executives. This minimal cost depends on AEPCO's assumption that ANR would have an extremely low attrition rate of three percent.[80] AEPCO assumes that managers could be hired for a fee equal to 25 percent of salary. With an ANR management staff of 107 managers, a total salary amount of $3,440,287, and a three percent attrition rate, AEPCO calculates human resource outsourcing costs of only $103,000. However, if a fee of 25 percent of salary were applied to a more reasonable management team of 478 with a total salary of $54 million, and a more realistic

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[79] While the Human Resources Departments of most comparable railroads are managed by a Vice-President-level position or higher, Defendants conservatively accept AEPCO's assumption that ANR's Director of Human Resources would report to the Vice President – Law and Administration. AEPCO Opening Nar. at III-D-38 to III-D-40.

[80] AEPCO electronic workpaper "ANR Operating Expense.xls," Tab "Training."

attrition rate of six percent[81] were used, it would produce an outsourced recruiting budget of close to one million dollars.

Defendants believe that an in-house HR staff would be a more effective way to handle both recruiting and most other HR responsibilities in an organization of ANR's size. Defendants agree with AEPCO's assumption that two Managers of Training would be sufficient. However, ANR would also need a compensation staff to develop and administer compensation packages; conduct compensation analyses; develop and maintain job descriptions; and administer overtime pay rules, bonus programs, and wage increases (*e.g.*, merit and cost-of-living increases). The staff would need to be aware of and comply with various laws prohibiting disparities in pay.

ANR would also need a compliance staff to administer an employee ethics hotline; administer anti-discrimination policies; conduct certain employee investigations; ensure compliance with regulations governing federal contractors; maintain mandated workplace postings; handle employee requests for accommodation; conduct internal compliance audits; and handle external agency charges of discrimination, including investigations, position statements, and representing the company at fact-finding hearings and mediations. ANR will need to ensure compliance with numerous federal and state employment statutes, such as the Family and Medical Leave Act, Title VII, and the Americans with Disabilities Act.

Further, staffing and restaffing responsibilities will require a staff to develop and administer recruiting strategy in accordance with affirmative action plans; attend job fairs; oversee college recruiting programs; create and post job openings; screen and test applicants; conduct interviews; administer drug tests and background checks; and verify work eligibility.

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[81] BNSF's exempt attrition rate has averaged 6.8% over the last six years. BNSF /UP reply electronic Workpaper "Note on exempt attrition.pdf."

To operate efficiently, ANR will need information systems that can be accessed by employees. This will require a Human Resources Information System Manager to administer systems (*e.g.*, those used to track employee information, applicant information, and employee complaints) and manage vendors (*e.g.*, companies conducting background checks or drug tests). This Manager will also have responsibility for filing veteran hiring and diversity reports, conducting adverse impact analyses, and providing headcount reports and attrition analyses.

ANR will also require a Medical Department that should be staffed by at least one person (either a physician or other health care professional). This individual will manage ANR's industrial hygiene efforts, coordinate required drug testing programs and Engineer certification exams, and oversee medical qualification for new hires and employees returning from illness or injury. In addition, this individual will manage work-related injuries pursuant to the FELA, perform physical exams required by hazardous material regulations, and perform hearing tests required under FRA locomotive safety regulations.

Finally, ANR will require an employee relations function to serve as a liaison between employees and managers on day-to-day issues; conduct certain employee investigations; administer disciplinary and attendance policies; review promotion, demotion, discipline, and discharge actions; and conduct exit interviews. Other responsibilities would include the development of a performance management process and overseeing performance reviews.

Total staffing for these functions is broken down in the BNSF/UP Reply workpaper entitled "Staffing Levels.xls." In developing the appropriate staffing levels for the Human Resources Department, Defendants did not attempt to scale against an existing railroad because most of these functions are required regardless of organizational size. Defendants' experts have generated a Human Resources staff of 13 for ANR, a staff of 13 for ANR-PRB, and a staff of 11 for ANR-NM.

IT Function. AEPCO concludes that ANR could function with an IT systems staff of only 13 employees, with a single Director of Information Technology managing a department consisting of twelve IT Specialists. This staffing for the IT function is insufficient for an organization of ANR's size.

A strong IT department is an essential prerequisite for modern, efficient railroad service. Strong IT capabilities support a railroad's ability to accomplish tasks effectively and productively despite unplanned disruptions. AEPCO claims that its small staff is sufficient because ANR will "take[] full advantage of modern technology," AEPCO Opening Nar. at III-D-11 and III-D-12. In itself, that statement assumes a robust IT department capable of developing and implementing fully integrated IT systems that can pass information between each other and handle complex business functions. But far from that, AEPCO provides ANR with a barebones staff with very little development capability; a variety of off-the-shelf computer systems that operate in a stand alone environment; an operating system (RMI) that does not interact with the other business systems; and a hardware environment with no development capabilities and minimal backup.

AEPCO's IT staffing presents three major concerns. First, it does not cover a number of functions that an IT department serving a large railroad would need to perform, including data base management, systems interfaces, or computer operations. Second, AEPCO provides minimal resources for development of systems that could link its non integrated systems. Third, as discussed above, the ANR management team should be considerably larger than AEPCO has provided in order to manage and support a railroad this size. It is this larger management group that ANR's IT staff must serve. Defendants provide for an organization that could efficiently serve the IT needs of a railroad of this size.

Vice President – Information Technology. AEPCO proposes that ANR's chief IT officer be a Director – Information Technology reporting to the Vice President – Law and Administration. As discussed above, it is not reasonable to expect that the Vice President – Law and Administration could effectively supervise such disparate functions as legal, HR, and IT. For this reason, and because of the importance of IT to the overall success of ANR, Defendants' experts placed the IT function in a separate department and elevated the chief information technology officer to Vice President – Information Technology. This Vice President is responsible for the overall IT strategy and tactical direction of the department and is part of the executive team.

Directors. To lead the staffs described below, Defendants provide for three director level positions. One director will lead the systems analysis group, comprised of systems analysts, program developers, database managers, and interface support. A second director will lead the support technicians who staff the help desk. The third director will lead the staff responsible for monitoring the computer operations, including network monitors and network engineers.

Systems Analysts AEPCO provides for one technician to monitor RMI (the car hire system). Defendants agree that at least one person would be required for RMI. However, other acquired systems, such as Crew Calling, Dispatch, and ERP, will need systems analysts to support them. Defendants provide for three positions to staff this function adequately.

Programmer/Development: AEPCO staffs this function with two systems analysts with responsibility for maintenance and development of existing systems. This is a conservative estimate of the number of analysts required to perform these functions. In addition, ANR would need staffing to manage and maintain a test/development system, in order to develop and implement new systems and enhancements to existing systems. AEPCO does not provide for any computer hardware, software, or staffing for such a development and test system. Test and development systems are part

of the overall system development life cycle and require tools and staffing for testing both system and application fixes and upgrades. Two additional analysts would be required for these functions.

Database Management. In several areas AEPCO references the need for data bases, including the Oracle data base for crew calling and SQL server. However, it does not provide any staffing for database management. Designing, maintaining, and optimizing database management systems comprise a vital function in any IT organization, and ANR would require IT personnel to perform this function. Defendants have determined that ANR would need two Database Support Managers to design, configure, and implement database systems; backup databases for recovery; perform recovery; monitor system performance; and configure the database for optimal performance

Interface Support. AEPCO also fails to recognize the need for IT staff to manage interfacing between ANR's various stand alone systems. There is a reference to using Sharepoint, which is a portal and file server based system that would require extensive customization and applications development. Defendants agree that such a system is required to allow all of ANR's systems to share information. For example, RMI will need to communicate with the crew system, which in turn needs to communicate with payroll. ANR will require at least three application programmers in this area to ensure that systems can be interfaced and function in an integrated manner.

Help Desk. AEPCO specifies one PC Help Desk technician during normal business hours and a staff of five Help Desk Technicians to staff a single 24x7 position. This position would provide support for all ANR's operating systems as well as issues with PC's, printers, and other equipment. ANR has defined a train operation that is dependent on having systems that are functioning at all times. The ANR Help Desk staffing is not large enough to perform the required work for this high level of performance. To service the needs of the organization, ANR would need three 24x7 positions and an additional two positions during normal business hours for a total of 17.

ANR-PRB would require two 24x7 positions and an additional four positions during normal business hours, for a total of fourteen. ANR-NM would require one 24x7 position with an additional three positions during normal business hours, for a total of nine.

Network Monitoring AEPCO has not provided for any computer support staffing. ANR will require a sophisticated computer system that is available and functioning around the clock. To ensure that level of performance, ANR will require tools and staff to monitor the health of the systems. It will require a staff of six to manage a 24x7 computer network operations support function, with extra staff on duty during normal business hours.

Network Engineers. AEPCO provides for two network engineers to oversee network security matters and local area network (LAN) and wide area network (WAN) functionality. Defendants accept this staffing.

Exchange 2007 Engineer. AEPCO calls for one person to handle this function on a part time basis. Defendants conclude that outsourcing email would be more efficient for a company the size of ANR and therefore do not provide Exchange 2007 engineers. Microsoft offers a variety of service options that large companies can use to host email. After reviewing the Microsoft offering, Defendants conclude that a budget of $8 per employee per month would cover the needs of ANR.[82] As mentioned below, to be a least cost, most efficient railroad, ANR will need all its employees to have email accounts to enable them to manage a variety of their HR needs.

[82] BNSF/UP Reply electronic workpaper "Microsoft Hosted email ANR.pdf."

ii. Compensation

Defendants accept AEPCO's proposed salaries and benefits for ANR's personnel,[83] with the exceptions noted below. First, while Defendants accept AEPCO's decision to base compensation for ANR's President and Vice Presidents on the compensation KCS paid to similar positions, AEPCO included only the salaries of these KCS personnel in its calculations – leaving out important compensation elements such as bonuses and stock grants. Defendants correct these calculations by including total compensation for these positions.

Table III.D.10 below summarizes Defendants' G&A staff compensation by functional area.

Table III.D.10
ANR General & Administrative Staff Compensation

	Employee Compensation ($000,000)			
FUNCTIONAL AREA	**AEPCO**	**Reply ANR**	**ANR-PRB**	**ANR-NM**
EXECUTIVE	$ 1.1	$ 3.8	$ 3.8	$ 3.8
MARKETING	$ 0.6	$ 4.2	$ 2.5	$ 2.7
Customer Service	$ 1.6	$ 10.2	$ 5.1	$ 7.8
FINANCE & ACCOUNTING	$ 0.4	$ 1.3	$1.3	$ 1.3
Treasury	$ 0.5	$ 0.6	$ 0.6	$ 0.6
Controller	$ 1.1	$ 8.7	$ 5.3	$ 5.5
Car Accounting	$ 0.2	$ 0.6	$ 0.3	$ 0.5
Purchasing	$ 0.3	$ 0.5	$ 0.5	$ 0.3
LEGAL & ADMINISTRATION	$ 1.2	$ 2.6	$ 1.7	$ 1.5
Environmental		$ 0.2	$ 0.1	$ 0.1
Police		$ 0.7	$ 0.6	$ 0.4
Human Resources	$ 0.3	$ 1.2	$ 1.2	$ 1.0
IT	$ 1.2	$ 4.9	$ 4.6	$ 4.1
Total	$ 8.6	$ 39.4	$ 27.5	$ 29.7

[83] Where Defendants corrected AEPCO's G&A staffing by adding positions, they set salaries for those positions at a level consistent with salaries for other positions at that level.

iii. Materials, Supplies and Equipment

Defendants accept AEPCO's proposed unit costs for the various categories of materials, supplies and equipment necessary to support ANR employees. Defendants' corrections to ANR staffing require a corresponding increase in the total expenditure for materials, supplies, and equipment.[84] Table III.D.11 summarizes these expenditures.

Table III.D.11
ANR Materials and Supplies

Category	Materials and Supplies ($000)			
	AEPCO	Reply ANR	ANR-PRB	ANR-NM
Desks	$28.3	$104.3	$69.8	$73.1
Supplies	$27.2	$124.3	$79.7	$86.0
Copy Machines	$0.8	$3.5	$2.2	$2.4
Autos	$27.3	$109.4	$103.9	$82.0
Travel	$232.0	$778.1	$548.3	$501.7
Utilities	$40.0	$177.5	$113.8	$122.8
Bad Debt		$1,290.6	$677.0	$304.4
Outsourced Services	$1,613.6	$3,193.2	$1,784.2	$1,250.7
Information Technology	$13,453.7	$15,131.6	$8,032.2	$11,709.9
Total	$15,423.0	$20,912.4	$11,411.1	$14,133.1

iv. Other

(a) IT Systems

AEPCO provides a systems solution for ANR that does not represent an integrated approach to data processing and would require a significantly larger G&A staff than the staff Defendants provide. Defendants accept the use of RMI for an operating system and the proposed costing

[84] These calculations are shown for ANR, ANR-PRB and ANR-NM in BNSF/UP Reply electronic workpapers "ANR Personnel.xls"; "ANR PRB Personnel.xls"; and "ANR-NM Personnel.xls."

AEPCO suggests for ANR. Defendants adjusted RMI costs downward for ANR-PRB and ANR-NM based on the number of carloads handled by each.

Defendants' experts concluded that Peachtree and Optimal Solutions would not be able to operate in an integrated manner, and have replaced both with Oracle. Review of documentation AEPCO provided for these systems shows that they are designed for small to medium-size businesses. Peachtree appears to have a maximum of 55 users, which would be totally inadequate for ANR's Finance and Accounting departments. Defendants provide for an Oracle solution, which would include functionality for Accounts Payables, Accounts Receivables, General Ledger, Purchasing & Materials, Treasury, Fixed Assets, Project Management, Tax, Financial Reporting, and HR functions, for all three SARRs.[85]

Defendants' experts also concluded that AEPCO has not provided adequate hardware to allow the ANR IT system to function properly and service the ANR staff. Defendants add two Server systems – one as a test and development system and the second to run the Oracle software. These two additional systems are designed and priced in a manner identical to the system AEPCO specified. Additional servers for Microsoft SQL and SharePoint Portal are added to account for the larger number of users. Additional switches are added to provide enough ports to cover the number of required users.[86]

Defendants provide that email will be outsourced (a lower cost alternative), rather than handled internally with Microsoft Exchange servers. For ANR to be an efficient operation, it would have to provide email applications for employees to manage their own HR and other activities.

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[85] The costs and specifications are shown in the BNSF/UP electronic workpaper "ANR IT.xls," Tab "Oracle."

[86] The systems are shown in BNSF/UP Reply electronic workpaper "ANR IT.xls," Tab "Computer system."

Thus, each employee would require an email address. If this were done in house, it would require significant investment in licensing and servers. Defendants assume outsourcing for this function would cost $8 per month per employee.

Defendants accept AEPCO's proposed communications plan, revising the number of phones, cell phones, pagers and NTS systems to be consistent with Defendants' staffing.

Defendants account for the cost of the capital items using a standard capital recovery process, assuming that laptops will have a useful life of four years; desktops, printers, servers and routers of five years; desktop software of six years; and application software of ten years.[87]

Defendants accept AEPCO's plan for providing laptops, desktops and printers for each employee. In addition, Defendants accept AEPCO's per unit price for laptops, desktops and printers. Defendants revise the total number of these units purchased to be consistent with Defendants' staffing figures.

(b) Outsourced Services

Defendants accept AEPCO's assumption that ANR will outsource some of its functions and accept most of AEPCO's decisions on outsourcing, with some revisions. As noted above, Defendants' experts believe that the contract administration process should be handled by ANR marketing personnel, so that function is not outsourced. Defendants provide for an Employee Assistance Program (EAP) that is outsourced. An EAP is an essential part of benefits provided for employees and is particularly important for railroads. These programs are typically outsourced to help promote confidentiality. Defendants determined the cost of EAP services to be $40 per employee, to cover employees, families and retirees, based on BNSF actual cost. AEPCO provides

[87] This information appears in BNSF/UP Reply electronic workpaper "ANR IT.xls."

for outsourcing legal services, employing retainers for law firms in each state of operations and one firm for federal matters. Defendants agree with this approach, and they provide an amount to cover legal work done by these firms. Defendants calculate this amount based on 0.275 percent of revenue, the metric used to define legal spend.

(c) Start-Up and Training Costs

Defendants accept the training concept AEPCO suggested for conductors and engineers, with one exception. AEPCO provides for a drop out rate of only three percent, representing the percent of students who start the training but do not complete it. This estimate is too low. Based on actual BNSF experience over the last ten years, the drop out rate should be ten percent.[88] Defendants also accept AEPCO's proposed training costs for maintenance of way and IT.

Dispatchers, too, require on the job training (OJT). They cannot be placed in a position immediately upon completion of classroom training. Dispatchers require intensive OJT to prepare for their complex job duties and significant responsibilities for keeping trains moving in a safe and expeditious manner. They need time not just to learn the dispatching system, but also to become familiar with the details of operations in their specific territories. Based on BNSF and UP training plans, it appears that the minimum amount of training needed for train dispatchers is 23 weeks. Defendants therefore provide for an OJT period of 23 weeks. Compensation during this period would be at 80 percent of full salary.

AEPCO understates required training for equipment inspectors, asserting that it would cost only $5000 plus one week's wages. This is not realistic; equipment inspectors need significant on-the-job training, Defendants have determined that equipment inspectors would require eight weeks

[88] BNSF/UP Reply electronic workpaper "New hire attrition.xls."

of OJT with compensation at 80 percent of the accepted wage rate for equipment inspectors. In addition, AEPCO provides no training costs whatsoever for first level Managers of Yard Operations. Individuals in these front line operating management positions must have full understanding of railroad systems, operating procedures, and safety protocols. Defendants provide for an 18-week training program for these front line managers, during which compensation would be at 90 percent of the Manager of Yard Operations level.

(d) Ongoing Staffing Cost

Defendants accept the basic methodology for calculating ANR's ongoing cost of restaffing– *i.e.*, multiplying the attrition rate by the start-up costs. However, AEPCO's assumed attrition rate of three percent is unreasonably low. ANR will be hiring personnel for all positions from the same pool of people as BNSF and UP draw from to do the same work in the same geographic territory. There is no reason to conclude that ANR attrition rates would be different from attrition rates at BNSF and UP. These attrition rates vary by type of employee, but in no case are they less than six percent. Defendants use these actual rates of attrition for operating personnel to calculate restaffing costs.[89] For G&A employees, Defendants use a very conservative six percent, which is lower than the BNSF average of 6.8 percent over the past six years.

(e) Bad Debt

AEPCO assumes that ANR will receive 100 percent of the revenue it bills to customers. It makes no provision for the fact that some ANR customers will fail to pay their bills at 100 percent of the amount billed. Given the many customers that ANR will serve, it will have some uncollectible accounts. Applicable accounting standards would require ANR to maintain an allowance for doubtful accounts. Statement of Financial Accounting Standards No. 5 (FAS5 – Accounting for

[89] BNSF/UP Reply electronic workpaper "Attrition levels.xls."

Contingencies) requires companies to maintain allowances for doubtful accounts for the estimated probable losses on uncollectible accounts and other receivables. The allowance is based on the creditworthiness of customers, historical experience, the age of the receivable, and current market and economic conditions, as well as any known trends or uncertainties related to customer billing and account collectibility.

Defendants have reviewed uncollectible rates with BNSF and UP and have concluded that an uncollectible rate of 0.065 percent would be reasonable for ANR.

(f) Defendants' G&A Analysis Produces a Highly Efficient SARR.

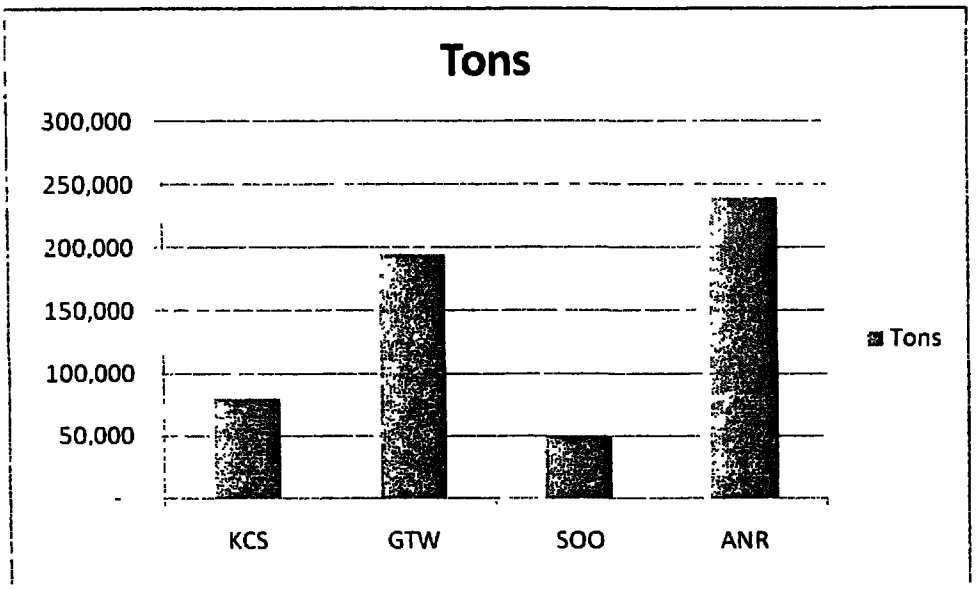
Defendants' bottom-up analysis of the minimum G&A staffing requirements and expenses for ANR results in a total G&A expense level of 3.1 percent of ANR's revenue (as opposed to the one percent of revenue proposed by AEPCO), resulting in a total G&A cost of $62million. A G&A expense level of _3.1percent is well below actual G&A expense levels across a wide range of transportation companies and other industry sectors. In the transportation sector, for example, a 2006 analysis of G&A expenses found that—with the single exception of a feeder airline that contracted its services to major trunk carriers—G&A expenses for all transportation sector companies exceeded 10 percent.[90]

By almost every measure, ANR is a larger railroad than KCS, GTW, or SOO. Table III.D.12 below shows tons handled by KCS, GTW, and SOO in 2008, compared with tons handled by ANR in 2009. ANR handles more tons than any of these railroads.

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[90] http://seekingalpha.com/article/10535-chart-freight-transportation-companies-sg-a-margin-mrq (May 12, 2006 Seeking Alpha survey) (last visited May 1, 2010).

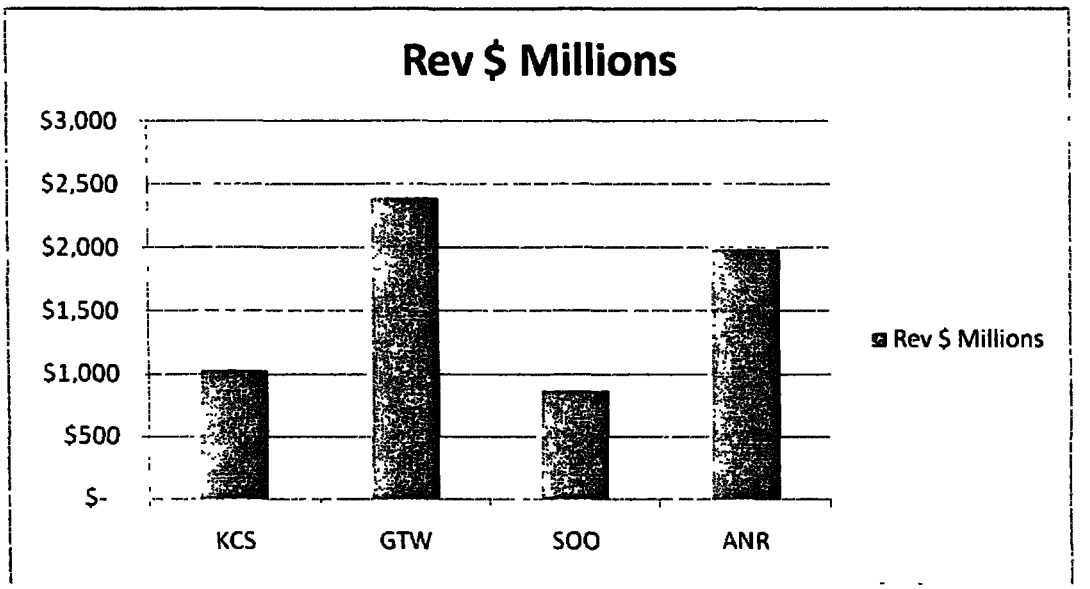
Table III.D.12
Tonnage Comparison



Source: R-1 reports, www.stb.dot.gov.

Revenue, which is a further indicator of the amount of transportation service provided, also shows that ANR is comparable to these other three Class I carriers. Table III.D.13 below shows that 2009 ANR revenue far exceeds 2008 revenue of KCS and SOO and is comparable to GTW revenue for 2008.

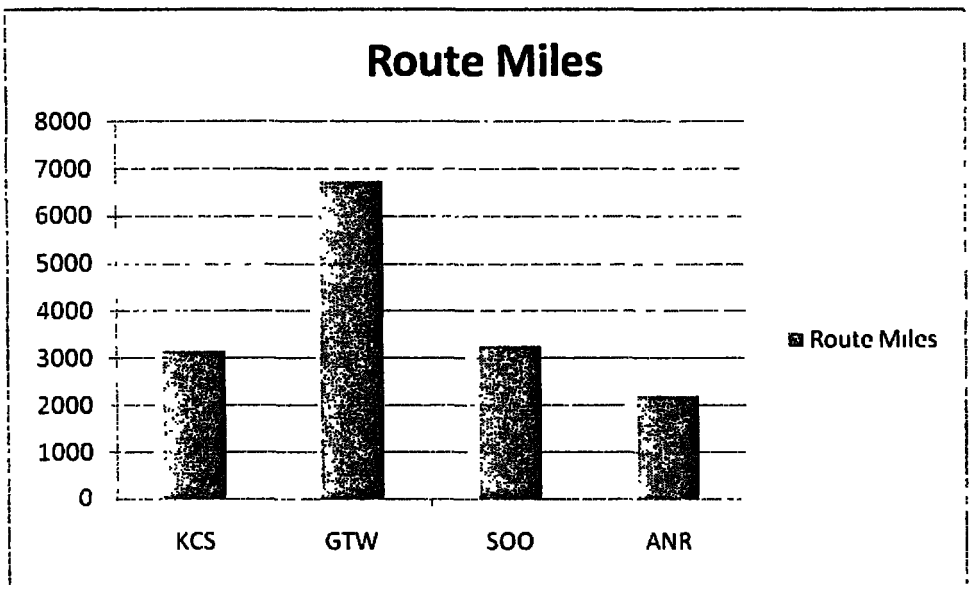
Table III.D.13
Revenue Comparison



Source: R-1 reports www.stb.dot.gov.

ANR's geographic scope is more limited than that of these three Class I carriers, but is in the same range as that of KCS and SOO. Table III.D.14 below shows the route miles for KCS, GTW, SOO and ANR.

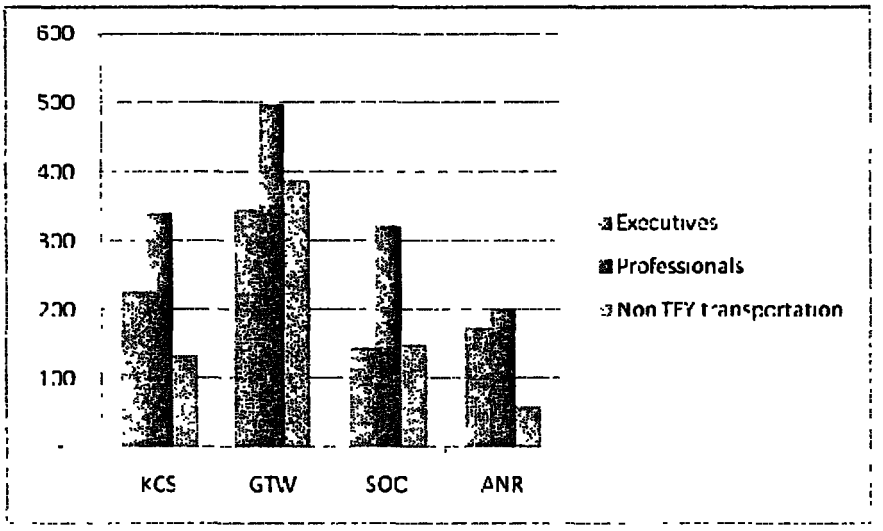
Table III.D.14
Route Mile Comparison



Source: R-1 reports www.stb.dot.gov.

While ANR is a railroad of generally comparable size and scope to KCS, GTW and SOO, the staffing levels Defendants have proposed are less than the staff size at these railroads. Table III.D.15 below compares staffing levels in three categories.

Table III.D.15
Staffing Level Comparison



Source: Wage A&B www.stb.dot.gov

Executives include president, vice president, department heads, and similar positions. With Defendants' staffing for ANR, the total number of executives is comparable to that of KCS, GTW, and SOO.

The professional group includes the majority of employees at the working levels of the G&A areas of the railroad. This includes marketing professionals, accountants, IT staff, and similar positions. ANR staffing levels have significantly fewer people in this category than do the other three railroads. Similarly, ANR has a lower level of transportation managers in the non-TEY transportation category than the three comparable class I railroads.

Based on this benchmarking analysis, Defendants' staffing levels place ANR as the most efficient railroad of its size in the United States.

4. Maintenance-of-Way ("MOW")

Defendants' maintenance-of-way witness is David J. Hughes. Mr. Hughes has 30 years of experience as a professional engineer, including railroad engineering, railroad operations, and maintenance supervision. From 1967 to 1975, he held numerous positions in the Engineering Department of Southern Pacific Railroad, such as first line supervision of track maintenance and bridge and building maintenance. Much of that experience was on portions of the lines replicated by ANR. From 1975 through 1980, he was Vice President of Engineering for the Boston and Maine Railroad, where he was responsible for all track structures, signal systems maintenance, and for planning the reconfiguration and reconstruction of 155 route miles of mainline. From 1980 through 1985, he was President for Pandrol, Inc. and Speno Rail Services, where he assisted railroads in developing high-performance track components and mechanized rail and ballast maintenance practices. From 1985 through 1991, he was President of the Bangor & Aroostook Railroad, a 430-mile regional railroad in the northeastern United States. From 1999 to 2006, he was Chief Engineer for the National Railway Passenger Corporation ("Amtrak"), where he was responsible for track structures, signal systems, maintenance, and construction. From 2005 through 2006, Mr. Hughes was Acting President and Chief Executive Officer of Amtrak.

During his career, Mr. Hughes has worked with more than 35 railroads in 25 countries – including Class I railroads in the United States – to improve operating efficiency, evaluate operations and maintenance costs, and optimize capital spending. Mr. Hughes has extensive experience supervising maintenance activities, and he is well-acquainted with maintenance on lines experiencing similar tonnages and traffic as AEPCO proposes for ANR. Thus, he is well-positioned and highly qualified to critique AEPCO's evidence and opine on the actual maintenance requirements for these lines. His testimony addresses the unreasonableness of

AEPCO's MOW assumptions and the need to consider real-world evidence in evaluating AEPCO's MOW plan.

Defendants' evidence on MOW costs is organized as follows:

- **Critique of AEPCO's MOW Plan**: Mr. Hughes uses well-established benchmarks to test the reasonableness of AEPCO's MOW plan, which demonstrate that AEPCO's plan significantly understates MOW costs. He also explains that AEPCO's proposed SARR cannot achieve significantly better labor efficiency than that of Class I railroads.

- **MOW Operating Expenses**: Mr. Hughes reviews ANR's MOW costs and provides new estimates based upon his experience and interviews with BNSF and UP employees.[91] This includes the following MOW categories organized by function:

  - Track Department;
  - MOW Material Management;
  - Communications and Signals Department;
  - Signal System Maintenance;
  - Communications System Maintenance;
  - Bridge & Building Department; and
  - Miscellaneous Administrative/Support Personnel.

- **Other Operating Expenses**: This includes the following operating expenses:

  - Snow Removal;
  - Storm Debris Removal and Washouts; and
  - Environmental Cleanup.

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[91] Mr. Hughes interviewed the following UP employees: Rod Dillenburg, Director of Signal Design; David Wickersham, Chief Engineer - Western Region; Marty Gearhart, Manager of Track Programs; Donald Christianson, Director of Administration; Terry Hite, Director of Signal Operations; and Mark Wheeland, Director of Track Maintenance. Mr. Hughes interviewed the following BNSF employees: James LeVere, Assistant Vice President, Signals; Michael Armstrong, General Director, Maintenance Planning; Gregory Koontz, Director II Engineering Systems and Support; and John Upward, General Director Work Equipment.

- **Well-established Benchmarks Support Mr. Hughes' Maintenance Plan Given ANR's Density and AEPCO's Apparent Failure to Provide Maintenance Roads.**

- **AEPCO's Failure to Include Maintenance Roads**: Mr. Hughes explains why the incremental cost associated with AEPCO's failure to include maintenance roads should be added to ANR's MOW plan.

- **MOW Plan for Defendants' Two Alternative SARRs:** Mr. Hughes uses the maintenance costs developed here as a basis for calculating MOW costs on defendants' alternative SARRs.

a. Critique of AEPCO's Maintenance-of-Way Plan

As discussed below, AEPCO's estimated MOW costs are far out of touch with reality.[92] In addition to the deficiencies discussed in Section III.D.4.b below, Mr. Hughes concludes that AEPCO's MOW plan is infeasible in comparison to relevant benchmarks. Mr. Hughes also explains that, as a general matter, a proposed SARR's MOW labor is not much more productive than that of the Class I railroads.

i. AEPCO's MOW Plan is Not Reasonable When Compared to Relevant Benchmarks

Mr. Hughes used several relevant benchmarks to evaluate the overall reasonableness of AEPCO's MOW plan. First, Mr. Hughes compared AEPCO's costs with similar costs reported in STB Report R-1. Table III.D.17 shows that real-world MOW costs per track mile are 58% to 69% higher than those in the AEPCO MOW plan, while defendants' per-mile MOW costs are below the U.S. average.[93] The average MOW cost per track mile for BNSF, UP, and railroads nationwide includes thousands of miles of branch lines with low maintenance expenses, which reduces the average cost per track mile. ANR, however, is comprised entirely of high-density main track and has no similar offset from low-density lines. For that reason, ANR's average costs per track mile should be higher than the average cost of BNSF, UP, and railroads nationwide.

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[92] Before evaluating AEPCO's MOW plan, it was necessary to correct two significant errors. AEPCO overstated ANR's communications equipment maintenance expense by more than $6 million and its building maintenance expense by more than $1 million. The combined effect of these corrections was to lower AEPCO's MOW costs from $60.3 million to $53.1 million. BNSF/UP Reply electronic workpaper "Restatement of AEPCO MOW Expenses.xlsx."

[93] The Board has previously used main track miles as a basis for comparing the reasonableness of field maintenance staffing by comparing main track miles per employee. *Western Fuels Ass'n, Inc. & Basin Elec. Power Coop.*, STB Docket No. 42088, at 57 (STB served Sept. 10, 2007) (*"WFA/Basin I"*). The same main track mile metric is used here to assess the reasonableness of ANR MOW spending.

Table III.D.17

MOW Maintenance Cost per Main Track Mile
(ANR Restated to $53.1 Million)

	U.S. Average	BNSF	UP	ANR
Cost per Track Mile (excludes Depreciation)	$27,084	$25,392	$26,304	$16,042
Comparison with ANR	+69%	+58%	+64%	-

Source: BNSF/UP Reply workpaper "Analysis of Class I Railroads 2008-ANR.xlsx."[94]

ANR MOW expenses are shown to be even more out of line when traffic density is taken into account. The table below shows that at 65.9 million gross tons per track mile, the traffic density on ANR is more than double the average density of BNSF and UP and almost three times that of all Class I railroads. Annual traffic density is a major determinant of track maintenance requirements.

Table III.D.18

Traffic Density: Millions of Gross Tons per Main Track Mile

	ANR	BNSF	UP	U.S. Average
Traffic Density MTG/Mile of Main Track	61.0	30.3	26.9	22.4
Comparison with ANR	100%	49.7%	44.1%	36.74%

Source: BNSF/UP Reply electronic workpaper "Analysis of Class I Railroads 2008-ANR.xlsx."

The combination of the low maintenance cost per track mile and the high traffic density means that AEPCO's proposed MOW costs per million gross ton miles are only one-third to one-quarter of those for BNSF, UP, and the average for Class I railroads as shown in Table III.D.19 below.

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[94] The source of the data is from Association of American Railroads ("AAR"), "Analysis of Class I Railroads" (2008). Mr. Hughes updated BNSF, UP and U.S. Average costs to 2009 using AAR's All Inclusive Adjustment Factor – Less Fuel (March, 2009).

Table III.D.19

MOW Operating Expense per Million Gross Ton Miles
(ANR Restated to $53.1 Million)

	ANR	BNSF	UP	US Average
MOW Cost per Million Gross Ton Miles Excluding Depreciation	$0.00024	$0.00079	$0.00092	$0.00114
Comparison with ANR	100%	325%	379%	468%

Source: BNSF/UP Reply electronic workpaper "Analysis of Class I Railroads 2008-ANR.xlsx."

Mr. Hughes also assessed the overall reasonableness of AEPCO's MOW plan by comparing the number of track miles per field employee for ANR to the Board's finding in the *WFA/Basin I*.[95] Some of the same geographical territory at issue in that case is assumed to be replicated by ANR, and traffic density is similar. In *WFA/Basin I*, the Board compared the MOW field staffing proposals on the basis of staff per main track mile. In that case, the Board decided that the appropriate field staffing was 4.0 track miles per field employee.[96] ANR proposes 319 field employees for 3,310 miles of main track – an inexplicable 10.6 track miles per employee.[97]

AEPCO offers no evidence that the levels of productivity and cost implied in its staffing plan have ever been achieved in the real world, and they imply far higher productivity than was accepted by the Board in *WFA/Basin I*. Since the overall costs of AEPCO's MOW plan fail to meet any of the standards of reasonableness discussed above, and since the staffing plan is not

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[95] *WFA/Basin I* at 57 (Table C-6).

[96] *Id.*

[97] AEPCO Opening Nar. at III-D-62. In its September 7, 2007 Decision, the Board considered WFA's proposal of 4.8 miles per employee and BNSF's proposal of 3.7 miles per employee, both far below ANR's claim of 10.6 miles per employee. *WFA/Basin I* at 57; AEPCO Opening Nar. at III-D-61.

supported by objective evidence, the ANR MOW staffing plan as a whole should be deemed infeasible.

Moreover, AEPCO's MOW plan fails to account for two significant factors that distinguish ANR from the existing BNSF and UP routes. First, the existing BNSF and UP routes have maintenance roads along an estimated 75% of the route miles, and it is standard practice on both railroads to build maintenance roads when adding main track or passing tracks. Without maintenance roads, ANR maintenance will rely more heavily on track occupancy to perform maintenance. Second, ANR is constructed entirely of wooden ties – even though the standard for new mainline construction on BNSF and UP is concrete ties – and concrete ties are used on much of the BNSF and UP line replicated by ANR. Wooden ties require more ongoing maintenance, and they require a higher operating cost even though they may have a lower initial capital cost.

ii. The MOW Labor Efficiency for the Proposed SARR Cannot be Not Materially Better than that of the Class I Railroads

AEPCO hypothesizes that ANR's employees would be more efficient than those of BNSF and UP:

> Development of the ANR's field MOW staff was guided by the principle that an efficient, least-cost SARR does not require unionized employees and does not face the same constraints as Class I railroads in terms of the level of supervision required and the ability to cross train. This enables MOW employees to be utilized in a more versatile manner, such as that an employee can perform more than one function where consistent with the level of specialization needed.[98]

[98] AEPCO Opening Nar. at III-D-60 n. 24.

However, AEPCO offers nothing more than platitudes about the possibility of lower supervision rates and cross-training in a non-union environment; it never actually explains how ANR's MOW plan would result in greater labor productivity than MOW plans followed by Class I railroads, nor does it give any indication of what the magnitude of those gains might actually be. Without any explanation or quantification of the claim for better labor efficiency for AEPCO's SARR, AEPCO's claims about greater efficiency should be dismissed as unsupported.

Based on Mr. Hughes' experience, there would be no material difference between the MOW maintenance staffing requirements for a non-union SARR and the staff required for a modern Class I railroad, such as BNSF or UP. Mr. Hughes draws this conclusion in part based upon due diligence he performed in several transactions that created non-union regional and short line railroads in the United States, as well as international locations where using contractors for MOW work is unrestricted by union work rules. One major reason that there would be no material gap between labor efficiency of ANR and Class I railroads is that the railroads have been aggressively improving labor productivity overall and specifically in the MOW function. Net ton miles per railroad employee, a key measure of labor productivity, has increased from 4.5 million in 1989 to 10.9 million in 2008, an improvement of 141%, which was generated in part through improved work rules in all crafts in multiple rounds of negotiations.[99] In the MOW area, the number of track miles per BNSF MOW employee has increased 37% – from 3.85 miles per employee to 5.37 miles – in the face of an increase of traffic density of 73% from 14.7 million gross tons per track mile to 25.5 million gross tons per track mile. In other words, BNSF's

[99] BNSF/UP Reply electronic workpaper "Analysis of Class I Railroads 2008-ANR.xlsx." The source of this data is from AAR, "Analysis of Class I Railroads" (1989) and (2008).

MOW productivity has increased significantly during this period despite increasing traffic density.[100]

Although Class I railroads have become more productive, AEPCO mistakenly assumes that ANR would experience significant productivity gains from cross-training employees. Within the track, bridge, and signal specializations, employees are typically multi-skilled already. The productivity gain from further cross-training is so limited as to be negligible.[101] The financial benefits of work rules improvements are generally shared between the union and the railroad during labor negotiations, so those benefits must be thoughtfully estimated for each work rule change. Mr. Hughes, as former Chief Engineer of a large railroad, has participated personally in estimating the value of various work rule changes in the MOW department in conjunction with labor negotiations. He found that the benefits from changing MOW work rules, even if fully realized, did not have an appreciable impact on the number of employees required to perform the work. Because the skill sets are so different, even non-union railroads maintain the division of MOW employee specializations between track, signal, and bridge.

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[100] Comparable figures for UP show that an increase in traffic density of 101% resulted in a decrease in track miles per employee of 4%. BNSF/UP Reply workpaper "Analysis of Class I Railroads 2008 – ANR.xlsx," Tab "MOW Productivity 1998-2008."

[101] The Board has rejected the use of cross-trained employees to justify reduced MOW workforce by complainants in other rate cases. *Pub. Serv. Co. of Colorado v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42057, at 79 (STB served June 8, 2004) ("[Xcel] also failed to meet its burden of establishing that a small, cross-trained MOW staff would be available and, even if available, how such a small MOW department could provide the unplanned day-to-day maintenance that would be needed by a railroad the size of the WCC.").

b. Maintenance-of-Way Operating Expenses for Personnel

Mr. Hughes' estimate of ANR's maintenance-of-way costs is based on a real-world view of the maintenance needs of a high-density railroad that is consistent with railroad practices. In Section III.D.4.b below, Mr. Hughes builds, from the bottom up, the real-world maintenance-of-way staff that would be needed on ANR. Based on his experience and interviews with BNSF and UP employees, Mr. Hughes identified the projects and problem areas that would be replicated on ANR and assigned work crews and dollars accordingly. The workforce is tailored to proposed ANR tonnages, train densities, plant size and facilities, weather conditions, and other unique circumstances on ANR's route to provide a lean maintenance team while covering the required maintenance activities. Salaries assumed in Mr. Hughes' plan are identical to those used by AEPCO for like positions. For the new job titles that were not included in AEPCO's MOW plan, Mr. Hughes used salaries that were the closest available to those used in AEPCO's plan. Mr. Hughes used substantially identical types of vehicles and equipment as those in AEPCO's plan, but he used different quantities because of differences in staffing between the plans and the added equipment required to support the additional maintenance staff. Defendants' MOW plan for ANR prepared by Mr. Hughes is based on an understanding of best practices in MOW maintenance, operational priorities of high performance railroads, and the practices of non-union regional and short line railroads. Mr. Hughes rejected the infeasible elements of AEPCO's MOW plan and accepted those elements of the AEPCO MOW plan that are feasible.

Mr. Hughes is familiar with previous Board decisions in SARR cases and the issues addressed in those decisions. The MOW plan prepared by Mr. Hughes was prepared with previous SAC cases in mind, particularly *WFA/Basin I* and *II,* which included a portion of the lines reproduced in ANR. He is also familiar with BNSF and UP maintenance practices from

interviews with personnel and his prior experience as he has served as an expert witness for UP and has consulted concerning proper size for BNSF's MOW vehicle fleet.

Mr. Hughes began by reviewing AEPCO's proposed MOW personnel. Table III.D.20 summarizes Mr. Hughes' personnel requirements for ANR's Office and Field Staff.

Table III.D.20
ANR MOW Personnel

Position	No. of Employees
HW Office/Supervisory	
Track Engineer	1
Manager of Welding & Grinding	1
Supervisor of Work Equipment	1
Administrative Assistant/Clerk	1
Communications & Signals Engineer	1
Assistant Engineer — Signals	1
Assistant Engineer — Communications	1
Assistant Engineer C&S — PTC	1
Administrative Assistant/Clerk	1
Bridge Engineer	1
Building Engineer	1
Administrative Assistant/Clerk	1
Engineer of Programs and Contracts	1
Public Project Engineer	2
Manager of Administration & Budgets	1
Manager of Environmental/Safety/Training	1
Manager of Mechanical Operations	1
Administrative Assistant/Clerk	1
Total Office	**19**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "MOW."

Table III.D.20
ANR MOW Personnel (continued)

Position	No. of Employees
Field	
Assistant Track Engineers	5
Roadmasters	20
Assistant Roadmasters	40

Track Crew Foreman	60
Track Crew Members	180
Roadway Machine Operators (Roadmaster)	40
Roadway Machine Operators (Track Engineer)	10
Roadway Machine Operators (Material Yard)	2
Distribution truck driver (Material Yard)	4
Clerk (Material Yard)	2
Welder/Helper/Grinders	80
Work Equipment Mechanics	10
Smoothing Crew Foremen	20
Smoothing Crew Member/Machine Operators	40
Communications and Signals Supervisors	5
CTC Dispatch Center Technicians	5
Communications technician	10
Communications maintainer	10
Signal Technician	5
Signal Inspector	9
Signal Maintainers	51
Communications Technicians - Radio/EOTD	6
Bridge &Building Supervisor	2
Building Maintenance Foreman	5
Multi-skilled Building Tradesman	15
Bridge and Building Inspector	2
Bridge and Building Machine Operator	2
Bridge and Building Foreman	4
Bridge and Building Carpenter/Welder/Helper	12
Total Field	**656**
Total MOW	**675**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "MOW."

To evaluate AEPCO's proposed MOW personnel, Mr. Hughes considered the MOW organization by function. To construct an organization to carry out MOW maintenance for ANR, the first step is to inventory the facilities to be maintained and describe their physical characteristics and the factors that determine the level of resources required to maintain them to a standard that supports the train operations requirements. The major drivers of track maintenance resource requirements are the amount of track to be maintained, the traffic density over the track, and the territory over which the railroad passes.

ANR is comprised of 2,201 route miles with 3,320 track miles and 853 main track switches constructed with wooden ties. ANR's average traffic density is 61 million gross tons per track mile (91 million gross tons per route mile).[102] This is more than twice the density of BNSF (30 million gross tons) or UP (27 million gross tons). The railroad has 482 miles of curves less than three degrees and 107 miles of curves over three degrees with gradients seldom exceeding 1%. Curvature and gradient of ANR are about average and do not distinguish ANR from other railroads generally. The territory traversed is generally arid, with areas subject to flash flooding and with extremes of temperature that can demand additional track maintenance and inspection. The frequency of train traffic is a significant maintenance issue. As demonstrated by UP's experience, maintenance becomes very difficult on single track centralized traffic control ("CTC") railroad as traffic approaches 40 trains per day or 80 trains per day on double track. ANR will operate as many as 68 trains per day on some segments. At these traffic levels, maintenance crews experience significant delay in carrying out their work. While Mr. Hughes considered density as part of the overall development of ANR staffing requirements, it is a normalized estimate that provides for average staffing levels over the ten-year discounted cash flow ("DCF") period.

i. Track Department

AEPCO's proposed plan to maintain ANR's track with 250 track employees is infeasible because it is demonstrably short of the core maintenance resources of section crews, welders, smoothing gangs, and the support required. The infeasibility of the plan is illustrated by incredibly low unit maintenance costs per main track mile and per million gross ton mile as

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[102] BNSF/UP Reply electronic workpaper "ANR Roadmaster Districts.xlsx," Tab "Density."

discussed above,[103] as well as the fact that AEPCO proposes to maintain 13.5 miles per track employee despite the Board's decision in *WFA/Basin* recognizing 6.9 miles per track employee as reasonable for a SARR.[104] Based on Mr. Hughes' industry experience and recent interviews with BNSF and UP MOW managers, AEPCO's staffing is also inconsistent with track maintenance staffing levels on other high density railroads, including BNSF and UP.

Moreover, AEPCO has made no provision for the extra maintenance required for upkeep of spikes and rail anchors or the spot gaging on curves that wood tie track inevitably requires. Nor has AEPCO accounted for the productive time maintenance crews will lose given AEPCO's apparent failure to include maintenance roads. To remedy these failures, defendants' MOW plan for ANR prepared by Mr. Hughes is calibrated to meet the needs of a railroad with the MOW assets, territory, and traffic characteristics of ANR.

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[103] Tables III.D.17 and III.D.19 provide details.

[104] In *WFA/Basin I*, the STB adopted 6.9 track miles per track employee, which Mr. Hughes calculated using 57 employees, including track staffing and purchasing/stores, and the SARR's 391 track miles. *WFA/Basin I*, STB Docket No. 42088, at 57 (Table C-6) (served Sept 10, 2007).

Table III.D.21
ANR Track Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Track Engineer	1	$123,900	$123,900
Manager of Welding & Grinding	1	$104,415	$104,415
Supervisor of Work Equipment	1	$91,567	$91,567
Administrative Assistant/Clerk	1	$57,660	$57,660
Assistant Track Engineers	5	$91,065	$455,325
Roadmasters	20	$104,415	$2,088,300
Assistant Roadmasters	40	$91,567	$3,662,680
Track Crew Foreman	60	$63,913	$3,834,780
Track Crew Members	180	$59,136	$10,644,480
Roadway Machine Operators (Roadmaster)	40	$66,208	$2,648,320
Roadway Machine Operators (Track Engineer)	10	$66,208	$662,080
Roadway Machine Operators (Mat'l. Yard)	2	$66,208	$132,416
Distribution truck driver (Mat'l. Yard)	4	$66,208	$264,832
Clerk (Mat'l. Yard)	2	$57,660	$115,320
Welder/Helper/Grinders	80	$67,242	$5,379,360
Work Equipment Mechanics	10	$67,242	$672,420
Smoothing Crew Foremen	20	$63,913	$1,278,260
Smoothing Crew Member/Machine Operators	40	$66,208	$2,648,320
Total	**517**	**---**	**$34,864,435**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "Track."

The first line supervisor responsible for track maintenance is the roadmaster on BNSF and most major railroads.[105] The roadmaster is responsible for the safety, reliability, and maintenance of a segment of track (his district or territory). In typical heavy haul practice, the size of a roadmaster's district varies widely depending on workload and track accessibility. Workload is primarily determined by the territory's gross tonnage, miles of main track, the number of switches, and track curvature and gradient.[106] The efficiency of maintenance crews is largely determined by the number of trains per day that maintenance crews have to work around, the length of the territory in route miles they have to travel, and the ease of access to the track via maintenance roads.

AEPCO demonstrates its lack of understanding of the impact of the apparent omission of maintenance roads on maintenance crew productivity, while still proposing roadmaster district lengths averaging 140 route miles. Unquestionably, AEPCO has not accounted for the impact of poor access to the track on crew productivity, implicitly assuming normal access.[107] (Alternatively, AEPCO may have simply failed to consider the issue, which amounts to the same thing.) Mr. Hughes' track maintenance plan likewise assumes normal track access and takes the issues of workload and crew efficiency under normal access conditions into account in providing 20 roadmaster districts averaging 110 road miles and 165 track miles. ANR's additional MOW

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[105] UP is organized slightly differently. UP calls the first line supervisor for track a Manager of Track Maintenance ("MTM"). The MTM has section crews, welders, roadway machine operators, and smoothing crews, much like a roadmaster on BNSF, but also calls on resources assigned to the Director of Track Maintenance on the Region.

[106] In congested terminal areas with many yard tracks and switches and grade crossings, these are also major determinants of workload, but ANR has no major terminals in urban areas.

[107] Normal access means that maintenance roads are present unless the terrain makes them infeasible. In the case of ANR's route, maintenance roads exist on more than 75% of ANR's route on the incumbent railroads according to BNSF and UP maintenance officials.

costs due to AEPCO's failure to provide normal access via maintenance roads are estimated separately as an incremental cost of maintenance.

Mr. Hughes balanced the workload and maintenance crew efficiency of each roadmaster district, so each roadmaster requires similar resources after taking into account the workload and track access.[108] The AEPCO MOW plan provides only 15 under-staffed roadmaster districts, each covering between 92 and 240 route miles. With only 29 track crews provided in the AEPCO MOW plan, each roadmaster averages less than two track crews to maintain a district.

Demonstrating further lack of understanding regarding ANR's workload, AEPCO asserts that its 15 welding crews will be sufficient because "[t]here are substantially fewer turnouts in each Roadmaster's District compared to those for which BNSF and UP are responsible today, as well as very few joints to maintain so there will not be much need for welding repair on the brand-new ANR."[109] While BNSF and UP operate more track and have more turnouts along the route than is planned by ANR, it is not obvious that ANR's roadmasters will each have fewer switches to maintain. This is because there are fewer ANR roadmasters than BNSF and UP currently have. AEPCO proposed ANR have 15 roadmasters, while BNSF and UP have 22 roadmasters districts along territory replicated by ANR. The brand-new ANR will not be brand-new for very long. Some segments carry 80 million gross tons per track mile per year and will need welding and grinding almost immediately. Mr. Hughes' MOW plan for ANR includes 20 roadmaster districts. Sixteen of the 20 roadmaster districts carry over 70 million gross tons per track mile per year and the other four carry more than 60 million gross tons. There will be

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[108] BNSF/UP Reply workpaper "ANR Roadmaster Districts.pdf."

[109] AEPCO's Opening Evidence at III-D-67.

premature failures in welded rails that require repair.[110] At these densities, substantial welding will be required from the outset.

The AEPCO plan simply does not provide the resources needed to cope with the myriad tasks that must be performed on a roadmaster's district including:

- **Switch Maintenance** – Switch adjustment; welding and replacement of inserts, heel rails, wrap rails, other switch components; and replacement of stock rails and switch points.
- **Insulated Joint Maintenance** – Slot grinding the rail end of ANR's more than 5,200 insulated joints to prevent rail end chipping; tamping the insulated joints to keep the track smooth around them to prevent them from being battered by passing trains; and replacing insulated joints.[111]
- **Tie Maintenance** – Gaging, respiking, replacing prematurely failed wooden ties and wood ties under at insulated joints.[112]
- **Rail Maintenance** – Replacing around 40 broken rails;[113] removing temporary repair rails at locations of service failures and welding in

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[110] Even with the best in plant welding and ultrasonic inspection, some failures will still occur and have to be repaired immediately, requiring quick response time from welders.

[111] ANR has more than 5,200 insulated joints to maintain and replace. In UP's experience, the life of an insulated joint is 100 million gross tons under 286,000 pound axle loads. This implies an insulated joint life of 1.5 years on ANR main track at 61 million gross tons per mile per year. Based on this number, 3,500 joints would have to be replaced each year on ANR, averaging three per roadmaster per week. Each replacement requires a track gang, a welding gang, a signal maintainer, and track occupancy.

[112] As discussed below, wooden ties require more ongoing maintenance, and they require a higher operating cost even though they may have a lower initial capital cost.

[113] Based on an average failure rate of one failure per mile per year and Mr. Hughes' experience, an illustrative number is that about 25% of failures are broken rails, not defects able to be located by the ultrasonic defect detector car. In 61 million gross ton mile track, rail is (continued...)

permanent plugs; supporting rail grinding trains (fire suppression and fire fighting); and supporting ultrasonic rail defect detection cars.[114]

- **Track Geometry Maintenance / Track Smoothing** – Testing for defects three or four times per year by a track geometry measurement car and remedying any defects found.[115]
- **Drainage Maintenance** – Cleaning of right-of-way ditches; and maintaining drainage around road crossings.
- **Minor and Major Derailments** – Repairing damage to track due to derailments (even if contractors are hired for general derailment cleanup after major derailments).
- **Storm Damage** – Repairing washouts along the track caused by flash floods (even if a contractor does all major work, track forces are still required for track repair and surfacing).
- **Vegetation Control** – Organizing track occupancy and required protection for contractors to apply chemicals to control weeds and brush.

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normally replaced when failures due to fatigue (either broken rails or flaws detected by ultrasonic inspection) reach two per mile per year.

[114] Rail is tested twice per year and each test may find 50 or 100 defective rails per roadmaster district that must be replaced promptly.

[115] If track geometry measurements fall outside those prescribed for the class of track (class III and IV for ANR), then the roadmaster must reduce the authorized train speed over the defect until the condition is corrected. For a short geometry defect, the roadmaster might dispatch a section crew to tamp the track with their hydraulic hand tampers to avoid a speed restriction until a tamping machine could reach the location. More commonly, the track geometry defects are not so severe as to require speed restrictions, instead requiring only intervention to keep the defect from becoming more serious and causing a restriction. Every inspection by the geometry car generates a list of locations where track geometry must be improved (or track gage adjusted, in the case of wood ties) and represents a significant part of the workload on a roadmaster district.

- **Materials Handling** – Unloading all track maintenance materials; and loading scrap material.
- **Track Inspection** – Inspecting mainline tracks twice per week and on schedule; keeping records; and accompanying FRA track inspectors during periodic inspections.

Mr. Hughes' plan provides three section gangs made up of a foreman and three men equipped with a hi-rail boom[116] dump truck and hydraulic track tools for each roadmaster district.[117]

Each roadmaster district requires one smoothing gang made up of a foreman, two machine operators, a tamper, and a ballast regulator. AEPCO's MOW plan to provide only five smoothing gangs for track smoothing is infeasible. Five smoothing gangs cannot perform the quantity of work that must be done on 3,301 miles of track bearing 61 million gross tons of traffic per track mile per year and be able to respond to geometry defects promptly to avoid speed restrictions. In justifying its inadequate complement of smoothing crews and equipment, AEPCO states that "[g]iven ANR's new track structure, it is unlikely that there will be many surface or line irregularities within the first ten years of the railroad's existence."[118] This again demonstrates AEPCO's simplistic and unreasonable understanding of the maintenance requirements of ANR. At an average density of 61 million gross tons per track mile per year, ANR's track will require resurfacing every two years. Between resurfacing cycles, continuous

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[116] This is a light boom capable of lifting and handling a rail. Heavier materials are handled by a Speed Swing assigned to the roadmaster.

[117] Territories are shown in defendants' workpapers. BNSF/UP Reply electronic workpaper "ANR Roadmaster Districts.xlsx."

[118] AEPCO Opening Nar. at III-D-70.

spot surfacing is required to remove geometry defects detected by the track geometry car or by visual inspection. With 20 smoothing gangs, each would be responsible for an average of 165 track miles. Under ANR traffic conditions, a smoothing gang would only be on track and productive for about two hours per day. A smoothing gang is equipped with a tamping machine that lifts the track where it is low and tamps ballast under the tie to restore the correct elevation. It is accompanied by a ballast regulator that shapes the shoulders of the ballast and regulates the quantity of ballast so that there is a shoulder of consistent and adequate width beyond the ends of the tie.

Since tampers and ballast regulators generally do not leave the rail, they must run to a non-operating track where they can spend the night and leave the track to go to work the next day.[119] AEPCO, in addition to its apparent penurious approach to maintenance roads, has been likewise stingy in its provision of tracks where rail bound maintenance equipment can get out of the way. A smoothing gang will either clear the main tracks in a failed equipment device ("FED") siding, which are spaced approximately 25 miles apart or run to one of the seven locations where storage tracks have been provided for track maintenance equipment. Either way, the foreman must talk to the dispatcher and receive authorization to occupy the track which may take ten to 15 minutes, then the equipment must run out an average of 12.5 miles to a worksite, set up the equipment and then go to work. Then, the foreman must stop work in order to run back to a safe location to clear the main track before the time he has been allowed to work by the dispatcher expires. Considering the time required to get permission to work, the time to travel to

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[119] There are exceptions. This type of equipment has had hydraulic rams and turntables that allowed the machines to leave the track at temporary set off locations. However, most machines in use now are too large and heavy to be taken of the track, particularly by a three-man tamping crew.

the work site and set up the equipment and the time to run back to a safe place with a margin of safety, the smoothing gang needs an hour gap between trains just to go through these steps to have the opportunity to work. To actually perform work requires a longer than one hour window between trains. The lowest density sections of ANR operate 20 trains per day on single track which means the average time between trains is just over an hour. As traffic approaches 40 trains per day which is near the upper limit of single track capacity, average time between trains is 36 minutes, though two trains in the same direction could pass as little as five minutes apart. To get two hours working time on track in an eight or even ten hour day is a challenge under these traffic conditions. It is essential that there is both adequate production capacity to handle the workload in the limited track time available and also that there be a tamper available constantly on each roadmaster district to deal with track geometry defects and avoid excessive speed restrictions.

Defendants omit the positions of Rail Lubricator Repairman and Ditching Crew as being unnecessary. ANR has a total of 220 lubricators, or eleven per roadmaster. Lubricator maintenance would be provided by section crews without difficulty. Likewise, no provision is made for specialized ditching crews. Light ditching would be handled by section crews or a machine operator and backhoe. Heavier ditching would be handled by equipment and operators assigned to the Assistant Track Engineer with support from the roadmaster's forces. AEPCO's plan for rail lubricator maintenance and ditch maintenance is infeasible because it is not economically justified. These resources are better utilized by including them in a workforce as general purpose workers.

Supporting the workforce on each roadmaster district are two roadway machine operators to assist with material handling, ditching and drainage, snow removal, and earthwork and to

supplement the section crews while performing heavier maintenance like replacing frogs or switch points. Each roadmaster has a backhoe for light duty work and a speed swing to handle heavier materials like long frogs, stock rails, and points.

AEPCO provides two assistant roadmasters to do track inspection and other miscellaneous chores. Whether they are called "assistant roadmasters" or "track inspectors," the function is substantially the same. AEPCO notionally assigns a territory to these inspectors as though they could provide significant supervisory assistance to the roadmaster. However, they are obligated to inspect track on the schedule described by AEPCO, which occupies their time for the majority of Monday, Tuesday, Thursday and Friday. This schedule denies them the flexibility in time or location needed to provide supervisory support. The inspectors are essential to the operation of the district, but they are principally inspectors, not supervisors.

In summary, an average roadmaster would be responsible for managing six gangs (three section, two welding, and one smoothing gang) covering an average 110 route miles (165 track miles) of track. This provides a reasonable span of control, workload, and geographical territory for a roadmaster on a railroad like ANR. By contrast, AEPCO's MOW plan provides each roadmaster with an average of one and a fraction section gangs, one full-time welding gang, and a less than one-half of a smoothing gang.[120] This complement of crew and equipment is less than half of what is needed to maintain ANR's track.

Supervising the roadmasters will be five Assistant Track Engineers, as proposed by AEPCO. Each Assistant Track Engineer would be responsible for four roadmasters, a territory

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[120] AEPCO provides five smoothing crews for 15 roadmasters. Each roadmaster would have a smoothing crew four months of the year.

of about 440 route miles (700 track miles), and handling contract maintenance programs (vegetation control, rail grinding, shoulder ballast screening, and ultrasonic rail inspection).

The Assistant Track Engineers would have a force of ten mobile roadway equipment mechanics stationed strategically along the line for system equipment and to provide equipment maintenance support to the 20 roadmasters. Under defendants' plan, ten mechanics support 20 roadmasters – a larger staff than AEPCO's eight mechanics supporting 15 lightly-equipped roadmasters – but the mechanics have a reasonable scope of work and a reasonable territory.

To efficiently perform ditching and support heavier maintenance on the system, Mr. Hughes' MOW plan specifies ten system roadway machine operators assigned to the Track Engineer. Those two operators are assigned to two large excavators, two small excavators, two Prentice loaders, two Gradalls, and two rotary dump trucks. The operators are responsible for performing ditching system-wide and providing heavy maintenance support to Assistant Track Engineers and roadmasters.

ii. Maintenance of Way Material Management

Procurement is handled centrally, and supervisors enter material orders online into a modern material management system. For actual material handling, two MOW material yards – one North and one South – receive maintenance and capital materials and distribute them to MOW departments. Each material yard is co-located with an Assistant Track Engineer and roadmaster headquarters point.

Each material yard reports to an Assistant Track Engineer and consists of a hydraulic crane, a roadway machine operator, four heavy duty flat bed trucks, two truck drivers, and a material clerk. The yards receive materials for delivery to maintenance and crew headquarters locations and maintain a small stock for maintenance and emergencies. The yard receives material and stages it for delivery to maintenance headquarters locations. The material yard

maintains an inventory of commonly used maintenance material and emergency stocks for small incidents. It is also a staging area for material for public projects like highway/railroad grade crossing upgrades and material for capital project that cannot be delivered directly to the job site.

Because ANR apparently has no maintenance roads, job site delivery is only possible by hi-rail. AEPCO makes no provision for MOW material management and distribution. As for other MOW maintenance functions, the material management function described above assumes "normal" track access. Without maintenance roads, ANR would incur additional costs for re-handling material and hi-rail or work train delivery to the job sites because material cannot be delivered directly to the job site. It must be unloaded at the material yard and then transported by hi-rail truck or by train to the work site. If ANR had maintenance roads, the delivery truck could use the road to access the work site and meet a boom truck with a hydraulic crane or a speed swing to unload material without a second handling. Without roads, the material must be staged at the yard until it can be delivered by hi-rail. Mr. Hughes estimated this increased cost separately as an incremental MOW cost associated with the absence of maintenance roads.

iii. Communications & Signals Department

Table III.D.22 shows ANR's required staff for signals and communications maintenance.

Table III.D.22
ANR Communications and Signals Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Communications and Signals Engineer	1	$95,664	$95,664
Assistant Engineer — Signals	1	$91,065	$91,065
Assistant Engineer — Communications	1	$91,065	$91,065
Assistant Engineer Communications and Signals — PTC	1	$91,065	$91,065

Administrative Assistant/Clerk	1	$57,660	$57,660
C&S Supervisors	5	$91,567	$457,835
CTC Dispatch Center Technicians	5	$81,274	$406,370
Communications technician	10	$81,274	$812,740
Communications maintainer	10	$81,274	$812,740
Signal Technician	5	$81,274	$406,370
Signal Inspector	9	$81,274	$731,466
Signal Maintainers	51	$81,274	$4,144,974
Communications Technicians - Radio/EOTD	6	$72,857	$437,142
Total	**106**	[redacted]	**$8,636,156**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "C&S."

iv. Signal System Maintenance

AEPCO's plan for signal maintenance is infeasible without additional resources. AEPCO proposes five signal supervisors, 40 signal maintainers, and six communications technicians for radio and end-of-train device ("EOTD") repair. While the five Signal Supervisors are sufficient, an additional eleven Signal Maintainers are needed to reduce the workload to an acceptable level of Association of American Railroads ("AAR") signal units per maintainer, meaning that ANR needs 51 Signal Maintainers rather than the 40 maintainers for ANR's 63,190 signal units.[121] AEPCO claims that a signal maintainer can handle 1,600 AAR signal units. Where signals

[121] Using AAR signal units is the best method for measuring the workload of a signal maintainer because it takes into account the time spent in required tests and allows an average amount of time for troubleshooting signal failures to support track crews. An average of 1,250 AAR signal units per signal maintainer is a reasonable standard. This is more conservative than the approach adopted by the Board in *WFA/Basin I* where the Board accepted WFA's proposal to use 1,239 units per maintainer. *WFA/Basin I*, STB Docket No. 40288, at 63 (served Sept. 10, 2007). Mr. Hughes does not repeat the reasons supporting an average of 1,250 AAR signal units per maintainer for the sake of brevity, but he notes that 1,250 AAR signal units per signal maintainer is a feasible standard while AEPCO's proposal that 1,600 AAR signal units per signal maintainer is not.

equipment is especially dense – such as a terminal – this may be true, but it is not a realistic average for an entire railroad. Signal Maintainers must handle routine maintenance and fault-finding. A typical UP Signal Maintainer performs 46 hours of tests per month, with the remainder of the time spent troubleshooting faults, working with track maintenance crews at insulated joints and other track/signal interfaces, and traveling. Signal Maintainers must also perform some six month and annual tests.

AEPCO fails to account for both electronic maintenance requiring a skilled Signal Technician and signal tests requiring a Signal Inspector in addition to Signal Maintainers. A Signal Technician performs maintenance and troubleshooting on electronic signal equipment such as code units, electronic track circuits, electronic grade crossing gate controls, and data radio handling CTC signals at control points. This work is beyond the skills of a Signal Maintainer. Five signal technicians (one for every 440 ANR route miles) are required to maintain the electronic signal equipment under a Signal Supervisor. Signal Inspectors perform two-year, four-year and ten-year FRA-mandated tests with the assistance of the Signal Maintainer. These tests are beyond the qualifications of a Signal Maintainer and frequently require two people (an inspector and the Signal Maintainer) to carry out. Nine Signal Inspectors are required to cover the ANR and may be used where needed on the system.

In addition to understating the required number of Signal Maintainers and omitting Signal Inspectors and Signal Technicians, AEPCO also omitted the maintenance of the mission-critical equipment in the Dispatch Center. The Dispatch Center requires hourly coverage at all times by Maintenance Technicians to ensure continuous operation without interruption of equipment critical to the control of trains. Five technicians are provided for the dispatch center to ensure daily, around-the-clock coverage.

v. Communications System Maintenance

AEPCO's MOW plan calls for contracting out communications maintenance except in the areas of train and mobile radio repair. AEPCO's proposal for contracting out communications maintenance is infeasible. The Board has previously "reject[ed] the notion that the MOW function can be outsourced."[122] And for good reason. Communications is the life blood of every activity of railroad operations. The communications system carries commands from the central train control office to equipment in the field that controls switch positions and signal indications. Locomotive engineers communicate with train dispatchers and others over the communications backbone system. MOW crews rely on the communications system to communicate with dispatchers, trains, and other maintenance units, and to coordinate material deliveries. Supervisors use the communications system to communicate with their field forces. Every aspect of the field railroad operation gives or receives instructions via the communications system. It is simply infeasible to place such a critical system into the hands of a contractor and rely on "quality of service" provisions in a maintenance contract to ensure adequate contractor performance and system reliability of such a critical system. Moreover, ANR's MOW plan does not explain the benefit of taking this unacceptable risk. Even if contracting were cheaper, which is unlikely, the loss of control over response times to failures and system reliability would make contracting unacceptable to a high density railroad like ANR.

To provide for communications system maintenance – including microwave radio equipment, communications infrastructure, telephone systems and video equipment at yards – five communications maintenance crews, which consist of a Communications System

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[122] *Xcel* at 79.

Technician and a Communications System Maintainer assist with tests and work tasks that require more than one person. In addition, handheld mobile radios, vehicle radios, locomotive radios, and end-of-train devices are maintained at a radio repair shop by an additional five Communications Technicians who also supplement the field maintenance force when required.

vi. Bridge & Building Department

AEPCO's bridge maintenance and building maintenance plan is infeasible in that it understates the number of employees required for bridge maintenance and assumes building maintenance will be contracted. The plan provides 24 employees, of which 22 are field employees for bridge maintenance and contract maintenance of buildings, at a cost of 2% of building construction cost, which is $3.09 million per year. There is no explanation of the advantage of contract building maintenance over maintenance by railroad employees, nor is there a factual basis provided for the estimated maintenance expense equaling 2% of building construction cost.

Table III.D.23
ANR Bridge and Building Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Bridge Engineer	1	$95,664	$95,664
Building Engineer	1	$91,567	$91,567
Administrative Assistant/Clerk	1	$57,660	$57,660
Bridge &Building Supervisor	2	$91,567	$183,134
B&B Inspector	2	$76,212	$152,424
Building Maintenance Foreman	5	$66,775	$333,875
Multi-skilled Building Tradesmen	15	$56,789	$851,835
B&B Machine Operator	2	$66,208	$132,416
B&B Foreman	4	$66,775	$267,100
B&B Carpenter/Welder/Helper	12	$56,789	$681,468
Total	**45**	[redacted]	**$ 2,847,143**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "B&B."

The disadvantages of contracting out any significant amount of building maintenance are clear. The Board summarized the argument well in *WFA/Basin* by saying, "Spot maintenance, by definition, includes problems that occur on a day to day basis, and as such, require necessary personnel on duty at all times."[123] Beyond that summary, there are other practical problems. First, demand for building tradespeople is highly cyclical and peak construction demand is high, while railroad needs are steady and time sensitive. During peak demand, contractors may not be responsive. Even in non-peak demand periods, building maintenance firms may be over-extended and inadequately responsive. In addition, the railroad as owner of the facilities is responsible for compliance with building codes and the safety of the buildings. Policing outside contractors is all but impossible over large distances, and local building users are not equipped for (or interested in) this task. Finally, while railroad workers hourly pay rates with fringes are generally higher than wages paid to contract maintenance workers, that difference is much smaller or non-existent when converted into billing rates, particularly for electricians and plumbers. Everything considered, the use of railroad employees to maintain ANR's buildings is cost neutral and more reliable than contracting building maintenance.

Properly providing maintenance for AEPCO's buildings requires one Building Engineer familiar with building code requirements and five maintenance gangs of four men. The annual expense for this workforce of 21 employees is $1.96 million per year, slightly less expensive than the restated $2.04 million per year in the AEPCO plan. However, it is far more responsive to the needs of the railroad.[124]

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[123] *WFA/Basin I* at 60.

[124] AEPCO's MOW plan in opening evidence includes $3.09 million which has been restated to $2.04 million to correct an error. BNSF/UP Reply electronic workpaper "Restatement of AEPCO MOW Expenses.xlsx."

Mr. Hughes agrees with AEPCO that the design and age of ANR's bridges will require less maintenance than that required by incumbent railroads. However, even new bridges can be damaged by accidents or storms, and they are not totally free of routine maintenance requirements. Drains and handrails may require maintenance, and other forms of unexpected maintenance may also be required. Nonetheless, Mr. Hughes agrees with AEPCO's bridge maintenance plan.

vii. Miscellaneous Administrative/Support Personnel

AEPCO's MOW plan allows seven Administrative/Support employees to support a MOW department staff of 330. Defendants' plan adopts this staffing for Administrative/Support Personnel.

Table III.D.24
ANR MOW Administrative/Support Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Engineer of Programs and Contracts	1	$91,065	$91,065
Public Project Engineer	2	$95,664	$191,328
Manager of Administration & Budgets	1	$104,415	$104,415
Manager of Environmental/Safety/Training	1	$95,664	$95,664
Manager of Mechanical Operations	1	$ 104,415	$104,415
Administrative Assistant/Clerk	1	$57,660	$57,660
Total	**7**	[redacted]	**$664,547**

Source: BNSF/UP Reply electronic workpaper "ANR III-D MOW Tables.xlsx," Tab "Admin."

The expenses and underlying assumptions of Mr. Hughes' MOW plan are shown in the accompanying workpapers.[125] Where costs shown in the workpapers are unchanged, Mr. Hughes accepted the costs used by AEPCO.

c. **Other MOW Operating Expenses**

Mr. Hughes' MOW Maintenance plan incorporates AEPCO's allowance of 20% of equipment and vehicle purchase price as the cost of ownership and AEPCO's allowance of 5% of vehicles and equipment purchase price as the cost of equipment maintenance.[126]

Other MOW expenses adopted from the AEPCO MOW plan are shown in the defendants' workpapers and include track geometry testing; ultrasonic rail testing; ballast cleaning; yard cleaning; vegetation control; crossing repaving; bridge inspections; building repairs; and derailments.[127]

Other MOW expenses not adopted from the AEPCO MOW plan include snow removal, storm debris removal and washout, environmental cleanup, and – as discussed above in Bridges and Buildings – building maintenance.

i. Snow Removal

ANR has five locations where inspection and fueling yards, crew change buildings and MOW buildings are located. In addition, there are 19 interchange yards, a CTC center, an office building, and 15 other MOW headquarters points. While Mr. Hughes agrees that snow is unlikely at Cochise, it is not unlikely in and north of Amarillo, and it is frequently accompanied

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[125] BNSF/UP Reply electronic workpaper "ANR MOW Plan.xlsx."

[126] The list of equipment included in defendants' MOW plan prepared by Mr. Hughes and the associated vehicle and maintenance expenses based on the additives above are shown in defendants' workpapers. BNSF/UP Reply electronic workpaper "ANR MOW Plan.xlsx," Tab "Annual MOW Equipment cost."

[127] BNSF/UP Reply electronic workpaper "ANR MOW Plan.xlsx."

with wind that requires more than one removal of snow per storm. It is not cost effective to use ANR forces to do work that can be done by an inexpensive snow removal contractor. Based on the number of facilities to be served, the climate, and experience, Mr. Hughes estimates $150,000 for contract snow removal.

ii. Storm Debris Removal and Washouts

AEPCO fails to recognize the significant extent to which arid territory is subject to washouts and flood borne storm debris. UP maintains a contractor year-round in Tucson whose primary purpose is to clean up after flash floods during the "Monsoon Season" across New Mexico and Arizona. According to UP maintenance officials, a contractor is retained for approximately $1 million annually to respond to storm debris and storm damage around bridges between El Paso and Tucson. In Mr. Hughes' experience, based on his employment in the engineering department of the Southern Pacific Railroad, damaging storms in arid country are a frequent occurrence due to localized flash flooding.[128] Mr. Hughes estimates an annual expense of $1 million for the entire ANR system, which is $750,000 for washouts and $250,000 for storm debris removal.

iii. Environmental Cleanup

AEPCO provides for only the customary cost of materials to avoid fuel leakage around fueling facilities. AEPCO did not include any costs for the greater risk – cleanup after an environmental incident due to a derailment, collision, or other incident that releases materials. Even an oil leak due to the hydraulic failure of a piece of MOW machinery must be cleaned up.

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[128] Mr. Hughes began his railroad career as a surveyor on Rio Grande Division of Southern Pacific Railroad in El Paso, Texas. The Rio Grande Division extended from Tucumcari, New Mexico through El Paso and west to Lordsburg, Texas. On several occasions following washouts during that period, Mr. Hughes has participated in drainage surveys intended to determine the causes of the washouts and how to mitigate or avoid future washouts.

AEPCO allows $2.6 million for "Average derailment costs."[129] Mr. Hughes estimates Environmental Cleanup cost at 3% of annual derailment cost or $78,000 plus the $36,000 estimated in the AEPCO MOW plan, or $114,000 total.

d. Mr. Hughes' MOW Plan Conforms to Well-Established Benchmarks Given ANR's High-Density Lines and the Absence of Maintenance Roads

Defendants' maintenance-of-way plan presented here amounts to $105.3 million, which is a reasonable $31,819 per track mile. It is not surprising that this number is higher than BNSF's and UP's per track mile maintenance cost. The average density on the ANR is higher than on BNSF and UP's lines. The traffic density on ANR is 220% that of BNSF, even though the average cost is only 25.3% more than the average cost for BNSF. This makes sense because ANR does not have any low-density lines that would offset the higher costs of the high-density lines.

e. The Incremental Cost Associated with the Absence of Maintenance Roads Should be Added to ANR's MOW Plan

Maintenance roads are critically important to a MOW department and are essential if a high density railroad is to be maintained without extraordinary incremental maintenance costs associated with the absence of maintenance roads. Both BNSF and UP customarily pay to construct maintenance roads when extending passing tracks or constructing second main track. Maintenance engineers for BNSF and UP estimate that 75% of the existing route replicated by ANR has maintenance roads in place. There is no indication that AEPCO included any

[129] AEPCO Opening workpaper "MOW Plan-Final.xlsx," Tab "Derailment Clearing Cost."

maintenance roads, except possibly for some sub-standard access roads in some limited areas along the Orin Line.[130]

AEPCO does not show how it would be possible to perform maintenance without maintenance roads and without obstructing the track.[131] In fact, AEPCO seems to assume that MOW forces have the benefit of maintenance roads without including the cost of roads in the capital base. Mr. Hughes considers the impact on maintenance of three core assumptions of the AEPCO MOW plan: (1) all maintenance, whether accounted for as capital or operating expense, is assumed to be performed without hindrance to train movement; (2) maintenance forces can reach the location where maintenance and inspections are to be performed without the benefit of parallel maintenance roads and without hindrance to train movement; and (3) the primary transport vehicle for MOW forces is a traditional truck, equipped with hi-rail equipment, hydraulic power tools, hydraulic crane capable of handling a rail, a truck bed for small material, a rack for carrying one or two rails, and a cab for the crew.

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[130] Construction site roads should not be confused with maintenance roads. As stated by AEPCO "access roads are created for moving earth, rock and other materials to and from construction sites." AEPCO Opening Nar. at III-F-49. The fact that construction site roads are or are not created during the term of construction does not mean that any maintenance road is created. To the extent that construction site roads parallel the location where the track will be laid, they are actually on top of the subgrade exactly where the track will eventually be placed. The actual railroad embankment may initially serve as the construction access road. A well-planned construction project will have all electrical and signal equipment installed before the track, while the embankment is still available to provide road access. The last item of work is laying the track and connecting the already installed wires from the wayside signal equipment to the track. After all material has been brought in and installed, the track is installed at which point there is no longer road access to the track, nor is there need for construction access to the track since all material has been delivered and installed.

[131] Single track sections of ANR experience 19 to 38 trains per day; double track sections experience 45 to 68 trains per day. BNSF/UP Reply electronic workpaper "ANR Roadmaster Districts.pdf."

AEPCO states that all maintenance and inspections can be performed with no impact on the flow of trains and therefore no provision need be made in the simulation model for maintenance windows.[132] No doubt this is a convenient assumption, but like so many elements of the AEPCO operating plan, it is at odds with reality and best practices in railroad operation and maintenance.

In fact, both BNSF and UP recognize that there is some hindrance to train movement due to normal maintenance, and they actively balance their maintenance expense and investment in maintenance technology such as premium track materials, high speed maintenance machinery, and heavy investment in maintenance gang equipment with their investment in track capacity.[133] One critical element in that balance is the underlying assumption and investment, whether carried on the books or not, that maintenance roads exist or will be built.[134] Maintenance roads are an integral element in modern U.S. track maintenance technology.

In fact, if there were no maintenance roads, the fleet of maintenance of way equipment for routine track maintenance would likely be completely different. The hi-rail maintenance vehicles described above that are assumed for section gangs in AEPCO's MOW plan are intended to spend the vast majority of their time off of the track, going on track only when absolutely necessary. It is slow and cumbersome to get authority to occupy the track and to put a large hi-rail vehicle on the track. Moreover, because of the size and weight of the truck, it can only get on track and off at paved public highway crossings. Private crossings are only a single

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[132] AEPCO Opening Nar. at III-C-37 – III-C-38.

[133] Normal maintenance is separate from random equipment outages, which refer to a failure such as a broken rail or a signal failure.

[134] For decades, it was common practice for roadmasters to gradually build roads where they were needed without formal approval using operating funds. AEPCO ignores the importance of these assets in its MOW plan.

lane and most are too short to maneuver a section gang or welder's truck onto the track. These trucks are designed to work primarily from the maintenance road and not from the track in their rail travel capability, even though they have rail as a secondary means of travel. Hi-rail gear is only intended for very short travel distances, generally in only the forward direction since trucks in reverse gear travel at perhaps a maximum of ten miles per hour and forward at around 25 miles per hour. For the great majority of the time, the gang truck travels to the work site via maintenance road, not hi-rail.

In an environment where maintenance roads never existed, such as in certain parts of Europe or South Africa, a class of trackbound maintenance vehicles has been developed to fill the need for transport of track maintenance gangs, equipment, and materials to the work site without relying on a maintenance road. Such rail bound section crew vehicles are used today by sophisticated track maintenance managers in Europe, South Africa and many other parts of the world. Those places have developed their own track maintenance technologies based on the unavailability of a parallel maintenance road, and they have a different mix of men, equipment, materials, and track capacity and MOW equipment sidings to suit the needs of an environment without maintenance roads. These vehicles are equipped similarly to the trucks described above — they carry a crane, a bed for light material, a few rail sections, a cab for the crew, and hydraulic power tools. Some even have vibratory tamping heads mounted on the front to quickly tamp a short stretch of track. Unlike the trucks used in AEPCO's MOW plan, the vehicles are made to travel quickly on track. Travel speeds are equal in both directions and around double the forward speed of a hi-rail truck. In addition, the railroads have many more places where such vehicles can clear the main track than the 25 mile distance provided by AEPCO between FED tracks. The 25 mile spacing chosen for FED sidings is entirely based on a reasonable spacing for

trains to set out failed cars, not for frequent use by hi-rail vehicles. The only equipment that would normally use the FED tracks to clear the main line would be the smoothing equipment and mechanized machines passing through every few years doing capitalized maintenance work. Both of these equipment types can travel at speeds comparable to rail-bound track maintenance equipment designed for section gangs. Just as these vehicle and the track are designed for each other, the trucks AEPCO selected are meant for a railroad with maintenance roads.

AEPCO's assumption that they will furnish ANR with traditional maintenance trucks, but build a railroad with no parallel access roads for those trucks to use is illogical and shows a lack of understanding of world best practices in railroad operation and maintenance.

Mr. Hughes discusses below the maintenance problems faced by a maintenance crew equipped with a hi-rail truck arising from the absence of maintenance roads.[135] Without maintenance roads, track, signal and bridge staff must use existing public or private roads to reach the railroad at a road crossing, as they do presently.[136] However, when they reach the railroad now, they turn down the maintenance road and continue to the work site. If there were no maintenance roads, the would have to call the dispatcher and ask for permission to occupy the track, wait the dispatcher grant permission when there is a gap between trains, and then travel to the work site. They would have to leave the work site and travel to a crossing in time to clear the track well ahead of the next train. Depending upon the type of vehicle being used, this could be problematic. Large trucks like those used by section gangs and welders require a public highway

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[135] While many maintenance vehicles specified by AEPCO are hi-rail-equipped, that does not mean that their preferred mode of travel is on rail. It means that in emergency situations or in a remote area they can use the hi-rail equipment to gain access to a work location.

[136] Crossings are typically two miles apart and perhaps one crossing in five or ten is a public crossing in ANR's territory. Most crossings are private crossings for landowners that the railroad uses by agreement.

crossing that is wide enough for them to get on the rail, while pickup trucks can generally get on the track at smaller private crossings.

When workers reach the railroad crossing, they have to use their hi-rail equipment to get on the rail and travel to wherever they need to work, test or inspect. That means almost every time a track, signal, or bridge crew needs to work on or inspect something, they must have a track occupied while they travel to the work site, perform the work, and make their way to a crossing where they can leave the track.[137] Welders will not be able to drive to switches or insulated joints, park their trucks trackside, and do welding or grinding between trains. Track crews will not be able to do spot tamping by pulling up along the track and using hydraulic power tools to work on track between trains. Signal maintainers will not be able to do fault-finding without putting their maintenance truck on rail. The frequent trips that signal maintainers make to control points will require a trip down the track. In every case, the truck must stay on the track at the worksite because there is no way off the track. AEPCO has not included those occupations in their simulation of track capacity requirements.

While AEPCO may rely on parallel highways to access the track, such as Highway 40 to access portions of BNSF's line, crews still must access the track with their maintenance vehicles and equipment, and it is not sufficient to assume that this is possible simply because a crew could get within the general vicinity of the track. Parallel highway access has nothing to do with parallel maintenance roads. On parallel maintenance roads, welders, track maintenance crews

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[137] Trucks must continue forward to exit the track, limiting their flexibility to get off track and thereby shortening their occupancy time. Backup speed is generally 10 miles per hour and long backup distances cause vehicles to overheat.

and signal maintainers can drive to the desired location, do what they need to do on the track or signal system, and return. A parallel highway does not provide that capability.

If AEPCO had considered the cost of creating the additional capacity needed to accommodate using the railroad as a maintenance road, AEPCO would not have omitted maintenance roads from the ANR because building roads for maintenance vehicles is cheaper than building additional track so vehicles can run on the railroad because there is no road. The two best solutions for overcoming this deficiency are to either add track capacity to accommodate the occupations or to build maintenance roads to avoid the occupations. AEPCO has done neither.

A third – and in the real world less feasible – option is to increase MOW forces sufficiently for them to tolerate the delays imposed on their work by waiting for trains and still perform the necessary work. The problem with this solution is that it leads to a spiral of more occupations, more delays, and more congestion. As more vehicles require track access to travel because there is no maintenance road, congestion on the track increases, requiring more maintenance forces and equipment to overcome time lost due to congestion. This is not desirable.

Nonetheless, since AEPCO apparently did not include any maintenance roads, Mr. Hughes conservatively estimated the incremental increase in maintenance costs associated with the absence of maintenance roads. If, for the sake of simplicity, it is generously assumed that the inefficiency created by the omission of maintenance roads for a railroad that averages 41 trains per day can be overcome by adding maintenance crews, the incremental cost is substantial.[138]

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[138] This assumption is generous because adding maintenance gangs and equipment also adds to the need for track occupations and further congestion. It is highly doubtful that the track (continued...)

Mr. Hughes first identified which MOW costs are directly impacted by the absence of maintenance roads. Mr. Hughes considered how the categories of MOW costs would be affected by the absence of maintenance roads. In other words, the absence of maintenance roads would not result in the same incremental cost for a signal maintainer as it would for a track welder. For example, the absence of maintenance roads would have the greatest cost impact upon track because almost all work performed by a track crew requires close proximity to the track. Both bridge and signal work are near the track, but not on it. By contrast, the impact on signals costs would be less than on track but still significant because, without roads, the signal maintainer would have to travel to his worksite or inspection location by hi-rail truck on the track. That would require getting permission to occupy the track from the train dispatcher, and traveling to his destination (likely a control point, switch, or an insulated joint). If he were going to a switch or control point location, he would remove his vehicle from the track and perform his duties (though AEPCO does not provide any investment for a set off at control points or other frequently visited locations). If he were trouble-shooting and needed to travel to an insulated joint, he would continue to occupy the track rather than driving down the parallel maintenance road. The impact on bridge and building labor would have the smallest impact because, once workers arrive at their work location, they can work unimpeded under the bridge and their vehicle can clear the track, assuming there is convenient siding nearby. Typically they travel to their worksite by maintenance road without any need to occupy the track and seldom ask the dispatcher to occupy the track or to take an asset out of service.

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design proposed by AEPCO provides enough capacity for the planned volume of trains and the number of hi-rail trips that would be required to carry out maintenance, fault finding, and inspection without normal maintenance roads.

Table III.D.25 below shows that 68% of MOW costs are directly impacted by the absence of maintenance roads. Mr. Hughes developed costs by performing a line-by-line evaluation of the labor, equipment, and annual MOW expenses to determine if the costs would vary if access to the railroad were not available through maintenance roads. Costs such as management and administration were excluded, as were costs like building maintenance and MOW materials. Costs directly related to the maintenance and inspection of track, signals, and bridges were included.[139] Mr. Hughes concluded that there were 18 job classifications that are dependent on track access. Labor, fringes, travel, vehicles, and equipment expenses were determined for each of the 18 classifications. He then assessed the extent to which the absence of maintenance roads would reduce productivity and increase costs for each classification, and he applied that percentage to the total costs for the classification to determine the incremental cost associated with the absence of maintenance roads for that classification. The sum of the classification for track, bridge, and signal functions are shown in the table below. Mr. Hughes did not include the secondary impact of additional occupations on the cost of rail-bound contract services due to the greater congestion delay in carrying out their contract services. Material costs were assumed unchanged.

Table III.D.25 below summarizes the 18 classifications by function and shows the incremental cost associated with the absence of maintenance roads. These are conservative estimates, and it is possible that the actual cost would be two or three times higher.

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[139] Defendants' workpapers show the details of items that were included and excluded. BNSF/UP Reply electronic workpaper "ANR MOW Plan.xlsx," Tab "Access Affected MOW Expenses."

Table III.D.25
Summary of ANR'S MOW Costs Impacted by the Absence of Maintenance Roads

ANR	Labor, travel and fringes	Equipment and vehicles	Total Affected MOW Expense	Amount of Incremental Cost	Percent of Incremental Cost
Track	$46,402,754	$12,845,786	$59,248,540	$32,452,723	55%
Communications and Signal	$8,462,319	$1,110,625	$9,572,944	$3,666,635	38%
Bridge and Building	$4,626,440	$138,350	$2,191,746	$601,389	27%
Administrative	-	-	-	-	
Total	**$59,491,512**	**$14,094,791**	**$71,013,230**	**$36,720,747**	**52%**

Source: BNSF/UP Reply electronic workpaper "ANR MOW Plan.xlsx," Tab "Access Affected MOW Expenses."

Mr. Hughes included the following example of the impact associated with the absence of maintenance roads. On a typical day, between 19 and 38 trains will traverse ANR's single track segments, creating an average interval between trains of 38 to 76 minutes.[140] As train speeds are close to one mile per minute, the track must be clear for five to ten miles ahead of the train, meaning no MOW equipment can occupy the track. If a worker wants to travel on the track, he must get permission to occupy the track from the train dispatcher. Then the track worker has to get on the track, travel to the destination, perform work, travel to a take off point, and remove the hi-rail vehicle from the track, all within the short time window. For that reason, the average working time for a smoothing crew is about two hours out of an eight or ten hour day.[141]

[140] The situation is not materially different on double track segments as up to 69 trains may transit a double track segment.

[141] A smoothing crew uses a tamping machine and a ballast regulator. Both machines are too heavy to be removed from the track so they must be on a side track for trains to pass.

Without maintenance roads, every maintenance and inspection crew has worktime restrictions almost as severe as those of a smoothing crew.[142] Hi-rail vehicles travel forward at about 25 miles per hour and about ten miles per hour in reverse. To minimize time, the vehicle must proceed in the same direction from the time it gets on the track until it gets off. Even so, the time needed is substantial.

Under normal conditions where maintenance roads are present (*i.e.*, with maintenance roads along 75% of the railroad), most MOW traffic is on the road. On a single roadmaster district, there is a smoothing gang, three track gangs, two welding gangs, two track inspectors, and two signal maintainers. All of these individuals travel from place to place within the district and take short track occupancies to do maintenance, inspection, or tests. Without maintenance roads, that contingent would need to travel on the railroad much of the time. Short occupations to perform a task become long occupations because of the additional time needed to put a hi-rail on the track, travel to another crossing, and get it off the track, plus the time spent waiting for a break between trains that is long enough to do all of that. These are the realities that lead railroads to build maintenance roads in conjunction with high density main track additions.

Weighing those realities and based on his experience as a general track foreman, bridge and building supervisor, and chief engineer, Mr. Hughes conservatively estimates that – if it is possible at all to maintain the ANR without normal maintenance roads – the MOW cost premium would be $36.7 million. This is 35% of the of $105.3 million in Mr. Hughes' MOW plan for ANR. That amount has been included as a separate item in defendants' MOW maintenance cost estimate prepared by Mr. Hughes.

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[142] The difference is that hi-rail vehicles can get off the track at crossings, but a smoothing crew cannot.

f. MOW for Defendants' Two Alternative SARRs: ANR-NM and ANR-PRB

Defendants next take the estimates developed by Mr. Hughes and allocate the estimates to the two alternative SARRs, ANR-NM and ANR-PRB.

i. General Approach to Developing the ANR-NM MOW Plan

Using the same assumptions that are applied in Mr. Hughes' ANR MOW Plan, Mr. Hughes adjusted the plan to meet the needs of New Mexico and prepare the ANR-NM's MOW plan. ANR-NM's MOW annual operating expenses are $25.0 million which equates to $33,771 per track mile, or 6% higher than ANR's $31,819 per track mile, excluding the additional incremental cost associated with the absence of maintenance roads. The higher expense per track mile is due to some negative economies of scale as the ANR-NM is only one-fifth of the size of ANR.

As was the case with ANR, no maintenance roads are constructed on ANR-NM, resulting in increased maintenance costs that was explained in ANR. For ANR-NM, Mr. Hughes used the same methodology to calculate the incremental cost associated with the absence of maintenance roads as he used with ANR. The result is shown in Table III.D.26 below.

Table III.D.26
Summary of ANR-NM'S MOW Costs Impacted by the Absence of Maintenance Roads

ANR-NM	Labor, travel and fringes	Equipment and vehicles	Total Expense	Amount of Incremental Cost	Percentage of Incremental Cost
Track	$11,749,458	$2,310,880	$14,060,337	$7,921,821	56%
Communications and Signal	$1,545,498	$173,000	$1,718,498	$584,154	34%
Bridge and Building	$1,061,300	$32,963	$590,256	$118,051	20%
Administrative	-	-	-	-	
Total	$14,356,256	$2,516,842	$16,369,092	$8,624,026	53%

Source: BNSF/UP Reply electronic workpaper "NM MOW Plan.xlsx," Tab "Access Affected MOW Expenses."

The incremental cost associated with the absence of maintenance roads for ANR-NM is $8.62 million or 34% of the ANR-NM MOW operating expense of $25.0 million. Of ANR-NM's total MOW operating expense, $16.37 million or 65% of expenses are affected by the absence of maintenance roads, and $8.62 million or 34% are unaffected by the absence of maintenance roads. Expenses for on-track contract services such as geometry inspection, vegetation control, ultrasonic rail inspection were also not considered because they do not depend directly on maintenance roads, even though they would be impacted by the congestion created by maintenance vehicles using the railroad as a maintenance road.

(a) ANR-NM MOW Personnel

Table III.D.27 summarizes ANR-NM's staff requirements for Office and Field Staff.

Table III.D.27
ANR-NM MOW Personnel

Position	No. of Employees
HW Office/Supervisory	
Track Engineer	1
Communications & Signals Engineer	1
Administrative Assistant/Clerk	2
Total Office	4
Field	
Assistant Track Engineers	1
Roadmasters	5
Assistant Roadmasters	10
Track Crew Foreman	15
Track Crew Members	45
Roadway Machine Operators (Roadmaster)	10
Roadway Machine Operators (Track Engineer)	2
RMO/Material Manager (Mat'l. Yard)	1
Distribution truck driver (Mat'l. Yard)	1
Welder/Helper/Grinders	20

Work Equipment Mechanics	3
Smoothing Crew Foremen	5
Smoothing Crew Member/Machine Operators	10
C&S Supervisors	1
CTC Dispatch Center Technicians	2
Communications technician	2
Communications maintainer	2
Signal Technician	1
Signal Inspector	1
Signal Maintainers	8
Communications Technicians - Radio/EOTD	2
Bridge &Building Supervisor	1
Building Maintenance Foreman	1
Multi-skilled Building Tradesmen	3
B&B Machine Operator	1
B&B Foreman	1
B&B Carpenter/Welder/Helper	3
Total Field	157
Total MOW	**161**

Source: BNSF/UP Reply electronic workpaper "NM III-D MOW Tables.xlsx," Tab "MOW."

The MOW organization for ANR-NM is substantially different than the ANR system, which is five times larger. The ANR-NM MOW staff numbers have been reduced to compensate for the reduction in size from ANR. The responsibilities for some jobs described in ANR have been distributed to a smaller number of people in ANR-NM. Some of the job descriptions used in staffing ANR-NM's MOW function are patterned after job descriptions on non-union regional railroads.[143]

As an overview, the 161 MOW positions in the ANR-NM MOW plan are 24% of the 675 positions in the ANR MOW plan. The ANR-NM track network consists of 445 route miles and 741 track miles, 20% and 22%, respectively, of the ANR's. The ANR-NM MOW staff did not

[143] Examples include yard manager/machine operator, the truck driver/machine operator, the multi-skilled building tradesmen, and the pooled multi-skilled communications technicians.

shrink proportionately due to reverse economies of scale. Also, the centralized traffic control center is comparatively larger than ANR's because centralized functions are not perfectly scalable. As with Mr. Hughes' proposed MOW plan for ANR, his staffing requirements for ANR-NM are a normalized estimate that provides for average staffing levels over the ten-year DCF period, even though he considered density as part of the overall development of ANR staffing requirements.

(b) ANR-NM MOW Organization by Function

ANR-NM is comprised of 445 route miles (741 track miles) with 147 track switches all constructed on wood ties. Average traffic density is 49.9 million gross tons per track mile. The railroad has 16 miles of curves greater than three degrees with grades seldom reaching one percent. Its curvature and gradient do not distinguish ANR-NM from freight railroads in general. The territory traversed is generally arid with areas subject to flash flooding and with extremes of temperature that can demand additional track maintenance and inspection. The frequency of train traffic is a significant maintenance issue. UP's experience has shown that maintenance of a railroad with centralized traffic control becomes difficult as traffic approaches 40 trains per day on a single track or 80 trains per day on double track. ANR-NM will operate as many as 71 trains per day on some segments. At these traffic levels, maintenance crews experience significant delay in carrying out their work.

(c) Track Department

The plan for ANR-NM Track Department is based on the conceptual approach described in Mr. Hughes' plan for ANR MOW.

Table III.D.28
ANR-NM Track Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Track Engineer	1	$123,900	$123,900
Manager of Welding & Grinding		$104,415	-
Supervisor of Work Equipment		$91,567	-
Administrative Assistant/Clerk		$57,660	-
Assistant Track Engineers	1	$91,065	$91,065
Roadmasters	5	$104,415	$522,075
Assistant Roadmasters	10	$91,567	$915,670
Track Crew Foreman	15	$63,913	$958,695
Track Crew Members	45	$59,136	$2,661,120
Roadway Machine Operators (Roadmaster)	10	$66,208	$662,080
Roadway Machine Operators (Track Engineer)	2	$66,208	$132,416
RMO/Material Manager (Mat'l. Yard)	1	$66,208	$66,208
Distribution truck driver (Mat'l. Yard)	1	$66,208	$66,208
Clerk (Mat'l. Yard)	0	$57,660	-
Welder/Helper/Grinders	20	$67,242	$1,344,840
Work Equipment Mechanics	3	$67,242	$201,726
Smoothing Crew Foremen	5	$63,913	$319,565
Smoothing Crew Member/Machine Operators	10	$66,208	$662,080
Total	**129**		**$8,727,648**

Source: BNSF/UP Reply electronic workpaper "NM III-D Tables.xlsx," Tab "Track."

The ANR-NM Track Department consists of 129 employees. The department is headed by a Track Engineer who performs the functions of Track Engineer, Manager of Welding and Grinding and Public Projects Engineer as they were described in Mr. Hughes' plan for ANR MOW. Since ANR-NM is less than one-fifth the route miles of ANR, it has a lower level of activity and is relatively compact, requiring less travel time for system officials.

The ANR-NM Assistant Track Engineer takes on the additional duty of Supervisor of Work Equipment, Mechanical Operations Manager and Engineer of Programs and Contracts because his maintenance role relates directly to those functions.

The Bridge and Building Supervisor assumes environmental responsibilities, and safety and training tasks are distributed among the line managers because they are core line management issues.

There is a small MOW material yard operated by a single machine operator/yard manager who handles shipping and receiving tasks and operates a hydraulic crane for material handling. There is a flat bed truck and truck driver/machine operator for material delivery.

The track field staff is supervised by five roadmasters, each of whom has two assistant roadmasters who principally perform track and switch inspections and other duties as time permits. As in the case with ANR, each roadmaster district has been sized to account for workload and crew efficiency. ANR-NM roadmaster districts, averaging 89 route miles and 148 track miles, are shorter than the 110 route mile/166 track mile average for ANR roadmasters, reflecting lighter traffic density of ANR-NM.[144] Each ANR-NM roadmaster has three section gangs of a foreman and three men, two welding gangs, one smoothing gang, and two roadway machine operators, all equipped as described in Mr. Hughes' plan for ANR MOW.

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[144] Defendants' workpapers include workload and crew efficiency measures for each district. BNSF/UP Reply electronic workpaper "NM Track Working.xlsx;" BNSF/UP Reply electronic workpaper "NM Roadmaster Districts.pdf."

(d) ANR-NM Communications and Signal Department

Table III.D.29
ANR-NM Communications and Signals Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Communications & Signals Engineer	1	$95,664	$95,664
Assistant Engineer — Signals		$91,065	-
Assistant Engineer — Communications		$91,065	-
Assistant Engineer C&S — PTC		$91,065	-
Administrative Assistant/Clerk		$57,660	-
			-
Communications and Signals Supervisors	1	$91,567	$91,567
CTC Dispatch Center Technicians	2	$81,274	$162,548
Communications technician	2	$81,274	$162,548
Communications maintainer	2	$81,274	$162,548
Signal Technician	1	$81,274	$81,274
Signal Inspector	1	$81,274	$81,274
Signal Maintainers	8	$81,274	$650,192
Communications Technicians - Radio/EOTD	2	$72,857	$145,714
Total	**20**		**$1,633,329**

Source: BNSF/UP Reply electronic workpaper "NM III-D MOW Tables.xlsx," Tab "C&S."

As in Mr. Hughes' plan for ANR MOW, both communications and signal maintenance are performed by ANR-NM employees. The Communications and Signal Department is headed by a Communications and Signals Engineer who performs the tasks of the Assistant Engineer of Signals and Communications and the Assistant Engineer of PTC & Communications as they were described in Mr. Hughes' plan for ANR MOW.

The Communications and Signals Supervisor reports to the Communications and Signal Engineer and supervises the Signal Maintainers, Signal Inspectors, and a Signal Technician. The six Communications Technicians and two Communications Maintainers are co-located with the dispatch center and radio repair shop where they can respond to trouble in the dispatch system, maintain radios, and travel when necessary for maintenance of field located communications

equipment. Again, ANR-NM is a compact system of 455 route miles, reducing travel time. One Communications Technician is a technician/foreman reporting to the Communications and Signals Engineer.

The ANR-NM signal system consists of equipment equivalent to 10,475 AAR signal units. Based on a workload of 1,250 units per maintainer as described in Mr. Hughes' plan for ANR MOW, eight Signal Maintainers are required. In addition, one signal technician and one signal inspector are required.

(e) ANR-NM Bridge and Building Department

Table III.D.30
ANR-NM Bridge and Building Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Bridge Engineer		$95,664	-
Building Engineer		$91,567	-
Administrative Assistant/Clerk		$57,660	-
Bridge &Building Supervisor	1	$91,567	$91,567
Bridge and Building Inspector		$76,212	-
Building Maintenance Foreman	1	$66,775	$66,775
Multi-skilled Building Tradesmen	3	$56,789	$170,367
Bridge and Building Machine Operator	1	$66,208	$66,208
Bridge and Building Foreman	1	$66,775	$66,775
Bridge and Building Carpenter/Welder/Helper	3	$56,789	$170,367
Total	**10**		**$632,059**

Source: BNSF/UP Reply electronic workpaper "NM III-D MOW Tables.xlsx," Tab "B&B."

The Bridge and Building function is headed by a Bridge and Building Supervisor reporting to the Chief Engineering Officer. The Bridge and Building Supervisor supervises ten Bridge and Building employees, is also is responsible for environmental matters, and performs those functions of the Building Engineer that are not performed by the Chief Engineering Officer as ANR-NM has no Building Engineer. There are two four-man maintenance gangs, and one

roadway machine operator to support the two gangs. One gang focuses on buildings while the other focuses on bridges. Workers can move between the gangs or work alone, depending on the job's requirements. As with ANR, ANR-NM performs building maintenance with employees, not contractors. The Bridge and Building Supervisor performs annual bridge inspections.

(f) ANR-NM Misc. Administrative and Staff Support

Table III.D.31
ANR-NM MOW Administrative/Support Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Engineer of Programs and Contracts	0	$91,065	-
Public Project Engineer	0	$95,664	-
Manager of Administration & Budgets	0	$ 104,415	-
Manager of Environmental/Safety/Training	0	$95,664	-
Manager of Mechanical Operations	0	$ 104,415	-
Administrative Assistant/Clerk	2	$57,660	$115,320
Total	**2**	[redacted]	**$115,320**

Source: BNSF/UP Reply electronic workpaper "NM III-D MOW Tables.xlsx," Tab "Admin."

The Administrative and Staff Support consists of one administrative assistant position. The tasks performed by the larger ANR Administrative staff have been distributed to other ANR-NM managers as described above. The Finance Department provides budget support as required.

(g) Compensation for MOW Employees

MOW employee compensation in the New Mexico MOW plan mirrors the compensation for like employees in Mr. Hughes' plan for ANR MOW. Salaries for positions that do not exist in the AEPCO plan were established by choosing the best match available.

(h) Non-Program Work Performed by Contractors

Assumptions regarding non-program work performed by contractors are consistent with the principles applied in Mr. Hughes' plan for ANR MOW, scaled to the size of ANR-NM.

(i) Planned Contract Maintenance

Mr. Hughes accepted the unit prices for MOW expenses for planned contract maintenance categories (*i.e.*, vegetation control, ballast cleaning, geometry testing, joint bar testing, rail testing, and yard cleaning) from AEPCO's Opening Evidence for the ANR-NM MOW plan. He adjusted the quantities to fit the circumstances of ANR-NM.

Equipment and vehicle maintenance costs have been estimated using 5% of purchase price as the estimated annual maintenance cost of vehicles and equipment, applied to the actual vehicles and equipment that AEPCO assumes.

(ii) Unplanned Contract Maintenance

Snow Removal was not included as an expense in the ANR-NM MOW plan due to ANR-NM's location. A storm debris removal expense was based on the assumption in Mr. Hughes' plan for ANR MOW, and scaled to fit ANR-NM.

(iii) Large Magnitude Unplanned Maintenance

Derailment expense was based on AEPCO's assumption for ANR, scaled to fit the operations of ANR-NM. A washout expense was based on Mr. Hughes' plan for ANR MOW assumptions and scaled to fit ANR-NM. Environmental Cleanup expense was based on assumptions in Mr. Hughes' plan for ANR MOW and scaled to fit ANR-NM.

ii. General Approach to Developing the ANR-PRB MOW Plan

The ANR-PRB MOW plan is based on the same general assumptions and principals that are incorporated in the ANR MOW plan prepared by Mr. Hughes, adjusted to meet the needs of ANR-PRB. The ANR-PRB MOW annual operating expenses are $62.4 million which equates to $31,655 per track mile, substantially the same as ANR's $31,819 per track mile. Traffic densities are similar at 57 and 61 million gross tons per track mile per year, respectively.

As was the case with ANR, no maintenance roads are constructed on ANR-PRB, resulting in increased maintenance costs that was explained above in ANR. For ANR-PRB, Mr. Hughes used the same methodology to calculate the incremental cost associated with the absence of maintenance roads as he used with ANR. The result is shown in Table III.D.32 below.

Table III.D.32
Summary of ANR-PRB'S MOW Costs Impacted by the Absence of Maintenance Roads

ANR-PRB	Labor, travel and fringes	Equipment and vehicles	Total Expense	Amount of Incremental Cost	Percentage of Incremental Cost
Track labor	$27,722,637	$ 4,938,111	$ 32,660,747	$ 18,893,958	58%
Communications and Signal	$5,513,950	666,375	6,180,325	2,187,550	35%
Bridge & Building	$1,484,812	102,138	1,586,950	398,910	25%
Administrative	-	-	-	-	
MOW (excl. Material)	$34,721,399	$5,706,623	$40,428,023	$21,480,418	53%

Source: BNSF/UP Reply electronic workpaper "PRB MOW Plan.xlsx," Tab "Access Affected MOW Expenses."

The incremental cost associated with the absence of maintenance roads for ANR-PRB is $21.5 million or 34% of the ANR-NM MOW operating expense of $62.4 million. Of ANR-PRB's total MOW operating expense, $40.28 million of expenses are affected by the absence of maintenance roads, and $21.96 million are unaffected by the absence of maintenance roads.

(a) ANR-PRB MOW Personnel

Table III.D.33 summarizes ANR-PRB's staff requirements for Office and Field Staff.

TABLE III.D.33
ANR-PRB MOW Personnel

Position	No. of Employees

HW Office/Supervisory	
Track Engineer	1
Manager of Welding & Grinding	1
Supervisor of Work Equipment	1
Administrative Assistant/Clerk	1
Communications & Signals Engineer	1
Assistant Engineer — Signals	1
Assistant Engineer — Communications	1
Assistant Engineer Communications and Signals — PTC	0
Administrative Assistant/Clerk	0
Bridge Engineer	1
Building Engineer	1
Administrative Assistant/Clerk	0
Engineer of Programs and Contracts	1
Public Project Engineer	1
Manager of Administration & Budgets	1
Manager of Environmental/Safety/Training	1
Manager of Mechanical Operations	0
Administrative Assistant/Clerk	1
Total Office	14

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "MOW."

Table III.D.33
ANR-PRB MOW Personnel (continued)

Position	No. of Employees
Field	
Assistant Track Engineers	3
Roadmasters	12
Assistant Roadmasters	24
Track Crew Foreman	36
Track Crew Members	108
Roadway Machine Operators (Roadmaster)	24
Roadway Machine Operators (Track Engineer)	7
Roadway Machine Operators (Mat'l. Yard)	1
Distribution truck driver (Mat'l. Yard)	2
Clerk (Mat'l. Yard)	1
Welder/Helper/Grinders	48
Work Equipment Mechanics	6

Smoothing Crew Foremen	12
Smoothing Crew Member/Machine Operators	24
Communications and Signals Supervisors	3
CTC Dispatch Center Technicians	5
Communications technician	6
Communications maintainer	6
Signal Technician	3
Signal Inspector	6
Signal Maintainers	30
Communications Technicians - Radio/EOTD	4
Bridge &Building Supervisor	2
Bridge and Building Inspector	1
Building Maintenance Foreman	3
Multi-skilled Building Tradesmen	9
Bridge and Building Machine Operator	1
Bridge and Building Foreman	3
Bridge and Building Carpenter/Welder/Helper	9
Total Field	**399**
Total MOW	**413**

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "MOW."

The ANR-PRB MOW staff numbers have been reduced to compensate for the reduction in size from ANR to ANR-PRB. The responsibilities for some jobs described in ANR have been distributed to a smaller number of people in ANR-PRB. Some of the job descriptions used in staffing ANR-PRB's MOW function are patterned after job descriptions on non-union regional railroads.[145] There are 413 MOW positions in the ANR-PRB MOW plan which amount to 62% of the 675 positions in the ANR MOW plan.

(b) ANR-PRB MOW Organization by Function

The ANR-PRB track network consists of 1,971 route miles and 1,377 track miles; amounts to 60% and 63%, respectively, of the ANR equivalents.

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[145] Examples include the yard manager/machine operator, the truck driver/machine operator, the multi-skilled building tradesmen, and the pooled multi-skilled communications technicians.

Average traffic density is 57 million gross tons per track mile, which is slightly lower than ANR's 61 million gross tons per track mile. The railroad has 90 miles of curves greater than three degrees with grades seldom reaching one percent. Curvature and gradient do not distinguish ANR-PRB from freight railroads in general. The territory traversed is generally arid with areas subject to flash flooding and with extremes of temperature that can demand additional track maintenance and inspection. The frequency of train traffic is a significant maintenance issue. UP's experience has shown that maintenance becomes very difficult on single track CTC railroad as traffic approaches 40 trains per day or 80 trains per day on double track. ANR-PRB will operate as many 45 trains per day on various segments. At these traffic levels, maintenance crews experience significant delay in carrying out their work.

(c) ANR-PRB Track Department

The plan for the ANR-PRB Track Department is based on the conceptual approach described in the ANR MOW plan.

Table III.D.34
ANR-PRB Track Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Track Engineer	1	$123,900	$123,900
Manager of Welding & Grinding	1	$104,415	$104,415
Supervisor of Work Equipment	1	$91,567	$91,567
Administrative Assistant/Clerk	1	$57,660	$57,660
Assistant Track Engineers	3	$ 91,065	$273,195
Roadmasters	12	$104,415	$1,252,980
Assistant Roadmasters	24	$91,567	$2,197,608
Track Crew Foreman	36	$63,913	$2,300,868
Track Crew Members	108	$59,136	$6,386,688
Roadway Machine Operators (Roadmaster)	24	$66,208	$1,588,992
Roadway Machine Operators (Track Engineer)	7	$66,208	$463,456
Roadway Machine Operators (Mat'l. Yard)	1	$66,208	$66,208
Distribution truck driver (Mat'l. Yard)	2	$66,208	$132,416
Clerk (Mat'l. Yard)	1	$57,660	$57,660
Welder/Helper/Grinders	48	$67,242	$3,227,616
Work Equipment Mechanics	6	$67,242	$403,452
Smoothing Crew Foremen	12	$63,913	$766,956
Smoothing Crew Member/Machine Operators	24	$66,208	$1,588,992
Total	**312**		**$21,084,629**

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "Track."

The ANR-PRB's Track Department consists of 312 employees. The department is headed by a Track Engineer. Reporting to the Track Engineer is a Manager of Welding and Grinding and a Supervisor of Work Equipment who also performs the role of Manager of Mechanical Operations in the ANR MOW plan and three Assistant Track Engineers who each supervise four Roadmasters. There is a set of heavy equipment under the control of the Track

Engineer made up of large and small excavators, swivel dump trucks, excavators and Prentice Loader as well as seven roadway equipment operators.[146]

There is a centrally located MOW material yard staffed by a machine operator with a hydraulic crane for material handling, a materials clerk for shipping, receiving and administrative duties, two truck drivers with heavy duty flat bed trucks for material delivery. The yard maintains an inventory of commonly used maintenance materials and stages materials for capital and recollectible projects.

The track field staff is supervised by five roadmasters each of whom has two assistant roadmasters who principally perform track and switch inspections and other duties as time permits. As in the case with ANR, each roadmaster district has been sized to account for work load and crew efficiency.[147] The overall MOW staffing plan is based on traffic density normalized over the ten year DCF period. The roadmaster districts were sized to require equal maintenance resources and average 133 route miles and 183 track miles, compared with the slightly shorter ANR districts at 110 route miles and 166 track miles.[148] Each ANR-PRB roadmaster has three section gangs of a foreman plus three men, two welding gangs, one smoothing gang and two roadway machine operators, and equipment, following the maintenance philosophy described in the ANR MOW plan.

(d) ANR-PRB Communications and Signal Department

Table III.D.35
ANR-PRB Communications and Signals Employees

[146] BNSF/UP Reply electronic workpaper "ANR-PRB MOW Plan.xlsx," Tab "Annual MOW Equipment Cost."

[147] BNSF/UP Reply electronic workpaper "PRB Roadmaster Districts.xlsx."

[148] Defendants' workpapers include workload and crew efficiency measures for each district. BNSF/UP Reply electronic workpaper "PRB Roadmaster Districts.pdf."

Position	No. of Employees	Comp. Per Employee	Total Comp.
Communications and Signals Engineer	1	$95,664	$95,664
Assistant Engineer — Signals	1	$91,065	$91,065
Assistant Engineer — Communications	1	$91,065	$91,065
Assistant Engineer C&S — PTC	0	$91,065	-
Administrative Assistant/Clerk		$57,660	-
Communications and Signals Supervisors	3	$91,567	$274,701
CTC Dispatch Center Technicians	5	$81,274	$406,370
Communications technician	6	$81,274	$487,644
Communications maintainer	6	$81,274	$487,644
Signal Technician	3	$81,274	$243,822
Signal Inspector	6	$81,274	$487,644
Signal Maintainers	30	$81,274	$2,438,220
Communications Technicians - Radio/EOTD	4	$72,857	$291,428
Total	**66**		**$5,395,267**

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "C&S."

As in the ANR MOW plan both communications and signal maintenance are performed by ANR-PRB employees. The Communications and Signal Department is headed by a Communications and Signals Engineer who is supported by an Assistant Engineer – Signals and an Assistant Engineer Communications and PTC. Communication and Signal maintenance forces are supervised by Communications and Signal Supervisors.

The PRB signal system consists of equipment equivalent to 37,819 AAR signal units. Based on a workload of 1,250 units per maintainer as described in the ANR MOW plan, 30 Signal Maintainers are required. In addition, three signal technicians and six signal inspectors are required. The role of each is as described in the ANR MOW plan.

To perform maintenance and repairs to communications equipment, there are six communications maintenance and repair gangs made up of a technician and a maintainer. Radios are maintained by four radio/EOTD technicians located strategically on the system.

(e) ANR-PRB Bridge and Building Department

Table III.D.36
ANR-PRB Bridge and Building Employees

Position	No. of Employees	Comp. Per Employee	Total Comp.
Bridge Engineer	1	$95,664	$95,664
Building Engineer	1	$91,567	$91,567
Administrative Assistant/Clerk	0	$57,660	-
Bridge &Building Supervisor	2	$91,567	$183,134
Bridge and Building Inspector	1	$76,212	$76,212
Building Maintenance Foreman	3	$66,775	$200,325
Multi-skilled Building Tradesmen	9	$56,789	$511,101
Bridge and Building Machine Operator	1	$66,208	$66,208
Bridge and Building Foreman	3	$66,775	$200,325
Bridge and Building Carpenter/Welder/Helper	9	$56,789	$511,101
Total	**30**		**$1,935,637**

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "B&B."

The Bridge and Building function is headed by a Bridge Engineer who reports to the chief engineering officer. A Building Engineer, two Bridge and Building Supervisors and the Bridge Inspector report to the Bridge Engineer. Reporting to the Bridge and Building Supervisors are six B&B foreman and system bridge inspector. There is a single roadway machine operator for the system bridge crane. As with ANR, ANR-PRB performs building maintenance with PRB employees, not contractors.

(f) ANR-PRB Misc. Administrative and Staff Support

TABLE III.D.37 ANR-PRB MOW Administrative/Support Employees			
Position	**No. of Employees**	**Comp. Per Employee**	**Total Comp.**
Engineer of Programs and Contracts	1	$91,065	$91,065
Public Project Engineer	1	$95,664	$95,664
Manager of Administration & Budgets	1	$104,415	$104,415
Manager of Environmental/Safety/Training	1	$95,664	$95,664
Manager of Mechanical Operations	0	$104,415	-
Administrative Assistant/Clerk	1	$57,660	$57,660
Total	5	[redacted]	$444,468

Source: BNSF/UP Reply electronic workpaper "PRB III-D MOW Tables.xlsx," Tab "Admin."

The Administrative and Staff Support consists of one Engineer of Programs and Contracts, one Public Projects Engineer, a Manager of Administration and Budgets, and a Manager of Environmental/Safety/Training. The ANR position of Manager of Mechanical Operations was absorbed into the Supervisor of Work Equipment position.

(g) ANR-PRB Compensation for MOW Employees

MOW employee compensation in the ANR-PRB MOW plan mirrors the compensation for like employees in AEPCO ANR MOW plan. Salaries for positions that do not exist in the AEPCO plan were established by choosing the best match available.

(h) ANR-PRB Non-Program Work Performed by Contractors

Assumptions regarding non-program work performed by contractors are consistent with the principles applied in the ANR MOW plan, scaled to the size of ANR-PRB.

(i) Planned Contract Maintenance

The unit prices for MOW expenses for planned contract maintenance categories, as described in AEPCO's Opening Evidence, for vegetation control, ballast cleaning, geometry

testing, joint bar testing, rail testing and yard cleaning have been adopted for the ANR-PRB MOW plan. Quantities have been adjusted to fit the circumstances of ANR-PRB.

Equipment and vehicle maintenance costs have been estimated using 5% of purchase price as the estimated annual maintenance cost of vehicles and equipment, applied to the actual vehicles and equipment that matches AEPCO's assumption.

(ii) Unplanned Contract Maintenance

Snow Removal was not included as an expense in the ANR-PRB MOW plan due to ANR-PRB's location. Storm Debris Removal expense was based on the assumption in the ANR MOW plan, which is different than the AEPCO assumption, scaled to fit ANR-PRB.

(iii) Large Magnitude Unplanned Maintenance

Derailment expense was based on AEPCO's assumption for ANR, scaled to fit the operations of ANR-PRB. Washout expense was based on the ANR MOW plan assumptions, which differ from AEPCO's, and scaled to fit ANR-PRB. Environmental Cleanup expense was based on ANR MOW plan assumptions, which differ from AEPCO, and scaled to fit ANR-PRB.

5. Leased Facilities

AEPCO states that its SARR has no leased track facilities and uses trackage rights over MRL. Defendants explained previously how they correct AEPCO's reliance on the MRL for cross-over traffic, and uses it only for overhead bridge movements between segments that ANR constructs, or for local shipments to PPL Montana's Corrette plant near Billings, Montana. As a result, the amount of traffic to which the MRL trackage rights fee applies in Defendants' ANR and ANR-PRB is much smaller than in AEPCO's ANR. For ANR and ANR-PRB bridge movements and shipments to the Corrette plant on the MRL, Defendants accept AEPCO's use of a { } fee. Defendants also point out that that fee does not represent BNSF's total payments to MRL, and that AEPCO failed to account for all of the costs associated with its ANR traffic. AEPCO selected trains that would originate or terminate in Laurel, Montana.[149] BNSF pays MRL {

}.[150] As AEPCO failed to include those payments, and also did not construct its own yard track facilities in Laurel[151] that would be necessary to serve that traffic, it understated the total costs that would be incurred.

ANR-PRB uses trackage rights on the BNSF between Pueblo and Stratford, as explained above in Section III.A. For the UP coal trains in the SARR traffic group that would use those

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[149] See, *e.g.*, AEPCO Opening Exh. III-C-1 at pages 2-3, rows 56-79.

[150] September 18, 2009 letter B. Gaede to AEPCO counsel, included as BNSF/UP Reply electronic workpaper "BNSF Sept 18 Letter.pdf."

[151] AEPCO Opening electronic workpaper "ANR Route Miles.xls."

trackage rights, Defendants include costs based on the trackage rights fee, which in the First Quarter 2009 was { }.[152]

ANR-NM pays SWRR a handling charge for moving the New Mexico issue traffic between Rincon and Deming. Based on materials that BNSF produced to AEPCO in discovery, Defendants include { } for the traffic moving over the SWRR.[153]

6. Loss and Damage

AEPCO states that it based ANR's loss and damage costs on the average of BNSF's and UP's actual 2008 loss and damage expense per ton.[154] Review of the associated workpaper, however, reveals that AEPCO relied upon a three-year average of the Defendants' loss and damage experience, based on information for 2006-2008 that was produced in discovery.[155] Defendants accept the multi-year approach that AEPCO's calculations follow, and also accept AEPCO's pro-rata allocation to the SARR based on relative mileages, which Defendants apply to their specific ANR, ANR-PRB, and ANR-NM traffic groups.[156]

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[152] BNSF/UP Reply electronic workpaper "1Q09 Pueblo Trackage Rights.pdf."

[153] BNSF_AEPCO_0036174 through BNSF_AEPCO_0036311, included as BNSF/UP Opening electronic workpaper "SWRR (BNSF 36174-311).pdf."

[154] AEPCO Opening Nar. at III-D-107.

[155] AEPCO Opening electronic workpaper "ANR Loss and Damage.xlsx."

[156] BNSF/UP Reply electronic workpaper "Loss and Damage RR Reply.xlsx."

7. Insurance

AEPCO asserts that ANR will self-insure and obtain insurance at competitive rates, and relies upon BNSF's experience to claim ANR insurance costs of 1.7% of operating expenses.[157] While ANR would be a Class I railroad, it is far smaller than BNSF. BNSF is able to achieve significant economies of scale when purchasing insurance, which explains its much lower insurance costs when compared to smaller Class I and other railroads more comparably-sized to ANR, ANR-PRB, and ANR-NM. As KCS, SOO, Genessee Wyoming, and RailAmerica represent a more apt benchmark for ANR insurance costs than BNSF, Defendants substitute their average – 4.9%[158] – for AEPCO's figure, which understates the insurance expense a railroad the size of ANR would incur.

8. Ad Valorem Tax

AEPCO relies upon a simplistic methodology for calculating the ANR's anticipated ad valorem taxes that understates the tax obligation ANR would actually incur. Under AEPCO's approach, the ANR tax will simply equal a share of the BNSF or UP tax in each state, prorated based on the ANR's share of the BNSF or UP miles in that state. This crude methodology fails to account for ANR's tax liability in western states where a key driver is capitalized net railway operating income (NROI).

Railroads operating in western states are required by state statute to be assessed by a central state assessment agency or taxing authority (Department of Revenue or State Tax Commission, etc.). The taxing authority will make a unitary assessment of the railroad's entire

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[157] AEPCO Opening Nar. at III-D-108.

[158] BNSF/UP Reply electronic workpaper "Insurance Rate.xls."

rail system and allocate a portion of that value to its state based on various allocation factors (property, income, mileage, etc.). The resulting state value would then be distributed (apportioned) across the various tax jurisdictions within the state (generally over railroad mileage factors). The local tax jurisdictions (school districts. counties, etc.) will tax the railroad based upon the state assessment using their own levies.

If ANR will have higher NROI per mile of road operated than BNSF and UP, it will pay proportionately higher ad valorem taxes because taxable values are determined predominately by capitalized NROI. To account for the income aspect of ad valorem tax liability, Defendants have created a model based on the NROI per mile of ANR compared to that of BNSF and UP. That ratio is then applied to the tax per mile in each state for BNSF and UP to calculate a tax per mile for ANR. That tax per mile is applied to the miles of ANR, ANR-PRB, and ANR-NM to generate an expected tax in each state for each of the SARRs.[159]

9. Other

a. Costs Related to Rerouted Traffic

Issues related to the impact of AEPCO's rerouting of traffic, including the issue traffic, are addressed elsewhere throughout Defendants' reply evidence.

b. Third Party Coal Loading Fees

AEPCO includes the costs for third party contract loading that is performed for BNSF at PRB mines. Defendants accept the rates per ton, or other basis, where applicable, on which

[159] BNSF/UP Reply electronic workpaper "ANR Ad Valorem Tax.xls."

AEPCO relies, and modify AEPCO's approach only to reflect the specific 2009 tonnages for their ANR and ANR-PRB.[160]

c. Intermodal Lift Cost

While ANR handles the vast majority of its non-coal traffic in overhead service, there are a number of intermodal containers and/or trailers that are originated or terminated locally by the SARR in El Paso. As a proxy for developing the service necessary to perform these operations, AEPCO relies upon certain UP intermodal terminal expenses reported in the R-1 report, from which AEPCO develops an average cost of $30 per event.[161] Defendants accept this expense per lift but, as explained above in Section III.B, also ensure that adequate space is provided for the ramp when configuring the yard. Defendants apply the $30 cost to the specific 2009 tonnages for ANR and ANR-PRB.[162]

d. Texico Train Expense Additive

AEPCO uses BNSF's URCS costs to estimate a cost that it claims accounts for the additional costs of switching and blocking operations at the ANR's Texico Yard. For the costs that the SARR would incur, AEPCO relies upon BNSF's system-wide costs and URCS allocation assumptions regarding the fuel cost per switch-engine minute and number of minutes per I&I switch to assign an additional 30 thousand gallons of fuel to the SARR.[163] This amount equates roughly to one locomotive consuming 3.4 gallons per hour – essentially idling –

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[160] BNSF/UP Reply electronic workpaper "Mine Loading.xlsx."

[161] AEPCO Opening electronic workpaper "Intermodal Lift Cost.xlsx."

[162] Defendants' electronic workpaper "Intermodal Lift RR Reply.xlsx."

[163] AEPCO Opening electronic workpaper "Texico block switching.xlsx."

throughout the year.[164] While the use of URCS-based proxies in lieu of developing the costs of the SARR's providing functions or performing activities should always receive careful review, in this instance the limited dollar amounts do not warrant rigorous scrutiny. Defendants note that their reply evidence more appropriately models the operations that would be required at Texico Yard (see discussion of operating plan and RTC modeling in Section III.C) and also accounts for the necessary infrastructure at the ANR yard there (see discussion of yard functions and configuration in Section III.B). In addition to building up the SARR operating and engineering components, Defendants also rely upon the fuel consumption for BNSF trains traversing the Clovis Yard, including trains that would be worked at Clovis. To avoid any concern that use of these fuel consumption records would already account for the minimal amount that AEPCO determined should be added, Defendants exclude this component from their SARR operating expenses.

e. Calculation of Annual Operating Expenses

At the end of Section III.D of its opening narrative, AEPCO reprises the description of the process by which it developed the ANR operating expenses. As Defendants identify above in Section III.C, AEPCO's process unnecessarily distorts the 2009 operating expenses that are input to the DCF model and serve as the basis for the ANR operating expenses for each year of the analysis period, through 2018. Two problems exist with AEPCO's development of operating expenses, both of which Defendants correct in their reply evidence. First, AEPCO used its projected peak-year 2018 trains to develop all the operating statistics it uses to calculate 2009 costs. Parties to SAC cases agree forecasted peak-year train volumes should provide the basis

[164] 3.4 gallons per hour x 8,760 hours per year = 29,800 annual gallons.

for identifying the peak-period, from which the capacity requirements and associated transit times of the SARR are calculated from the RTC model. In this case, however, AEPCO also used its *peak-year* (2018) train forecast as the basis for other operating statistics, such as train starts and locomotive miles, for calculating SARR *base-year* (2009) operating expenses. As these other statistics are not calculated for the peak-period, and thus do not need to be developed from the peak-year volumes, AEPCO's approach contributes additional forecast error, even to the SARR's 2009 base-year operating expenses.

The steps AEPCO follows are: AEPCO (1) generates a list of trains from the April 2008-March 2009 period; (2) applies its traffic forecast to inflate to 2018 levels;[165] (3) calculates most of the operating statistics – including locomotive miles, crew starts, etc. – with its forecasted 2018 train list; and then (4) reduces those statistics back to 2009 levels, for calculation of operating expenses and input to the DCF model. Defendants' approach, by contrast, avoids the unnecessary introduction of error from the use of forecasts for the 2009-2018 period by (1) calculating the operating statistics for each of the trains in the list for the April 2008-March 2009 period; and then (2) adjusting those statistics to 2009 levels. By forecasting ahead less than one whole year – and not relying on projections ten years in the future, as AEPCO's process does – Defendants generate a much more reliable set of operating statistics and expenses for 2009, and as a result, each year thereafter.

The second problem with AEPCO's approach to calculating operating expenses is that it adjusts the 2018 statistics back to 2009 levels on the basis of *tons*,[166] but then inflates its 2009

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[165] Defendants explain in Section III.A. the extensive problems with AEPCO's forecasted traffic levels.

[166] AEPCO Opening Nar. at III-D-111 to III-D-112.

operating expenses in the DCF model, to return to 2018 volume levels, on the basis of *ton-miles.*[167] Due to this inconsistency, AEPCO's 2018 operating expenses in the DCF model will not match the expenses it would have calculated from the 2018 trains that it used in the first place for the very purpose of calculating operating expenses. Defendants eliminate this inconsistency from their development of operating expenses by adjusting from April 2008-March 2009 levels to 2009 SARR base-year levels on the basis of ton-miles, not tons, and continue to use this statistic to inflate expenses in the DCF thereafter, following AEPCO's approach.

Finally, there are a few errors in AEPCO's spreadsheet that summarizes ANR operating statistics.[168] The formulas calculating the total LUMs, locomotive hours, car miles, and car hours (row 19) do not include the amounts associated with ANR Agricultural traffic; and the formula calculating the total number of locomotives (row 26) does not include the units associated with ANR Industrial traffic.

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[167] AEPCO Opening Nar. at III-H-8 to III-H-9.

[168] AEPCO Opening electronic workpaper "ANR Operating Statistics.xlsx."

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ARIZONA ELECTRIC POWER COOPERATIVE, INC.
v.
BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

JOINT REPLY EVIDENCE AND ARGUMENT OF DEFENDANTS BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

NARRATIVE

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ABBREVIATIONS

Terms:

AAR	Association of American Railroads
AEI	Automatic Equipment Identification
AEO	Annual Energy Outlook
AEPCO	Arizona Electric Power Cooperative, Inc.
AFE	Authority for Expenditure
AMTO	Assistant Manager-Train Operations
ANR	Arizona & Northern Railroad
ANR-NM	Arizona & Northern Railroad-New Mexico
ANR-PRB	Arizona & Northern Railroad-Powder River Basin
Apache Station	Apache Generating Station
ATC	Average Total Cost
BN	Burlington Northern Railroad
BNSF	BNSF Railway Company
CPA	Certified Public Accounting
CTC	Centralized Traffic Control
DCF	Discounted Cash Flow
DOT	Department of Transportation
DP	Distributed Power
DTL	Direct-to-Locomotive
EDI	Electronic Data Interchange
EIA	U.S. Energy Information Administration
EAP	Employee Assistance Program
EOTD	End-of-Train Device
EPA	Environmental Protection Agency
FED	Failed Equipment Detector
FELA	Federal Employers Liability Act
FRA	Federal Railroad Administration
FXE	Ferrocarril Mexicano, S.A. de C.V.
G&A	General and Administrative
GWR	Gross Weight on Rail
HDF	On-Highway Diesel Fuel Index
HR	Human Resources
ICC	Interstate Commerce Commission
ICCTA	Interstate Commerce Commission Termination Act 0f 1995
IRS	Internal Revenue Service
ISS	Interline Settlement System
IT	Information Technology
KCS	Kansas City Southern
LAN	Local Area Network
LRP	Long Range Plan
LUM	Locomotive Unit Mile
MLO	Manager of Locomotive Operations
MNA	Missouri & Northern Arkansas Railroad

MOW	Maintenance of Way
MRL	Montana Rail Link
MTM	Manager of Track Maintenance
MTO	Manager-Train Operations
NKCR	Nebraska Kansas Colorado Railway
NROI	Net Railway Operating Income
OJT	On the job training
PRB	Powder River Basin
PTC	Positive Train Control
RCAF-U	Rail Cost Adjustment Factor-Unadjusted for Changes in Productivity
RCL	Remote Control Locomotives
ROW	Right of Way
RSIA	Rail Safety Improvement Act of 2008
RS Means or Means	RS Means Heavy Construction Handbook
RTC	Rail Traffic Controller
SAC	Stand-Alone Cost
SARR	Stand-Alone Railroad
SEC	Securities and Exchange Commission
SOX	Sarbanes-Oxley Act of 2002
SWRR	Southwest Railroad
T&E	Train and Engine Crew
UP	Union Pacific Railroad Company
URCS	Uniform Rail Costing System
USDA	U.S. Department of Agriculture
WAN	Wide Area Network
WTI	West Texas Intermediate Crude Prices
WTU	West Texas Utilities

CASE NAMES

AEPCO I	*Arizona Electric Power Cooperative Inc. v. Burlington Northern & Santa Fe Ry.*, 6 S.T.B. 322 (2002)
AEP Texas	*AEP Texas North Company v. BNSF Railway Company*, STB Docket No. 41191 (Sub-No. 1) (STB served May 15, 2009)
Bottleneck I	*Central Power & Light Co. v. Southern Pacific Transportation Co.*, 1 S.T.B. 1059 (1996)
Bottleneck II	*Central Power & Light Co. v. Southern Pacific Transportation Co.*, 2 S.T.B. 235 (1997)
Burlington Northern	*Burlington Northern Railroad v. STB*, 75 F.3d 685 (D.C. Cir. 1996)
Coal Rate Guidelines	*Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520 (1985)
Coal Trading	*Coal Trading Corp. v. Baltimore & Ohio R.R..*, 6 I.C.C. 2d 361 (1990)
Duke/CSXT	*Duke Energy Corp. v. CSX Transportation, Inc.*, STB Docket No. 42072 (STB served Feb. 4, 2004)
KCPL	*Kansas City Power & Light Company v. Union Pacific Railroad Company*, STB Docket No. 42095 (STB served May 19, 2008)
Major Issues	*Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006)
PSCo/Xcel I	*Pub. Serv. Co. of Colorado v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42057 (STB served June 8, 2004)
TMPA	*Texas Mun. Power Agency v. Burlington N. & S.F. Ry Co.*, 7 S.T.B. 803 (2004)
West Texas	*W. Tex. Util. Co. v. Burlington N.R.R..*, 1 S.T.B. 638 (1996)
WFA/Basin I	*Western Fuels Ass'n & Basin Elec. Power Coop. v. BNSF Ry.*, STB Docket No. 42088 (STB served Sept. 10, 2007), on appeal, *BNSF Ry. v. Western Fuels Ass'n & Basin Elec. Power Coop.*, Case. No. 09-1092, 09-1190, 09-1234 (consolidated) (D.C. Cir.)

WFA/Basin II	*Western Fuels Ass'n & Basin Elec. Power Coop v. BNSF Ry.*, STB Docket No. 42088 (STB served Feb. 18, 2009), on appeal, *BNSF Ry. v. Western Fuels Ass'n & Basin Elec. Power Coop.*, Case. No. 09-1092, 09-1190, 09-1234 (consolidated) (D.C. Cir.)
Xcel	*Pub. Ser. Co. of Colorado v. Burlington Northern & Santa Fe Ry.*, STB Docket No. 42057 (STB served June 8, 2004)

III. E. NON-ROAD PROPERTY INVESTMENT

Non-road property investment costs, including costs for locomotives, railcars and other equipment, are addressed in other sections of defendants' reply evidence.

III. F. ROAD PROPERTY INVESTMENT

Defendants' evidence regarding road property investment is sponsored by several engineering experts (collectively, "defendants' engineering experts"). The primary sponsors are Robert C. Phillips and Randall G. Frederick of STV/Whitehead Engineering, with specialized assistance from Dennis K. Prewitt on earthwork; George T. Zimmerman on track; Roberto Guardia of Shannon and Wilson on roadbed preparation and tunnels; and John F. MacDonald on tunnels; Gary Bechdol on construction schedule and rail; Willis S. White and David A. Magistro on bridges; John T. Sharkey of Campbell Technology Corporation on signals and communications; and Richard C. Dummar on facilities. Individual witnesses' qualifications appear in Part IV.

These experts have reviewed in detail AEPCO's proposed construction costs for ANR and have identified numerous significant flaws in AEPCO's opening evidence (above and beyond the improper SARR configuration issues discussed in detail in Sections III.A and III.B). The most egregious problems include:

- Miscalculating the weighted average location factor across the entire ANR that apply to Means earthwork and facilities unit costs.
- Improperly extrapolating earthwork unit costs from five small railroad capacity expansion projects to the entire 2,180-plus mile ANR.
- Using incomplete and irrelevant data to estimate costs for Type 4 and Type 5 bridges.
- Miscalculating transportation costs for construction materials by wrongly assuming that those materials could be transported over ANR lines that had not yet been built.

These and other errors are described and corrected in the subsections below.

Defendants have also developed and present in this section their evidence relating to their two alternative SARRs – ANR-PRB and ANR-NM. The methodologies for developing

quantities and cost for the alternative SARRs generally mirror those defendants use to develop them for ANR. Where distinctions need to be made or methodologies differ, they are discussed specifically below.

Summary Cost Comparison

Table III.F.1 below compares the construction costs for ANR included in AEPCO's opening evidence with the properly developed construction costs detailed in this Reply.

Table III.F.1
Comparison of ANR Road Property Investment Cost
($millions)

	AEPCO ANR	Reply ANR	Difference	ANR-PRB	ANR - NM
Land	$217.1	$217.1	$0.0	$195.4	$6.2
Roadbed Preparation	$1,147.8	$2,088.2	$940.4	$1,455.2	$385.8
Track	$2,518.7	$2,982.9	$464.2	$2,098.8	$670.3
Tunnels	$54.5	$74.2	$19.7	$74.2	$0.0
Bridges	$795.6	$736.2	-$59.4	$459.5	$202.8
Signals & Communications	$294.5	$331.3	$36.8	$221.1	$54.9
Buildings & Facilities	$131.0	$225.4	$94.4	$124.5	$50.6
Public Improvements	$62.7	$59.9	-$2.8	$43.3	$12.0
Subtotal	$5,222.1	$6,708.8	$1,486.7	$4,667.7	$1,381.2
Mobilization	$56.5	$123.0	$66.5	$83.2	$24.7
Engineering	$500.5	$649.2	$148.7	$447.2	$137.5
Contingencies	$577.9	$748.1	$170.2	$519.8	$154.3
Total Road Property Investment	$6,357.0	$8,236.8	$1,879.8	$5,723.1	$1,699.4

1. Land

Defendants accept AEPCO's assumptions regarding the cost of acquiring land for ANR. However, as noted in Section III.H.3, defendants reject AEPCO's treatment of January 1, 2009-based land values in the discounted cash flow model.

For ANR-PRB and ANR-NM, defendants determined the real estate value using a 100-foot right-of-way and AEPCO's cost of $1,260 per acre for acquiring land along the ANR route on which to dispose of excavation waste.

2. Roadbed Preparation

AEPCO's calculation of roadbed preparation costs is fundamentally flawed. Before addressing the multitude of specific problems relating to AEPCO's calculations, defendants highlight two errors that cause AEPCO to understate almost every cost in its opening evidence.

First, AEPCO miscalculated its weighted average location factor. AEPCO included the route miles of the entire ANR in the denominator of its calculation, but omitted from the numerator the 296.59 track miles associated with Billings, Montana.[1] The error caused AEPCO to understate the weighted average location factor by more than 15%.[2] This systemic error has an enormous impact because it affects virtually every earthwork and facilities cost calculation.

Including the miles associated with Billings, Montana in both the numerator and the denominator results in a substantially higher weighted average location factor than AEPCO used in its cost estimates, as shown in Table III.F.2.

Table III.F.2
Location Factor Corrections

	AEPCO Opening Evidence	Corrected
Material	0.7921	0.9146
Installation	0.8495	0.9810
Total	0.8314	0.9601

Defendants apply the corrected calculation of the Means location factor in their Reply.

[1] AEPCO Opening workpaper "ANR Grading.xls," Tab "IIIF Loc Factor," cells H:21, I:21 & J:21.

[2] *Id.*

Second, AEPCO consistently assumes that goods and services are available at all times at all places on the ANR route at the cheapest price found anywhere at any time and that those goods and services are of equivalent quality to those for which the market rate is significantly higher. This is obviously wrong. While ANR is entitled to the presumption of unconstrained resources, limitations due to location and quality are still applicable.

Most costs are tied to a particular location – for example, to a particular construction project or supplier. Distances and geological differences limit the availability and applicability of costs. Ballast purchased in Wyoming does not get to Texas without incurring transportation costs.[3] Common earthwork in a region typified by sedimentary rock is less expensive than common earthwork in a region typified by significant amounts of igneous and metamorphic rock.[4] Rail lines have to be built before construction materials can be shipped over them.[5]

Also, if a price seems too good to be true, it probably is. Quality varies, and the way that costs are broken up on an AFE may obscure what is being provided at what cost. Subballast sold at { } of the national average price almost certainly does not meet the necessary specifications for use on a Class I railroad.[6] An AFE that does not specifically list water for compaction does not mean that water is not needed for compaction.[7]

AEPCO identifies particular line items without context and asserts that those costs are applicable everywhere and under every circumstance.

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[3] Section III.F.3.b.

[4] BNSF/UP Reply workpaper "Route Topo.pdf"; BNSF/UP Reply workpaper "ANR Physiographic Features.pdf."

[5] Section III.F.3.d.

[6] Section III.F.3.b.ii.(b).

[7] Section III.F.2.e.vii.

Defendants – in line with hundreds of Board decisions – apply Means costs (properly adjusted for location) except where there is documentation of adequate goods and services being provided at a location that is a legitimate comparator to a segment of the ANR route. AEPCO challenges the use of Means costs by asserting that they are not "real-world costs."[8] AEPCO then asserts that Means costs are overly "conservative" because they do not "recognize all the benefits that [a railroad] could realize through the competitive bid process" (except when Means costs are lower, when they suddenly "reflect the ANR's economies of scale").[9] This ignores the simple fact that Means costs *are* real-world costs.[10]

Means lists average prices for a given year for products, labor, equipment rentals, and other costs incurred by railroads. Average prices for products are determined by gathering real-world prices charged by manufacturers, dealers, distributors, and contractors across the United States and Canada. Average labor costs are determined based on union and non-union wage rates from 30 major American cities. Equipment rental rates are determined by gathering real-world rates from contractors, suppliers, dealers, manufacturers, and distributors throughout North America on virtually every type of equipment used by railroads, including costs for equipment maintenance (servicing, fuel, lubricants, etc.). These national averages can then be converted into regional averages by application of the proper location factor for labor or materials.

Accordingly, Means represents a far more appropriate standard for determining costs for a railroad with ANR's 2,180-plus mile route than cherry-picking specific costs for specific projects in specific places from specific invoices that lack specifics on what is actually being paid for. By contrast, every Means price has explicit and very specific assumptions built in –

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[8] AEPCO Opening Nar. at III-F-10.

[9] *Id.*

[10] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.3.

like hauling distances, stockpile locations, and production rates – that allow a very precise fit to virtually every situation.

The remainder of this section addresses specific issues relevant to AEPCO's ANR roadbed preparation costs. A summary comparison of defendants' Reply ANR roadbed preparation costs with AEPCO's opening evidence is presented in Table III.F.3.

The costs of roadbed preparation for the alternative SARRs were developed in the same manner as for ANR. The quantities for segments of the alternative SARRs not replicating ANR segments were taken from ICC Engineering Reports and adjusted as necessary in the same manner as ANR earthwork quantities.

Table III.F.3
Roadbed Preparation Costs
($ thousands)

	Item	AEPCO ANR	Defendants' ANR	Difference
1.	Clearing and Grubbing	$6,731	$18,301	$11,570
2.	Earthwork	$1,013,005	$1,705,170	$692,166
	a. Common	$280,800	$685,064	$404,264
	b. Loose Rock	$65,845	$90,752	$24,907
	c. Solid Rock	$137,611	$163,298	$25,688
	d. Borrow	$528,749	$766,056	$237,307
3.	Drainage			
	a. Lateral Drainage	$366	$360	-$6
4.	Culverts	$36,825	$61,282	$24,457
5.	Retaining Walls	$9,315	$11,156	$1,842
6.	Rip Rap	$11,632	$13,424	$1,792
7.	Relocation of Utilities	$5,540	$5,540	$0
8.	Topsoil Placement/Seeding	$5,742	$5,742	$0
9.	Surfacing for Detour Roads	$6,817	$7,872	$1,055
10.	Land For Waste Excavation	$1,562	$1,714	$152
11.	Environmental Compliance	$2,876	$2,876	$0
12.	Tunnel Daylighting	$17,453	$0	-$17,453
13.	Sand and Drainage Berms	$23,047	$45,594	$22,547
14.	El Paso Trainway	$4,918	$14,594	$9,676
15.	Over Excavate Rock		$74,353	$74,353
16.	Undercutting		$52,804	$52,804
17.	Finish Grading		$67,438	$67,438
18.	**Total**	**$1,145,828**	**$2,088,221**	**$942,393**

a. Clearing and Grubbing

i. Clearing and Grubbing Quantities

Defendants accept AEPCO's approach to developing ANR clearing quantities and apply the same method here.[11] Likewise, defendants accept and apply AEPCO's approach to grubbing quantities.[12] The total quantities for ANR, however, are increased to adjust for the proper quantity of track miles.

ii. Clearing & Grubbing Costs

Defendants dispute the clearing and grubbing costs used by AEPCO. AEPCO makes two significant errors in determining such costs: (a) applying the Means costs for equipment that could not clear land at the rate of speed assumed by AEPCO; and (b) neglecting to include the Means cost of the equipment and labor necessary to load and haul away loose material created during clearing.

First, AEPCO understates clearing and grubbing costs because – despite using Means costs – the equipment assumed by Means in developing those costs cannot clear land at the rate AEPCO claims. The Means unit cost that AEPCO used is based on a 200 horsepower dozer. To clear land at the rate contemplated by AEPCO, a 200 horsepower dozer would need to clear eight acres per hour. Assuming that the dozer pulls a standard twelve foot wide brush rake, just passing the rake over eight acres in an hour would require the dozer to average 5.5 miles per

[11] This method calculates clearing quantities (acres per track mile) by valuation section based on the clearing and grubbing quantities in the ICC Bureau of Valuation B.V. Form 561 (ICC Engineering Reports) and related documents. Those amounts are then increased by the ratio of the current roadbed specifications to the original construction specifications. Next, the adjusted quantities by valuation section are applied to track miles (including yards and sidings) of ANR's line segments in the same manner as the grading quantities discussed below.

[12] Grubbing quantities are calculated similarly to clearing quantities. The ICC Engineering Reports provides acres per track mile of grubbing, which are adjusted in the same way as the clearing numbers and applied to ANR.

hour. Indeed, the dozer would have to be significantly faster than 5.5 miles per hour to allow time for the operator to stockpile roots, grass, and other organic material for loading and removal.

However, a real 200 horsepower dozer – pulling a brush rake and having to stop for stockpiling of organic materials – can clear only four acres per day.[13] The defendants' engineering experts therefore use that rate of clearing to calculate ANR's clearing costs.

Second, AEPCO fails to account for the time, labor, and equipment necessary to load and haul away unsuitable material left after clearing. To adjust for this omission, the defendants' engineering experts add the Means cost of a crew to remove such material.

After reducing the clearing rate to a realistic four acres per day and adding the cost of a crew to load and haul away materials after clearing, the total daily rate of clearing and loading a 30-foot wide section for over a mile is $1165 per acre.[14]

iii. Other

(a) Stripping

AEPCO relies on Board precedent from *Public Service Co. of Colorado v. Burlington Northern & Santa Fe Railway*, STB Docket No. 42057 (STB Served June 8, 2004) ("*PSCo/Xcel I*"), to justify its decision not to include stripping costs.[15] While AEPCO is correct that those cases do stand for the proposition that the inclusion of stripping costs is not required under some circumstances, AEPCO's assertion that separate stripping costs are never required goes too far. In particular, stripping is required when building a roadbed on an embankment.

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[13] BNSF/UP Reply workpaper "Equipment Selection reply 5-1-10 revised RCP.xls."

[14] *Id.*

[15] AEPCO Opening Nar. at III-F-16.

The Board has explained that, "because the top six inches of soil would be removed during excavation and because topsoil removal is included in waste costs," a separate stripping cost could be duplicative. *Id.* at 90. But, this reasoning applies only to roadbed in cut sections for which the uppermost sections of soil are removed. Building an embankment for roadbed is a very different process, requiring separate undercutting costs.

Building a roadbed on embankment requires far more than simply removing a layer of soil. As a result, the stripping costs are not subsumed in the initial excavation. The first step – which must be done before building an embankment – is to remove all vegetation at the base all the way down to the root mat.[16] The ground must be free of all roots exceeding three inches.[17] If those are not removed, they will decompose and leave soft spots in the embankment that shift under the pressure of the tracks and train. Next, the ground must be filled and compacted where stumps have been removed.[18] After this is done, the entire area to receive the embankment is proof-rolled to locate any soft areas.[19] If a soft area is found, the entire area needs to be plowed or scarified, and then compacted using water.[20] Only then can a railroad even begin placing embankment. Organic material removed also must be disposed of in waste pits. These costs of stripping are not included in waste – and AEPCO fails to include them elsewhere.

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[16] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

[17] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

[18] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

[19] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

[20] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

Defendants, however, do not develop a separate cost for stripping. Instead, stripping costs are included in the undercutting costs necessary when constructing a roadbed embankment.

(b) Undercutting

Undercutting and/or stripping is required when constructing an embankment. Excavation of unsuitable material is clearly identified in the AFEs for the four BNSF capacity expansion projects on the Orin Line and the one on the Hereford Subdivision upon which AEPCO bases most of its earthwork costs (hereinafter "BNSF expansion projects").[21] However, AEPCO does not include them in its costs. Therefore, defendants must develop them in the first instance.

To determine how much of the ANR roadbed requires embankment, the defendants' engineering experts relied on the embankment quantities in the ICC Engineering Reports. Unfortunately, the ICC Engineering Reports do not specify the amount of undercutting. The Reports are based on post-construction cross-sections taken every 100 feet and observations of physical characteristics of topography or structures that were an observable part of the roadbed construction effort. This information does not aid in estimates of subsurface roadbed or slope stabilization devices – including undercutting of unsuitable material – subsurface under-drainage, subsurface excavation or subsurface fill preparation. A cross-section viewed long after construction simply cannot show what was removed or added to make the roadbed.

The majority of the original construction records that would show these quantities have been lost, destroyed, or are otherwise unavailable. However, the original records would only indicate what was necessary to construct roadbeds that met the standards in existence at that time. Axle loads at the time of the construction of most of the roadbed that ANR duplicates were

[21] The Hereford Subdivision work is from a small BNSF project near Amarillo, Texas. Overall earthwork quantities from the Hereford Subdivision project represent only one-half of 1% of the total real-world project quantities referenced by AEPCO, meaning that virtually all real-world earthwork costs are for projects on the Orin Line.

only a fraction of modern axle loads. The invention of modern earthwork machinery also affects how these roadbeds would be constructed if built today.

Therefore, to determine the costs of necessary undercutting, the defendants' engineering experts multiplied the number of cubic yards under embankment footprints by the costs of undercutting using modern means. The costs include: removal and disposal of all vegetation down to the root; undercutting of an average of six inches of material to reach material suitable for compaction; and ground compaction for placement of the embankment (required by both BNSF's and UP's construction standards).

The total common excavation quantities in the BNSF expansion projects relied upon by AEPCO amounted to approximately 3.7 million cubic yards.[22] The pay items for "over-excavation and disposal of unsuitable material" indicate that approximately 150,000 cubic yards of the total excavation was unsuitable material.[23] Unsuitable material therefore amounted to 4% of the total common excavation. Different portions of ANR will have different proportions of unsuitable materials based on the geological conditions.[24] Based on the defendants' engineering experts' review of the known geology of the ANR route, the southern portion of ANR in particular would likely contain significantly higher proportions of unsuitable material than the

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[22] BNSF/UP Reply workpaper "Opening Roadbed prep costs from AFE.xls."

[23] BNSF/UP Reply workpaper "Opening Roadbed prepcosts from AFEs - RCP revisions 5-1-10.xls."

[24] BNSF/UP Reply workpaper "Engineering_Aspects_033010.pdf"; BNSF/UP Reply workpaper "Engineering_Aspects_Legends_033010.pdf"; BNSF/UP Reply workpaper "Karst effect RJG.pdf."

Powder River Basin (Orin Line).[25] However, as a conservative estimate, defendants apply the 4% figure to the entire ANR route.

To calculate the quantity of undercutting required beneath embankment footprints, the defendants' engineering experts used the quantity of common excavation provided by AEPCO and multiplied by 4%.[26]

The unit cost of undercutting is the same as the unit cost for common excavation developed in Section III.F.2.b.gi. Because borrow has to be added to replace the unsuitable material removed during undercutting, the defendants' engineering experts also use the quantity of unsuitable material as the quantity of borrow needed. The total cost of the borrow is then calculated using that quantity and the unit costs of borrow.[27]

(c) Over-Excavation

In addition to undercutting, modern roadbed construction requires that, when solid rock is found at subgrade levels in cuts, at least twelve inches of over-excavation occur and that the rock be replaced with at least of twelve inches of select material and compacted to the same specifications as embankments.[28] On many projects, sub-ballast is used for the twelve inches of material to bring the level back to subgrade elevation. However, the least-cost, most-efficient method would be to use compacted borrow for the quantities and costs to replace the over-excavation of rock.

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[25] BNSF/UP Reply workpaper "Engineering_Aspects_033010.pdf"; BNSF/UP Reply workpaper "Engineering_Aspects_Legends_033010.pdf"; BNSF/UP Reply workpaper "Karst effect RJF.pdf."

[26] BNSF/UP Reply workpaper "Revised ANR GRADING.xls," Tab "IIIF_ 11_EW Cost," column 13.

[27] BNSF/UP Reply workpaper "Revised ANR Grading.xls," Tab "Unit Cost."

[28] BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

The defendants' engineering experts used the roadbed dimensions provided by AEPCO to calculate cubic yard quantities of rock over-excavation required in rock cuts.[29] The rock excavation must be replaced by compacted embankment from borrow, so the number of cubic yard of compacted borrow are needed.

b. Earthworks

Like the parties in most full SAC proceedings, AEPCO relied on ICC Engineering Reports for most of ANR's earthwork quantities. Defendants accept these quantities as starting points when relevant real-world quantities are unavailable. However, when real-world quantities are available, defendants use those. Additionally, when ICC Engineering Reports do not account for changes to the road property since their creation, the defendants' engineering experts adjust the quantities as necessary and explain why the adjustment is necessary.

i. Earthwork Quantities from ICC Engineering Reports

With one exception, the defendants' engineering experts accept AEPCO's earthwork and other grading quantities, its assignment of valuation sections to the ANR route, and its adjustment of Engineering Report quantities to reflect modern day construction standards.

The exception is that AEPCO does not fully account for BNSF and UP track built on extra-wide roadbed centers. In fact, with the exception of the non-parallel tracks on the Gallup Subdivision, AEPCO omits these additional tracks entirely.

Railroads build double track with extra-wide (generally 25-foot) centers to permit maintenance on one track without having to provide on-track protection on the adjacent track, meaning that train flow through the area is not affected. Non-parallel (diverging) track is added for the same purpose when it is not feasible to widen the existing roadbed. Additions of both

[29] BNSF/UP Reply workpaper "Revised ANR Grading.xls," Tab "Over-Excavate Rock"; AEPCO Opening workpaper "ANR Grading.xls."

types have happened since the ICC Engineering Reports were compiled. Because ANR transports much the same traffic as UP and BNSF do today over the lines it replicates, ANR would require extra-wide centers and non-parallel tracks in all the places that they currently exist.

To determine additional costs due to extra-wide roadbed centers and non-parallel track, the defendants' engineering experts developed an inventory of these types of rail.[30]

- For the Gallup Subdivision, AEPCO properly recognizes the 37.91 miles of non-parallel tracks.

- On the Clovis Subdivision, there are 4.94 miles of non-parallel track between mileposts 750 and 756 and another 1.68 miles between mileposts 778 and 781.[31] In addition, there are 25-foot track centers between mileposts 815 and 850.[32]

- For the Hereford Subdivision, the BNSF Track Charts show wide roadbed centers for approximately 2.5 miles, starting two miles south of Haney, Texas.[33] When measured using aerial views, the track centers measure approximately 52 feet.

- For the Lordsburg Subdivision, the non-parallel tracks are identified on UP Track Charts.[34] Aerial views of the track confirmed these locations.[35] UP Track Charts show 20-foot centers starting at milepost 1065.38, about four miles east of Cochise, Arizona, and runs eastward to milepost 1290.00 at Anapra, New Mexico, before non-parallel mains begin. Anapra is located approximately four miles west of the El Paso Yard.

Defendants' engineering experts calculated the additional the additional earthwork quantities for non-parallel tracks using the same quantity of earthwork per track mile used

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[30] BNSF/UP Reply workpaper "Wide Track Centers and Non-Parallel Mains_ANR.xls."

[31] BNSF/UP Reply workpaper "Clovis Sub MP 750.93 to 755.87.pdf"; BNSF/UP Reply workpaper "Clovis Sub MP 778.79 to 780.47.pdf"; BNSF/UP Reply workpaper "Non-Parallel Mains Aerial Photos Clovis Sub only.pdf"

[32] On February 10, 2003, Robert Phillips observed and measured these extra-wide centers during a hirail inspection trip for the first *AEPCO* case.

[33] BNSF/UP Reply workpaper "Hereford Sub 52 ft Track Centers Aerial Views.pdf."

[34] BNSF/UP Reply workpaper "Wide Track Centers and Non-Parallel Mains_ANR.xls."

[35] BNSF/UP Reply workpaper "Non Parallel Mains Aerial Photo Lordsburg Sub.pdf."

elsewhere.[36] Defendants' engineering experts determined the additional earthwork quantities for extra-wide track center roadbeds by calculating increase in cubic yards of roadbed per mile from the increased cross-section of the roadbed and then multiplying that by the number of miles of roadbeds with extra-wide track centers.[37]

ii. Earthwork Quantities for Segments Not Covered by ICC Engineering Reports

Defendants accept AEPCO's earthwork quantities for segments not covered by ICC Engineering Reports.

iii. ANR Earthwork Quantities and Costs

(a) ANR Line Segments

Defendants generally accept the ANR route, except as discussed in other sections (such as the addition of 6.06 main track route miles and 1.65 second main and passing track miles increased by 1.65 miles in Section III.B), and the ANR-PRB and ANR-NM segments.

(b) ANR Yards

AEPCO has proposed five major yards for ANR: Amarillo, Texas; Guernsey, Wyoming; and Texico, West Vaughn, and West El Paso, New Mexico. AEPCO has calculated the yard grading requirements on an assumed average fill height of one foot (except in the eastern portion of Guernsey). The topography for ANR yard locations selected by AEPCO would require fill heights well in excess of one foot, but the defendants' engineering experts recognize that the Board in previous cases has found a one-foot fill assumption reasonable for stand-alone railroad yards. Although disagreeing with this precedent, defendants nonetheless accept AEPCO's one-foot fill assumption for purposes of this case.

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[36] BNSF/UP Reply workpaper "Revised ANR Grading.xls," Tab "IIIF_9 CY Grad," column "Non-Parallel 2nd Main 3."

[37] *Id.*

(c) Daylighting of Tunnel No. 2 Near Guernsey

AEPCO establishes the cost of digging the Number 2 tunnel near Guernsey, Wyoming by indexing the 1998 and 2002 AFE costs of open cutting ("daylighting") that tunnel to the first quarter of 2009. This understates the quantity of excavation needed because the material excavated in the daylighting project does not include the material excavated during the tunnel's creation. The defendants' engineering experts calculate the cross-section of the original tunnel to equal 374 square feet.[38] With a length of 1,930 feet, this totals 26,805 cubic yards of rock excavation not included in AEPCO's calculations. Defendants therefore add that quantity to the total rock excavations required.

(d) El Paso Trainway

AEPCO's stated cost for building the El Paso Trainway is baseless. AEPCO calculates this cost using the ${ } figure for the trainway submitted in the prior *AEPCO* case and indexing it forward. AEPCO makes this claim without any further analysis.[39] Defendants' workpapers exhaustively detail the itemized costs of the trainway and provide the necessary documentation showing the accuracy of that amount.[40] Once that amount is indexed to first quarter of 2009, the total cost for the trainway is ${ } million.[41]

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[38] This corresponds to the tunnel cross-section area utilized in the tunnel cost estimates for a horseshoe-shaped tunnel with a finished width of 16 feet and a height of 19 feet from top of rail to top of arch.

[39] AEPCO Opening Nar. at III-F-28-29.

[40] BNSF/UP Reply workpaper "El_Paso_Trainway.pdf"

[41] *Id.*

(e) Sand and Drainage Berms

AEPCO uses out-of-date borrow unit costs to calculate the total cost of building the sand berms along the UP route between El Paso and Lordsburg.[42] After accepting defendants' estimate of 2,566,080 cubic yards of borrow from its original rate case against defendants, AEPCO proceeds to calculate the costs by recycling the 2004 costs and indexing them to first quarter 2009. Instead, AEPCO should have simply used the 2009 costs. Applying the correct year's costs to the agreed-upon number of cubic yards results in a total cost for sand berms of ${ } million – almost ${ } million more than AEPCO improperly claims.[43]

(f) Total Earthwork Quantities

Defendants accept AEPCO's general approach of separating earthwork requirements into four types of material (common, loose rock, solid rock, and borrow) based on the distribution percentages in ICC Engineering Reports. Challenges to specific quantities are discussed below.

Table III.F.4 below compares the earthwork quantities calculated by defendants with those proposed by AEPCO.

Table III.F.4
ANR Earthwork[44]
Quantities by Type of Material Moved

Type of Earth Moved	AEPCO Cubic Yards (000s)	RAILROADS Cubic Yards (000s)	Difference Cubic Yards (000s)
1. Common Excavation	82,346	79,388	-2,958
2. Loose Rock Excavation	6,827	6,796	-30
3. Solid Rock Excavation	10,805	9,235	-1,570
4. Borrow (incl. yards)	41,416	43,115	1,699
5. Total	141,393	138,534	-2,859

[42] AEPCO Opening Workpaper "El Paso Trainway and Berms.pdf."

[43] BNSF/UP Reply workpaper "Sand Berm on UP 032003 RCP.pdf."

[44] AEPCO Opening Workpaper "El Paso Trainway and Berms.pdf."

(g) Earthwork Unit Costs

Before addressing AEPCO's unit costs for specific types of earthwork, defendants address one issue that affects all AEPCO's Means-based earthwork unit costs – shrinkage and swell.[45] The volume and density of earth undergo considerable changes when the earth is excavated, hauled, placed, and compacted. This is commonly referred to as "shrinkage and swell," and AEPCO does not account for it when developing costs based on Means.

The different volume characteristics are typically defined as follows:

- The bank-measure volume (BCY) is the volume of the earth measured in the borrow pit, trench, canal, or cut prior to loosening. This is the volume on which payment is usually based.

- The loose-measure volume (LCY) is the volume of earth after it has been removed from its natural position and deposited into trucks, scrapers, or spoil piles.

- The compacted-volume (ECY), or "fill volume," is the volume of the earth after it has been placed in a fill (*e.g.*, a dam or road) and compacted.

Because of these changes, it is necessary to specify whether the volume is measured in its original position (BCY), in the loose position (LCY), or in the fill after compaction (ECY). The quantities recorded in the ICC Engineering Reports are bank-measure cubic yards (BCY) for cuts and borrow and compacted-measure (ECY) for fills. The Means manual now provides the applicable measure for each price component. The defendants' engineering experts have conformed the AEPCO's quantities to these different measures.

Workpaper "Swell and Shrinkage.pdf" contains charts and graphs that detail the swell and shrinkage factors for various soil types. The various factors are summarized below.

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[45] Shrinkage and swell have not been an issue in the development of Means earthwork costs in earlier Board stand-alone proceedings because the unit price information published by Means before 2005 did not identify the characteristics of the cubic yard earthwork quantities to which its unit costs applied. Since 2005, Means has included the BCY, LCY, and ECY unit designations, as discussed in the text.

Sandy-Gravely-Earth	15% to 35%
Loose Rock (including ripped limestone & shale)	40% to 85%
Rock, well blasted	50% - 100%

The defendants' engineering experts conservatively used the following factors for adjusting quantities due to swell and shrinkage:

Sandy-Gravely-Earth	15%
Loose Rock (including ripped limestone & shale)	40%
Rock, well blasted	50%

The defendants' engineering experts then adjusted the Means based earthwork costs to consider properly earthwork materials as BCY, LCY, or ECY.

i. Common Earthwork

AEPCO relies on inapposite sources to develop its common earthwork unit cost. Specifically, AEPCO uses the BNSF expansion projects.[46] These projects, which span approximately 76.85 miles, simply added an adjacent track to an existing main track roadbed. AEPCO ignores the added costs of common earthwork on projects constructing new roadbeds across rural territory.

There are three types of costs associated with building new roadbed that are omitted in the unit costs from the BNSF expansion projects: (a) certain types of excavation; (b) costs of building infrastructure to support the earthwork; and (c) costs to obtaining information necessary to perform the earthwork.

The common earthwork costs of expansion projects are substantially lower than building a new line because some types of excavation have already been done. This includes stripping/waste. Whether the cost is deemed stripping or waste, soil must be removed to provide a stable base for track (except when undercutting is required instead of stripping). Expansion

[46] AEPCO Opening Nar. III-F-33.

lines use roadbed that has already been stripped. Similarly, when undercutting is required to build roadbed on an embankment, railroads building new lines must incur that cost, including the removal of unsuitable materials. Expansion lines, however, can use pre-existing embankments. ANR's roadbed would not be constructed where stripping and undercutting have already been done. Therefore, AEPCO is not entitled to derive its common earthwork costs from projects expanding existing roadbeds.

Expansion projects also have the benefit of infrastructure from the original construction. Equipment can be brought in faster and more cheaply because access roads have already been cut. Vehicles can traverse canyons and rivers because bridges had already been built. Construction offices can be erected faster because site improvements have already been made. Existing infrastructure eliminates certain costs associated with common earthwork that would otherwise increase the cost of the earthwork. ANR's roadbed would not be constructed where there was preexisting infrastructure to support earthwork, so AEPCO is not entitled to take earthworking costs from projects that did benefit from that infrastructure.

Finally, there are costs – in terms of time and money – to gain the information necessary to construct new lines. These costs include locating staging areas for unloading and storing equipment and materials and waste areas to dispose of excess or unsuitable material. Again, the ANR would have to incur these costs to perform common earthwork, so AEPCO cannot rely on expansion projects for its common earthwork costs.

Even if reliance on expansion projects were permissible generally in determining the cost of common earthwork on a new line, AEPCO relies on earthwork in only one area, ignoring that excavation costs differ with the geological features of a given region. AEPCO itself recognizes that there are regional differences in unit costs. When it does use Means costs, AEPCO adjusts

for regional differences in labor, equipment, and materials by using the tables found in the Means handbook. However, without adequate explanation, AEPCO applies the cost of common earthwork excavation for a regional project – the Orin Line – throughout the entire ANR.

For portions of ANR (and ANR-PRB and ANR-NM) other than the Orin Line, defendants apply the Means cost (derived from the average costs in North America) and adjust those costs by the Means factors to account for regional differences.[47] For the Orin Line, defendants apply the costs from the BNSF expansion projects on which AEPCO relies, including the AFE pay items that APECO inexplicably omits from its costs.[48]

In developing Means-based costs for common excavation, defendants apply the Means items identified (but not applied) by AEPCO with two minor modifications.

First, AEPCO's evidence assumes use of an elevating scraper for the excavation and borrow of common earth. The defendants' engineering experts found similar scrapers on construction projects visited and therefore take no exception to this selection. However, self-propelled scrapers are not capable of shaping the roadbed or slopes required by the typical section identified by AEPCO. To correct this oversight, defendants add a dozer for spreading dumped material.

Second, AEPCO's evidence specifies an equal 50%-50% ratio between sheepsfoot rollers and steel wheel rollers for compaction. Although the equipment selected is not problematic, the ratio is impractical. When embankments are being constructed, the terrain is initially uneven. Steel wheel rollers are almost impossible to maneuver on uneven surfaces because the smoothness of the steel drum causes them to slide downhill. Therefore, sheepsfoot rollers are

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[47] BNSF/UP Reply workpaper "Revised ANR Grading.xls," Tab "Location Factor."

[48] AEPCO Opening workpaper "ANR Grading.xls, Tab "Unit Costs"; BNSF/UP Reply workpaper "Roadbed costs from AFEs - RCP Revisions 5-1-10.xls."

used to compact embankments until they reach subgrade elevation – which is the majority of the compaction. Steel wheel rollers are used only for the top one to two feet. As a result, the correct ratio between sheepsfoot rollers and steel drum rollers is 80%-20%.

ii. Loose Rock Excavation

For its loose rock excavation costs, AEPCO uses the Means estimating manual, which defendants accept. However, defendants make three necessary modifications to the unit costs. First, defendants apply the volume changes in earthwork materials due to shrinkage and swell to the Means costs. Second, the Means costs AEPCO applies are based on the use of 42 cubic yard haulers, which defendants reject because their weight makes them a practical impossibility for use on the typical ANR roadbed. And, third, defendants correct AEPCO's cost to reflect the equipment selections in its narrative.

As discussed above, defendants adjust AEPCO's costs to properly reflect shrinkage and swell.

Defendants also reject AEPCO's selection of 42 cubic yard haulers because the stress from the vehicle's axle load would crush standard culverts. A two-foot diameter culvert is designed to bear the stress of the embankment on top of it. A typical ten-foot high embankment with a train loading exerts a stress of 2,063 pounds per square foot at the base of the embankment (and thus on the culvert).[49] The axle load of a 42 cubic yard hauler, on the other hand, creates approximately 5,000 pounds per square foot of stress at the top of the pipe.[50] In other words, when a 42 cubic yard hauler travels over a two-foot diameter culvert, the culvert would have to support 2.4 times the stress that it is designed to bear. Unless AEPCO is willing to purchase culverts 2.4 times stronger than what is needed to support an embankment and train

[49] BNSF/UP Reply workpaper "42 CY Axle Loading.pdf."

[50] *Id.*

loading, 42 cubic yard haulers cannot be used on ANR's roadbed. AEPCO has failed to meet its burden of demonstrating the feasibility of this equipment. Defendants therefore adjust the Means-derived earthwork costs to reflect the use of standard 22 cubic yard haulers.

Finally, defendants correct the inconsistency between AEPCO's narrative and workpapers regarding how it would rip and pile rock. In its narrative, AEPCO chooses a 300 horsepower dozer to do both ripping and piling rock.[51] However, in its workpapers, AEPCO uses the Means price for ripping rock with a 300 horsepower dozer and piling the rock with a 410 horsepower dozer.[52] Defendants apply the Means cost of 300 horsepower dozers to both ripping the rock and piling it.[53]

iii. Solid Rock Excavation

In developing solid rock excavation unit costs from Means, AEPCO again makes three errors. The first two are simply instances of two of AEPCO's more pervasive errors.

Shrinkage and swell are again neglected in AEPCO's calculations, as discussed above. The defendants' engineering experts adjust the quantities as necessary to remedy this.

Similarly, AEPCO selects 42 cubic yard haulers for solid rock excavation, which is infeasible due to its weight. The defendants' engineering experts incorporate the cost of using standard 22 cubic yard haulers in the corrected solid rock excavation costs.

Finally, AEPCO ignores the boulders produced by blasting. AEPCO's calculations assume that blasted rock produces only fine materials that can be handled by a three cubic yard

[51] AEPCO Opening Nar. at III-F-36.

[52] AEPCO Opening workpaper "ANR Grading.xls, Tab "IIIF Unit Costs."

[53] *Id.*

bucket. However, blasting produces large boulders as well.[54] The defendants' engineering experts noticed this when observing blasting operations at the New Mexico construction site.[55]

Boulders, even those under one cubic yard, take significantly more time to handle and load than fine materials. Means accommodates this by lowering the production rate when handling boulders.[56] Based on photographs of the material left by blasting solid rock, the defendants' engineering experts made a conservative estimate that one-tenth of that material is comprised of boulders. Defendants adjust the solid rock excavation costs accordingly.

iv. Embankment/Borrow

Defendants accept AEPCO's use of Means unit costs for borrow, aside from the corrections for shrinkage and swell, the costs of compaction (which are discussed in Section III.F.2.e.xi), and location factor.

v. Fine Grading

Based on an agreement between the parties in *Western Fuels Ass'n, Inc. & Basin Electric Power Cooperative v. Burlington Northern Santa Fe Railway*, STB Docket No. 42088 (STB served Sept. 10, 2007) ("*WFA/Basin I*") that costs for a particular project used in that case included but did not separately enumerate any necessary fine grading, *id.* slip op. at 88, AEPCO omits all costs for fine grading in this case.[57] Defendants do not agree that fine grading costs can be excluded for those parts of ANR where the costs of common excavation were not based on actual construction data that already covers those costs under another line item.

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[54] BNSF/UP Reply workpaper "Hondo Valley Equipment 030603 RCP.pdf," p.5.

[55] BNSF/UP Reply workpaper "US 70 Hondo Valley Project 021203.pdf."

[56] BNSF/UP Reply workpaper "RS MEANS Cost Data 2009.pdf," p.7 (Means 31-23-16.30-2800).

[57] AEPCO Opening Nar. at III-F-38.

Fine grading is necessary for two reasons. First, it is needed to ensure proper drainage; without fine grading, there will be depressions in the roadbed surface that collect water.

Second, fine grading is necessary to ensure a properly compacted and smooth foundation for an adequate and uniform thickness of sub-ballast. Without this assurance, there is no way to be certain that the subgrade is finished at plan elevation. Fine grading produces an even and smooth compacted surface to verify the specified thickness of subballast, minimizing waste and overruns in planned subballast quantities. Unevenness in the roadbed surface causes anomalous results that, in turn, causes uncertainty about whether the sub-ballast is adequate to support the necessary weight.

Because of AEPCO's failure to include the costs of fine grading, defendants have developed these costs in the first instance. For areas of ANR where common excavation cost was determined from actual construction data, defendants agree with AEPCO that the cost of common excavation already includes fine grading. However, where Means costs are used, the costs of fine grading the roadbed to specification are not included and must be added. This is evident from the fact that Means has a separate cost for fine grading.[58]

Special equipment is necessary for fine grading. The equipment AEPCO identifies for constructing fills and embankments will not suffice. For spreading fill material and constructing embankments AEPCO selects a 200 horsepower dozer.[59] For evacuating cuts, AEPCO opts for a 3CY power shovel and an elevating scraper. Even with a GPS-equipped dozer, these machines could not do fine grading.

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[58] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.6 (Means 31-22-16.10-0200).

[59] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.13 (Means 31-23-23.17-0020).

For fills, a dozer can spread fill material in eight-inch to one-foot layers close to the layout lines, and rollers can compact the material. However, fill materials do not compress evenly across the layer because of voids and differences in materials. As a result, the compacted fill material has an uneven surface that will cause drainage problems.

These problems are magnified when building embankments. Although a grade foreman or GPS-equipped dozer could spread the loose material within the nominal footprint and embankment grades, the initial placement is insufficiently exact for the finished grade. Again, voids and differences in the composition of the material create unevenness during compaction. With embankments, there is an additional problem of the compacting squeezing material out of any unconfined edges. To accommodate this, embankments are built slightly fat and high, then reduced to the proper dimensions with trimming or fine grading.

Fine grading requires contractors to "plow, scarify, and break up the base of excavations for the entire crown width of the subgrade and then shall condition and compact the material to a depth of at least six and up to 18 inches (if necessary to reach the specified density) below finished surface of the excavated section."[60] Fine grading crews typically perform this operation using motor-graders, which have scarifying teeth able to plow subgrade up to about twelve inches. After scarifying, the crews condition the ground by drying or adding water and then re-compacting to 95% maximum density.[61] AEPCO does not account for the crews, the equipment, or the subsequent conditioning in its cost analysis.

The defendants' engineering experts determined the quantity of fine grading required for ANR based on AEPCO's proposed 24-foot and 39-foot subgrade widths for single and double

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[60] BNSF/UP Reply workpaper "UP Finish Grading & Compaction Specs.pdf"; BNSF/UP Reply workpaper "BNSF Exc & Emb Specs.pdf"; BNSF/UP Reply workpaper "UP Exc & Emb Specs.pdf."

[61] *Id.*

track fill. To calculate square yard quantities of scarifying of subgrade required in common earth and loose rock cuts, defendants' engineering experts used values in AEPCO's workpapers.[62]

Defendants base the cost of fine grading on the Means catalog.[63] Defendants adjust this cost to include the additional equipment and labor necessary to collect and haul the spoils resulting from the fine grading to waste areas and to compact the subgrade using a steel wheel vibratory roller.[64]

(a). Land for Waste Excavation

The defendants accept AEPCO's method for determining the amount of land required for waste materials and cost per acre. However, this cost increases due to the increased earthwork quantities resulting swell of excavated soils that are not re-compacted and from the additional track miles required by defendants' detailed operating plan.

(b). Total Earthwork Cost

The total ANR earthwork cost, including land for waste excavation, is $1,707 million. The cost increase associated with total earthwork is $692 million.

c. Drainage

i. Lateral Drainage

AEPCO's method of estimating the cost of lateral drainage is severely flawed. AEPCO makes major errors in both its calculation of the number of linear feet of pipe per route mile and of the cost of laying that pipe. Defendants first address the errors in estimating quantities.

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[62] AEPCO Opening workpaper "ANR Grading.xls." Additional calculations were then performed to determine quantities of fine grading. BNSF/UP Reply workpaper "UP Finish Grading.xls"; BNSF/UP Reply workpaper "Revised ANR Grading.xls," Tab "IIIF_ 4 Othr EW." The Railroads do not include slopes, swales, ditches, or yards in the quantities of earthwork requiring fine grading. *Id.*

[63] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.5 (Means 31-22-16.10-0200).

[64] BNSF/UP Reply workpaper "Equipment Selection Reply 5-1-10 revised RCP.xls."

AEPCO's estimates for the linear feet of pipe necessary for lateral drainage come from three sources. Defendants accept the linear footage figures taken from ICC Engineering Reports; and, defendants accept the linear footage figures imputed from mainline track at the point of connection to a branch or spur line. However, defendants do not accept the quantities for the remaining two sections of track – the Orin Line and the Campbell Branch.[65]

AEPCO's estimates for the number of linear feet of pipe for lateral drainage in those sections are incorrect. AEPCO includes zero linear feet of lateral drainage for the Orin Line.[66] A review of Orin Line branch charts shows that the Line has 63,360 linear feet of lateral drainage pipe.[67] Although AEPCO claims that it uses the quantity of lateral drainage found in the track chart for the Campbell Branch,[68] it seriously understates that number.[69] A review of Campbell Branch track charts shows that it has 5,808 linear feet of lateral drainage pipe, significantly more than AEPCO asserts.[70] Defendants' engineering experts apply the corrected quantities.[71]

Likewise, AEPCO's costs for installing drainage pipe are significantly flawed. First, AEPCO fails to include the cost of digging the trenches in which the drainage pipe sits. Assuming a trench cross-section is 1.33 feet wide by four feet deep, the volume of the trench

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[65] AEPCO Opening workpaper "ANR Lines w_o ICC Eng Reports.pdf."

[66] AEPCO Opening workpaper "ANR Grading.xls," Tab IIIF_3 Orin Oth."

[67] BNSF/UP Reply workpaper "Lateral Drainage."

[68] AEPCO Opening Nar. III-F-39.

[69] AEPCO Opening workpaper "ANR Grading.xls," Tab "Lateral Drain."

[70] AEPCO Opening workpaper "Campbell.pdf."

[71] BNSF/UP Reply workpaper "Lateral Drainage."

(less the volume of the drainage pipe in it) is 0.18 cubic yards per linear foot. Means identifies the cost of this type of trench excavation as $8.10 per cubic yard per linear foot.[72]

The trenches then must be filled. AEPCO includes a cost for filling the trenches but selects a Means cost based on a faulty assumption. To account for backfill costs, AEPCO chooses a Means cost that assumes both that the material source is a maximum of two miles from the trench to be filled and that the material is stockpiled less than 200 feet from the backfill site.[73] AEPCO's assumption that every lateral drainage site on ANR will be within two miles of a source of crushed stone is unreasonable. AEPCO's assumption that it will have space to stockpile large quantities of crushed stone within 200 feet is also problematic – a 100-foot right-of-way with a roadbed in the middle does not provide much space for stockpiling large quantities of crushed stone. Quarries and locations for stockpiling stone are generally located around cities and towns, but the ANR route traverses primarily undeveloped areas. As a result, the efficiencies reflected in AEPCO's Means unit prices can never be achieved for ANR.

The defendants' engineering experts therefore assume ten miles as a conservative estimate of the average haul distance to the crushed stone. The Means cost for hauling crushed stone an average of ten miles is $4.09.[74]

Finally, AEPCO fails to include the costs of disposing of trench excavation spoils. This is necessary because, as AEPCO recognizes, trenches are backfilled with crushed stone, not the

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[72] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.6 (Means 31-23-16.13-0050).

[73] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.6 (Means 31-23-23.16-0050; Means 31-23-23.16-0600; Means 31-23-23.16-0610; Means 31-23-16.13-3060; Means 31-23-16.13-3100).

[74] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.13 (Means 31-23-23.20-4278).

material excavated while digging the trench. As a result, the trench excavation spoils must be collected and hauled to waste sites.

ii. Yard Drainage

Although AEPCO includes a cost for yard drainage in its facilities costs for each of the five ANR yards, it provides extremely minimal explanation of how that drainage would be provided. The majority of AEPCO's yard drainage plan is to construct roadbed for the yard tracks that slope away from the main line, which, AEPCO claims, would be sufficient to allow storm water runoff to drain through the ballast and into ditches around the perimeter of the yards.[75] The remainder of the yard drainage plan is to install catch basins to collect water in low areas "near facilities and between tracks separated by non-typical spacing."[76]

This demonstrates a profound lack of understanding about the type and level of drainage necessary. Thus, the defendants' engineering experts were required to design a site drainage system and develop cost estimates for that system.

Before discussing the system designed by the defendants' engineering experts, defendants explain why AEPCO's proposed system is faulty. The ballast section under railroad track does allow some water to percolate through it (and that amount of drainage, in most places, is sufficient for the volume of water that falls onto the roadbed). However, AEPCO remarkably suggests that all water that falls in an entire rail yard can "drain freely through the ballast" sections of the yard track.[77]

By way of analogy, AEPCO is saying that, because the water from a kitchen tap can pass through a sieve without the sieve overflowing, the water from a fire hose can also pass through a

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[75] AEPCO Opening Nar. at III-F-39.

[76] *Id.* at 39-40.

[77] *Id.* at 39.

sieve without the sieve overflowing. It is common knowledge that ballast sections are simply not substitutes for check dams or filtration systems for surface water runoff. ANR yards would need both.

If surface runoff is not drained away from the track structure, the ballast will become fouled or plugged with fines materials carried by the runoff through the ballast section. In such circumstances, the ballast effectively becomes a dam, and water is trapped between the yard tracks. This water saturates the subgrade, creating mud which "pumps" under rail traffic and deforms the track structure.

As a leading railroad engineering text explains:

> 1. Effects of Poor Drainage
>
> There is scarcely an item of maintenance cost that is not increased by poor drainage. Roadbed stability depends on a well-drained subgrade. Unstable track is reflected in poor surface, line, and gage. With poor drainage, ballast, fouled by dust from abrasion, wind-blown dust from plowed fields or sand dunes, and car dropping, churns and pumps under loose ties and joints. Ties deteriorate more quickly when wet. Pumping joints accelerate rail-end batter and joint-bar and tie wear.
>
> Flooded and washed-out track often reflects inadequate drainage. In winter insufficient drainage causes ice accumulation, especially in narrow cuts and tunnels, even causing track obstructions. Excess moisture is a direct cause of frost action and heaved track.
>
> 2. Types of Drainage
>
> The purpose of drainage is to keep the roadbed dry by doing the following:
>
> 1. Intercepting and diverting groundwater.
> 2. Containing and channeling streams.
> 3. Disposing of rainwater and snow runoff.
> 4. Tapping and draining water pockets and springs.
> 5. Intercepting seepage and underground streams.
> 6. Drying saturated fills.
> 7. Lowering water tables.

8. Drying the ballast section by draining water from under ties.[78]

To avoid these problems, the defendants' engineering experts designed a yard drainage system that would provide the level of drainage needed at ANR yards. Briefly, ANR yards would be subgraded to direct water to drop-inlets. The drop-inlets would then direct the water to pipes under the yard track. The pipes would then dump the water into the perimeter ditch proposed by AEPCO.

For the drop-inlets, the defendants' engineering experts would use a grid of standard 18-inch corrugated metal pipe drop-inlets between every other rail track. This design assumes a spacing of 750 feet as the typical drainage grid under all yards. The drop-inlets would connect to the pipes.

Pipes fitted with flared end sections would be placed under the yard tracks every 500 to 1,000 feet and set perpendicular to the track direction. To minimize costs, the pipes would follow the grade of the yard topography (a 0.5% to 2% yard slope based on AEPCO's description). For the standard drainage system for a typical yard, 18-inch corrugated metal pipe would be used. However, 48-inch corrugated metal pipe would be needed to convey the water under ladder tracks, yard lead track, and main lines to the main ditch. The pipes' size is assumed not to increase as the system crosses the yard and collects additional drainage.[79] To reach the perimeter ditches, the pipes would project out (daylight) without the need for headwalls or riprap slope protection.

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[78] AEPCO Opening workpaper "Yard Drainage" (quoting William W. Hay, Railroad Engineering (2d ed. 1982)).

[79] In general, pipe sizes increase as the volume of water being collected across the yard increases, *i.e.* 12" to 18" to 24" to 30", etc.

Ditches would be excavated around the perimeter of the arrival and departure tracks and the classification tracks to divert water away from the yard (ditch work would be considered as part of earthwork quantities and cost).

Details of the defendants' engineering experts' yard drainage calculations are set forth in the workpapers and are added into the Buildings and Facilities costs.[80]

d. Culverts

Defendants reject AEPCO's culvert costs. AEPCO makes several sweeping moves to reduce culvert costs – all of which are meritless.

To develop the ANR-PRB and ANR-NM culvert costs, defendants' engineering experts obtained inventories of culverts for the sections not replicating those of the ANR route and applied the corrected costs described below. Those costs were then added to the costs of culverts for portions of the alternate SARRs that do replicate the ANR route.

i. Culvert Unit Costs

AEPCO's culvert unit costs are grossly understated. AEPCO develops the costs for the needed band fasteners[81] by improper sleight of hand. It relies on inapposite sources for its prices on corrugated metal pipe, band fasteners, and box culverts. And, AEPCO omits necessary costs from its total unit costs.

When setting the price at which AEPCO claims it could buy band fasteners, AEPCO uses unprincipled methods. AEPCO uses two documents from different suppliers to generate a price for band fasteners lower than the stated price in any document. The first document is a set of

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[80] BNSF/UP Reply workpaper "Yard Drainage.xls."

[81] Band fasteners (also called "coupling bands") fasten around two pipes to connect them without welding.

bids for highway work submitted to the Missouri Department of Transportation (DOT).[82] It contains the lowest price for 18-inch and 24-inch diameter pipe that AEPCO could find.[83] The second document is a set of bids from a Florida supplier.[84] The Florida supplier's pipe prices were higher, but it noted that it sold band fasteners at the same price as one linear foot of the appropriate diameter pipe.[85] AEPCO took that statement from the Florida supplier and – instead of using it to determine the price of band fasteners from the Florida supplier's pipe prices – used the pipe prices from the first supplier (*i.e.* the pipe prices in the Missouri DOT bid document). By doing so, AEPCO manages to "establish" a price for band fasteners lower than that offered by any supplier.

Even setting aside its method of generating its band fastener prices, AEPCO relies on inapposite sources – the price documents for the Missouri and Arizona highway projects discussed above and a similar price document from a Florida highway project – for unit prices of corrugated metal pipe, larger band fasteners, and box culverts. The location of these projects alone makes them unreliable as prices for ANR. Even AEPCO implicitly recognizes this, in that, when relying on Means costs, it applies the applicable location factor for materials. Missouri and Florida both have material location factors different from the regions traversed by ANR.[86] While the prices from the Arizona bid document might be regionally appropriate, it does not

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[82] BNSF/UP Reply workpaper "Public Bid Results.pdf."

[83] *Id.*

[84] *Id.*

[85] *Id.*

[86] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," pp.28-29.

specify the size or gauge of the materials priced.[87] As a result, it is impossible to know if the prices represent materials that would meet railroad specifications.[88]

Even if developed properly from acceptable sources, AEPCO does not include several significant costs in its culvert unit costs. These include the cost of transporting bedding and rip rap materials to culvert installation sites and the cost to compact bedding.

Defendants adjust AEPCO's culvert material cost by using unit costs from Means and adding the omitted costs.[89]

ii. Culvert Installation Plans

AEPCO understates the amount of excavation needed for both corrugated metal pipe and box culverts. The excavation depth for culvert pipe is determined by adding the diameter of culvert pipe, a foot below the pipe for bedding, and one foot above the top of the pipe for cover.[90] AEPCO's formula assumes only one foot of excavation in spite of recognizing the need for one foot of bedding stone underneath the pipe and backfill over it.[91] Defendants have corrected AEPCO's spreadsheet to account for the amount of the additional needed excavation.[92]

In addition to miscalculating the necessary quantity of excavation, AEPCO applies a Means cost that assumes culvert backfill will be placed and compacted by hand.[93] Handling the backfill in this way would be massively inefficient of time and money. The defendants'

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[87] BNSF/UP Reply workpaper "Public Bid Results.pdf."

[88] BNSF/UP Reply workpaper "BNSF Standard Construction Specifications-05100-Pipe Culverts-pg05100-3."

[89] BNSF/UP Reply workpaper "ANR Culverts working.xls," Tab "Earthwork Cost."

[90] BNSF/UP Reply workpaper "Culvert Installation Example.pdf."

[91] AEPCO Opening Nar. at III-F-41-42.

[92] BNSF/UP Reply workpaper "ANR Culverts.xlsx," Tab "ANR Culvert List."

[93] BNSF/UP Reply workpaper "ANR Culverts working.xls," Tab "Earthwork Cost."

engineering experts recalculate the costs of backfilling for culverts using the Means cost of backfilling to one foot above the top of the pipe with a front-end loader.[94]

iii. Culvert Quantities

There are three problems with AEPCO's proposed ANR culvert inventory. First, AEPCO incorrectly calculates the lengths of its culverts. Second, in 26 instances, AEPCO proposes substituting bridges with absurd dimensions for real-world culverts. Third, AEPCO opts to use non-standard pipe sizes for its culverts but fails to factor in the prohibitively high premium charged by pipe fabrication plants for retooling lines to produce non-standard sizes of pipe.

Initially, AEPCO errs in determining the necessary length of its culverts. AEPCO assumes that a culvert under a single track is 20 feet long and a culvert under a double track is 40 feet long. The standard ANR single track roadbeds are 24 feet – wider than the culvert length AEPCO assumes. A real culvert shorter than the width of the roadbed over it would be completely ineffective because one or both ends would open into the fill – thereby preventing water from flowing through the culvert.

The necessary length of a culvert, however, is substantially more than just the width of the roadbed above it. A minimum of two feet of fill is required between the top of the culvert and the track to effectively distribute loadings from trains.[95] Defendants have accepted AEPCO's average sideslope ratio of 1.5:1.[96] This means that each sideslope will be at least 1.5 times the height of the culvert plus cover. To channel water under the track, the culvert must

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[94] *Id.*

[95] BNSF/UP Reply workpaper "UP-AEPCO 56154-Drainage Section 02400-page02434-6.pdf"

[96] AEPCO Opening Nar. III-F-43-44.

therefore reach from the end of one sideslope, under the roadbed, and out to the end of the other sideslope.

The narrowest culvert on ANR is 18 inches wide, and the widest is 16 feet.[97] Therefore, ANR's shortest culvert would have to be at least 34.5 feet long under a single track roadbed and 49.5 feet long under a double track roadbed.[98] Similarly, ANR's minimum length for a twelve-foot wide culvert would be 78 feet long under a single track roadbed and 93 feet long under a double track roadbed.[99] These are significant increases in the necessary lengths of the culverts from AEPCO's figures of 20 feet for single track roadbeds and 40 for double track roadbeds. The defendants' engineering experts make the necessary adjustments in culvert costs.[100]

Next, AEPCO tries to avoid the costs of 26 culverts along the ANR route by replacing them with bridges that are engineering impossibilities and the cost of which are not represented by average bridge per foot construction costs. AEPCO selected the culverts it would replace by comparing the cost of installing a culvert of the size and length of the actual culvert with the construction cost per linear foot of bridge multiplied by the culvert width. When the culvert would cost more using this formula, AEPCO substitutes a bridge. For the reasons below, defendants do not accept this substitution.

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[97] BNSF/UP Reply Workpaper "ANR Culverts Working.xls," Tab "Culvert List."

[98] This is calculated as follows: 1.5 feet (the diameter of the culvert) plus 2 feet (the height of the fill) equals 3.5 feet (the total height of the culvert). 3.5 feet times 1.5 (the sideslope ratio) equals 5.25 feet (the length of one sideslope). 5.25 feet plus 5.25 feet (the length of the other sideslope) plus 24 feet (the width of a single track roadbed) equals 34.5 feet (the total length of the culvert). Similarly, (1.5'+2')*1.5 +(1.5'+2')*1.5+39'= 49.5'.

[99] This is calculated as follows: (16'+2')*1.5+(16'+2')*1.5+24'= 78'; (16'+2')*1.5+(16'+2')*1.5+39'= 93'.

[100] BSNF/UP Reply workpaper "ANR Culverts-revised.xls," Tab "UP/BNSF Unit Costs"; BNSF/UP Reply Workpaper "ANR Culverts-revised-Working.xls," Tab "Culvert List."

AEPCO's formula for identifying substitutions fails to consider the height of the embankment above each culvert. Once this factor is acknowledged, it becomes obvious that AEPCO's bridge substitutions are economically infeasible and, frequently, impracticable. The average length of the theoretical bridges proposed to replace the 26 culverts is 5.5 feet.[101] The 26 culverts chosen for replacement average 280 feet in length. As explained above, a culvert's length is dictated almost entirely by the height of the embankment through which the culvert channels water. For the standard ANR roadbed configuration, a 280-foot long culvert passing under an embankment supporting two tracks would have a height of 80 feet.[102] To pick a particularly absurd example, AEPCO proposes building a bridge to replace the 18-inch pipe at Pueblo Subdivision Milepost 564.95. This bridge would be 1.5 feet in length and approximately 109 feet high.[103] AEPCO estimates its cost as $6,301.

For a bridge to take the strain of a fully loaded train crossing its deck, its vertical supports have to reach down to material able to support the load. This means that AEPCO's substitution bridges would require vertical supports averaging more than 80 feet. The excavation necessary to do this would be particularly difficult because of the narrowness of the chasm spanned by the bridge – only 5.5 feet on average. All of this would make the per-foot cost of a bridge astronomically higher than building the required culvert.

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[101] BSNF/UP Reply workpaper "ANR Culverts-revised.xls," Tab "UP/BNSF Unit Costs."

[102] This is calculated as follows: 280 feet (the length of the culvert) minus 39 feet (the width of a double track roadbed) equals 241 feet (the width of the base of the embankment). The base distance from the centerline to the toe of the slope is half the width of the base of the embankment. 241 divided by 2 equals 120.5 feet. 120.5 divided by the 1.5 sideslope ratio equals 80 feet.

[103] This is calculated as follows: 350 feet (the adjusted length of the culvert) minus 24 feet (the width of a single track roadbed) equals 326 feet (the width of the base of the embankment). The base distance from the centerline to the toe of the slope is half the width of the base of the embankment. 326 divided by 2 equals 163 feet. 163 divided by the 1.5 sideslope ratio equals 108 feet eight inches.

Finally, AEPCO has specified non-standard pipe sizes for ANR, including sizes of 21, 27, 34, 51 and 71 inches. These sizes are not standard production sizes, meaning that a fabrication plant would need to reconfigure its production lines to produce just ANR pipes. The time spent reconfiguring the production lines and then returning them to their original configuration would slow the plant's overall production rate. To offset this cost, fabrication plants charge extra to produce non-standard pipes. The premium on non-standard pipes makes their use cost-prohibitive. The defendants' engineering experts have corrected AEPCO's inventory to reflect standard pipe sizes.[104]

iv. Total Culvert Costs

Defendants have determined the cost of culverts to be $24,457,095 million higher than in AEPCO's opening. [105]

e. Other

v. Sideslopes

Defendants accept AEPCO's average sideslope ratio of 1.5:1.

vi. Ditches

Defendants accept AEPCO's specification of side ditches in trapezoidal sections with cuts two feet wide and two feet deep.

vii. Retaining Walls

Defendants reject AEPCO's quantities and costs for retaining walls.

(a) Gabion Quantities

AEPCO understates the quantity of gabion needed to build ANR's retaining walls. AEPCO opts to replace all of the retaining walls in the ICC Engineering Reports with gabion

[104] BNSF/UP Reply workpaper "ANR Culverts - Revside.xlsx," Tab "Culvert List."

[105] UP\BNSF Reply workpaper "revised Culvert List - xls," Tab "Culvert List."

walls.[106] While this is feasible, AEPCO does not properly calculate how much gabion is needed to make the substitution. Specifically, where the Reports list masonry walls, AEPCO substitutes only one cubic yard of gabion to replace one cubic yard of masonry.[107] However, the retaining power of a masonry gravity-type wall is based on weight – not volume. A cubic yard of gabion (a rectangular wire basket filled with small pieces of stone) weighs significantly less than a cubic yard of masonry (larger chunks of stone kept together with or without mortar). As a result, gabion has a significantly lower load-bearing capacity than masonry. To substitute gabion for masonry, the weight of gabion used must equal the weight of the masonry replaced. AEPCO improperly substitutes based only on volume. The defendants' engineering experts develop the proper volume conversion ratio below.

To determine the correct gabion-to-masonry substitution ratio, it is necessary to determine both the average weight of a cubic yard of masonry and the average weight of a cubic yard of gabion. Masonry walls are composed of units of solid material like that found around the right-of-way. The ICC Engineering Report lists examples of this material, including: blocks of cut stone, cobbles, rubble, and (in some cases) concrete or brick. In the regions that ANR traverse, the most common stone that could be used for masonry would be sandstone and soft- to medium-density limestone.

The sandstone and limestone have solid unit weights of 140 pounds per cubic foot and 138 pounds per cubic foot, respectively (averaging 139 pounds per cubic foot).[108] The broken-stone unit weight of both types of stone is 90 pounds. Incorporating all of these factors produces

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[106] AEPCO Opening Nar. at III-F-44.

[107] AEPCO Opening workpaper "ANR Grading.xls," Tab "IIIF_4 Othr EW."

[108] BNSF/UP Reply workpaper "Retaining Wall.pdf," drawing "RET_WALL-1."

an average of 3,753 pounds per cubic yard of sandstone/limestone masonry. A gabion basket containing one cubic yard of broken sandstone or limestone will weigh only 2,430 pounds.[109]

The quantity of gabion needed to replace all the masonry walls in the ICC Engineering Reports is equal to the ratio between the weight of masonry and the weight of gabion (slightly over 1.54:1)[110] multiplied by the total quantity of masonry being replaced. Maccaferri shows this same relation of solid stone versus broken stone gabion basket unit weights for replacing gravity retaining walls.[111] The defendants' engineering experts make this adjustment to the volume of gabion.[112]

(b) Gabion Unit Costs

AEPCO makes two fundamental errors in developing its gabion unit costs: (a) selecting the incorrect Means cost for its gabion retaining walls, and (b) omitting the cost of several tasks necessary to construct gabion retaining walls.

Initially, AEPCO picks the wrong Means price for gabion labor and material. The Means item AEPCO uses assumes that the site of the gabion retaining wall will be within a maximum of two miles of the quarry supplying the stone and that the stone will be stockpiled less than 200 feet from the retaining wall sites.[113] AEPCO provides no support for the notion that every location where it will need gabion retaining walls will be within two miles of the quarry ANR is using. In fact, the remoteness of the area traversed by ANR makes this extremely implausible.

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[109] BNSF/UP Reply workpaper "Maccaferri.pdf," Section "Effective weight of a structure made up with gabions."

[110] This calculation is as follows: 3,753 ÷ 2,430 = 1.54.

[111] BNSF/UP Reply workpaper "Maccaferri.pdf," Section "Effective weight of a structure made up with gabions," Table 2.

[112] BNSF/UP Reply workpaper "Retaining Wall.pdf," drawing "RET_WALL-1."

[113] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.15 (Means 32-32-36.10-6020).

Defendants assume a much more reasonable – although still generous given the remoteness of many segments of ANR – average haul distance of ten miles. This necessitates a different Means costs.[114] Defendants will assume that the hauling truck is able to travel along the finished subgrade and deposit the stone within 200 feet of each gabion wall site and that no "double-handling" of stone will be necessary. Otherwise, the costs would be substantially higher. The defendants' engineering experts adjust AEPCO's gabion unit prices accordingly.[115]

Aside from making faulty assumptions regarding the appropriate costs, AEPCO omits the costs of several necessary steps in constructing gabion retaining walls. Specifically, AEPCO omits costs associated with both footings and shoring and backfill.

(i) Footings

AEPCO does not include any quantities or cost for excavating footings (*i.e.* bases) for its gabion walls. Design charts created by Maccaferri establish the necessary dimensions for footings of gabion walls of different heights. These dimensions are then used to calculate the amount of excavation that AEPCO neglects to include for footings.

The Maccaferri design literature shows that, for gabion walls less than or equal to twelve feet high, the footings must be excavated 1.5 feet deep into the existing subgrade to support the wall and to resist shear forces, overturning forces, and slide forces.[116] Walls with heights greater than twelve feet are required to have footings excavated three feet deep.[117] For gabion walls between six and nine feet high, the minimum footing width is 4.5 feet to 7.5 feet, depending on

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[114] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.22 (Means 31-23-23.20-4278).

[115] BNSF/UP Reply workpaper " Revised ANR_Grading.xls," Tab "Unit Cost.

[116] BNSF/UP Reply workpaper "Maccaferri.pdf," Section "Approximate dimensions of gravity gabion retaining structures."

[117] *Id.*

the height-to-base ratio of the wall.[118] The width needed for the footings increases to as much as eighteen feet as the height of the retaining wall increases. However, for purposes of calculation, the defendants' engineering experts assume that the average height of all retaining walls is nine feet and apply the smaller 4.5-foot footing width, rather than the more likely 7.5 feet mandated for higher walls. Thus, ANR contractors would have to excavate a foundation trench 1.5 foot deep by 4.5 foot wide for each wall.

To determine the length of the necessary gabion walls, the defendants' engineering experts developed the length of the walls that the gabion walls would replace.[119] Thus, the length of the masonry retaining walls in feet is the same as the total number of cubic yards of retaining wall materials listed in the ICC Engineering Report.

Additionally, each linear foot of a timber lagging wall nine feet in height will contain one square yard of surface area. The length of the nine-foot height timber lagging walls is then also one linear foot.[120] Thus each square yard of timber lagging wall nine feet in height equals one lineal foot of wall. This same calculation is performed for crib walls and results in each square yard of crib wall equaling one linear foot of crib wall.[121]

Based on this calculation, the unit cost of excavating footings is $5.69 per cubic yard.[122]

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[118] *Id.*

[119] BNSF/UP Reply workpaper "Retaining Wall.pdf," drawing "RET_WALL-2" & drawing "RET WALL-5." The thickness of the masonry walls is a factor in determining its length, and three feet is generous, as the walls vary in size from two feet thick to three feet thick. Mr. Robert Phillips, one of the defendants' engineering experts, observed that most of the walls on this route are less than nine feet high, so the assumed nine-foot height is also generous because it results in a lower calculated length along the route.

[120] This calculation is as follows: SY Timber Lagging * 9 SF/SY / 9 FT Height = 1 LF.

[121] SY Crib * 9 SF/SY / 9 FT Height = 1 LF

[122] This calculation is as follows: Means cost of $5.80 per cubic yard multiplied by ANR location factor for labor (0.9810), resulting in an adjusted unit price of $4.93 per cubic yard. BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.6 (Means 31-23-16.13-0062).

(ii) Temporary Shoring Structures

AEPCO also omits the costs associated with shoring, which is necessary when constructing retaining walls. The reason that cut-slopes require retaining walls is that the soils on the cut-slopes are not self-supporting. Unfortunately, this instability presents a problem when building retaining walls, and a temporary shoring structure is therefore needed.[123]

Before constructing a retaining wall, cut-slopes are excavated horizontally to a minimum of three feet beyond the footprint of the gabion wall footing to provide the space needed for labor crews and the temporary shoring.[124] In some cases, temporary shoring (typically sheet piling) will be driven into the slope to hold it in place before excavation for the retaining wall begins. In other cases, the temporary shoring is installed as the excavation is completed. After the retaining wall is constructed, the shoring is removed, leaving a hole that has to be backfilled. Finally, the backfill must be compacted.

The defendants' engineering experts first develop the cost of the temporary retaining structures. In so doing, they assume that 25% of the retaining walls on ANR are in cut-slopes. The adjusted Means cost of the temporary retaining structure is $19.20 per square foot.[125] The defendants' engineering experts incorporate the costs of shoring to the gabion wall unit costs.[126]

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[123] Depending on the availability of materials and particular cut-slope characteristics, contractors use temporary shoring made of interlocked sheet piles, soldier piles and timber lagging, or interlocking concrete units. Rarely, the forces on the cut-slope are such that the soils naturally occurring in the slope are of sufficient strength to withstand the effects of weather, shear force, and slide force for a short period of time while the permanent wall is being built.

[124] This excavation cost is not included in the grading quantities in the ICC Engineering Report B.V. Form 561.

[125] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.18 (Means 31-41-16.10-1300) This unit cost is then adjusted by the corrected total location factor (0.9601), resulting in a total unit cost of $19.20 per square foot.

[126] BNSF/UP Reply workpaper "Revised ANR Unit Cost.xls," Tab "Unit Costs."

In addition to the cost of the temporary retaining structures themselves, AEPCO must account for the cost of backfilling and compacting the voids remaining after the temporary structures are removed. The amount of backfill needed is determined by how much excavation is done when installing the temporary structure and retaining wall. Cut-slopes are excavated horizontally to at least three feet beyond the footprint of the gabion wall footing to provide the space needed for labor crews and the temporary shoring. Defendants' workpapers include the nominal cross-sectional area behind the completed gabion wall that will need backfill.[127] The length of the walls requiring backfill multiplied by the cross-sectional area gives the total amount of backfill required.

The defendants' engineering experts develop the per-cubic-yard cost of backfilling and compaction using Means costs.[128] The defendants' engineering experts incorporate the cost of backfills and compaction to the gabion wall unit costs.[129]

viii. Rip Rap

Defendants accept AEPCO's quantities of rip rap but reject the unit costs. Specifically, when developing the unit costs of rip rap, AEPCO makes a baseless assumption concerning the distance that suitable rock would have to be transported. The Means cost AEPCO selects assumes that rock suitable for use as rip rap is within two miles of where the rip rap would be used. The defendants' engineering experts again reject AEPCO's unsupported and unrealistic

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[127] BNSF/Up Reply workpaper "Retaining Wall.pdf," drawing "RET_WALL-3."

[128] BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.11 (Means 31-23-23.14-2000); BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.17 (Means 31-23-23.23-7000). Defendants assume that the material excavated for the gabion walls and footings would be stockpiled on site and used for backfill, obviating the cost of purchasing/obtaining backfill materials. The backfilling and compaction costs are then adjusted by the corrected ANR location factor for labor (0.9810) to $1.01 and $2.09, respectively.

[129] BNSF/UP Reply workpaper "Revised ANR Unit Cost.xls," Tab "Unit Costs."

assertion that the an average of only two miles separates the remote areas traversed by ANR from the location where the purchased rock is quarried. The defendants' engineering experts modify this cost by assuming the Means unit cost for rip rap based on a ten mile haul.[130]

ix. Relocating and Protecting Utilities

The defendants' engineering experts accept AEPCO's costs for relocating and protecting utilities.

x. Seeding/Topsoil Placement

Defendants accept AEPCO's embankment protection costs and quantities.

xi. Water for Compaction

AEPCO makes two fundamental errors in calculating the total cost of water for compaction in constructing ANR. First, AEPCO applies the Means unit cost for water incorrectly. Second, in calculating the quantity of water needed, AEPCO completely omits water for compaction in the vast majority of its embankment construction.

AEPCO misapplies the Means unit cost for water cubic yard of embankment.[131] AEPCO treats the Means unit cost as though it were only a materials cost (*i.e.* the price paid for a given volume of water). Then, instead of using this cost, AEPCO uses the cost of water in the AFE for the Shawnee to Walker capacity expansion project.[132] In fact, the Means unit cost includes the cost of water as a material and the cost of the labor and equipment needed to load and distribute the water at a production rate of 1,888 cubic yards of embankment per day.[133] Using the material cost relied upon by AEPCO and the labor and equipment costs from Means, the cost of loading

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[130] AEPCO Opening workpaper "Revised ANR Grading.xls," TAB "Unit Cost," row 7.

[131] AEPCO Opening workpaper "ANR Grading.xls," Tab "Unit Costs."

[132] AEPCO Opening Nar. at III-F-47-48.

[133] BNSF/Up Reply workpaper "RS Means Cost Data 2009.pdf," p.17 & p.26.

and distributing the water need to compact one cubic yard of embankment with water totals ${ }.[134]

AEPCO also grossly miscalculates the total quantity of water necessary for compaction along the ANR route. AEPCO's narrative states that because "only one project, Walker to Shawnee, WY, included a separate cost for water for compaction," those costs "were incorporated into the embankment cost per cubic yard."[135] AEPCO Opening Nar. at III-F-47-48. This suggests that AEPCO determined the cost of water for compaction by including the cost per cubic yard from the Walker to Shawnee capacity expansion project into the cost of every cubic yard of embankment. In fact, AEPCO created a weighted average of five BNSF expansion projects including the Walker to Shawnee project and assumed that, because the others did not have a line item for water, only the Walker to Shawnee used any water.[136] As a result, AEPCO omits the costs of water for compaction from 70% of the excavated soil it uses in embankment construction and 100% of the borrow it uses in embankment construction on the remainder of ANR. That average is then used to calculate average embankment costs per cubic yard.

Compaction is necessary to build an embankment to modern specifications. Compaction increases the density of soil, thereby increasing its load-bearing capacity. In addition, compaction helps prevent soil settlement and frost damage and reduces hydraulic conductivity. The degree to which soil can be compacted is directly affected by the moisture content. Water is added up to the optimum moisture content to lubricate soil particles to allow them to slide into

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[134] BNSF/Up Reply workpaper "RS Means Cost Data 2009.pdf," pp. 17 & 26; BNSF/Up Reply workpaper "Roadbed prep costs from AFEs – RCP Revisions 5-1-10.xls", Tab "Common exc and emb AFE"; BNSF/Up Reply workpaper "Equipment Selection Reply 5-1-10 revised RCP," Tab "Water."

[135] AEPCO Opening Nar. at III-F-47-48.

[136] AEPCO Opening workpaper "Roadbed prep costs from AFEs.xls," Tab "common exe and emd."

small voids, resulting in the densest soil possible. In an arid region like the area traversed by ANR, additional water is required for the necessary level of compaction when constructing an embankment. Therefore, the defendants' engineering experts properly include the cost of water for compaction (and the required equipment and labor to actually use it for compaction) for all of the embankments on ANR.

To determine the necessary quantity of water for compaction on ANR embankments, the defendants' engineering experts must calculate the amount of water needed to raise a cubic yard of soil to its optimum moisture for compaction. Laboratory testing of typical material for the region that ANR traverses revealed a naturally occurring moisture content of 5%. Proctor Chart. The optimal moisture content for compaction of this soil is 13%. [137] To increase the moisture content the remaining 8% requires 31 gallons of water per cubic yard of soil.[138] In the real-world, this number would be higher due to waste and evaporation, but the defendants' engineering experts assume these losses away. The total quantity of water needed to compact the embankments is therefore 1.3 billion gallons.[139]

xii. Surfacing for Detour Roads

Defendants accept AEPCO's costs for surfacing detour roads.

xiii. Environmental Compliance

Defendants accept AEPCO's costs of environmental compliance.

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[137] BNSF/UP Reply workpaper "Water for Compaction-SRM RJG 04_19_10.pdf"

[138] BNSF/UP Reply workpaper "Equipment Selection Reply 5-1-10 revised RCP.xls," Tab "Water."

[139] This is calculated by multiplying 31 gallons of water per cubic yard of soil by the cubic yards of soil in ANR embankments.

3. Track Construction

AEPCO estimates track construction for ANR at $2.522 billion. This understates the track construction costs by $461 million. Each of the components of track construction costs is discussed below.

Table III.F.5
Track Costs Comparison[140]

		AEPCO	Defendants	Difference
1.	Ties	$472,358,651	$472,358,651	$0
2.	Ballast	$157,638,842	$581,080,052	$423,441,210
3.	Labor	$862,304,624	$911,230,987	$48,926,363
4.	Rail & Other Track Material	$1,001,716,519	$1,018,197,187	$16,480,668

a. Geotextile Fabric

While recognizing the need for geotextiles, AEPCO miscalculates the total quantity of geotextile fabric needed for ANR turnouts and at-grade crossings. AEPCO's quantity of geotextile fabric is insufficient to cover the total width of the subgrade area under the turnout long ties along the mainline length. Also, AEPCO omits the fabric needed due to its decision not to use transitional ties. The lack of transitional ties requires geotextile fabric to extend ten feet on each end of the turnout long ties and over the triangular area for the diverging side of the turnout.

AEPCO's miscalculations understate some quantities and overstate others. The quantity AEPCO states ANR needs for turnouts Number 9, Number 11, and Number 15 is too low. The quantity AEPCO states ANR needs for turnouts Number 20 and Number 24 are too high. The

[140] BNSF/UP Reply workpaper "ANR Track Construction Working.xls," Tab "Table III-F-5"; BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Track Construction Cost."

defendants' engineering experts have properly calculated the area under each turnout and restated geotextile costs for all ANR turnouts.[141]

b. Ballast and Subballast

AEPCO errs in calculating the quantity and cost of ballast and subballast needed on ANR.

i. Quantities

The ballast and subballast depth specifications AEPCO uses for main tracks – eight inches of clean rock ballast and one foot of subballast – are acceptable. However, there are numerous problems with how the total quantities are calculated and, as a result, the quantities of ballast are drastically understated.

First, the typical cross-section upon which AEPCO bases its ballast quantities is incorrect. Twelve inches of ballast is needed outside the ends of timber rail ties to restrain the continuous welded rail during hot weather.[142] Otherwise, the metal in the rail will expand and shift the track out of alignment. Misaligned track restricts speeds until a costly realignment is done. AEPCO's ballast calculations assume one shoulder will have the necessary twelve inches of ballast but that the other will only have eight inches. The remaining four inches of ballast on the shoulder totals as much as 0.1 tons of ballast per track foot.[143]

AEPCO also incorrectly calculates the total amount of subballast needed. AEPCO's calculation measures subballast from the top of the rail down to the top of the subgrade,

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[141] BNSF/UP Reply workpaper "Turnout Geotextiles Restated.xls."

[142] American Railway Engineering and Maintenance-of Way Association, 2009 Manual for Railway Engineering, 2.1.1.5.2.2.c (2009) (hereinafter "AREMA").

[143] BNSF/UP Reply workpaper "Ballast and Subballast worksheet modified for Rebuttal.xls."

assuming that the lower width of the ballast section equals the top width of the subballast.[144] Doing this omits the subballast used to cover and protect the entire top of the subgrade.[145]

The reasons for this protective layer of subballast on top of the subgrade are: '(a) to divert water away from the subgrade; (b) to allow water vapor to escape out of the subgrade; (c) to support the ballast section; (d) to prevent freezes and thaws in the subbgrade where there are sub-freezing temperatures; and (e) to provide a stable construction platform to place track ballast without rutting or surface irregularities that could hold water.[146] Without subballast covering the subgrade, none of these functions is met.

One reason why subballast must cover the subgrade is that, if water is not diverted away from the subgrade, organic materials will infiltrate the subgrade and decrease its load capacity. Rainwater falling directly on the subgrade would begin to soak in. Rainwater falling on the ballast would flow to the edge of the ballast and also soak in to the subgrade. Because of the density and shape of the compacted subgrade, the water would initially flow away from the center of the section. However, the moisture content of the subgrade would increase as the water saturated the material. Quickly, natural seeding and mulching would cause vegetation to spread. As plant roots infiltrated the subgrade, the soil would be loosened up to the subballast line. The loosened subgrade would lack the necessary load-bearing capacity originally provided by compacting the soil.

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[144] AREMA 1.2 (showing typical track cross-sections, all of which have a layer of subballast covering entire top of prepared subgrade).

[145] BNSF/UP Reply workpaper "ANR Track Section Double.pdf"; BNSF/UP Reply workpaper "ANR Track Section Single.pdf."

[146] AREMA 1.2 (commentary).

The defendants' engineering experts recalculate the quantity of subballast to include the amount needed to cover the top of the subgrade.[147]

ii. Unit Prices

As explained below, AEPCO incorrectly develops both its ballast and subballast unit prices.

(a) Ballast

AEPCO makes two fundamental errors in calculating transportation costs for ANR's ballast, thereby understating the unit cost. First, AEPCO miscalculates its transportation costs based on the faulty assumption that rail transportation costs can be lowered by putting more material in fewer cars. Second, AEPCO selects a source for ballast that requires it to transport the ballast an average of more than 130 miles – but includes only one mile of transportation when determining its transportation costs.

AEPCO tries to lower its rail transportation costs for ballast by putting more material in each train car. The generally accepted cost of transportation intra-railroad rail is $0.035 per ton-mile per 100 ton car. AEPCO bases its transportation costs on the assumption that, by placing 110 tons of ballast in the car, it can reduce the rail transportation cost to $0.029 per ton-mile.[148] Rail transportation costs are calculated by the ton-mile, not the number of cars. A car carrying 110 tons of ballast costs 110% as much to transport as a car carrying 100 tons of ballast. AEPCO cannot reduce its transportation costs simply by over-loading rail cars.

AEPCO's other attempt to lower its transportation costs for ballast is equally meritless. AEPCO identifies a single ballast supplier – the Granite Canyon Quarry just west of Cheyenne,

[147] BNSF/UP Reply workpaper "Ballast and Subballast worksheet modified for Rebuttal.xls."

[148] BNSF/UP Reply workpaper "ANR Track Construction Working.xls," Tab "Total Track Quant."

Wyoming – to supply it with ballast at an exceptionally low unit cost. [149] The quarry is not on the ANR route. In fact, the average distance between that quarry and an ANR railhead is more than 130 miles. However, when calculating the cost of transporting the ballast, AEPCO assumed that the material would only have to be transported one mile. The defendants' engineering experts develop the realistic costs of transporting ballast for ANR below, and add this cost to the per-unit cost of ballast.

To determine the average off-ANR transportation distance, the defendants' engineering experts average the rail line distances from the quarry to the railheads at Sidney, Nebraska; Denver, Colorado; and Guernsey, Wyoming. This produces an average distance of 132.65 miles from quarry to railhead. Applying the per ton-mile transportation cost of $0.035 accepted in previous rate cases, the average cost of moving one ton of ballast from the quarry to the northern two-thirds of ANR is $4.64.[150]

The cost of transporting ballast from the Granite Canyon Quarry to the southern third of ANR is so high that the per-unit price from that location – as oddly low as it is – is still higher than nearer sources. Shipping ballast from that quarry to the third of ANR south of Pueblo, Colorado – which includes Cochise, Arizona; Deming, Montana; and Stratford, Texas – would require a prohibitively circuitous route. The material would have to be transported from the quarry to the western-most part of ANR by way of Salt Lake City, Utah before it could be shipped to the places on ANR it was needed.[151] That route exceeds 850 miles.[152]

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[149] BNSF/UP Reply workpaper "ANR Unit Costs.xls."

[150] BNSF/UP Reply workpaper "Distances For Hauling Ballast.xls." Applying the $0.035 per ton mile rate is a generous assumption because that is the rate railroads "charge" themselves for shipping on their own lines, and ANR would have to ship ballast to railheads by other carriers.

[151] BNSF/UP Reply workpaper "Distances for hauling Ballast and Subballast_041610FDB_2514616_2514618."

At the $0.035 per ton-mile rate, transporting a ton of ballast from the Granite Canyon Quarry to the southern third of ANR would cost an average of more than $29.75.

To comply with the requirement for least-cost, most-economical methods, the defendants' engineering experts located another source of ballast: the Torrance Quarry at Encino, New Mexico. This quarry has provided ballast in quantities greater than those shown for the Granite Canyon Quarry and is located directly on the ANR route. Located 22.8 miles from Vaughn, New Mexico, the quarry can begin to supply ballast using the newly constructed ANR route to Vaughn and then residual trackage to reach Deming, New Mexico and Stratford, Texas. The southern one-third of the proposed ANR can be supplied from these railheads. This quarry had four major productions of ballast typical of the types required to complete ANR.[153] The 2009 average price from discovery from these was ${ } per ton at the quarry.[154] Transportation to Deming and Stratford would add an additional $20.58 per ton-mile.

To account for the different prices for the northern two-third and southern third of ANR, the defendants' engineering experts apply a weighted average of material and transportation costs of ${ } per ton.

(b) Subballast

As it did with the cost of ballast for ANR, AEPCO identifies a single supplier for subballast apparently offering a unit price grossly out of line with prevailing market prices – and then applies that unit price without accounting for the practical implications of relying entirely on a single supplier. AEPCO assumes a unit price of ${ } per ton for subballast from a single

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[152] "Distances For Hauling Ballast.xls."

[153] BNSF/UP Reply workpaper "Ballast 2006 Thru 2009 (Version 2).xls."

[154] BNSF/UP Reply workpaper "Ballast 2006 Thru 2009 (Version 2).xls," rows 20, 155, 231, & 294.

entry in a single document produced in discovery by UP without subballast quantities or context.[155] Defendants reject this unit price for three reasons.

First, the price – only { }% of the Means price[156] – suggests that "subballast" purchased was actually fine aggregate material. The quarry from which it was purchased is a major ballast producer. Producing washed ballast generates considerable amounts of fine aggregate materials as a by-product. The material takes up space at the quarry and has little value on the open market. However, in some cases, it can be used as a fill-material of slightly better quality than most natural soils. Quarry operators will sometimes classify this type of material as "subballast" and offer it at exceptionally low prices. Except for the "subballast" bid tabulation heading, nothing on the document from which AEPCO pulls this price indicates the gradation or quality of the material. There is no way to know whether it would meet ANR's specifications as proposed by AEPCO. The price alone strongly suggests that it would not.

Second, even if the unit price were as reported and the material met the specifications for ANR subballast, a single source could not supply all of the necessary subballast for ANR. The transportation costs on the subballast would be prohibitive. Using the subballast to build the railroad roadbeds means that the subballast could not be shipped on the as-yet-unbuilt railways. To get subballast from Granite Canyon to ANR railheads by other routes would require immensely circuitous routing. The chart below shows the typical shortest routing from Granite

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[155] BNSF/UP Reply workpaper "AEPCO Subballast Material and Transportation costs.pdf."

[156] The Means 2009 price for 1.5-inch crushed stone base course with one-foot depth is $21.50 per square yard for the material alone. BNSF/UP Reply workpaper "RS Means Cost Data 2009.pdf," p.21 (Means 32-11-23.23-0304). One square yard of one-foot deep subballast equals nine cubic feet, which is one-third of a cubic yard. Therefore, the Means price converted into cubic yards is $64.50 per cubic yard. Converting to tons at the accepted conversion of 3,000 pounds per cubic yard results in a per-ton price of $96.75 per ton. Applying the corrected location factor for materials of .9146, the Means unit cost would be $93.02.

Canyon to locations on ANR, the distance, and the transportation cost (calculated using the standard SAC cost for transportation of $0.035 per ton-mile).

Table III.F.6
Subballast Transportation Distances[157]

Destination	Typical Shortest Route	Distance	Transportation Cost at $0.035 per ton-mile
Cochise, Arizona	Granite Canyon - Cheyenne - Denver - Salt Lake City - Stockton - Barstow - Colton - Cochise	2,444	$85.55/ton
Amarillo, Texas	Granite Canyon - Cheyenne - Julesburg - Gibbon - Hastings - Maryville - Topeka - Emporia - Amarillo	1,129	$39.52/ton
El Paso, Texas	Granite Canyon - Cheyenne - Julesburg - Gibbon - Hastings - Maryville - Topeka - Emporia - Oklahoma City - Fort Worth - Sweetwater - El Paso	1,957	$68.50/ton
Billings, Montana	Granite Canyon - Pocatello - Idaho Falls - Silver Bow - Garrison - Billings	1,120	$39.20/ton

Third, shipping subballast long distances by rail – the transportation method specified in AEPCO's unit cost – would increase the quantity of subballast that has to be rejected for failing to meet specification and increase the magnitude of the problems that result. As discussed in Section III.F.3.b.i, prepared subgrade needs to be covered with subballast almost immediately to protect against rain (and such other threats as construction activities or trespassers disturbing the subgrade surface). Therefore, in the normal course, a particular stretch of subgrade is finished, approved by the construction inspection team, and then covered quickly in subballast. To ensure that the subballast is available in the right quantity at the right locations at the right time, railroads buy subballast from local quarries that can quickly load a truck and deliver the material directly to the proper location.

[157] BNSF/UP Reply workpaper "Distances For Hauling Ballast.xls."

Because AEPCO chooses to buy its subballast far away from ANR and ship it by rail, subballast would need to be loaded into train cars, transported by rail from the quarry to the closest railhead, unloaded and stockpiled there, then reloaded into trucks for delivery as needed. Unfortunately, over-handling subballast can break down materials to the point where they are no longer within specifications. In these circumstances, subballast has to be shipped back to quarry to be re-blended with coarser materials and re-delivered.

Over-handling happens occasionally even when subballast is quarried, placed directly in a truck, and driven directly to the site to be dumped on the exposed subgrade. This problem becomes more frequent as the amount of handling increases. The extra steps of loading subballast into a train car, having pieces break each other down while shifting in transit, and unloading subballast into the stockpile all increase the likelihood that the delivered subballast will not meet specifications. This leaves the subgrade exposed until subballast can be found that meets the specifications or the out-of-specification subgrade can be re-blended. Also, the transportation costs of the subballast triple when it has to be shipped back to the quarry to be re-blended and then re-delivered.

Although not every load of subballast shipped by rail will be over-handled to the point of being unusable, the quantities involved in the construction of a 2,180-plus mile railroad make this a virtual certainty some of the time. At that point, AEPCO would have to incur the costs of shipping the subballast back to the quarry for re-blending and then shipping it back to the railhead.[158] Similarly, exposed subgrade will not always be compromised by rain or disturbed by construction activities or trespassers – but, the more and the longer that subgrade is exposed, the

[158] If the quarry were to guarantee that the subballast were within specifications, then it would bear these costs directly but would have to increase the prices its charged to ANR to off-set them.

greater the chance that adverse results will materialize. Then, AEPCO would have no choice but to re-finish the subgrade. These costs have not been included in AEPCO's calculations, but they make its selection of subballast from Wyoming impractical and uneconomical.

Because AEPCO fails to identify a valid price for subballast, the defendants' engineering experts calculate it in the first instance. The price of subballast from local sources depends on geological conditions and transportation. Geological conditions – *e.g.* having suitable parent rock very near the surface – can decrease subballast prices because extraction will be less expensive. Transportation costs could be lower when circumstances make delivery by truck[159] easier, such as where there is level terrain. Subballast quotes for materials and delivery from various quarries and material distribution yards are as follows:

Table III.F.7
Subballast Quotes[160]

Location	Supplier	Subballast Price	Transportation @ 20 miles
Billings, Montana	Fisher Industries	$4.50 per ton	$3.50 per ton
Gillette, Wyoming	Quality Aggregate	$8.40 per ton	$15.60 per ton
Guernsey, Wyoming	Martin Marietta	$5.00 per ton	$4.25 per ton
Denver, Colorado	Pioneer Sand & Gravel	$5.00 per ton	$8.50 per ton
Colorado Springs, Colorado	Lafarge	$5.00 per ton	$9.45 per ton
Amarillo, Texas	Texas Gravel & Sand	$4.75 per ton	$3.40 per ton
El Paso, Texas	CEMEX	$3.50 per ton	$5.00 per ton

Based on this sampling, the average costs for subballast material is $5.16 per ton, and the cost to move it 20 miles from quarry to roadbed is $7.10 per ton. The defendants' engineering

[159] Subballast must be delivered by truck because it is used in the construction process long before rail is laid.

[160] BNSF/UP Reply workpaper "Scanned Subballast Cost Backup_050110GTZ_2514616_2514618.pdf."

experts accept that the cost of placing, grading, compacting, and final shaping has been included in the track construction costs. Therefore, the total cost for materials and transportation is $12.26 per ton.

The defendants' engineering experts applied this average cost for subballast in defendants' Reply.

c. Ties

Defendants accept AEPCO's unit costs and spacing for railroad ties.

d. Track (Rail)

The total costs for ANR's track inventory are described below. For the alternate SARRs, the cost of track for portions of the routes that do not replicate the ANR route were developed by taking inventories from BNSF and UP track charts and using the cost for track as developed below.

i. Main Line

Defendants accept AEPCO's proposed main line rail specifications but reject its costs.

AEPCO improperly calculates its rail costs by basing its transportation costs on a faulty assumption. Specifically, when determining the costs of its rail, AEPCO applies transportation costs based on shipping the rail along ANR (*i.e.* UP or BNSF) tracks. This requires AEPCO to pick between waiting until particular sections of ANR are completed and fully functional to ship the welded rail to build other sections or paying other railroads to ship the welded rail along circuitous routes to access points on ANR. Transportation by other carriers would increase the total cost of the rail, while delaying would dramatically extend the length of the construction beyond the already lengthened construction schedule discussed in Section III.F.12.a.

Assuming that AEPCO intends to finish construction of ANR as close to its proposed schedule as possible, it will have to ship welded rail over other railroads' lines. Applying a

$0.035 per ton-mile rate, the defendants' engineering experts calculate the additional transportation costs even at that rate as adding $7.46 per ton of welded rail shipped.[161] This figure is included in defendants' revised rail costs for ANR.[162]

ii. Yard and Other Tracks

Other than the adjustment in rail costs discussed in the previous section, defendants accept AEPCO's costs for yard and other tracks (including branch lines).

iii. Field Welds

Defendants reject AEPCO's proposed costs of field welds and the quantity of welds needed.

AEPCO applies the wrong cost for installing a field weld, dramatically understating the total costs per unit. The BNSF AFE upon which AEPCO relies for its field weld installation cost shows that the BNSF crew charged { } man-hours of overtime for installing field welds.[163] AEPCO, however, uses the overtime cost as its total cost, omitting the cost of the { } man-hours of time other than overtime.[164] Including both regular and overtime work, the AFE shows that { } man-hours were needed to field weld the 58 joints.[165] This averages { } man-hours per joint, which includes set-up, welding, clean up, and travel to the next joint. Using the

[161] BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Rail Transportation Cost."

[162] BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Track Construction Cost."

[163] BNSF/UP Reply workpaper "BNSF_AEPCO_0037046, AFE # A050386.pdf."

[164] AEPCO Opening workpaper "ANR Track Construction working.xls," Tab "Installation Costs," cell C:58.

[165] BNSF/UP Reply workpaper "BNSF_AEPCO_0037046.pdf."

AEPCO contractor labor rate of ${ } per man-hour, the cost to install a field weld is ${ }.[166]

Additionally, AEPCO severely understates the quantity of field welds. AEPCO's total number includes only welds used to join 1,600-foot strings of welded rail. This figure fails to account for welds needed to join turnout panels in the field and welds needed to join the turnouts to the welded rail strings.

The turnout panels consist of four to six panels which must be welded together in the field. Each turnout will need from eight to 16 welds to connect the panels (not including the joints at the heel of switch and the insulated joints in the turnout). An additional six welds will be needed to connect to the welded rail strings. Defendants' engineering experts make the necessary adjustments to the total number of field welds required.[167]

Defendants adjust the total cost of field welds to include those detailed above and omitted by AEPCO, increasing the total cost to $21,579,457.59.[168]

iv. Insulated Joints

Insulated joint requirements are addressed in the signals and communications costs discussed in Part III.F.6 below.

e. Switches (Turnouts)

The defendants' engineering experts accept AEPCO's proposed turnout sizes but reject AEPCO's turnout unit prices because – contrary to AEPCO's assertion – the turnout prices do not include the cost of switch machines for power turnouts.[169]

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[166] BNSF/UP Reply workpaper "ANR Track Construction working, Tab "Installation Costs."

[167] BNSF/UP Reply workpaper "BNSF/UPRR Common Standard Turnout Drawings."

[168] BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Field Welds."

AEPCO fails to provide a source for panelized turnouts. The defendants' engineering experts therefore assume that the panelized turnouts will shipped from Sherman, Texas and Newton, Kansas on the BNSF. The defendants' engineering experts agree that the turnout cost includes shipping to the rail head by the most direct on-line routing.

The most direct routing upon which the transportation cost is based may not be available because of AEPCO's proposed construction schedule. ANR requires 32 No. 24 turnouts delivered to Defiance, New Mexico for the Defiance – McCartys line segment. The present shipping route is from Sherman, Texas through Fort Worth and Amarillo, Texas, to Clovis and Belen, New Mexico, then to Defiance, a distance of 906 miles according to the BNSF Railprices web page.[170] But, since the Amarillo – Defiance lines would not be in service when the turnouts are required at Defiance, the shipping route becomes Newton, Kansas to Denver, Colorado then following the same routing through Salt Lake City, Utah and Daggett, California as the welded rail. This distance is 2,234 miles.

The defendants' engineering experts calculated the total costs of turnouts, including transportation by the most direct route possible under AEPCO's construction schedule and a transportation cost of $0.035 per ton mile.[171]

f. Other

i. Rail Lubrication

The defendants accept AEPCO's number of rail lubricators and the unit cost.

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[169] AEPCO Opening Nar. at III-F-56.

[170] BNSF 6003 Rail Miles Inquiry, http://www.bnsf.com/bnsf.was6/RailMiles/RMCentralContoller (last visited May 5, 2010).

[171] BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Turnout Shipping Costs."

ii. Plates, Spikes, and Anchors

The defendants' engineering experts accept AEPCO's proposed tie plate, spike, and anchoring specifications and unit costs.

iii. Derails and Wheel Stops

AEPCO's figure for the number of derails needed for ANR omits derails for several locations where railcars are stored and there is a potential to have a car roll freely onto the main track or other important tracks. This includes servicing, intermodal, and interchange locations located within the yard limits and at any private industry track that feeds into the mainline. Yard exhibits show the location for additional derails.[172] The defendants' engineering experts incorporate these additional derails in the total needed for ANR.[173] An inventory of the total number of derails required is included in defendants' workpapers.[174]

Defendants accept AEPCO's statement that there is no need for wheel stops in the proposed ANR as there are no stub ended tracks, and AEPCO's costs for derails.

iv. Materials Transportation

AEPCO fails to include the cost of work train service required to distribute welded rail, panelized turnouts, and ballast for those construction contracts that have rail access. The daily cost for a three-man crew doing one eight-hour shift of work train service is ${ }, including overhead.[175] The cost of fuel for that shift is ${ }.[176] The total daily rate for work train service is therefore ${ } per eight-hour day.

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[172] BNSF/UP Reply workpaper "Derail Counts for Setouts, Helpers, MOW Equip and Yards_042210FDB_2514616_2514618."

[173] *Id.*

[174] *Id.*

[175] BNSF/UP Reply workpaper "BNSF_AEPCO_0037049 (BNSF AFE #A050386)."

[176] *Id.*

Three work trains are required by each track contractor using work train service – one each to distribute welded rail, turnouts, and ballast, for a total daily work train cost of ${ }. At the track construction rate of ½ mile per day proposed by AEPCO, this adds ${ } per track foot to the track construction cost.

Other transportation costs associated with particular items are addressed in the relevant portions of this section or in the applicable workpapers.

v. Track Labor and Equipment

The defendants accept AEPCO's track labor and equipment costs.

4. Tunnels

As described in Section III.B above, defendants are submitting evidence for ANR and for two alternative SARR configurations, ANR-PRB and ANR-NM. ANR and ANR-PRB have the same tunnels, so tunnel costs for those two scenarios are the same. There are no tunnels on ANR-NM, and therefore no tunnel costs under that scenario. The discussion below addresses tunnel costs for ANR and ANR-PRB.

There are three tunnels on ANR. Two – tunnels No. 1 and No. 3 – are located near Guernsey, Wyoming. The third is located in Montana along BNSF's Laurel Subdivision. Defendants agree that these tunnels are single track and accept the tunnel lengths specified in AEPCO's electronic workpapers.[177] Defendants also accept that the tunnels would be concrete-lined and steel reinforced, as specified by AEPCO,[178] but do not accept the per linear foot cost used by AEPCO.

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[177] AEPCO Opening workpaper "ANR Tunnels.xls." There is a one-foot discrepancy for two of the tunnels between AEPCO's opening narrative, AEPCO Opening Nar. at III-F-59, and the lengths used in AEPCO's workpapers. The railroads use the lengths from AEPCO's workpapers in their Reply Evidence.

[178] AEPCO Opening Nar. at III-F-61.

AEPCO relies on a 1980 vintage base unit cost of $2,561 per linear foot ("LF") developed by the parties in *Coal Trading Corp. v. Baltimore & Ohio R.R.*, 6 I.C.C. 2d 361 (1990) ("*Coal Trading*"), indexed from 1980 to 1Q09, for developing its tunnel costs. The procedure yields a tunnel construction unit cost of $7,431 per linear foot. AEPCO asserts that this unit cost would be sufficient to cover construction of the concrete-lined and steel-reinforced tunnels it assumes would be built on the SARR. AEPCO Opening Nar. at III-F-61. In *WFA/Basin I*, slip op. at 75, 107, however, the Board rejected the claim that the *Coal Trading* unit cost would be sufficient to cover the costs of constructing modern tunnels with concrete and steel. As the Board has recognized, the unit cost for tunnels developed in *Coal Trading* was adequate only for the construction of old-fashioned timber lined tunnels (which are no longer commonly built today). *Id.* at 107.[179]

AEPCO acknowledges that the Board has already determined that the *Coal Trading* costs can be applied only to timber-lined tunnels,[180] but devotes a paragraph to the argument that even if this is so, the *Coal Trading* costs would also be sufficient to cover construction of modern tunnels. AEPCO bears the burden of proof and needs to demonstrate the validity of the unit costs it proposes for the type of tunnel it has proposed to build. AEPCO cannot satisfy this burden by arguing that, had it attempted to develop unit costs for concrete and steel tunnels, the costs would probably have been lower than the unit costs for the different type of tunnel that it actually chose to use.[181]

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[179] Indeed, the Board required the SARR in *WFA/Basin I* to bear additional maintenance costs for the upkeep of timber-lined tunnels when the *Coal Trading* unit costs were used in that case. *WFA/Basin I*, slip op. at 75, 107. AEPCO has not included such added maintenance costs here because it posits the construction of concrete-lined, steel-rein forced tunnels.

[180] AEPCO Opening Nar. at III-F-60.

[181] In support of its argument, AEPCO refers to projects where concrete and steel tunnels were supposedly constructed at a lower per linear foot cost than AEPCO is using in this case.

Because AEPCO did not develop unit costs for the concrete and steel tunnels specified for ANR, the defendants' engineering experts have done so. Rather than rely on an outdated unit cost for timber lined tunnels that is nearly 30 years old, they have developed detailed tunnel construction costs for the modern type of tunnel specified by AEPCO. Specifically, a construction cost was developed for each of the three tunnels individually because per linear foot costs can be expected to vary from tunnel to tunnel. Some tunneling costs are directly related to tunnel length, while other items – such as portal work and ventilation – are independent of tunnel length.

Detailed development of the costs for each tunnel are contained in defendants' electronic workpapers.[182] Defendants' expert witnesses Roberto Guardia and John F. MacDonald worked in conjunction to develop unit costs for the tunnels. Both have extensive expertise in tunnel construction, as detailed in their qualifications in Section IV. Mr. MacDonald, who provided estimates of unit costs based on both publicly available information and on his own knowledge, is a professional estimator and has decades of experience in estimating the cost of tunnel construction projects.

AEPCO Opening Nar. at III-F-61. AEPCO supports its argument only with reference to a pdf file that contains a newspaper article about a tunnel project and unexplained documents that may be related to bids on other tunnel projects. AEPCO offers no explanation of how these other projects relate to conditions and costs that would be encountered in Montana and Wyoming nor does AEPCO attempt to establish that the documents in question cover the entire scope of work that would be required for the tunnels to be constructed on the SARR. Even if these documents were sufficient to establish construction costs for concrete and steel tunnels, which they are not, references to these other projects cannot support the proposition that the *Coal Trading* costs can be used for steel and concrete tunnels. Unsupported and unexplained references to supposed construction costs for other tunnels are clearly inadequate to establish that current costs for a modern tunnel would bear any relationship to the unit costs established in *Coal Trading*.

[182] BNSF/UP Reply workpaper "Single Track Lined Tunnel – ANR – Montana Tunnel.pdf"; BNSF/UP Reply workpaper "Single Track Lined Tunnel – ANR – Guernsey Tunnel 1.pdf"; BNSF/UP Reply workpaper "Single Track Lined Tunnel – ANR – Guernsey Tunnel 3.pdf."

Because AEPCO simply took the indexed *Coal Trading* costs and multiplied them by the length of each tunnel, AEPCO did not develop detailed specifications for the tunnels. To properly develop tunnel costs from the ground up, the Messrs. Guardia and MacDonald made a number of assumptions concerning the tunnel specifications and construction methods, all of which are consistent with modern practices. These assumptions include:

- Because of the relatively short length and horseshoe shape of the tunnels, they would also be excavated today with drill and blast methods. Large and sophisticated rock tunnel boring machines excavate tunnels in a circular shape and are typically used for much longer tunnels. The real-world versions of these three tunnels were excavated using drill and blast methods.

- Each tunnel is horseshoe shaped with a finished width of 16 and a height of 19 feet from top of rail to top of arch.

- Concrete lining thickness for each tunnel is twelve inches of reinforced cast-in-place concrete.

- The tunnels would be excavated in a non-gassy environment, meaning that methane or other explosive gasses usually found in coal deposits would not be encountered during construction.

- Tunnel excavated rock is stockpiled within one mile of the portals and the disposal costs to the final disposal location are not included.

- Electricity is generated on-site with diesel generators instead of using power grid electricity.

The geology of the area in which the tunnels are being constructed affects, among other things, the rate at which the tunnel can be excavated and the initial support requirements. Conditions differ for the Wyoming tunnels compared to the Montana tunnel. The two tunnels located in Wyoming (Tunnels Nos. 1 and 3) were excavated in soft tuffaceous siltstone that is considered difficult ground for tunneling.[183] Because of the difficult ground conditions, it would

[183] Indeed, BNSF's Tunnel No. 2, which is located between the real-world tunnels Nos. 1 and 3, was daylighted in 1998 due to deterioration of the soft rock found in the area and is now called the Guernsey cut.

not be possible to move forward as far which each round of drilling/blasting/excavating. Given the ground conditions, it was assumed that the advance per blasting round for the Wyoming tunnels would be 8.25 feet, whereas the more forgiving ground conditions surrounding the Montana tunnel would permit an advance of 12.5 feet per blasting round. Also due to ground conditions, the Wyoming tunnels require more initial support than the Montana tunnel. For the Montana tunnel, initial support would consist of rock bolts and shotcrete, while for the Wyoming tunnels wire mesh would be necessary in addition to the rock bolts and shotcrete. Despite the potentially challenging ground conditions in Wyoming, ground conditions for all three tunnels are assumed to be stable enough to allow for full face excavation without a partial top heading and bench which would require a slower excavation rate in two steps of advance.

The assumptions concerning advance per blast round and initial support requirements were used to develop a Tunnel Cycle Time for each tunnel.[184] Each cost estimate has a detailed breakdown of the Tunnel Cycle Time based on a drilling speed of three feet per minute, a loading time of three minutes per hole, and an excavation rate of 20 bank cubic yards per hour. Initial tunnel support consisting of ten-foot long rockbolts, wire mesh and shotcrete are installed at a rate of twelve minutes per rock bolt with a boom drill, five cubic yards of shotcrete per hour, and, for the Wyoming tunnels, 1.3 minutes/square foot of wire mesh. Tunnel Cycle time for the tunnels is 17 hours for an 8.25 feet advance per blasting round (the Wyoming tunnels) and 20.2 hours for a 12.5 feet advance per blasting round (the Montana tunnel). Advance rates are 46.8 feet per week for the Wyoming tunnels and 59.2 feet per week for the Montana tunnel. These cycle times are used in calculating various components of the costs for each tunnel.

[184] Tunnel Cycle Time is the time it takes to drill blast holes, load blast holes with explosives, detonate, excavate the blasted rock and install temporary support.

The workpapers include a detailed breakdown of all the steps and components required for construction of each tunnel. Each direct cost activity is broken down by labor and operated equipment cost and material costs when applicable. Each activity has a quantity of work, production rate and the activity duration. Total cost for each activity is summarized at the beginning of the cost estimate for each tunnel. Each activity has an item number for easy cross-reference. Each cost estimate includes a construction schedule as a bar chart showing the main activities and the sequential duration in weeks.

In addition to the three tunnels, ANR replicates a BNSF structure described as a "super span" (a large culvert that acts as a tunnel) on the small portion of the Spanish Peaks Subdivision that leads to the Comanche Power Plant. Defendants accept AEPCO's cost for this structure. Costs for this structure are included in ANR and ANR-PRB, but not ANR-NM, which does not serve the Comanche plant.

Table III.F.8
Defendants' ANR Tunnel Lengths and Cost by Type[185]

	Tunnel Type	Total Length (ft)	Cost
1.	Guernsey Tunnel 1	3,333	$33,774,101
2.	Guernsey Tunnel 3	1,441	$17,459,896
3.	Montana Tunnel	2,517	$22,667,462
4.	Super Span Structure	130	$277,533
5.			
6.	**Total**	7,421	$74,178,992
7.	AEPCO Opening		$54,456,954
8.	**Difference**		$19,722,038

[185] BNSF/UP Reply workpaper "Single Track Lined Tunnel – ANR – Montana Tunnel.pdf"; BNSF/UP Reply workpaper "Single Track Lined Tunnel – ANR – Guernsey Tunnel 1.pdf"; AEPCO Opening workpaper "ANR Tunnels.xls."

5. Bridges

In its narrative, AEPCO purports to have followed a fairly standard approach to the development of bridge costs. An inventory of bridges on the replicated route is developed, bridges are categorized by defined bridge types, unit costs are identified for each bridge type, and finally the appropriate unit costs are applied to the bridge inventory. In fact, AEPCO takes shortcuts that distinguish its evidence from that found in other SAC cases, and in particular from the *WFA/Basin* case upon which it claims to rely for its bridge specifications and unit costs. As a result of these shortcuts, AEPCO's bridge evidence is fatally flawed and cannot be accepted by the Board.

AEPCO's bridge evidence is noteworthy for the virtual absence of any independent development of bridge costs for purposes of this proceeding. AEPCO's evidence does not contain any specific bridge layouts, any bridge designs, any drawings, any model bridges, any detailed bridge specifications, any details of specific bridge components with specific costs assigned to those components, or any attempt to independently develop bridge costs for the bridges found on ANR. Despite AEPCO's assertion that AEPCO "designed and costed . . . bridges using more efficient spans where feasible,"[186] AEPCO does not appear to have departed from the span and bridge length information provided in discovery, and certainly did not identify or explain any such departures. Instead, AEPCO has simply adopted the bridge type definitions and unit costs from the *WFA/Basin* proceeding, with the exception of one additional bridge type it has added to cover a number of larger bridges on ANR. AEPCO then applied the *WFA/Basin* unit costs in a manner that was different from – and inconsistent with – the use of those same

[186] AEPCO Opening Nar. at III-F-63.

unit costs in *WFA/Basin*. Indeed, as described in more detail below, AEPCO's workpapers contain an error with respect to one bridge type that causes a significant *overstatement* of bridge costs. The defects in AEPCO's approach and defendants' alternative development of bridge costs are discussed in more detail below.

The following table summarizes bridge costs for ANR, both as submitted by AEPCO and as corrected by defendants, for ANR-PRB, and for ANR-NM.

Table III.F.9
Comparison of Defendants' Estimate of Bridge Costs[187]
With AEPCO's Estimate of Bridge Costs (in millions of dollars)

Route	AEPCO			DEFENDANTS' REPLY			Difference
	Railroad Bridges	Overhead Bridges	Total	Railroad Bridges	Overhead Bridges	Total	
ANR	$784.4[1]	$10.1[2]	$794.4	$724.0[3]	$12.2[4]	$736.2	$(58.2)
ANR-PRB				$450.0[3]	$9.5[4]	$459.5	
ANR-NMR				$201.6[3]	$1.2[4]	$202.8	

a. Bridge Types

AEPCO states in its narrative that it "utilized several previously-accepted standard bridge designs" to develop bridge costs.[188] In fact, AEPCO did not use "bridge designs" at all. It simply adopted the categories of bridges developed in the *WFA/Basin* proceeding and then added a fifth bridge type to cover larger bridges. It then assumed that all bridges of a common type

[187] 1/ AEPCO Opening workpaper "ANR Bridges Working.xls," Tab "Summary"
2/ AEPCO Opening workpaper "ANR OH Bridges Final.xls," Tab "ANR OH Bridges."
3/ BNSF/UP Reply workpaper "ANR Bridges RR Final.xlxs."
4/ BNSF/UP Reply workpaper "ANR OH Bridges RR-Final.xlxs," Tab "ANR OH Bridges."

[188] AEPCO Opening Nar. at III-F-63.

would be constructed using similar components. The five bridge types used by AEPCO are as follows:[189]

- "Any ANR bridge shorter than or equal to 30' tall and with its largest span less than or equal to 16'-0" was classified as Type I."
- "Any ANR bridge less than or equal to 30' tall and with its largest span greater than 16 feet and less than 35 feet was classified as Type II."
- "Any ANR bridge less than or equal to 30 feet and with a maximum span greater than 35 feet and less than or equal to 65 feet was classified as a Type III bridge."
- "Type IV bridges range up to 80 feet tall with spans as great as 125 feet. . . . Any ANR bridge taller than 30 feet or with spans greater than 65 feet was classified as a Type IV bridge."
- Type V bridges are those that "exceed one or both of the Type IV bridge parameters of span and height."

AEPCO also briefly notes construction characteristics for the various bridge types. Types I and II bridges are described as using similar precast decks, column caps, abutment caps, wingwalls, and columns and abutments with three HP 14x89 piles as the foundation.[190] Type III bridges are similar in construction to Types I and II, except that longer spans are constructed "using four precast I-girders side-by-side. A cast in place deck is installed over the I-girders."[191] "[A]butment and column caps . . . are larger than those on Type I and Type II bridges."[192] Type IV bridges "use a deck system similar to Type III bridges, except they include five precast girders, side-by-side, rather than four. . . . The main difference between the Type IV and Type III bridges are the massive foundations for the Type IV bridges."[193] No construction characteristics

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[189] AEPCO Opening Nar. at III-F-64 to III-F- 66.

[190] *Id.* at III-F-64.

[191] *Id.*

[192] *Id.*

[193] *Id.* at III-F-65.

of this type are provided for Type V bridges, except the notation that "there is a need to provide additional foundation and span structure strength and capability."[194]

Defendants accept the Type I, II, and III categories as specified by AEPCO. Defendants also accept the Type IV category, with the clarification that bridges with heights greater than 80 feet or spans longer than 125 feet are classified as Type V bridges. Defendants also accept that, as described in AEPCO's narrative, all bridges in the SARR's inventory should be classified by bridge type so that the proper unit costs for that bridge type can be applied.[195]

Defendants do not accept that all bridges that exceed 80 feet in height or that have a span longer than 125 feet can be lumped into a single Type V category. Because the point of developing bridge types is to simplify application of common unit costs, defendants' engineering experts have evaluated the characteristics of the Type V bridges located on ANR and the alternative ANR-PRB and ANR-NM routes. There are 15 such bridges on ANR, two additional such bridges on the segments of ANR-PRB not constructed by AEPCO as part of ANR, and four on the segments of ANR-NM not constructed as part of ANR. Defendants' engineering experts believe that AEPCO's Type V bridges should be further broken down into two subcategories based on the required superstructure type.

The defendants' engineering experts have classified Type V bridges as either Type V_a or Type V_b. AEPCO's engineers classified any bridge with a span over 125 feet in length as a Type V bridge. The AREMA Manual for Railway Engineering states that the preferred type of superstructure for spans up to 150 feet is a girder span, whereas for spans greater than 150 feet a

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[194] *Id.* at III-F-65 to III-F-66.

[195] BNSF/UP Reply workpaper "ANR Bridges_RR Final.xlsx," Tab "ANR RR Corrected Bridge List," column "V."

truss span is *preferred.*[196] These "preferences" are based on the economic experience of the whole railroad industry and indicate the most economical span type for a given length. Defendants' engineering experts have, accordingly, split the Type V category based on span lengths greater or less than 150 feet. Type V_a bridges include any bridges containing a span between 125 feet and 150 feet. The bridge costs for Type V_a bridges are based on steel through plate girder spans. The piers and abutments supporting the Type V_a through plate girder spans have to be evaluated independently, because their costs are not linearly related to the span length. This becomes particularly apparent when bridges 15 feet high are compared with bridges 115 feet high.

Type V_b bridges include any bridges containing a span over 150 feet. The bridge costs for Type V_b bridges are based on steel through truss spans. As with Type V_a bridges, the piers and abutments on Type V_b bridges have to be evaluated independently, because their costs are not linearly related to the span length.

b. Bridge Unit Costs

i. Type I, II, and III Bridge Unit Costs

AEPCO purports to use unit costs for Types I, II, and III bridges developed in the *WFA/Basin* case.[197] Defendants accept these unit costs, but note that they must be applied appropriately, as described in detail below under Section III.F.5.c.i.

ii. Type IV Bridge Unit Costs

AEPCO relies on a bid document relating to BNSF's Canadian River Bridge project as the basis for costs for Type IV bridges.[198] Defendants accept this document as an appropriate

[196] AREMA 15.1.2.3.

[197] AEPCO Opening Nar. at III-F-67.

[198] AEPCO Opening workpaper "ANR Bridges Working.xls," Tab "Type 4."

source for unit costs for Type IV bridges but note that it omits costs for a critical component: prestressed concrete I-Beams.

It is evident from the face of the document that costs for this component are not included. First, costs for prestressed concrete I-Beams are typically quoted on a per item basis. The only bid line item that mentions prestressed concrete I-Beams is Item 04500, which covers "Transportation & Erection of Concrete I-Beams." That item obviously does not cover the cost of I-Beams themselves since it is quoted on a "Lump Sum" basis and by its own terms relates only to transportation and erection.[199] None of the other bid items includes I-Beams either. I-Beams contribute to the portion of bridge costs that varies by linear foot. AEPCO has identified only three bid line items other than Item 04500 that it believes should be included in the cost of the bridge per foot (as opposed to costs associated with columns and abutments or fixed costs), and none of those items could conceivably include the cost of the I-Beams.[200]

Second, Defendants' engineering experts obtained a quotation for the type of prestressed concrete I-Beams that would be used in the comparatively long spans of Type IV bridges from Coreslab Structures, a company that supplies large quantities of prestressed and precast bridge components to BNSF every year.[201] The quote for the prestressed I-Beams was $175 per foot of I-Beam, and AEPCO's description of Type IV bridges requires five such I-Beams per span. The cost of the prestressed I-Beams alone would therefore be $875.00 per linear foot of bridge.

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[199] *Id.*, cell D:23.

[200] The items are "04400 Superstructure Concrete (Class 55)," "04500 Bridge Deck Waterproofing," and "04610 Handrail Panels."

[201] BNSF/UP Reply workpaper "Coreslab Beam Estimate.pdf."

AEPCO's estimate for the cost of superstructure per foot of bridge is only $740.74 (in 2009 dollars), which is less than the cost of prestressed I-Beams alone.[202]

The only reasonable conclusion is that the bid documents do not include the cost of the I-Beams, merely the cost for transportation and installation.[203] Defendants' engineering experts added material costs for the I-Beams into the Type IV unit costs.

iii. Type V Bridge Unit Costs

As described in AEPCO's narrative, "AEPCO engineers calculated the Type IV costs for each Type V bridge, then applied an additional 17.8% to the overall cost to reach a total Type V bridge cost."[204] AEPCO based this multiplier on a Nebraska Department of Highways comparison of different types of highway bridges. Defendants reject this approach to determining costs for Type V bridges because it suggests that a linear relationship exists between the costs of highway bridges and railroad bridges. AEPCO has not and cannot demonstrate that highway bridges serve as a valid comparison proxy for railroad bridges.

In fact, there is no linear relationship that can be established between railroad bridge costs and highway bridge costs as the span lengths increase. The primary reason that a linear relation does not exist between the costs of highway bridges and railroad bridges is the markedly

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[202] AEPCO Opening workpaper "ANR Bridges Working.xls," Tab "Type 4," cell F:42. The price quote for the 90-foot beam (as opposed to the 60-foot beam) was used to generate a "cost per foot of beam" because that length falls very close to the middle of the range of span lengths for which AEPCO proposes to use these beams (span length range of 65 feet on Type III bridges up to 125-foot spans on Type IV bridges).

[203] In *WFA/Basin I*, the Board was presented with the same question of whether these bid documents included the cost of prestressed concrete I-Beams. The Board was confronted with conflicting recollections by opposing witnesses on this issue, and concluded that "because there is no other evidence that one party's statement should be given more weight over the other party's statement, we cannot rely on either statement here." *WFA/Basin I*, slip op. at 112. The above discussion and quote for prestressed concrete I-Beams constitute such other evidence and definitively demonstrate that such costs are not included.

[204] AEPCO Opening Nar. at III-F-68.

differing magnitude of the live loads carried by each type of structure, and the rate at which the respective live loads increase in relation to an increase in span length. For example, for a 100-foot single track span, the railroad live load, including dynamic impact, is a total of 1,365,300 lbs. For a 200-foot single track span, it is 2,256,700 lbs, a 65% increase. The corresponding total live loads with impact on a two lane highway bridge are 320,000 lbs. and 448,000 lbs., which represents only a 40% increase in the highway bridge context. Clearly, the percentage of increase in live load is much greater for railway bridges than for highway bridges.

The disparity between railroad bridges and highway bridges is even more apparent if the load carrying requirement of a span (the bending moment of the span) is considered. The equation to calculate the bending moment is a product of the live load and the square of the span length. As a result, the divergence between the bending moment imparted on the structure of highway bridges compared to that of railroad bridges increases even more rapidly as span lengths increase. The divergence in bending moment as the two types of structures increase in length is evidence that a linear relationship does not exist between the costs of the two types of structures.

From the discussion above, it is obvious that estimating construction costs for railroad bridges based on a highway bridge study would seriously underestimate the railroad bridge cost. A bridge that supports highway loads can be made up of prestressed concrete I-Beams with span lengths far in excess of 100 feet. For bridges that support railroad live loads, however, the cost efficiency of prestressed concrete I-Beams diminishes rapidly beyond a span length of 80 feet. The lengths of these prestressed beams can be pushed to as high as 125 feet for railroad bridges, but they are not cost efficient at these longer spans because thicker concrete decks and deeper ballast sections must be used. Typically, when railroad bridges require span lengths beyond approximately 100 feet, railroads use steel plate girders up to span lengths of about 150 feet.

They use these types of spans because they are the most cost-efficient for carrying railroad loads over that range of span lengths. Beyond 150 feet in span length, railroad structures are typically truss spans. The preferred structure type for spans beyond 150 feet in length shifts to truss spans because the cross-section of plate girders required for span lengths over 150 feet become very difficult to fabricate, and nearly impossible to transport to the bridge site.

A designer can reasonably project the cost of a 200-foot highway bridge span based on the cost of 100-foot highway bridge span, within a reasonable level of uncertainty because the 200-foot highway bridge span is the same type of span. It is a similar cross-section and is made up of similar material when compared to the 100-foot highway bridge span. However, the same projection cannot reasonably be made for the cost of railroad bridges when the span increases from 100-feet to 200-feet. That projection cannot reasonably be made for the cost of a railroad bridge because the 200-foot railroad bridge span is a different type of material, a different type of span, and has a much different cross-section than the 100-foot railroad bridge span. Essentially, they are two completely different types of bridge spans, whereas a 200-foot highway bridge span may simply be a longer version of a 100-foot highway bridge span.

Defendants' engineering experts discuss in more detail below their approach to estimating the costs for Type V bridges.

c. Development of Total Bridge Costs

i. Application of Unit Costs Based on Bridge Type

AEPCO's narrative clearly states that *bridges* were classified by type depending on the length of the longest span and the height of the bridge.[205] The necessary implication of this statement is that unit costs for the various bridge types would then be applied to each bridge

[205] *Id.* at III-F-64-66.

based on its type classification. Following the approach described in AEPCO's narrative would have been the only appropriate manner for applying the *WFA/Basin* costs used by AEPCO because they were developed and applied to entire bridges based on type.

AEPCO's workpapers reveal that AEPCO did not follow the costing approach described in its narrative evidence. Instead, AEPCO assigned unit costs to each *span* of each bridge based on the length of the *span.* For example, a 24-foot *span* was classified as "Type II" and was costed using unit costs for Type II *bridges*. Another span on the same bridge might be classified as "Type I" and use Type I unit costs.[206] This individualized treatment of spans directly contradicts the bridge classification approach described in AEPCO's narrative. It is also inconsistent with the way the costs were developed and used in the *WFA/Basin* case.

The public version of WFA/Basin's narrative from that case makes clear that unit costs for all bridge types were developed from and applied to entire bridges. As the *WFA/Basin* narrative describes, unit costs for Types I, II, and III bridges were developed based on 21 Model Bridges for which BNSF had produced detailed cost information. The Bridges were sorted by Type – using the same Type classifications that AEPCO has adopted here – and then average costs for each bridge Type were developed from the Model Bridges that fell within that type. Each bridge on the SARR was then costed using the unit costs for the appropriate bridge Type.

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[206] *See, e.g.,* AEPCO Opening workpaper "ANR Bridges working.xls," Tab "Multi Span," lines 19-30. Those lines describe a single bridge over the South Platte River that AEPCO has costed individually using Type I, Type II, and Type III bridge unit costs. *Id.*, column "Q." Indeed, the operation of AEPCO's spreadsheet assigns a "bridge type" to each *span* although according to AEPCO's narrative the entire *bridge* should be treated (and costed) as a Type III bridge because it has a maximum span of 65 feet. *Id.* column "P." Bridges that should be classified and costed as Types IV and V are treated in the same manner. *See, e.g.,* AEPCO Opening workpaper "ANR Bridges working.xls," Tab "Type IV Bridges," lines 98-102; AEPCO Opening workpaper "ANR Bridges working.xls," Tab "Type V Bridges," lines 3-7.

Type IV bridges were costed in the same manner, but the costs were derived from the Canadian River bridge bid materials instead of from the Model Bridges.[207]

The complainants in *WFA/Basin* employed a more sophisticated approach to developing bridge costs than simply calculating a per linear foot cost and multiplying it by the length of the bridge. As their narrative describes, they developed three costs for each bridge type: (1) abutment and fixed costs; (2) per column costs; and (3) costs per linear foot. The total cost for a particular bridge was determined by summing these three costs as calculated based on that bridge's characteristics.[208] AEPCO partially followed this more sophisticated approach, but only did so with respect to *individual spans* of bridges that AEPCO classified as Type IV or Type V *spans*.

It is clearly inappropriate to take costs developed with respect to entire bridges and apply them piecemeal to individual spans as AEPCO has done here. In *WFA/Basin*, if a bridge was classified as Type III, all spans of the bridge were costed with Type III unit costs. Here, by contrast, a bridge's total costs could be a mishmash of Type I, II, III, IV, and V costs. The methodological flaw in AEPCO's approach should be obvious. ANR includes a number of bridges that were also present on the *WFA/Basin* SARR. Using AEPCO's approach of mixing costs from multiple bridge types would mean that AEPCO would obtain distinctly different costs for the same bridge even though AEPCO purports to be using the same unit costs. Indeed, the only rationale for AEPCO's use of the *WFA/Basin* costs in the first place is AEPCO's contention

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[207] *See* Opening Evidence of Complainants, *Western Fuels Association v. BNSF Railway Company*, STB Docket No. 42088, Narrative Vol. 2 of 2, at III-F-79 to III-F-81 (filed Apr. 19, 2005) (public version). An excerpt from the public version is included as BNSF/UP electronic workpaper "WFA Basin Opening Evidence Vol 2 Bridges.pdf."

[208] AEPCO Opening Nar. at III-F-80.

that it has adopted the same bridge types and designs as *WFA/Basin* and should therefore be entitled to use the same costs.

Mixing and matching average costs from different bridge types presents more than a theoretical problem. Under the WFA/Basin approach, total costs for each bridge type would have reflected the specialized equipment necessary to construct the longest spans on the bridge. The *WFA/Basin* approach thus captures an important aspect of real-world build construction costs. The fixed costs associated with building a bridge depend upon the equipment that must be used in its construction. For example:

- It takes larger, more expensive equipment to build drilled shafts for a Type IV bridge than it does to drive piles for a Type III bridge.
- It takes larger, more expensive cranes to lift and place 90-foot long prestressed beams than it does to lift and place 16-foot long concrete box beams.
- It takes far more time and labor to place reinforcing steel and cast abutment concrete in-place for a Type V bridge than it does to erect a pre-cast abutment cap for a Type III bridge.

If a contractor builds a bridge that consists of four short spans (spans that AEPCO's workpapers would classify as "Type I"), and a long span (that AEPCO's workpapers would classify as "Type IV"), that contractor needs to have the larger equipment available on-site for constructing drilled shafts, casting abutments in-place and erecting longer, heavier beams associated with the Type IV span, even though not every span in the bridge would necessarily require that equipment for construction. These are the fixed costs. Thus, estimating bridge costs by ruling bridge type more accurately reflects the reality of building an actual bridge as compared to estimating costs on a span-by-span basis. As noted, the average costs from

WFA/Basin capture this fixed cost effect and spread it across the fixed cost for the entire bridge, not just the longer span.[209]

AEPCO may argue that it was attempting to use an à la carte bridge costing process of mixing and matching bridge components that has been accepted by the Board in some SAC cases. AEPCO's decision to use the costs from *WFA/Basin* foreclosed this option. In order to use an à la carte approach, the bridge costs used by AEPCO would need to have been developed in a different manner. In previous SAC cases where the Board accepted that the complainants could estimate bridge costs based on mixing and matching specific bridge components, the complainants had to generate a specific bridge layout at each location. In each location, the proposed bridge layout consisted of a unique arrangement of the specifically defined bridge components, including different types of intermediate substructures, and different abutments. In fact, spans, or superstructure elements, were broken down into separate components. In those previous cases, the complainants identified the unique cost of each specifically defined bridge component. The mixing and matching of components was only valid because the complainants had proposed a unique bridge layout and could assign a specific cost to each unique component within that bridge layout. However, those complainants' various bridge layouts were limited to the components for which they had unique and specific costs. Essentially, they could generate a

[209] In the example used here, the costs attributed to the long section by a linear foot unit cost could be viewed as too low while those attributed to the shorter sections could be viewed as too high because some of the fixed costs that arise because of the long section are assigned to the short sections. When the bridge is dealt with as a whole, however, the distribution of costs among the sections does not matter. By contrast, if that same bridge were costed using unit costs for Type I bridges for the short segments and unit costs for Type IV bridges for the long segment, the total cost of the bridge would clearly be understated. The costing of the long span would capture only part of the higher fixed cost while the costing for the shorter spans would not include any of the higher fixed costs because the unit costs used for the shorter spans were not derived from a bridge that employed the more expensive equipment necessary when a longer span is present.

bridge layout from any of the items on their "menu," but they had to define the item's details, engineering properties and cost if it was to be an available item.

In restating the bridge costs for ANR and in developing the bridge costs for ANR-PRB and ANR-NM, defendants' engineering experts have followed the bridge categorization approach described in AEPCO's narrative: a bridge is categorized depending on its longest span and height. Once the bridge is categorized, the unit costs applicable to that bridge Type are applied to the entire bridge. AEPCO's electronic workpapers contained the pertinent information concerning individual spans to permit correct categorization of bridges and application of unit costs.[210] Similar information was used for the bridges on those portions of ANR-PRB and ANR-NM that were not constructed by AEPCO.[211]

ii. ANR Bridge Inventory

The defendants' engineering experts identified several instances where a bridge was omitted that should have been included on the ANR route. Those bridges were added to ANR inventory in the Railroad's corrected spreadsheet. The specific locations can be identified by a note in column "B" in the corrected spreadsheet.[212] In a much larger number of instances, AEPCO treated bridges as single-tracked where AEPCO's track diagrams clearly indicate that ANR would have double tracks. The defendants' engineering experts have corrected the workpapers to reflect the proper number of tracks.[213]

AEPCO also assumes that all bridges spanning 20 feet or less and crossing natural barriers are being been built on ANR as culverts. Defendants accept this assumption. AEPCO

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[210] BNSF/UP Reply workpaper "ANR Bridges RR Final.xlsx," Tab "ANR RR Corrected Bridge List," columns "V" & "W."

[211] *Id.*, Tab "RR Bridge Summary."

[212] *Id.*, at Tab "ANR RR Corrected Bridge List," column "B."

[213] *Id.*, column "J."

also assumes that certain bridges would be replaced by culverts. As discussed in Section III.F.2 above, defendants do not accept that bridges could be replaced by culverts.

iii. ANR-PRB and ANR-NM Bridge Inventories

Defendants' engineering experts developed the bridge inventories for ANR-PRB and ANR-NM from the inventory materials and track charts provided to AEPCO in discovery. For those bridges not listed in ANR inventory, defendants' engineering experts collected the same types of information contained in AEPCO's workpapers necessary to categorize and cost the additional bridges.

iv. Issues Specific to Type IV Bridges

AEPCO's approach to costing Type IV bridges is somewhat more similar to the approach used in *WFA/Basin* employing the same unit costs. Specifically, costs are developed separately for (1) abutments and fixed costs; (2) column related costs; and (3) costs per linear foot of superstructure. In *WFA/Basin*, costs were then calculated for an entire bridge based on the length of the bridge and the number of columns plus the abutments. AEPCO departed from the *WFA/Basin* approach by using abutment/column/per foot costs derived from the Canadian River Bridge project only for *spans* that AEPCO classified as Type IV spans. Shorter spans on the same bridge were costed as Type I, II, or III bridges depending on AEPCO's classification of the span. For the reasons described above, defendants have rejected AEPCO's span-by-span approach. Defendants follow the same approach used in *WFA/Basin*: Type IV unit costs for abutments, columns, and linear feet are applied to the entire bridge if the bridge is classified as a Type IV bridge.

AEPCO's workpapers contain a substantial error with respect to Type IV bridges that defendants have corrected in their restatement of ANR's bridge costs. The workpaper improperly applies the cost of two abutments in lieu of the interior pier cost to each interior pier

location on all of the multi-span bridges. Since the abutment costs are significantly higher than the interior pier costs, this error has the effect of substantially overstating pier costs on Type IV bridges.[214] The overall effect of AEPCO's error is a significant overstatement of ANR's bridge costs due to Type IV bridge costs.

v. Issues Specific to Type V Bridges

AEPCO costed Type V bridges in essentially the same manner as Type IV bridges, but applied a multiplier to Type IV costs to reflect the more substantial nature of Type V bridges. Defendants' engineering experts have explained above their basis for rejecting AEPCO's approach. Because of their unusually tall heights and extraordinarily long spans, the defendants have taken a more individualized approach to developing the costs of Type V bridges, both those located on ANR, and those located on ANR-PRB and ANR-NM.

The Type V_a superstructures – those with spans from 125 to 150 feet – were estimated by developing a through plate girder design for the average span length of the Type V_a bridges on the routes (130.5 feet). This provided a weight for the structural steel to be used for this type of bridge. So as not to use the same steel weight for different span lengths, the steel weights for different span lengths were based on adjusting this calculated weight using a formula relating weight to span length.[215]

The Type V_b superstructures – those with spans greater than 150 feet – were estimated by using the calculated weight of a previously designed 200-foot single track railway truss span. Plan sheets showing the truss layout, member sizes, and total weight are included in the

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[214] *See* AEPCO Opening workpaper "ANR Bridges Working.xls," Tab "Type IV Bridges."

[215] BNSF/UP Reply workpaper "AEPCO Estimate TPF Section Mod.pdf"; BNSF/UP Reply workpaper "TPG span design.xls."

workpapers.[216] Again, the steel weights for different span lengths were determined by adjusting this calculated weight to correspond to the different span lengths found on the routes.

The substructure elements (columns and abutments) were estimated separately, with bridge height and supported span length being the main variables in the column materials estimate. A design calculation spreadsheet was prepared for the columns.[217]

Type V bridges are mixed structures which vary considerably based on the crossing geometry. In some cases, the appropriate structure consists of long lengths of trestle approaches crossing flood plains and leading to a single or a few large truss spans over a main channel. In other cases, such as urban areas, the approaches must accommodate underpassing roadways and trestle type approach structures do not have the required span lengths to achieve that. Then, there are locations where approaches are not necessary at all, and the bridge consists of one (or perhaps a few) long truss spans.

The Railroad engineering experts have organized the cost estimating parameters for Type V bridges to accommodate these different crossing geometries, while still recognizing that the longer and taller main spans are more expensive to construct. The greater construction costs are due to the heavier construction equipment which must be used, the need for falsework, the need for cofferdams, difficult access and other considerations. Many times, these bridges are constructed with one contractor constructing the approaches, while specialty contractors are required for erection of the truss or the heavy through plate girder spans or for the construction of the special piers or abutments. Thus, since it is likely that more than one contractor may be

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[216] BNSF/UP Reply workpaper "029 LATERAL BRACING.pdf"; BNSF/UP Reply workpaper "030 TRUSS ELEVATION.pdf."

[217] BNSF/UP Reply workpaper "Type 5 bridges.xls," Tab "Type 5 designs"; *Id.*, Tab "Pier Costs."

used on long bridges with approach type spans and then long/high main spans, it is appropriate to identify and delineate differing cost bases for the different spans used in Type V bridges.

A practical example serves to illustrate the point. If the approaches for a Type V bridge are trestles consisting of short span prestressed concrete, a separate general bridge contractor may be used to erect those portions of the bridge, while a specialty contractor is brought in for the heavy pier construction and erection of the main spans. Thus, on a complex Type V bridge where there is a big difference in the constituent span types, it is reasonable to use the Type III bridge costs for the linear footage of approach, while using a separate, independently developed cost for the main spans. Likewise, if the approaches consist of deck girder spans of varied length, such as are necessary in areas where major highways or multi-lane roads are crossed adjacent to the main spans, then a more capable general contractor may be used to erect the approaches as well as the longer spans. Thus, in these situations, it is reasonable to use the Type IV costs for the linear footage of approach.

In the case of a bridge consisting of a single or multiple spans that exceed 125 feet, all components of the bridge, including the abutments, must be constructed by a contractor experienced in this type of work. Consequently, independently developed costs for the abutments, piers, and spans must be used in the estimate.

d. Highway Overpasses

Defendants accept AEPCO's assumption that ANR would bear 100% of the costs of highway overpasses located in territories replicating recently constructed lines, including the Orin, Reno, and Campbell Subdivisions. Defendants further accept that the SARR would bear 10% of the costs for such bridges located elsewhere. Defendants also accept AEPCO's choice of the California DOT comparative bridge costs as a source for unit costs. Several corrections to AEPCO's evidence are necessary, however.

Defendants' engineering experts evaluated AEPCO's inventory of highway overpasses and identified several mistakes in the inventory which were corrected in restating ANR's costs. Corrections to the AEPCO inventory are noted in defendants workpapers.[218] Those workpapers also set forth the inventory of highway overpasses for ANR-PRB and ANR-NM.[219]

A second issue relates to AEPCO's selection of specific unit costs from the California DOT publication. In that cost study, each structure type was assigned a range of reasonable unit costs to be applied to the square footage of the bridge. Further, there was a list of several criteria that would tend to push any given bridge toward either the upper or lower end of the unit cost spectrum. Those criteria are summarized as follows:

Factors for Lower end of Price Range	**Factors for Higher end of Price Range**
Short spans, **Low Structure Height**, No Environmental Constraints, Large Project, No Aesthetic Issues, Dry Conditions, **No Bridge Skew**	Long spans, **High Structure Height**, Environmental Constraints, Small Project, Aesthetic Issues, Wet Conditions (cofferdams required), **Skewed Bridges**
Urban Location	**Remote Location**
Seat Abutment	Cantilever Abutment
Spread Footing	Pile Footing
No Stage Construction	2 Stage Construction

AEPCO's engineers inserted a note in the workpaper spreadsheet indicating that they used the lowest end of the spectrum of unit costs because, they assert, ANR bridges meet the appropriate criteria for the lower unit costs.[220] This assumption is not reasonable. There are a several specific items – those in bold font in the summary table above – that would characterize many of the overhead bridges on ANR, ANR-PRB, and ANR-NM and that do not allow the use

[218] BNSF/UP Reply workpaper "ANR OH Bridges RR Final.xlsx," Tab "ANR OH Bridges."

[219] *Id.*

[220] AEPCO Opening workpaper "ANR OH Bridges Final.xls," Tab "ANR Unit Costs."

of the lowest end of the cost range. These structures pass over railroad tracks, which require a minimum vertical clearance (23 feet) greater than that for structures that pass over highways (14-16 feet, depending on the type of roadway below), indicating that they are exceptionally tall structures by roadway bridge standards. Additionally, while certainly not all of these overhead bridges are skewed, a great many of them do cross the tracks at a skew. Also, a great many of these structures are located in remote areas. Using the lowest unit cost in the expected range of unit costs is therefore unsupportable.

A more reasonable assumption concerning unit costs would account for the presence of higher costs features on the SARR bridges. In restating costs for ANR and in developing the costs for ANR-PRB and ANR-NM, defendants have assumed that overhead bridges unit costs would be the low-end cost for each item plus 25% of the range between the low and high cost for that item. For example, if the unit cost range in the California DOT study is $800 to $1200 per square foot, defendants have used a unit cost of $900.[221]

A final issue relates to overhead bridges that span four or more tracks. The longest span proposed by AEPCO for overhead bridges (RC T-Beam) is only capable of spanning 59 feet, according to California DOT's Comparative Bridge Cost tables.[222] A bridge spanning four tracks would need a clear span of at least 69 feet, assuming 15-foot track centers and 12 feet of clearance on either side of the outermost tracks. For these longer spans, a reinforced concrete box superstructure would be used because – according to the same California DOT table – spans constructed with those components can span up to 121 feet. Defendants have identified the six

[221] This is: $800 + .25 x ($1200-$800).

[222] AEPCO Opening workpaper "ANR OH Bridges Final.xls," Tab "Comparative Bridge Costs 2004," cell E:28.

overhead structures on ANR that would be affected and have developed costs for overhead structures on ANR-PRB and ANR-NM following the same approach.[223]

6. Signals and Communications

AEPCO assumes that the signal system for ANR will be Centralized Traffic Control ("CTC"). Also included in AEPCO's signal cost estimate are Failed Equipment Detectors ("FEDs"), Highway-Rail Grade Crossing Warning Systems and Automatic Equipment Identification ("AEI") scanners, and related equipment. AEPCO assumes that the communications for ANR will be accomplished with a combination of fiber optic trunk lines, microwave towers, and land mobile radio stations.

The defendants' engineering experts generally accept AEPCO's choice of CTC as ANR's primary signal system, its proposed use of fiber optic truck lines, and—although the technology is outdated and no longer generally installed by defendants—AEPCO's proposed sporadic deployment of a microwave-based communications system. However, there are serious flaws and omissions in AEPCO's development of costs. The defendants' engineering experts' review of AEPCO's documentation reveals a number of omissions and understatements of the quantities and costs required for a complete, functioning signal system. Details of these revised counts are included in defendants' Signals and Communications workpapers.[224]

Signals and communications costs for ANR-PRB and ANR-NM were developed using the same assumptions regarding signal, AEI, FED, and communication system spacing as on ANR. Active grade crossing warning systems costs used the FRA inventory and were

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[223] BNSF/UP Reply workpaper "ANR OH Bridges RR Final.xlsx," Tab "ANR OH Bridges," cells P:38, P:39, P:58, P:109, P:118, & P131.

[224] BNSF/UP Reply workpaper "Summary Signal Costs.xls"; BNSF/UP Reply workpaper "Comms Summary.xls."

discounted to 10% in accordance with the Board's decision *Duke Energy Corp. v. CSX Transportation, Inc.*, STB Docket No. 42072 (STB served February 4, 2004) ("*Duke/CSXT*").

a. Highway Grade Crossing Warning Systems

The Board's decision in *Duke/CSXT* requires SARRs to assume 10% of the cost of crossing protection at grade crossings. STB Docket No. 42072 at 504. AEPCO claims to have done so.[225] However, a review of its workpapers shows that, of the 373 grade crossings with active warning devices, AEPCO includes costs for only 27.[226] Defendants fully itemize the cost of all crossings at 10% of their installation cost.[227]

b. Insulated Joints

The AEPCO workpapers suggest that the costs for insulated joints for ANR's power switches are incorporated in the cost of the signal and communications investment.[228] This assertion is partially false and appears to be copied from another submittal. A review of AEPCO's workpapers reveals that AEPCO's signal estimates do not include the cost of the insulated joints in the closure rail and in the stock rail of track turnouts at the control points.[229] This resulted in an understatement of 1,612 insulated joints and 3,224 field welds, which the defendants' engineering experts have included in the corrected signals costs.[230]

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[225] AEPCO Opening Nar. at III-F-71.

[226] AEPCO Opening workpaper "Summary Signals costs.xls."

[227] BNSF/UP Reply workpaper "RR Grade Crossing Warning Summary.xlsx," Tab 1, cell K11.

[228] AEPCO Opening Nar. at III-F-56.

[229] AEPCO Opening workpaper "ANR Signal Est working.xls"; Tab "EOS," row 169; Tab "UniXover," line 174; Tab "Sngl XOVER," line 169.

[230] BNSF/UP Reply workpaper "Summary Signal Costs.xls."

c. Switch Machines

AEPCO's costs for turnouts do not include the cost of switch machines or the layout material necessary to connect the mechanisms to the track structure.[231]

In addition, AEPCO omits the cost of second "helper" switch machines on #20 and #24 turnouts and the standard rods for connecting the switch machines to the rail. Helper switch machines are standard on longer turnouts – including #20 and #24 turnouts – because of the length of the rail that has to be switched. Under certain circumstances (weather, etc.), a single machine may not have sufficient power and leverage to properly switch rails of those lengths. Therefore, the defendants' engineering experts added the helper switch machines and the rods needed to connect them to the rail in their restatement of ANR signals costs.[232]

d. Cost of CTC Office Equipment

AEPCO based the cost of ANR's dispatching center on a cost previously accepted by the Board in *WFA/Basin*. The SARR proposed in that case was relatively short and simple in comparison with the length and complexity of the ANR route. Although the ANR route replicates portions of the route proposed in *WFA/Basin*, ANR has four times as many route miles.

All Class I railroads have provisions for a disaster recovery dispatcher site in the event that their primary site becomes inoperative due to a natural disaster or other catastrophic event. For instance, the BNSF has satellite dispatcher sites at Kansas City, Kansas, San Bernardino, California, and Houston, Texas, all capable of controlling the entire railroad. The disaster

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[231] A statement in AEPCO's workpapers suggests that the costs for switch machines for ANR power switches are incorporated as part of the total cost of turnouts included in track investments. AEPCO Opening Nar. at III-F-56. However, review of the actual costs show that this is not the case.

[232] BNSF/UP Reply workpaper "Summary Signal Costs.xls."

recovery site should be far enough from the primary site that a natural disaster does not affect the secondary site. For ANR, Denver, Colorado is recommended for the secondary site because it is distant and has building and communication facilities that can economically be used for this purpose. The defendants' engineering experts used the updated Alstom quote and included the cost of a disaster recovery center in his restatement of ANR signal costs of $2,500,000.[233]

e. Cost of Fiber Optic Interface Equipment

AEPCO proposes to use fiber optic cable and a combination of microwave systems for its communication system backbone. The opening evidence is weak in its assessment of the costs of the fiber optic interface to the communication's system. AEPCO's estimate is $500,000 for "Fiber nodes," but there is absolutely no explanation of, or support for, why that is the appropriate amount.[234] The cost of installing fiber optics interfaces is not trivial. Today, interfacing into a previously-installed fiber system and building a microwave system are approximately equivalent. AEPCO's $500,000 cost is grossly understated.

The defendants' engineering experts have determined that just a fiber optic interface system site capable of carrying and distributing railroad voice and data communications costs approximately $250,000.[235] The defendants' engineering experts estimate that 30 fiber optic cable interface sites are necessary to service the VHF radio base station spacing. The cost of these sites is included in the signals and communications workpapers.[236]

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[233] BNSF/UP Reply workpaper "Alstom CTC quote.pdf."

[234] AEPCO Opening workpaper "comms summary.xls."

[235] BNSF/UP Reply workpaper "Fiber Sites.pdf."

[236] BNSF/UP Reply workpaper "Comms Summary.xls."

f. PTC Costs

AEPCO has omitted the cost of instituting positive train control ("PTC") on ANR lines meeting the Federal Railroad Administration PTC criteria as mandated by the Railway Safety Improvement Act of 2008. Public Law 110-432, 122 Stat. 4848-4970. The Congress and the Federal Railroad Administration mandates that this system be in place by 2015, yet AEPCO does not account for this cost at all. As discussed in Section III.C, the defendants' engineering experts developed the cost of PTC for those ANR lines carrying hazardous materials and assumed PTC implementation in the year 2015. These PTC costs were developed using both a Federal Railroad Administration Economic Analysis and the input of Class I railroads, which have recently submitted implementation plans to the FRA.[237]

The defendants' engineering experts calculate the materials costs of installing PTC equipment by multiplying the unit price for the required equipment by the number of locations – intermediate signal points, control points, and locomotives – where each unit is needed.

The defendants' engineering experts calculate the back room costs of PTC based on UP's PTC investments, making all necessary adjustments due to ANR's smaller size.[238]

The cost of testing PTC system integrity is a function of the number of track miles that must be tested. Because the ANR is only 6.85% as long as UP, its PTC system integrity and testing cost is only 6.85% of UP's.[239]

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[237] BNSF/UP Reply workpaper "PTC Investment Summary -Open.xlsx"; BNSF/UP Reply workpaper "2009 0717 PTC Economic Analysis FRA-2008-0132-0001.pdf"; BNSF/UP Reply workpaper BNSF PTCIP.pdf; BNSF/UP Reply workpaper "Union Pacific PTC Implementation Plan v1 04-16-2010 Public.pdf."

As noted in Section III.C, defendants' evidence in this proceeding assumes that AEPCO's SARR starts with modern signal and communications systems, so the costs of installing PTC on the SARR will be much lower than the costs that defendants are facing with respect to their own systems in the real world.

[238] BNSF/UP Reply workpaper "PTC Investment Summary."

However, the backroom hardware necessary to operate the PTC system is the same regardless of the length of the railroad. Therefore, the cost of PTC systems hardware is fixed and requires no adjustment. BNSF/UP Reply workpaper "ANR Signal Est working.xls."

Finally, costs for systems integration and development are related to the length of the railroad but must account for larger railroads' lower cost per track mile due to economies of scale. The defendants' engineering experts multiply UP's PTC systems integration and development costs by 6.85% to account for the shorter length of ANR but then increase that cost by 50% to account for the absence of economies of scale that UP enjoys because of its size.[240]

The defendants apply the same per-track mile PTC costs for ANR-PRB and ANR-NM as apply to the ANR. Similarly, non-fixed backroom costs for ANR-PRB and ANR-NM were assumed to be the same as ANR's per track mile. This is a particularly generous assumption, given the decrease in efficiency caused by the smaller size of ANR-PRB and ANR-NM.

Table III.F.10
Signals and Communications System Costs[241]

Item	AEPCO Cost	DEFENDANTS' REPLY Cost	Difference
CTC, FEDs, Crossing Signals, AEI Scanners, and Related Equipment	$275,558,792	$356,036,274	$80,477,482
Communications	$20,351,901	$27,851,901	$7,500,000
Total	$295,910,693	$383,888,175	$87,977,482

[239] BNSF/UP Reply workpaper "Summary Signal Costs.xls"; BNSF/UP Reply workpaper "ANR Signal Est working.xls."

[240] BNSF/UP Reply workpaper "ANR Signal Est working.xls."

[241] BNSF/UP Reply workpaper "Summary Signal Costs.xls"; BNSF/UP Reply workpaper "Comms Summary.xls."

7. Buildings and Facilities

Defendants' buildings and facilities evidence address the requirements for each of the alternative SARRs for which defendants are presenting evidence, ANR, ANR-PRB, and ANR-NM. Details of the costs developed for each alternative are contained in defendants' workpapers.[242]

a. Headquarters Building

AEPCO assumes the headquarters building for the ANR is located at ANR's North Amarillo Yard and will accommodate its supervisory, general and administrative, clerical and dispatching staffs. The defendants' accept AEPCO's assumption of a 21,500 square foot headquarters facility for ANR, as well as AEPCO's use of R.S. Means construction cost pricing, and removal of engineering and architectural design fees. As noted at the beginning of Section III.F, AEPCO miscalculated the location factor. All facilities calculations use the appropriate corrected location factor. For convenience, the defendants have assumed that the headquarters building would be located in Deming, New Mexico, under all three SARR scenarios.

Due to the smaller number of employees, ANR-PRB will require less space for work rooms, IT equipment, corridors, restrooms, and mechanical services. ANR-PRB's headquarters building would be 16,125 square feet. Likewise, the headquarters building for ANR-NM would be sized to reflect the smaller railroad, and would be 6,450 square feet. The alternative headquarters buildings were sized using the same methodology employed by AEPCO. ANR-PRB and ANR-NM headquarters facilities would be constructed to the same standards as specified by AEPCO for ANR headquarters building.

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[242] BNSF/UP Reply workpaper "ANR RR Buildings and Facilities.xls"; BNSF/UP Reply workpaper "ANR RR Site and Facilities Costs.xls"; BNSF/UP Reply workpaper "ANR RR Fuel Storage Tanks.xls"; BNSF/UP Reply workpaper "ANR RR Yards and Facilities Costs.xls."

AEPCO left out of its ANR headquarters building estimate a number of relatively low cost but essential items in its costing of the headquarters facility – including window treatments, an emergency generator, and utility connections. Costs for these items as well as for a paging system, smoke detectors, and a security system has been added for ANR headquarters and included in the estimates of ANR-PRB and ANR-NM headquarters.

Defendants accept generally AEPCO's methodology and pricing for site grading, drainage, and lighting.

b. Fueling Facilities

AEPCO proposes to use modular fueling platforms at its Guernsey, North Amarillo, West Vaughn, and West El Paso Yards. Defendants accept the design of these facilities, as well as the cost for each fueling facility. The same modular design has been employed for the fueling facilities on ANR-PRB and ANR-NM. The specific requirements for each yard under each scenario are described in Section III.B above and defendants' workpapers.[243] Also, there is no source for fuel at either the Vaughn or El Paso Yard. As a result, extra fuel storage is required at those yards. Defendants' restated costs for these yards include the cost of this extra storage.

c. Locomotive Shops

AEPCO assumes ANR has two locomotive shops. The primary locomotive shop, where heavier repairs can be performed, is located at ANR's North Amarillo Yard. A similar shop designed to perform FRA-required 92-day inspections is located in Guernsey. AEPCO proposes that the two would have the same footprint and general layout, but the Guernsey facility does not

[243] Defendants note that AEPCO specified one indoor and one mainline fueling facility at its Guernsey yard, AEPCO Opening Nar. at III-F-77, III-C-50, but AEPCO's workpapers include costs for only a single fueling platform at that location. AEPCO Opening workpaper "ANR Buildings and Facilities Final.xls," Tab "ANR Locomotive Shops with Yards." As described in Section III.B, defendants have determined that AEPCO would require two mainline platforms and one indoor platform at Guernsey.

include certain equipment needed for heavier repairs. Defendants generally accept the sizing of these facilities and the source for the unit costs. Defendants have determined, however, that certain modifications to the configuration and equipment are necessary. In addition, as described in Section III.B, ANR would require a locomotive shop similar to the Guernsey facility at the El Paso Yard.

Some modifications to AEPCO's locomotive shop design are necessary. AEPCO specifies that each locomotive shop would have only one five-ton crane. Having only one crane would restrict locomotive flow through the shop to only one track for changing components whenever an inspection is necessary. The defendants' engineering experts alter the shop design to include one five-ton crane per track. Costs for the additional cranes, as well as for the additional runways, pedestals and other required items for these cranes, have been added in defendants' restatement of costs for the locomotive shops.

FRA mandated maintenance and inspections are more efficient and effective when locomotives are clean. In addition, a clean working environment promotes efficiency and safety of the maintenance staff. AEPCO provides for a locomotive wash house at both Guernsey and North Amarillo, but provides that only the Guernsey wash house is enclosed. Both wash houses would need to be enclosed in order to permit continued operation during inclement weather.

In addition to the items discussed above, the defendants added the following required items missing from AEPCO's locomotive shop costs:

- Pump House – This building houses pumps for distribution of locomotive lubricating oil, journal oil, air compressor oil, waste oil, radiator water, soap, and toilet chemicals throughout the shop and wash house.

- Pipe Racks – Support structures for the maintenance fluid distribution system

- Storage Tank Containment Structure – Concrete structure enclosing storage tanks holding locomotive lubricating oil, journal oil, air compressor oil, waste oil, soap, and toilet chemicals.

- Wastewater Pretreatment Building – Holds wastewater pretreatment (Dissolved Air Flotation) apparatus and discharge metering equipment.

- Pressure combined sanitary and industrial wastewater sewer line.

Defendants also added costs for tracks outside the shop on which to stage locomotives waiting to enter the shop for maintenance or on which to perform locomotive load tests and concrete walkways so maintenance personnel can access the locomotive.

With respect to the alternative SARRs, ANR-PRB would include the locomotive repair facilities at Guernsey and El Paso. Both facilities would be based on the design of AEPCO's North Amarillo shop and would be capable of performing heavier repairs. ANR-NM would have a single locomotive shop based on the ANR Guernsey shop, which would be capable of performing 92-day inspections and related repairs.

d. Car Repair Shop

Defendants accept AEPCO's car repair shop costs, and do not include costs for freight car repair shops on any of the SARR alternatives.

e. Crew Change Facilities and Yard Offices

Defendants accept AEPCO's design for crew change buildings. Defendants do not accept AEPCO's unit costs. Defendants have used unit costs for these building based on Means. Where crew change and yard office functions could be combined in a single building, defendants have specified a single, somewhat larger building.

f. Maintenance of Way Buildings (Roadway Buildings)

Defendants accept AEPCO's design for maintenance of way buildings, but, as with crew facilities do not accept AEPCO's unit costs. Each MOW facility will require an 8,000 square

foot outdoor fenced storage yard for enclosed security. The area will be gravel-paved to provide a stable surface for storage of track materials and other storage.

g. Wastewater Treatment

Defendants accept AEPCO's proposal for wastewater treatment at its yards.

h. Yard Air and Yard Lighting

Defendants accept AEPCO's assumptions for yard air and lighting.

i. Intermodal Terminals

Given the traffic AEPCO has selected, ANR requires intermodal facilities at the El Paso yard, as described in Section III.B, with the capability to handle 100,000 lifts. AEPCO did not build or cost this facility. Defendants' restatement of costs for the El Paso Yard include the security fencing, two sliding truck gates, two sliding rail gates, high mast light towers and guard booths. This facility would also be required on ANR-PRB.

8. Public Improvements

a. Fences

Defendants accept AEPCO's assumption that fencing is required for all of ANR lines, except for the Campbell Branch where 90% is fenced. Defendants also accept AEPCO's right of way fencing unit costs. Defendants have developed costs for ANR-PRB and ANR-NM fencing on rights of way following the same principles.[244]

Defendants do not accept AEPCO's unit cost of $21.25 per linear foot for fencing of the headquarters and yard facilities. Those facilities would require a six-foot high chain link industrial fence, with two-inch posts at 10 feet on center, set in concrete, using nine gauge wire, galvanized steel, with three strands of barb wire. The Means costs for such fencing is $22.50 per linear foot.

[244] BNSF/UP Reply workpaper "ANR RR Public Improvements.xlsx."

Outlying Maintenance-of-Way (MOW) and signal facilities require security fencing to protect against theft and vandalism of railroad equipment and property. AEPCO did not include fencing costs for either maintenance-of-way buildings or microwave towers. The Railroad's cost estimates for these facilities on all three SARRs include fencing costs using the same specifications as for yard facilities and the headquarters. As described in Section III.F.7 above, maintenance of way facilities will include a fenced area of 8,000 square feet. Microwave towers will require security fencing around the tower base, the microwave building, and the back-up generator. This will entail a securely fenced area of 90 square feet, or approximately 360 linear feet per tower location.

b. Signs and Road Crossing Devices

Defendants accept AEPCO's costs for railroad sign posts, a standard package of railroad signs – including mileposts, whistle posts, yard limit, and cross-buck signs – and the associated costs. Defendants add, however, costs for installation of the Emergency Notification Signs that must be located at all Class 1 railroad at-grade crossings. Specifically, in 1994, following a demonstrated need for an Emergency Notification System among Class 1 railroads, Congress directed the Secretary of Transportation to pursue a pilot program for a toll-free notification system at all at-grade rail/highway crossings. The National Transportation Safety Board, in conjunction with the FRA, recommended implementation of the ENS system among all Class 1 railroads. A key component of this system is two emergency notification signs at each at-grade rail/highway crossing communicating the following information: "1-800 Telephone Number and Grade Crossing Identifier." As of mid-2010, 49 U.S.C. § 20152, as amended by the Rail Safety

Improvement Act of 2008, requires the Secretary of Transportation to make such signs mandatory. All three SARRs would need to comply with this requirement.[245]

c. Grade-Separated and At-Grade Crossings

Defendants accept AEPCO assumption that ANR would pay for all crossing materials and accept AEPCO's unit costs for those materials. Defendants also accept AEPCO's assumption that ANR (and ANR-PRB) would incur all the costs for crossing protection on the Orin, Campbell, Reno, and Boise City Subdivisions. As described in Section III.F.6, defendants do not accept the assumption that ANR would incur no cost for crossing protection on other areas of its network. Costs for these items are discussed in that section.

Grade separated crossings are addressed in Section III.F.5 of defendants' Reply Narrative.

9. Mobilization

AEPCO has added a 2.4% mobilization factor based on the *AEP-Texas* decision for all items where mobilization is not already included in the contractor's bid. The defendants' engineering experts reject the 2.4% factor for mobilization from *AEP-Texas* because the mobilization factor in that decision was built up based on a detailed analysis of the mobilization costs for each major asset category. *AEP Texas North Co. v. BNSF Railway Co.*, STB Docket No. 41191 (Sub-No. 1), slip op. at 103 (served Sept. 7, 2007), AEPCO has not undertaken a comparable detailed study that would support use of the *AEP Texas* mobilization factor in this case. Under these circumstances, defendants believe it is more appropriate to use the more generalized mobilization factor of 3.5% that the Board has approved in *Simplified Standards for Rail Rate Cases*, STB Ex Parte No. 636 (Sub.-No. 1), slip op. at 48 (served Sept. 5, 2007)

[245] Additional ENS signing costs are identified in defendants' workpapers. BNSF/UP Reply workpaper "ENS Construction Costs - By segmentation - Worksheet Support.xlsx."

("Mobilization will be fixed at 3.5% of the cost of road preparation, track, tunnels, bridges and culverts, signals and communications, buildings and facilities, and public improvements.")

10. Engineering

Defendants accept AEPCO's 10% additive for engineering on ANR.

11. Contingencies

Defendants accept AEPCO's 10% contingency factor applied to the construction subtotal, excluding land.

12. Other

a. Construction Time Period

AEPCO has assumed an 80 day track construction schedule utilizing 65 track construction contracts. The number of track construction contracts in each line segment was determined mathematically by dividing the route miles in a line segment by 0.5 miles per day (the rate of track construction) and dividing the result by 26 working days per month to give the number of months required to construct the line segment. The number of months was then divided by three months (approximately 80 days) to give the number of track contracts required to construct the line segment in 80 days. As an example AEPCO calculates that it will take six track construction contracts to build the 232.63 mile Big Horn Subdivision in 80 days.

This method of determining the number of contracts is acceptable where track materials such as cross ties, spikes, tie plates and other track materials can be delivered and distributed by truck from multiple access points. However, for materials that must be delivered by rail (such as rail, ballast, and turnouts) only two access points are available on the Big Horn Subdivision – Jones Junction on the north end and Donkey Creek on the south end. Access from Donkey Creek will not be available until the line segment from Orin to Shawnee Junction with the UP is completed.

The defendants' engineering experts' proposed construction schedule splits the Big Horn Subdivision at Dutch, Wyoming, since (a) access from Donkey Creek is not available until approximately two weeks after the start of construction at Jones Junction and (b) the rail contractor coming from Donkey Creek will turn at Dutch to continue rail laying on the Dutch Subdivision.[246] Based on the track diagrams provided by AEPCO, the distance from Jones Junction to the southerly turnout to the Dutch Subdivision is 134.22 miles. Using the AEPCO rate of track construction of one-half mile per day gives a construction period of 268 days, more than three times the assumed time period of 80 days.

Similar situations exist on other subdivisions. The Carrizozo Subdivision is 227.5 miles long, with rail access available only at El Paso, Texas and Vaughn, New Mexico. The construction period for this subdivision is 228 days, assuming an equal split in the length of the segment.

The Gallup Subdivision from Belen, New Mexico to Defiance, New Mexico is 169.30 miles long, and the Lordsburg Subdivision from Deming, New Mexico to Cochise, Arizona is 146.92 miles long. Splitting these two subdivisions approximately in half results in a construction time period of about 168 days for the Gallup Subdivision, and 158 days for the Lordsburg Subdivision. However, both of these schedules are dependent on rail being shipped from Laurel, Montana and Pueblo, Colorado by a routing of approximately 2,000 miles in order to reach the west ends of the two subdivisions at Defiance, New Mexico and Cochise, Arizona. If construction were to proceed from the east ends only to avoid the circuitous routing, the construction periods become 339 days for the Gallup Subdivision and 294 days for the Lordsburg Subdivision.

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[246] BNSF/UP Reply workpaper "AEPCO Track Construction Schedule.xls," Tab "Track Construction Time Line."

Despite the dramatic increases in the time required, they are actually understated because these construction schedules apply only to the construction of a single main track from the access point to the end of the track segment. Additional time is required to cut turnouts into the main track and construct second main tracks, passing tracks, and set out tracks.

For AEPCO to come close to meeting its proposed construction schedule, it must use outside rail providers and circuitous routing, as discussing in Sections III.F.3.d.i and III.F.3.d.v above.[247] On March 21, 2008, the start date for track construction, only 20 construction contracts will have direct rail access for delivery of materials. That leaves 45 contracts for which all materials would have to be transported by outside rail carrier.

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[247] Alternatively, AEPCO could truck materials to construction locations, but this would cost more. For example, rail could be delivered to the sidings nearest to the construction site. However, the nearest siding could well be 100 to 150 miles away. A trackwork contractor would then assemble the rails, ties, and other track material into 39-foot panels that can be transported on flatbed trailers to the construction site. Once at the work site the panels would be bolted together and the assembled track lined and surfaced.

Turnouts would have to be delivered to the construction sites as kits and assembled in place because turnout panels exceed height limitations on state and federal highway systems.

After consolidating the ballast for two or three days, the track would be given a final surface, and bolted joints would then be field welded to form continuous strings of rail.

To join 39-foot panels, 270 field welds are need per track mile. At the ${ } per field weld unit cost developed in Section III.F.3.B.ii.d.(iii), this would cost ${ } per track mile.

Similarly, the cost of trucking subballast from Wyoming exceeds the cost of shipping by outside rail carrier, despite the circuitous routing required.

III.G: Discounted Cash Flow Analysis

III. G. DISCOUNTED CASH FLOW ANALYSIS

AEPCO's discounted cash flow ("DCF") model strays from the Board's standard DCF application in a number of key respects, the most significant of which are the truncating of the standard discounting of the interest and depreciation tax benefits after year 10 and the improper substitution of the 2008 cost of equity derived from the Board's Capital Asset Pricing Model ("CAPM") in place of the Board-determined 2008 railroad industry cost of equity that is based on a 50/50 mix of the CAPM-based cost of equity and the cost of equity determined using the Board's Multi-Stage Discounted Cash Flow model ("MSDCF"). These and other required corrections to AEPCO's DCF are discussed in this section.

1 Cost of Capital

The Board should reject AEPCO's argument for calculating ANR's 2008 cost of equity using only the cost-of-equity estimate determined by using the CAPM, and not the cost-of-equity estimate determined by using the average of the estimate produced by the CAPM and the MSDCF model.[1] AEPCO's argument is a collateral challenge to the Board's decision to adopt a combined MSDCF-CAPM approach for determining the railroad industry cost of capital.[2]

AEPCO does little to disguise its challenge to the Board's use of the MSDCF approach in cost of capital determinations. AEPCO concludes its attack on the MSDCF model's results for 2008 by asserting. "The MSDCF value is simply not reasonable and should not be utilized for any purpose."[3] But the Board has definitively rejected shippers' claims that the MSDCF approach does not produce results that can reasonably be used in determining the railroad

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[1] AEPCO Opening Nar. at III-G-5 to III-G-15.

[2] *Use of a Multi-Stage Discounted Cash Flow Model in Determining the Railroad Industry's Cost of Capital*, STB Ex Parte No. 664 (Sub-No. 1) (STB served Jan 28, 2009).

[3] AEPCO Opening Nar. at III-G-14.

industry's cost of capital when it adopted the combined MSDCF-CAPM approach.[4] AEPCO now tries to challenge the Board's decision through the back door, by urging the Board to eliminate the MSDCF result from one of the primary uses of the railroad industry's cost of capital in regulatory applications, *i.e.*, its use to determine the permissible rate of return in rate reasonableness cases. The Board has already decided that the use of a combined MSDCF-CAPM approach yields the best estimate of the railroad industry's cost of capital, and AEPCO should not be permitted to challenge that decision in this case.

AEPCO claims that it is not asking the Board to revisit its decision to adopt a combined MSDCF-CAPM approach to calculate the railroad industry's cost of capital. Instead, AEPCO argues that it is only asking the Board to exclude the MSDCF result from the application of the railroad industry's cost of capital to the ANR.[5] But AEPCO cannot have it both ways. It cannot purport to use the railroad industry as a proxy for ANR in estimating ANR's cost of capital but then use something other than the Board's official estimate of the railroad industry cost of capital. Either the railroad industry is a valid proxy for ANR for purposes of estimating ANR's cost of capital, or it is not. If the railroad industry is a valid proxy for ANR, then the only railroad industry cost of capital estimate that the Board could reasonably use is the official estimate produced by the Board. Beginning in 2008, the Board's official estimate is based on a combined MSDCF-CAPM approach.

Indeed, this case presents one of the strongest cases that the Board has seen recently for the use of the railroad industry cost of capital as a proxy for the SARR's cost of capital. Unlike prior rate reasonableness cases where the SARR predominately handled coal, ANR handles a

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[4] *Use of a Multi-Stage Discounted Cash Flow Model*, supra.

[5] AEPCO Opening Nar. at III-G-6.

wide range of products that are carried in the real world by both BNSF and UP. ANR is not just a limited carve out of a real world railroad's coal network but instead is a very large railroad that will be subject to the same economic forces affecting real world railroads.

AEPCO could have tried to develop a SARR-specific cost of capital, as opposed to using the railroad industry as a proxy, but that is not the approach it took. In fact, AEPCO's arguments hint strongly at the reason why AEPCO chose not to pursue that course: it might have produced an even higher estimated cost of equity for ANR than the Board's estimate for the railroad industry.

The centerpiece of AEPCO's argument against the use of the MSDCF model's results in this case is that the MSDCF portion of the railroad industry cost of capital estimate is based on growth assumptions that do not comport with ANR's forecasted growth.[6] However, the MSDCF results depend on both growth in earnings *and* free cash flow. The MSDCF approach seeks to identify the discount rate which, if applied to forecasted cash flows, would equal current stock value. As compared to real-world railroads, ANR would have extremely high free cash flows. AEPCO designed ANR to replicate only the most profitable segments of the real-world defendants and assumed ANR's costs to provide the replicated service would be at levels substantially below the real-world defendants' costs. ANR's higher cash flows would offset, and likely even overwhelm, any difference in earnings growth. AEPCO's attack on growth rates conveniently ignores the initial free cash flow part of the MSDCF calculation.[7] AEPCO also

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[6] AEPCO Opening Nar. at III-G-7 to III-G-11

[7] AEPCO claims that defining ANR's cash flow would be a "speculative exercise." AEPCO Opening Nar. at III-G-7 n.8. However, AEPCO could have derived ANR's cash flows using the revenue and cost data developed in its evidence. Such calculations would be no more speculative than the many other calculations required in a SAC case. For example, AEPCO's opening Table III-H-1 shows revenue overpayments of $937.0 million for 2009. Because the stand-alone costs to which revenues are compared include an allowance for depreciation and

argues that the Board's CAPM results provide a better proxy for ANR's cost of equity because the CAPM approach focuses on risk rather than growth rates.[8] However, if AEPCO had tried to develop an ANR-specific cost of equity based on the CAPM approach, it would have had to address the numerous factors specific to ANR that would make ANR a particularly risky venture for investors as compared to other firms in the economy with which ANR would compete for capital.[9] For example, ANR has no network redundancy in the event of derailment or other calamity that would render an ANR segment inoperable. Similarly, ANR is almost exclusively an overhead carrier, and as an overhead carrier for most of its traffic, the destiny of the railroad would not be within its control. Moreover, ANR would be seeking capital based on construction cost estimates that include extremely low contingencies and engineering estimates for a venture of its size and scope and aggressive engineering schedule.

AEPCO's argument that the CAPM portion of the Board's cost of capital estimate is particularly well suited to the SARR is flawed for another reason as well. AEPCO ignores the Boards' reason for estimating the railroad industry's cost of capital using both the CAPM and

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return on investment, free cash flow for ANR is even higher. $937.0 million is 14.7 percent of total ANR replacement cost shown in AEPCO Opening Nar. at III-F-2, Table III-F-1. The railroad industry initial cash flow in the Board's 2008 MSDCF is only 5.0 percent of market value. AEPCO also asserts that it could not have applied the MSDCF approach to ANR because ANR does not have a stock price. AEPCO Opening Nar. at III-G-7 n.8. However, the MSDCF model can be adapted to run with relative percentages instead of absolute dollar amounts.

[8] AEPCO Opening Nar. at III-G-12.

[9] AEPCO asserts in a footnote that because ANR is "required to yield a sustainable return to enable it to achieve revenue adequacy, the ANR should constitute a less risky enterprise" than other Class I railroads. AEPCO Opening Nar. at III-G-7 n.8. However, this argument makes no sense. ANR is not "required" to produce any specific return. The SAC test estimates the costs and revenues of a hypothetical railroad that serves a group of the defendants' shippers that have the same revenue-generating prospects as the defendants' real-world shippers. The SARR is thus subject to the same cost and revenue uncertainties that would apply to real-world railroads; it has no special guarantee of earning adequate revenues.

MSDCF approaches. As the Board explained, use of an average of the two approaches, each of which looks at different economic factors, "will improve the reliability and stability of our cost-of-equity calculation."[10] The importance of that consideration is particularly apparent in the current economic circumstances, where the substantial drop in equity values in the latter part of 2008 produced a substantial downward movement in the CAPM-based cost of equity estimate. The Board's use of a combined MSDCF-CAPM approach to estimate the railroad industry's cost of capital is expressly intended to smooth out these short-term variations in cost of equity that would result from using only one or the other cost of capital approach.[11] This is an additional reason why it makes no sense to claim that the railroad industry is a valid proxy to use in estimating ANR's cost of capital but then use something other than the Board's official estimate of the railroad industry's cost of capital.

2. Equity Flotation Costs

Until 2007, the Board had rejected arguments by railroad defendants in SAC cases that the costs of raising the equity necessary to finance the construction of the SARR must be included in the SAC cost analysis. The Board's rationale was that there was not sufficient evidence of the "existence and size of equity flotation fees associated with equity issuances of a similar size." *Pub. Serv. Co. of Colo. D/B/A Xcel Energy v. The Burlington N. & Santa Fe. Ry.*, 7 S.T.B. 589, 659 (2004). In 2007 the Board changed its approach. In the SAC case involving AEP Texas, AEP Texas objected to the evidence submitted by BNSF as to the size of an appropriate equity flotation fee and argued that the best evidence of the existence and size of an

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[10] *Use of a Multi-Stage Discounted Cash Flow Model*, slip op. at 14.

[11] AEPCO's claim that the complainants would be entitled to choose the lower of a CAPM or MSDCF-based estimate just confirms that AEPCO's approach is result-oriented and not deserving of serious consideration.

equity financing fee for a major railroad project was set forth in the ICC's railroad industry cost of capital determination for the year 1991, in which the ICC acknowledged that the Burlington Northern Railroad had incurred equity flotation costs of about 3.9 percent in 1991 in connection with the issuance of over 10 million shares of new common stock. *See* Rebuttal Evidence of Complainant AEP Texas North Company in *AEP Texas North Co. v BNSF Railway Co.*, STB Docket No. 41191 (Sub-No. 1), at III-G-4 (filed July 27, 2004). However, AEP Texas argued that the Board should treat that evidence of equity flotation fees in the SAC analysis the same way those fees were treated in the 1991 cost of capital determination, *i.e.*, by spreading the impact of the equity flotation fees across the entire railroad industry. *Id.* The Board agreed with AEP Texas. *See AEP Texas North Co. v. BNSF Ry.*, STB Docket No. 41191 (Sub-No. 1), slip op. at 108 (STB served Sept. 10, 2007) ("*AEP Texas*").

AEPCO ignored the Board's decision in *AEP Texas* and included in its SAC evidence no costs associated with the raising of the financing necessary to construct and operate the ANR. Defendants' reply evidence in this case reflects the Board's conclusion in *AEP Texas* that the 3.9 percent equity flotation costs incurred by Burlington Northern in 1991 provide sufficient evidence of the costs that would be incurred by a new entrant into the railroad market. Defendants agree that the 3.9 percent cost incurred by Burlington Northern in 1991 is a valid real-world estimate of the costs to a SARR to raise equity. However, defendants believe that the Board incorrectly concluded in *AEP Texas* that the cost of that flotation fee should be assessed to the SARR only to the extent the cost was reflected in a hypothetical change to the railroad industry cost of capital in the years in which the SARR needed to raise capital to finance construction of the SARR. For the reasons set out below, defendants urge the Board to include the full 3.9 percent equity flotation fee in this case as a direct cost to the SARR.

The SARR's cost to raise equity is a cost that is borne directly by the SARR, just like other direct costs associated with construction of the SARR. The fee that must be paid to underwriters to raise the necessary financing is no different in kind from the fee that the SARR must pay to its engineers to design the SARR. It is a cost incurred by a new entrant to construct and operate a major railroad project, and it should be reflected in the SAC analysis.

The Board's approach effectively eliminates the impact of the equity flotation costs. In *AEP Texas*, the Board multiplied the flotation cost percentage by the percentage that the SARR's market valuation was of the total railroad industry market value. The Board added this reduced cost to the weighted industry-average cost of equity capital. This approach implicitly assumes that an equity flotation cost is associated only with a small percentage of the railroad industry equity. That assumption is erroneous. Railroads have not recently raised equity but they incurred the flotation costs in the past when they did raise equity. The Board's approach assumes that the SARR can avoid all but a small percentage of the equity flotation costs that real world railroads have, a kind of reverse entry barrier. In 1991, the Burlington Northern incurred equity flotation costs when it raised equity. While the railroad industry cost of capital increased slightly in that year to account for the flotation costs, the Burlington Northern incurred the full extent of the costs itself. By recognizing the SARR's equity flotation costs only to the extent that those costs would be reflected in the railroad industry cost of capital for a year in which the SARR is the only firm that raises equity, the Board is allowing the SARR to avoid responsibility for a cost that real world railroads incur.

In *AEP Texas*, the Board claimed that its approach to equity flotation costs is consistent with its treatment of debt flotation fees. *AEP Texas*, slip op. at 108 But that assertion is not correct. Debt flotation fees are in fact incurred by all railroads as they regularly raise debt

Therefore, the fees that a SARR would incur would be reflected in the debt component of the cost of capital for the railroad industry. In the context of the equity flotation fees, the SARR's costs are diluted because no other member of the industry raised equity in the year when the SARR raised the equity. In the area of debt, the SARR's costs would not be diluted because other railroads incur debt flotation fees in the year in which the SARR is assumed to incur those costs, and the costs are therefore reflected in the railroad industry cost of capital.

3. Inflation Indices

AEPCO used actual AAR cost indices and Global Insight's December 2009 forecasts to calculate annual inflation forecasts. Defendants do not dispute AEPCO's road property asset and operating expense DCF inflation indexes derived from these sources and, consistent with prior Board precedent, update those indices in circumstances where new actual index values have become available. Defendants do however take issue with AEPCO's inflation index for land.

AEPCO computed an annual land inflation forecast of 3.83 percent derived from two sources - the United States Department of Agriculture ("USDA") for agricultural land values and the Bureau of Labor Statistics ("BLS") Consumer Price Index for non-agricultural land. AEPCO made a number of conceptual and implementation errors in its calculations that overstate significantly its land inflation forecasts. Specifically AEPCO:

1. Used as the starting point for its calculations the year 2005, which is well before the bursting of the nationwide real estate bubble.
2. Used 2006 USDA agricultural land index values (although its calculations are labeled as 2009 index values).
3. Weighted the index values by number of acres instead of land values.
4. Used the BLS Consumer Price index as a surrogate for non-agricultural land values when more relevant real estate indexes are readily available.

Each item addressed below:

Year 2005 Starting Point

By developing an index starting with the year 2005, AEPCO effectively circumvents the drop in real estate prices between 2008 and 2009 and predicts instead that real estate prices would increase at an annual average of 3.83 percent from 2005 all the way through 2018. In other words, AEPCO's real estate inflation index assumes that cost of real estate acquired in 2005 would increase over 63 percent by 2018. Not only is this inconsistent with what has actually happened in the real estate market, it contradicts directly the report of AEPCO's own real estate expert, Stuart I. Smith, who explains at page 78 of his report:[12]

> *As 2009 begins, investors are watching the value of their assets decline. Many feel troubled that the ills of the U.S. Economic recession have yet to fully impact the real estate industry. Many believe that the worst is not behind use Preserving asset values is very difficult at a time when the U.S. economy continues to hemorrhage jobs at a monthly paced not seen in over 60 years.*
>
> *Job losses extend across all industries and are causing numerous companies to downsize, consolidate addresses or vanish completely.*
>
> *For commercial real estate, Federal Reserve Economic Research and Data conclude.*
>
> > *The commercial real estate market is going through a correction very similar to that of the housing market. Prices of commercial real estate almost doubled between 2000 and 2007 and have since declined by more than 20 percent. Vacancy rates have increased, the delinquency rate on commercial mortgages has risen, and the pace of construction has slowed to a crawl. Starting in June, commercial-mortgage-backed securities (CMBS), which are an important source of financing in the commercial real estate market, will be eligible collateral under the Federal Reserve's Term Asset-Backed Securities Loan Facility (TALF). Almost no CMBS have been issued in the U.S. since the summer of 2008.*
>
> *For Residential product, the Federal Reserve November 2008 Letter states that:*
>
> > *The bust in the housing markets has, of course, been hitting the economy for some time Although Residential investment accounts for only a small share of overall economic activity, its decline over the past three years has been a major drag on real GDP growth. During this period, housing starts have plummeted and are down by over 30% just in the past year Yet inventories of unsold new and existing homes*

[12] AEPCO Opening workpaper "Land Valuation Report.pdf."

remain at very high levels, especially relative to sales, making it difficult to predict with any confidence when starts will bottom out.

Indeed, the possibility of ongoing contraction in this sector is intensified by the interplay of the economic downturn and the credit crunch.

Along with the decline in construction, house prices have fallen by around 15 to 20% from their peak, depending on which measure you use. [For many markets this "peak" is identified as early to mid-2008.] Unfortunately, this is another case where the bottom is not yet in sight. In view of these factors, it's not surprising that futures contracts for house prices developed by Case and Shiller predict further declines

For farmland, which comprises a considerable percent of the hypothetical right of way, there have been significant changes since mid-year 2008. Lower grain prices and higher costs of production mean lower net revenue per acre which ultimately would imply moderation in land value.

He goes on to conclude on page 79 that:

Based on these trends, MillenniuM Real Estate Advisors concludes that, in general, land values as of January 1, 2008, have retreated from highs in 2007 and 2008. For the most part, commercial, residential and farm land values are lower than they were even a few months ago.

While a good deal of uncertainty exists long term due to the chaotic financial situation, we do not expect to see a continued major drop in values reminiscent of the past 6 months. Weakening conditions and declines in economic activity appear to be likely over the near term. Real estate markets are expected to remain in the doldrums in most areas with only scattered, very tentative signs of stabilized markets being reported. Housing prices are predicted to continue to decline. Demand for commercial, industrial and retail space will likely continue to decline. Continued weakness is anticipated for agricultural producers in various areas of the country. Accordingly, it is our view that these and other factors have had and will continue to have a downward, deleterious impact on land values.

Yet, in the face of these dire predictions by its own expert, AEPCO assumes real estate prices to increase for years to come. Defendants, instead of including all of the real estate gains experienced in the 2005 to 2008 time frame prior to the collapse described by Mr. Smith, restate AEPCO's calculations to start with 2007 and thereby conservatively reflect a modest amount of the price increase between 2007 and 2008 as a more reasonable alternative.

Year 2009 Ending Point

While labeled as 2009 values, the state-specific agricultural index values used by AEPCO actually reflect the 2006 index values and not those from 2009. Even though 2009 index values are higher than those for 2006 for seven of the eight ANR states, defendants have corrected AEPCO's calculations to use the correct 2009 index values.

Indexes Weighted By Acres Instead of Land Values

AEPCO incorrectly weights its index values by acres instead of relative land values. Because the land inflation forecast is applied to land investment values in the DCF model, weighting the index by relative values provides a more precise estimate.

Improper Use of the Bureau of Labor Statistics Consumer Price Index as a Surrogate for Land Values

AEPCO provides no explanation or rational as to why the Consumer Price Index represents the relevant index for ANR non-agricultural land values. The Consumer Price Index ("CPI") is a measure of the average change in prices over time of goods and services purchased by households. AEPCO uses the CPI for All Urban Consumers ("CPI-U") The CPI indexes published by the BLS are based on prices of food, clothing, shelter, and fuels, transportation fares, charges for doctors' and dentists' services, drugs, and other goods and services that people buy for day-to-day living. Thus while the CPI-U does capture costs for shelter, those costs are mixed with a variety of other typical consumer related items. As a result, the effects of price shifts related to changes in real estate prices are diluted by changes in the prices of other consumer goods. In particular, because the CPI-U includes fuel costs, which have fluctuated dramatically over the 2005 through 2009 time frame, the utility of the CPI-U as a predictor of real estate prices is suspect.

Defendants instead substitute for the CPI-U an index developed from data produced by the Massachusetts Institute of Technology ("MIT") to track the price changes for commercial property. Specifically, MIT publishes changes in commercial real estate prices covering the east, south and west United States. An index was created from the MIT percentage price change information for the south and the west, and the average western index values were applied to Colorado, while the average southern index values were applied to Texas.

DCF Inflation Factors

The corrected indexes produce an average 3.92 percent annual decline in real estate values for the 2007 through 2009 period. This percentage change was used in the DCF model to adjust AEPCO's 2009 real estate values back to levels in 2007 – the year the land is assumed to be acquired under AEPCO's proposed investment schedule. Because virtually all of the decline is attributable to the non-agricultural land in Colorado and Texas, and because there is no forecast indicating that prices will continue to decline at that level, the 2009 though 2018 land inflation forecast used by defendants in the DCF is based only on the 2007 to 2009 change in values for agricultural land. The inflation forecast for commercial property is set at zero. This is more optimistic than AEPCO's own expert's forecast which as shown above predicts further declines.

4. Tax Liability

AEPCO's DCF incorporates three errors affecting the calculation of ANR income tax liability. First, as discussed in Section III.H.1.f, AEPCO misapplied the guidelines relative to bonus depreciation and overstated the tax credit associated with that benefit. Second, as also discussed in Section III.H.1.f, AEPCO used the wrong tax life for certain of the ANR road property assets. Third, as discussed in Section III.G.5, AEPCO treated improperly the calculation of the present value of remaining interest and accelerated depreciation tax benefits

beyond year 10 of the DCF. Defendants corrected these shortcomings as explained in the referenced Sections

5. Capital Cost Recovery

AEPCO states that it calculated the capital recover cost of ANR's property using a 10-year DCF period in accordance with the Board's decision in *Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1) (STB served Oct. 30, 2006). AEPCO Opening Nar. at III-G-18. AEPCO's workpapers show that AEPCO performed its calculation by truncating its DCF analysis at 10 years and computing the terminal value as of year 10. AEPCO Opening Narr. at III-H-7. AEPCO's truncation of the DCF analysis at 10 years, rather than at the 20-year mark the Board has consistently used to compute the terminal value using its discounted cash flow model, emphasizes a flaw in the Board's model and produces a significant distorting effect on the DCF results. Defendants correct the flaw in the Board's model, as discussed below.

The Board's DCF model contains a flaw that becomes less pronounced as the analysis period is lengthened. The Board's model is flawed in that it sums the amount of unused depreciation beyond the truncation year and allows the SARR to realize all of the remaining depreciation-related benefits in the truncation year.[13] In fact, depreciation benefits should extend to the 50th year of the DCF's perpetual calculations (because the longest IRS tax depreciation life for railroad assets is 50 years). Thus, when the DCF model is truncated at year 20, the correct approach for realizing the tax benefits generated by the depreciation deduction would be

[13] The year-20 terminal value calculation in the Board's DCF model capitalizes the DCF quarter 80 pre-tax calculated revenue requirement by dividing by the real cost of capital. This, in effect, calculates the present value of the quarter 80 capital requirement assuming it had been indexed for inflation from the fourth quarter of year 20 into perpetuity, and is then discounted back to year 20 fourth quarter levels using the nominal cost of capital. From this capitalized revenue stream the model subtracts the unconsumed tax benefits from depreciation for those assets with lives in excess of 20 years before calculating Federal and state tax liability.

to compute the present value of the remaining depreciation benefit as of year 20 and deduct that amount from the capitalized revenue stream. Calculating the present value of these unused tax benefits is consistent with the treatment of interest and depreciation in the section of the Board's DCF model that computes the present value of the replacement costs of assets into perpetuity as they are projected to wear. Columns G and H of the "Replacement" tab of the model compute the present value of future interest and depreciation payments that are assumed by the model to occur far into the future.

Under the Board's model, truncating the DCF calculation at year 20 produces some distortion to the DCF result by accelerating the availability of depreciation benefits that should only be available after year 20.[14] However, the problem becomes even more pronounced when the model is truncated at year 10. When the model is truncated at year 10, the flawed assumption results in both the remaining depreciation benefit and certain remaining tax deductible interest benefit being realized immediately after year 10.[15] Under AEPCO's calculations, both of these benefits are used to reduce ANR's tax liability at the end of year 10, instead of being spread over a longer period.[16]

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[14] The DCF model also computes a tax benefit for tax deductible interest payments related to the amortization of the SARR's debt. However, because the SARR's debt is amortized over 20 years, the benefit is completely exhausted when the terminal value is calculated after the 20th year, and thus the flaw in the Board's DCF model does not distort this benefit when the model is truncated at year 20.

[15] As explained in note 14, the SARR benefits from a tax deduction for interest payments on its debt that is amortized over 20 years. When the DCF model is truncated after 10 years, the SARR immediately realizes the benefit of the deductions that should have been spread across years 11 through 20.

[16] In its terminal value calculation in this case, AEPCO capitalizes the quarter 40 pre-tax revenue requirement and deducts the sum of the remaining years 11 through 20 debt amortization and the sum of the remaining years 11 through 50 accelerated depreciation, effectively assuming all of those benefits will be realized immediately after year 10, when in fact they will be spread over many years.

Rather than argue that the Board should revert back to the 20-year format previously used in SAC cases,[17] defendants accept AEPCO's proposal to compute the terminal value at the end of year 10, but they also correct the flaw in that calculation that fails to consider the timing of the remaining tax benefits and, as a result overstates the terminal value. The need for this correction can be demonstrated through a simplified example.

Assume a SARR with the following financial profile:

Initial Investment	$1,000,000
PV of Future Investment	$50,000
Total To Be Recovered	$1,050,000
Inflation	3.0%
Cost of Debt	5.0%
Cost of Capital	11.0%
Federal Tax Rate	35.0%
State Tax Rate	5.0%
Debt %	25.0%
Debt Amortization	20
Depreciation:	
20-Year SL	50.0%
50-Year SL	50.0%

[17] The Board could, consistent with use of a 10-year DCF period, continue to use its discounted cash flow model and truncate the calculation at year 20. The DCF period need not be the same as the time period covered by the discounted cash flow model. The period covered by the model, as the Board explained, is perpetuity (hence the need to calculate a "terminal value") The DCF-period is simply the time period over which stand-alone costs are compared to stand-alone revenues to determine if the rates being evaluated are reasonable. *See Major Issues*, slip op. at 65 (explaining that "use of a shorter DCF period does not necessitate the adjustment of how debt is treated, i.e., amortization over the life of the asset versus amortization over the DCF period").

Table III.G.1 below shows the starting revenue requirement and the sum of the present value of the net terminal value calculation when the discounted cash flow model is run with terminal values calculated in different years, but without any consideration of the tax benefits associated with interest or depreciation. The terminal value alternatives evaluated are:

1. Perpetuity – DCF model is run into perpetuity which for purposes of this demonstration is 2,000 quarters or 500 years.

2. 20 Year Post 20 PV – Board's standard 20-year discounted cash flow format, but with conceptual error corrected to account for actual timing of depreciation benefits.

3. 20 Year - Board's standard 20-year discounted cash flow format with no corrections.

4. AEPCO 10 – 10-year format used by AEPCO in this proceeding with conceptual error expanded to include unused interest and depreciation tax benefits for years 11 through 20.

5. 10 Year Post 10 PV – 10-year format used by AEPCO in this proceeding with the conceptual error corrected to match the timing of the tax benefits with the timing of the cash flows.

Table III.G.1

	Starting Revenue Requirement	Post Year 10 Including Terminal Value - Present Value
Perpetual	$31,799	$496,972
20 Year Post 20 PV	$31,799	$496,972
20 Year	$31,799	$496,972
AEPCO 10	$31,799	$496,972
10 Year Post 10 PV	$31,799	$496,972

Source: BNSF/UP Reply workpaper "DCF Period Demonstration - quarterly no interest or depreciation.xlsx."

Table III.G.1 shows that without any consideration for tax benefits from interest or depreciation, the starting revenue requirement for each time format is identical, as is the present value of the net terminal value after year 10

Table III G.2 shows the results of running the exact same models, but this time recognizing the tax benefits of interest and depreciation.

Table III.G.2

	Starting Revenue Requirement	Post Year 10 Including Terminal Value - Present Value
Perpetual	$27,381	$465,591
20 Year Post 20 PV	$27,381	$465,591
20 Year	$27,076	$470,896
AEPCO 10	$25,661	$495,500
10 Year Post 10 PV	$27,381	$465,591

Source: BNSF/UP Reply workpaper "DCF Period Demonstration - quarterly.xlsx."

Table III.G.2 shows that when tax benefits are considered, the starting revenue requirement for the perpetual model and for those variations that correctly match the timing of the tax benefits with the timing of the revenue stream by calculating the present value of the unused tax benefit stream is identical, as is the present value of terminal value after year 10. However the 20 Year and the AEPCO 10 scenario -- which assume all of the tax benefits are consumed at the time of the terminal value calculation - have lower starting revenue requirements and correspondingly higher present value terminal values. This is the direct result of the incorrect overstatement of unused tax benefits and resulting overstatement of the terminal value.

The Atchison, Topeka & Santa Fe Railway noted this conceptual problem with the Board's discounted cash flow model in *Arizona Public Service Company and Pacificorp v. The Atchison, Topeka & Santa Fe Railway Co.*, STB Docket No. 41185 ("*APS*"). In that proceeding, the Board rejected Santa Fe's proposed correction on the grounds that it would require a major

change to its discounted cash flow model by creating the need to project and discount SARR earnings in the post analysis period.

> Santa Fe asserts that we erred by failing to calculate the present value of the unused tax benefits from depreciation that would be available in the post-analysis period. We disagree. If we were to separately discount the stream of annual depreciation allowances in the post-analysis period, which could be used to offset earnings generated after 2013, we would also have to separately project and discount earnings (and annual taxes due on those earnings) that the AGRR would realize in the post-analysis period. However, developing present values for various projected revenue requirements in the post-analysis period would convert our analysis to a perpetual model, which, as we have explained, would be inappropriate.

3 S.T.B. 70, 82-83 (1998).

However, the Board's concern in *APS* was unjustified, and the Board's explanation of the supposed difficulties associated with Santa Fe's proposal was inconsistent with the way the discounted cash flow model actually works.[18] As explained above, the terminal value formula in the Board's discounted cash flow model calculates the present value of the last quarter's capital requirement assuming it had been indexed for inflation into perpetuity, which is then discounted back to the last quarter's level using the nominal cost of capital. In other words, contrary to the Board's explanation in *APS*, the discounted cash flow model *does* project and discount earnings and taxes. It just fails to do so with the unused post-terminal value tax benefits. To demonstrate that the truncated discounted cash flow models does in fact implicitly assume the projecting and discounting of earnings, defendants replicated the terminal value calculation for each of the scenarios analyzed by projecting the revenue stream into perpetuity (assumed for these

[18] Santa Fe's proposed correction may not have been clearly expressed, or the Board may have misunderstood the precise nature of Santa Fe's proposal, as Santa Fe was also arguing in the same case that the Board should abandon the 20-year SAC analysis period in favor of an analysis that required a SARR to be profitable into the indefinite future. *See APS*, 3 S.T.B. at 80-81. As noted above, however, there is no necessary link between the SAC analysis period and the treatment of the truncation year in the discounted cash flow model. *See* note 17, *supra*.

calculations as 500 years) and discounting it back to the last quarter's level. In each instance, the calculation into perpetuity matched exactly the terminal value produced by the Board's formula. Table III.G 3 compares the results for each scenario based on the Board's truncated model and comparable calculations run into perpetuity.

Table III.G.3

	Truncated Model		Perpetual Run Verification	
	Starting Revenue Requirement	Post Year 10 Including Terminal Value - Present Value	Starting Revenue Requirement	Post Year 10 Including Terminal Value - Present Value
Perpetual	N/A	N/A	$27,381	$465,591
20 Year Post 20 PV	$27,381	$465,591	$27,381	$465,591
20 Year	$27,076	$470,896	$27,076	$470,896
AEPCO 10	$25,661	$495,500	$25,661	$495,500
10 Year Post 10 PV	$27,381	$465,591	$27,381	$465,591

Source: BNSF/UP Reply workpaper "DCF Period Demonstration – quarterly.xlsx."

In each case, the perpetual run verification matched exactly the results of the truncated model. In sum, defendants' proposed correction to the Board's discounted cash flow model's treatment of remaining depreciation benefits and tax deductible interest benefits in the model's terminal value calculation is consistent with the model's approach to other issues and merely corrects an error in the model's treatment of unused post-terminal value tax benefits.

6. Positive Train Control

Also, as discussed in Section III.C, AEPCO's Opening Evidence excluded any investment costs associated with federally-mandated positive train control ("PTC") systems. Defendants have added those costs that ANR will incur to its Reply DCF and assumed that those expenditures will be made in the year 2015. Because those investments will be made after ANR begins operations, defendants expanded the ANR DCF model to accommodate a separate capital

recovery stream for PTC investment assuming expenditures are made in the first three quarters of 2015 and the PTC investment is placed into service the fourth quarter of 2015.

III. H. RESULTS OF SAC DCF ANALYSIS

1. Results of SAC DCF Analysis

AEPCO deployed a variation of the Board's DCF model to develop the capital recovery and operating expense related revenue requirements. Certain of the problems with AEPCO's model were discussed in Section III.G. There are other problems with AEPCO's DCF inputs and assumptions that could also fall under the Section III.G Discounted Cash Flow Analysis purview; however, because AEPCO discussed these other issues under Section III.H Stand Alone Cost, defendants address them in Section III.H as well. The DCF implementation problems discussed under Section III.H include AEPCO's misapplication of bonus depreciation to ANR assets and its use of the wrong tax depreciation lives for certain of the ANR road property assets. Defendants' corrected DCF analyses are set out in Exhibits III.H-1 for ANR-PRB, and III.H-2, for ANR-NM.

a. Cost of Capital

As discussed above in Section III.G, AEPCO incorrectly used only the CAPM-derived component of the Board's 2008 railroad cost of equity component and failed to include equity floatation costs, which defendants corrected. The cost of capital figures used by defendants in their reply are set forth in Table A of Exhibits III.H-1 and 2.

b. Road Property Investment Values

The calculations for road property investment values are detailed in Table C of Exhibits III.H-1 and 2. Defendants replaced AEPCO's the road property investments with those specified in Section III.F. Defendants accept AEPCO's ANR proposed construction schedule.

For land investments, AEPCO's land valuation witness estimated 2009 land values and discounted those values back to the ANR construction period using an index that does not

capture properly the recent decline in real estate values. As explained in Section III.G, defendants corrected the index to reflect properly the change in land values over that time period.

c. Interest During Construction

The interest during construction ("IDC") was calculated on construction funds outstanding during 2006, 2007 and 2008 using the same methodology as AEPCO. Interest during construction for Positive Train Control ("PTC") investments is calculated assuming investment occurs in equal increments throughout 2015.

d. Amortization Schedule of Assets Purchased with Debt Capital

Defendants accept AEPCO's debt amortization schedules for road property assets assumed to be placed into service on both January 1, 2009, and January 1, 2012.

Because PTC investments are expected to be made in 2015, defendants created a separate debt amortization table for the debt portion of that investment, using a 20-year term and ANR's cost of debt for 2015.

e. Present Value of Replacement Cost

Defendants accept AEPCO's calculation of the replacement cost of ANR assets.

Defendants created a separate replacement cost worksheet for PTC investments that uses the composite cost of capital. The initial investments are in 2015 dollars so that the replacement cost calculations reflect the later implementation date for the investment.

f. Tax Depreciation Schedules

AEPCO's tax depreciation schedules contain two errors. The more significant of the two errors relates to AEPCO's assumptions regarding the applicability of bonus depreciation to the ANR investment assets. In its opening evidence, AEPCO assumes that ANR will take advantage of additional or "bonus" depreciation provisions enacted in 2008 and 2009 as part of federal economic stimulus legislation. The Economic Stimulus Act of 2008 ("Stimulus Act") provided

bonus depreciation on capital investments with Modified Accelerated Cost Recovery System ("MACRS") recovery periods of 20 years or less. The American Reinvestment and Recovery Act ("ARRA") extended this bonus depreciation into 2009. Under both the Stimulus Act and the ARRA, qualifying investments are allowed a 50 percent depreciation bonus in the year that they are placed into service. Tax depreciation for the remaining 50 percent of the cost, or the remaining cost basis, is calculated using the standard MACRS schedules. In applying the bonus depreciation to ANR assets, AEPCO assumes that because the DCF model is predicated upon all assets being placed into service in the first year of the 10-year DCF period, the majority of ANR's investment qualifies for the bonus depreciation. However, this assumption is incorrect.

The standard for qualifying for bonus depreciation is not (as AEPCO asserts) when an asset is placed in service, but rather when the asset is acquired.

IRS rules clearly specify that assets acquired in 2006 and 2007 do not qualify.

> "Certain qualified property (defined below) acquired after December 31, 2007 is eligible for a 50% special depreciation allowance. If a binding contract to acquire the property existed before January 1, 2008, the property does not qualify." (2009 IRS Form 4562, page 4).[1]

Because ANR is scheduled to be built over three years, many of the assets are assumed within the DCF to be acquired prior to the January 1, 2008 qualification date. AEPCO ignored this restriction on prior year purchases and included over $1.2 billion in investments from 2006 and 2007, which overstates the year one 2009 bonus depreciation by $600 million. This overstated depreciation contributes to an enormous tax carry forward in the first several years of AEPCO's ANR. Defendants corrected this error and only allowed 2008 investments purchased on or after January 1, 2008 to be eligible for the bonus depreciation.

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[1] BNSF/UP Reply workpaper "IRS Form 4562.pdf."

The second error relates to the tax depreciation schedules for certain accounts assumed by AEPCO to qualify for 15-year lives when, under IRS rules, they actually qualify as 20-year properties. Internal Revenue Code § 168(e) specifies the rules for the classification of property for purposes of computing the cost recovery allowance provided by the MACRS. Property is classified according to class life as determined in Revenue Procedure 87-56 unless statutorily classified otherwise in § 168.[2] There are no exceptions to this rule. The following assets are specifically listed under asset class 40.2, each carrying a 20-year tax life.

- Account 6 - Bridge & Trestles
- Account 13 - Fences & Roadway Signs
- Account 17 - Roadway Buildings
- Account 19 - Fuel Stations
- Account 20 - Shops & Enginehouses
- Account 39 - Public Improvements

For each of these asset categories, defendants changed the depreciation period from 15 years to 20 years and updated the depreciation percentages to comply with the proper 20-year MACRS table.

g. Average Annual Inflation in Asset Prices

Defendants accept AEPCO's inflation assumptions for assets other than land, as discussed above. Consistent with Board precedent, defendants updated the AAR and RCAF indexes used by AEPCO as more recent indexes became available.

h. Discounted Cash Flow

As explained in detail above in Section III.G.4, defendants accept AEPCO proposal to calculate the terminal value after year 10, but they correct the calculation to capture properly the timing of the use of the tax benefits beyond year 10. Defendants include a separate discounted cash flow for PTC investments. These levelized capital carrying charge requirements are added

[2] BNSF/UP Reply workpaper "IRC 168.pdf."

to the ANR's SAC requirements in years 2015-2018 in the Netting tab of BNSF/UP Reply Exhibits III-H-1 through 3.

i. Computation of Tax Liability – Taxable Income

Defendants accept AEPCO's assumed federal tax rate of 35%. For state taxes, AEPCO calculated a composite rate based on the number of miles of track in each state. Defendants accept AEPCO's calculation of the composite state tax rate.

As elsewhere, defendants include a separate table for PTC.

j. Operating Expenses

Defendants updated the base year operating expenses as detailed in Section III.D. For the annual adjustment of operating expenses, AEPCO used ton miles instead of the Board's standard use of tons to more accurately account for the mix of traffic on ANR. Defendants accept AEPCO's use of ton miles and update the calculations in the DCF using the updated and corrected ton miles from Section III.A.2. In a change from prior Board precedent, AEPCO applied its ton mile adjustment to maintenance of way expenses. Because maintenance of way expenses are developed on a normalized basis over the 10-year DCF period, they reflect the average personnel and maintenance expenditures over that time span. There is no need to index these costs.

k. Summary of SAC Analysis

Defendants' stand-alone costs and revenues for ANR-PRB are presented in Table L of Exhibit III.H-1 on a quarterly and annual basis. Defendants' stand-alone costs and revenues for ANR-NM are presented in Table L of Exhibit III.H-2.[3] Capital investments for road property

[3] Defendants do not believe, for reasons set out elsewhere, that AEPCO's configuration of ANR provides a valid basis for carrying out the SAC analysis of the Wyoming/Montana and New Mexico issue traffic rates. Nevertheless, the results of defendants' corrections of AEPCO's

and PTC are from Table I and annual operating expenses are from Table K. As shown in those Exhibits, stand-alone costs exceed stand-alone revenues for ANR-PRB. For ANR-NM, SAC revenues exceed SAC costs. However, ANR-NM contains a relatively low density north-south line segment from Rincon to Belen. Defendants therefore carried out an internal cross-subsidy analysis to determine whether there were sufficient revenues available to ANR-NM to cover the costs of that line segment.[4]

The Board's threshold internal cross-subsidy analysis is designed to ensure that a shipper does not prevail in a SAC case by relying on a SAC presentation that creates a cross-subsidy in favor of the issue traffic. As the Board has explained, a shipper cannot "prove an impermissible cross-subsidy by shifting 'responsibility for paying for facilities it uses to other shippers who do not benefit from those facilities.'" *Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071, slip op. at 24 (STB served Jan. 25, 2006) (quoting *PPL Montana, LLC v. Burlington N. & Santa Fe Ry.*, 6 S.T.B. 752, 757-78 (2003)).

In this case, the Board's threshold internal cross-subsidy analysis reveals that ANR-NM relies on traffic that uses only parts of the SARR (traffic using the east-west transcontinental lines) to pay for other parts needed to serve AEPCO. In other words, the evidence shows that "the revenues from traffic using one part of [those] system[s] are less than the costs attributable to that traffic." *Id.*, slip op. at 24. Application of the Board's threshold internal cross-subsidy

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SAC evidence, as applied to AEPCO's ANR, are set out in BNSF/UP Reply workpaper "AEPCO ANR DCF.xlsx."

[4] ANR-PRB also contains a relatively light density line segment from El Paso, Texas, to Stratford, Texas. While defendants have shown that SARR costs exceed SAC revenues for ANR-PRB, and therefore there is no need to carry out an additional cross-subsidy analysis of portions of ANR-PRB, defendants present in BNSF/UP Reply workpaper "ANR-PRB CROSS SUB.xlsx" the results of an internal cross-subsidy test on the El Paso-Stratford segment showing that the revenue shortfall on that portion of the SARR are even greater than the overall revenue shortfall.

analysis therefore explains why AEPCO sought to reroute the New Mexico issue traffic over a longer, less efficient route through Vaughn and El Paso, rather than use the actual route between Belen and Deming: ANR-NM relies on the vast quantities of BNSF and UP intermodal traffic that would use only the east-west parts of the system to pay for the infrastructure needed on the north-south part of the system between Belen and Deming. ANR-NM's reliance on traffic using the east-west segments to pay for the north-south segment is suggested by the dramatic imbalance in tonnage and revenue associated with those different segments of ANR-NM. The north-south segment is 147.44 miles long, or 39% of the ANR-NM route,[5] but only 3% of ANR-NM traffic, accounting for only 9% of ANR-NM revenue, uses those portions of the route.[6]

Defendants' cross-subsidy analysis applied the procedures and assumptions that the Board used in *Otter Tail*. Defendants first estimated the road-property investment that is attributable to the north-south part of ANR-NM, which includes the infrastructure from Belen to Deming, but not any of the yard facilities at Belen or Deming.[7] Defendants then estimated the portion of each operating expense category that should be attributed to the north-south part, using a bottom-up approach to calculate direct operating expenses,[8] and an URCS-based approach to calculate indirect operating expenses,[9] just as the Board did in *Otter Tail* (without any further refinements to the Board's approach). *See Otter Tail*, slip op. at 25-29. Finally,

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[5] *See* Section III.B, Table III.B.2.

[6] BNSF/UP Reply workpapers "Exhibit III-A-2 Reply.xlsx" and "Exhibit III-A-3 Reply.xlsx."

[7] Defendants assume ANR-NM will use trackage rights between Rincon and Deming, so they do not construct that segment.

[8] BNSF/UP Reply workpaper "ANR Operating Expense RR Reply.xlsx."

[9] BNSF/UP Reply workpaper "Reply Exhibit III-H-3 tab Operating Expense."

defendants performed a DCF analysis for the north-south part, which shows that the revenues they are expected to earn from the traffic using the north-south part are less than the stand-alone costs attributable to that traffic for each year from 2009 through 2018, and cumulatively for the entire 10-year SAC analysis period.[10] The results of this analysis are set out in Exhibit III.H-3.

Defendants' cross-subsidy analysis demonstrates that ANR-NM relies on improper cross-subsidization of the traffic on the north-south part, which includes AEPCO's own traffic. Thus, AEPCO cannot demonstrate, using a properly configured sub-SARR, that it is paying more than would be necessary for efficient service or is cross-subsidizing other parts of the defendants' networks. Its complaint should therefore be dismissed.

2. Maximum Rate Calculations

AEPCO's SAC presentation raises an important issue with respect to the Board's MMM methodology for determining maximum reasonable rates in cases where SAC revenues exceed SAC costs. This issue does not need to be addressed if the Board carries out the SAC analysis based on ANR-PRB and ANR-NM SARR configurations. As explained previously, the challenged rates do not exceed reasonable maximum rates when those rates are evaluated based on properly configured SARRs. In the case of ANR-PRB, the revenues available to the SARR are not sufficient to cover the full SAC costs of the SARR. In the case of ANR-NM, the revenues available to the SARR are not sufficient to cover the north-south portion of ANR-NM that is needed to provide the issue traffic service. Therefore, the rates charged for the issue traffic service in both cases are not being used to cross-subsidize other shippers on defendants' railroads.

[10] BNSF/UP Reply workpaper "Reply Exhibit III-H-3 tab Summary."

If the Board carries out a SAC analysis based on the ANR as configured by AEPCO, defendants urge the Board to modify its application of MMM. MMM was developed based on the Board's experience in cases where the SARR traffic was dominated by a single traffic group – coal – and where there was only one defendant. But as explained below, MMM produces arbitrary and inappropriate results in a case such as this involving multiple defendants and multiple traffic groups.

In *Western Fuels Association, Inc. and Basin Electric Power Cooperative v. BNSF Railway Co.*, STB Docket No. 42088, slip op. at 5 (STB served Feb. 18, 2009), the Board indicated that a party seeking to modify application of MMM in a particular case must show "material error, new evidence or substantially changed circumstances" in order to have the modification considered in the context of an adjudication. Defendants present new evidence showing that the application of MMM in multi-defendant cases involving multiple traffic groups produces inappropriate results. This new evidence is sufficient to justify a modification to MMM in this case if the Board carries out the SAC analysis based on the ANR as posited by AEPCO.

To understand the problem with MMM as applied in this case, it is necessary to consider the objective of MMM. The Board developed the MMM methodology to "allocate the total SAC costs among all of the movements in the traffic group to determine if the challenged rate is unreasonably high, and if so by how much." *Major Issues in Rail Rate Cases*, STB Ex Parte No. 657 (Sub-No. 1), slip op. at 9 (STB served Oct. 30, 2006) ("*Major Issues*"). The allocation of SAC costs is based on each movement's "relative share of service provided, as measured by URCS variable costs." *Id.* at 14. MMM calculates a maximum revenue-to-variable cost ratio

that limits the contribution from any single movement to a prescribed ratio based on each movement's "share of service provided."

Logically, each movement's share of service provided should be based on the SARR's costs because MMM is allocating the costs of service provided by the SARR. But the SARR's costs cannot be known until the Board has resolved evidentiary disputes over costs. It is presumably for this reason that MMM as formulated by the Board uses the defendant's URCS to determine the "share of service provided" to each movement on the SARR. As the Board noted in *Major Issues*, this made the application of MMM a relatively simple task. And in the context of single defendant and single commodity cases, this use of the defendant's costs as a proxy for SARR costs may have accomplished with reasonable accuracy what the Board set out to do with MMM – allocate SAC costs based on the relative amount of service provided by the SARR, as reflected in the variable costs of the movement. But when the SAC analysis is extended to multiple defendants and includes multiple traffic groups, the use of the defendants' URCS costs as the basis for the MMM calculation no longer identifies with any reasonable degree of accuracy the relative "share of service provided" by the SARR to individual movements on the SARR or groups of movements.

A defendant's URCS costs for a particular movement are clearly different from a SARR's variable costs for that movement since the SARR has a different cost structure than the real world defendant. But in a single defendant case with a single commodity, the differences between the defendant's cost structure and the SARR's cost structure may not substantially distort the assessment of each movement's relative "share of service provided" by the SARR under MMM. The relationship between the defendant's cost structure for a movement and the SARR's cost structure is likely to be relatively constant across all movements. Thus, while the

SARR's costs may be lower than the defendant's costs, the *relative* costs of the different movements on the SARR may not be substantially affected by using the SARR's costs or the defendant's costs.

But in a multi-defendant case, use of the defendants' URCS costs is no longer a valid proxy for the SARR's cost. The two defendants have different cost structures, and each defendant's cost structure is different from that of the SARR.[11] It is no longer reasonable to assume that the relative costs would remain the same if the defendants' costs are used instead of the SARR's costs. If one of the defendants has a higher cost structure than the other defendant, then movements on the higher cost defendant would consistently be assigned a higher "share of services provided" by the SARR.

The discrepancy between SARR costs and the defendants' URCS costs becomes particularly acute when the SARR also carries multiple traffic groups, as in the current case. The defendants' URCS costs cannot be used as a proxy for the SARR's costs when multiple traffic groups are included in the SARR and where the nature of the service provided by the SARR is different across the different traffic groups. AEPCO's ANR provides a clear example of the distortions created under these circumstances. ANR originates almost all of the coal handled by BNSF and provides a substantial portion of the through movement for a number of those coal movements. In contrast, the intermodal and merchandise traffic is handled by the SARR almost exclusively as "hook and haul" overhead traffic on high-density line segments carved out of the defendants' real world networks. But the URCS costs for each defendant allocate to the SARR's traffic a homogenized cost that reflects the composite characteristics of all traffic moving across

[11] *See Simplified Standards for Rail Rate Cases*, STB Ex Parte No. 646 (Sub-No. 1), slip op. at 82 (STB served Sept. 5, 2007) ("We will exclude non-defendant traffic from the comparison group because R/VC ratios of one carrier cannot fairly be compared with R/VC ratios charged by another railroad.").

all of the carriers' lines. For example, the defendants' system average URCS costs reflect, among other things, the real world operation of local and way trains used by the defendants to originate, aggregate, disseminate and deliver merchandise traffic. That service is a far cry from the highly efficient hook and haul nature of ANR merchandise traffic operations. Similarly, the defendants' URCS intermodal costs allocate to ANR traffic a pro rata share of costs associated with intermodal train delays typically encountered by the defendants when entering or exiting major intermodal terminal areas even though ANR's intermodal trains are assumed to whisk across the desert with little delay. Because the defendants' real-world URCS costs reflect defendants' relatively less efficient operations as well as their more efficient operations, applying those costs to the SARR's highly efficient intermodal and merchandise traffic distorts the assessment of the relative "share of services" provided by the SARR.

It is possible to avoid the distortions that result from using the defendants' URCS costs to assess the relative costs of traffic in a multi-defendant, multi-traffic SARR by directly using the SARR's costs in the MMM calculations. It is not complicated to develop an URCS for the SARR itself. Using the SARR's URCS costs instead of the defendants' URCS costs in MMM bypasses the use of a proxy for the SARR's costs and implements MMM in a way that is consistent with its conceptual underpinnings and that produces more accurate results in a multi-defendant, multi-traffic group case.

The SARR's URCS costs must be developed based on the SARR's costs after the Board resolves disputes among the parties on individual cost items. Therefore, it is not possible to develop a final URCS for ANR in this case at this time. However, to illustrate how ANR's URCS costs would be developed if the Board decides to carry out the MMM analysis based on ANR as posited by AEPCO, defendants have prepared an ANR URCS based on the costs as

posited by AEPCO on opening. The calculations and assumptions used to produce ANR's URCS costs are set out in BNSF/UP Reply workpaper "ANR URCS Development.doc."

Table III.H.1 below compares the total variable costs for the coal movements on ANR, UP's non-coal movements on ANR, and BNSF's non-coal movements on ANR as calculated using the defendants' URCS and as calculated using ANR's URCS costs. As seen in Table III.H.1, ANR's total variable costs are lower than the variable costs of ANR traffic calculated using the defendants' URCS, and the variable costs for each traffic group are also lower when ANR's URCS costs are used. However, the differences between the defendants' URCS-based costs and ANR's URCS-based costs vary substantially among the traffic groups. The variable costs of ANR's coal traffic as calculated using ANR's variable costs are only 16.6 percent lower than the variable costs of that traffic using the defendants' URCS costs, while the variable costs of the UP non-coal traffic, for example, are 36.3 percent lower. It is clear that a much larger portion of ANR's variable costs are associated with coal traffic than would appear to be the case when the defendants' URCS are used. This is important because it indicates that coal traffic should be allocated a much larger share of ANR's SAC costs.

Table III.H.1
Comparison of Relative URCS Cost Attributable to Major ANR Traffic Groups

	BNSF & UP URCS VC	ANR URCS VC	Percentage Difference
Coal	$699	$583	(16.6%)
UP Non-Coal	311	198	(36.3%)
BNSF Non-Coal	677	432	(36.2%)

All figures in millions (except percentages)

Table III.H.2 shows the impact of these differences in variable cost calculations on the MMM results. Mr. Baranowski ran MMM on the ANR traffic to allocate the SAC costs of ANR,

using AEPCO's SAC assumptions, to the different traffic groups. Mr. Baranowski made the MMM calculations using both the defendants' URCS costs and ANR's URCS costs. As shown in Table III.H.2, when MMM is run with ANR's costs, coal traffic is allocated a much larger portion of the SAC costs. Since coal receives a much larger "share of the services provided" by ANR when the cost calculations are done correctly, coal traffic is allocated a much larger share of the SAC costs.

Table III.H.2
Comparison of SARR Revenue Allocation Under BNSF & UP URCS versus ANR URCS

	Allocation of SAC Based on BNSF & UP URCS VC	Allocation of SAC Based on ANR URCS VC	Percent Under-Allocation / (Over-Allocation)
Coal	$524	598	14.1%
UP Non-Coal	222	199	(10.4%)
BNSF Non-Coal	.504	454	(9.9%)

All figures in millions (except percentages)

Table III.H.3 compares the total variable costs for each issue traffic movement (2009) when the BNSF and UP URCS and the ANR URCS are used to determine variable costs.

Table III.H.3
Comparison of Relative URCS Cost Attributable to Issue Traffic

Origin (based on MMM)	BNSF & UP URCS VC 1/	ANR URCS VC	Percentage Difference
Decker MT	$1,025	$907	(11.5%)
Lee Ranch NM	7,397	6,446	(12.9%)
El Segundo NM	1,707	1,488	(12.8%)
Total	$10,129	$8,841	(12.7%)

1/ Updated to use ANR miles
All figures in thousands (except percentages)

Table III.H.4 shows that MMM substantially understates the relative "share of services provided" by the SARR to the issue traffic when the defendants' URCS costs are used to determine variable costs. Mr. Baranowski ran MMM to determine the maximum revenues that could be contributed by the issue traffic where the defendants' URCS costs are used to allocate the SAC requirement and where ANR's URCS costs are used to make the cost allocation. The use of defendants' URCS costs produces highly inaccurate results.

Table III.H.4
Comparison of SARR Revenue Allocation to Issue Traffic
Under BNSF & UP URCS versus ANR URCS

Origin (based on MMM)	Allocation of SAC Based on BNSF & UP URCS VC	Allocation of SAC Based on ANR URCS VC	Percent Under-Allocation / (Over-Allocation)
Decker MT	$740	$957	29.3%
Lee Ranch NM	4,341	6,799	56.6%
El Segundo NM	998	1,568	57.1%
Total	$6,080	$9,324	53.4%

All figures in thousands (except percentages)

Table III.H.5 compares the maximum MMM-based R/VC ratios produced when the SAC allocation is done using defendants' URCS costs and using ANR's URCS costs. The maximum R/VC ratios in Table III.H.5 are determined by taking the allocation of SAC costs to each issue traffic movement based on BNSF and UP URCS costs and based on ANR's URCS costs (Table III.H.4) and then dividing the SAC allocation by the defendants' URCS variable costs. This allows the MMM rate prescription to be expressed as revenue-to-variable cost ratio using the defendants' URCS costs that can be converted into specific rates per ton over the rate prescription period based on changes in URCS costs over the rate prescription period.

Table III.H.5

Origin (based on MMM)	Revenue Per Ton	BNSF & UP URCS VC Per Ton	MMM Prescribed R/VC Based on Allocation of SAC with AEPCO URCS VC	MMM Prescribed R/VC Based on Allocation of SAC with ANR URCS VC	Percentage increase in prescribed R/VC
Decker MT	$42.03	$17.56	75.7	105.5	39%
El Segundo NM	13.94	6.04	75.7	105.5	39%
Lee Ranch NM	14.78	6.13	75.7	105.5	39%

Table III.H.5 shows that the use of ANR's costs in the MMM calculation produces radically different results in a case like this where there are multiple defendants and multiple traffic groups. However, the results set out in Table III.H.5 are illustrative only. The MMM calculations would have to be made after the Board resolves outstanding disputes over SAC costs, which will affect not only the total SAC costs but also ANR's URCS costs used to allocate SAC costs.

In addition, if the Board carries out the SAC analysis in this case based on ANR as posited by AEPCO, the Board would have to conduct a cross-subsidy analysis to determine whether the revenues generated by traffic using the Vaughn-El Paso segment cover the costs of that segment. If the cross-subsidy analysis showed that ANR traffic using the Vaughn-El Paso segment did not generate revenues sufficient to cover the full cost of that segment, the Board would have to conclude that the challenged New Mexico and PRB issue traffic rates are not unreasonable because they are not being used to cross-subsidize any other traffic – they do not even generate revenue sufficient to cover the costs of the facilities they use.

Even if the cross-subsidy analysis were to show that ANR traffic using the Vaughn-El Paso segment generated revenue sufficient to cover the full costs of that segment before any rate reduction was assumed, the Board would have to ensure that any rate reduction produced using

MMM does not reduce rates to levels that are insufficient to cover the costs of the Vaughn-El Paso segment. As the Board stated in *Otter Tail Power Co. v. BNSF Ry.*, STB Docket No. 42071, slip op. at 11 (STB served Jan. 27, 2006), "our *PPL* cross-subsidy analysis serves as both a threshold inquiry and a limit on potential rate relief." To ensure that rates are not driven down below the level that would be required to cover the costs of the Vaughn-El Paso, it would be necessary to apply the MMM methodology (corrected to use ANR's URCS costs) to allocate the costs of the Vaughn-El Paso segment to the users of that segment, including the issue traffic. BNSF/UP Reply ANR-URCS and MMM application work papers show how this calculation would have to be made.

In addition, if the Board were to conduct any analyses on ANR as proposed by AEPCO, the URCS costs for the issue traffic should be based on the SARR rerouted miles for both the MMM allocation process and any resulting rate prescriptions. See Section I.B.5 above.

IV: Witness Qualifications

MICHAEL R. BARANOWSKI

Mr. Baranowski is a Senior Managing Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. Since 1980, Mr. Baranowski has been involved in various aspects of transportation analysis including operations, engineering, facility requirements, valuations and costing.

Mr. Baranowski holds a Bachelor of Science degree in accounting from Fairfield University in Fairfield, Connecticut. In 1980, he joined the consulting firm of Wyer, Dick and Company in Livingston, New Jersey as a consultant. He participated in a variety of studies for railroad, shipper and other clients including line abandonments, operations analysis, terminal switching studies, labor protection and rail facility and equipment valuation.

In late 1981, Mr. Baranowski became a consultant with Snavely, King and Associates with offices in Morristown, New Jersey and Washington, D.C. While at Snavely, King, he was involved in rail merger, traffic, switching, liquidation and valuation studies for a variety of rail and rail related clients. He was also responsible for engineering, operating and costing components in a number of Section 229 proceedings.

Mr. Baranowski joined Klick, Kent & Allen ("KK&A") in 1988 as a Senior Consultant. He became a principal of KK&A in 1989 and remained in that position until its acquisition by FTI in 1998.

Mr. Baranowski has presented testimony before the Interstate Commerce Commission, Surface Transportation Board, Federal Communications Commission, Federal Regulatory Commission and a variety of state regulatory agencies. Mr. Baranowski's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Baranowski is sponsoring Sections III.G and III.H of defendants' Reply Evidence. 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 7, 2010

Michael R. Baranowski

Michael R. Baranowski

Senior Managing Director - Economic Consulting

mike.baranowski@fticonsulting.com

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Washington DC 20005
Tel (202) 312-9100
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Education
B.S. in Accounting, Fairfield University

Supplemental Finance Studies, Kean College

Mike Baranowski provides financial and economic consulting services to the telecommunications and transportation industries. He has special expertise in analyzing and developing complex computer costing models, operations analysis, and transportation engineering. Much of his work involves providing oral and written expert testimony before courts and regulatory bodies.

Some of Mr. Baranowski's representative accomplishments include:

- Overseeing the development of computer cost modeling tools designed to simulate the cost of competive entry into local telecommunications markets and directing the efforts of a nationwide team of testifying experts presenting the cost model results in multiple proceedings across the country.
- Directing the analysis, critique and restatement of a variety of complex cost models developed by major telecommunications companies designed to simulate the forward-looking cost of competitive entry into local telecommunications markets.
- Designing multiple PC-based spreadsheet models for use in calculating the stand-alone cost of competitive entry into the railroad and pipeline markets. These models have been used to assist clients in all three network industries in making internal pricing decisions that are in compliance with governing regulatory standards.
- Conducting detailed analyses of railroad operations and developing the associated capital requirements and operating expenses attributable to specific movements and the incremental capital and operating expense requirements attributable to major changes in anticipated traffic levels.
- Calculating marginal and incremental costs for a major petroleum products pipeline company, an approach that is now used regularly by the company in making internal day-to-day pricing decisions.

Mr. Baranowski holds a B S. in Accounting from Fairfield University in Fairfield, Connecticut and has pursued supplemental finance studies at Kean College in Union, New Jersey.

TELECOMMUNICATIONS TESTIMONY

Federal Communications Commission

February 1998	File No. E-98-05. AT&T Corp. v. Bell Atlantic Corp. Affidavit of Michael R. Baranowski
March 13, 1998	File No. E-98-05. AT&T Corp. v. Bell Atlantic Corp. Supplemental Affidavit of Michael R. Baranowski.
June 10, 1999	CC Docket No. 96-98. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996. Reply Affidavit of Michael R. Baranowski, John C. Klick and Brian F Pitkin.

July 25, 2001	CC Docket No. 00-251, 00-218. In the Matter of Petition of AT&T Communications of Virginia, Inc. and WorldCom, Inc., Pursuant to Section 252(e)(5) of the Communications Act, for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon-Virginia, Inc. Panel
June 13, 2005	WC Docket No. 05-25;RM-10593. In the Matter of Special Access Rates for Price Cap Local Exchange Carriers; AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, Joint Declaration on Behalf of SBC Communications, Inc.
July 29, 2005	WC Docket No. 05-25;RM-10593. In the Matter of Special Access Rates for Price Cap Local Exchange Carriers; AT&T Corp. Petition for Rulemaking to Reform Regulation of Incumbent Local Exchange Carrier Rates for Interstate Special Access Services, Joint Reply Declaration on Behalf of SBC Communications, Inc.

Public Service Commission of Delaware

February 4, 1997	PSC Docket No. 96-324. In the Matter of Bell Atlantic - Delaware Statement of Terms and Conditions Under Section 252(F) of the Telecommunications Act of 1996. Testimony of Michael R. Baranowski.

Public Service Commission of the District of Columbia

March 24, 1997	Formal Case No. 962. In the Matter of the Implementation of the District of Columbia Telecommunications Competition Act of 1996. Testimony of Michael R. Baranowski.
May 2, 1997	Formal Case No. 962. In the Matter of the Implementation of the District of Columbia Telecommunications Competition Act of 1996. Rebuttal Testimony of Michael R. Baranowski.

Public Service Commission of the State of Maryland

March 7, 1997	Docket No. 8731, Phase II. In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under Section 252 of the Telecommunications Act of 1996. Direct Testimony of Michael R. Baranowski.
April 4, 1997	Docket No. 8731, Phase II. In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under Section 252 of the Telecommunications Act of 1996. Rebuttal Testimony of Michael R. Baranowski.
May 25, 2001	Case No. 8879. In the Matter of the Investigation into Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996. Panel Testimony on Recurring Cost Issues

Public Service Commission of the State of Michigan

January 20, 2004	Case No. U-13531. In the Matter, on the Commission's Own Motion to Review the Costs of Telecommunication Service Provided By SBC Michigan. Initial Testimony of Michael R. Baranowski and Julie A. Murphy.
May 10, 2004	Case No. U-13531. In the Matter, on the Commission's Own Motion to Review the Costs of Telecommunication Service Provided By SBC Michigan. Final Reply Testimony of Michael R. Baranowski and Julie A. Murphy.

New Jersey Board of Public Utilities

December 20, 1996	Docket No. TX 95120631. Notice of Investigation Local Exchange Competition for Telecommunications Services. Rebuttal Testimony of John C. Klick and Michael R. Baranowski.

North Carolina Utilities Commission

March 9, 1998	Docket No. P-100, Sub 133d. In the Matter of Establishment of Universal Support Mechanisms Pursuant to Section 254 of the Telecommunications Act of 1996. Rebuttal Testimony of Michael R. Baranowski.

Pennsylvania Public Utility Commission

January 13, 1997	Docket Nos. A-310203F0002 et al. MFS-III. Application of MFS Intelenet of Pennsylvania, Inc. et. Al. (Phase III). Rebuttal Testimony of Michael R. Baranowski.
February 21, 1997	Docket Nos. A-310203F0002 et al. MFS-III. Application of MFS Intelenet of Pennsylvania, Inc. et. Al. (Phase III). Surrebuttal Testimony of Michael R. Baranowski.
April 22, 1999	Docket Nos. P-00991648, P-00991649. Petition of Senators and CLECs for Adoption of Partial Settlement and Joint Petition for Global Resolution of Telecommunications Proceedings Direct Testimony of Michael R. Baranowski.
January 11, 2002	Docket No. R-00016683. Generic Investigation of Verizon Pennsylvania, Inc.'s Unbundled Network Element Rates. Panel Testimony on Recurring Cost Issues

State Corporation Commission Commonwealth of Virginia

April 7, 1997	Case No. PUC970005. Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc. Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law. Affidavit of Michael R. Baranowski.
April 23, 1997	Case No. PUC970005. Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc. Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law. Direct Testimony of Michael R. Baranowski.

June 10, 1997 — Case No. PUC970005. Ex Parte to Determine Prices Bell Atlantic - Virginia, Inc. Is Authorized To Charge Competing Local Exchange Carriers In Accordance With The Telecommunications Act of 1996 And Applicable State Law. Rebuttal Testimony of Michael R. Baranowski.

Washington State Utilities and Transportation Commission

December 22, 2003 — Docket No. UT-033044. In the Matter of the Petition of Qwest Corporation To Initiate a Mass-Market Switching and Dedicated Transport Case Pursuant to the Triennial Review Order. Direct Testimony of Michael R. Baranowski.

February 2, 2004 — Docket No. UT-033044. In the Matter of the Petition of Qwest Corporation To Initiate a Mass-Market Switching and Dedicated Transport Case Pursuant to the Triennial Review Order. Response Testimony of Michael R. Baranowski.

Public Service Commission of West Virginia

February 13, 1997 — Case Nos. 96-1516-T-PC, 96-1561-T-PC, 96-1009-T-PC, 96-1533-T-T. Petition to establish a proceeding to review the Statement of Generally Available Terms and Conditions offered by Bell Atlantic in accordance with Sections 251, 252, and 271 of the Telecommunications Act of 1996. Testimony of Michael R. Baranowski.

February 27, 1997 — Case Nos. 96-1516-T-PC, 96-1561-T-PC, 96-1009-T-PC, 96-1533-T-T. Petition to establish a proceeding to review the Statement of Generally Available Terms and Conditions offered by Bell Atlantic in accordance with Sections 251, 252, and 271 of the Telecommunications Act of 1996. Rebuttal Testimony of Michael R. Baranowski.

June 3, 2002 — Case No. 01-1696-T-PC, Verizon West Virginia, Inc. Petition For Declaratory Ruling That Pricing of Certain Additional Unbundled Network Elements (UNEs) Complies With Total Element Long-Run Incremental Cost (TELRIC) Principles. Direct Testimony of Michael R. Baranowski

July 1, 2002 — Case No. 01-1696-T-PC, Verizon West Virginia, Inc. Petition For Declaratory Ruling That Pricing of Certain Additional Unbundled Network Elements (UNEs) Complies With Total Element Long-Run Incremental Cost (TELRIC) Principles. Supplemental Direct Testimony of Michael R. Baranowski

RAILROAD TESTIMONY

Interstate Commerce Commission

March 9, 1995 — Finance Docket No. 32467. National Railroad Passenger Corporation and Consolidated Rail Corporation -- Application Under Section 402(a) of the Rail Passenger Service Act for an Order Fixing Just Compensation.

October 30, 1995 — Docket No. 41185. Arizona Public Service Company and Pacificorp v. The Atchison, Topeka and Santa Fe Railway Company.

Surface Transportation Board

July 11, 1997	Docket No. 41989. Potomac Electric Power Company v. CSX Transportation, Inc. Reply Statement and Evidence of Defendant CSX Transportation, Inc.
August 14, 2000	Docket No. 42051. Wisconsin Power and Light Company v. Union Pacific Railroad Company, Reply Verified Statement of Christopher D. Kent and Michael R. Baranowski.
September 20, 2002	STB Docket No. 42070 Duke Energy Corporation v. CSX Transportation, Inc., Reply Evidence and Argument of CSX Transportation, Inc.
September 30, 2002	STB Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company.
October 11, 2002	STB Docket No. 42072. Carolina Power & Light v. Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company.
November 12, 2002	Docket No. 42070 Duke Energy Corporation v. CSX Transportation, Rebuttal Evidence and Argument of CSX Transportation
November 19, 2002	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
November 27, 2002	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
January 10, 2003	STB Docket No. 41185. Arizona Public Service Co. And Pacificorp v. The Atchison, Topeka and Santa Fe Railway Company, Petition of the Burlington Northern and Santa Fe Railway Company to Reopen and Vacate Rate Prescription.
February 19, 2003	STB Docket No. 42077, Arizona Public Service Co. And Pacificorp v. The Burlington Northern and Santa Fe Railway Company, and STB Docket No. 41185, Arizona Public Service Co. And Pacificorp v. The Burlington Northern and Santa Fe Railway Company, Reply of the Burlington Northern Santa Fe Railway Company in Opposition to Petition for Consolidation.
April 4, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
October 8, 2003	Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
October 24, 2003	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company

October 31, 2003	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Duke Energy Company's Supplemental Evidence
November 24, 2003	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company
December 2, 2003	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Carolina Power & Light Company's Supplemental Evidence
December 12, 2003	Docket No. 42069 Reply of Norfolk Southern Railway Company to Duke Energy Corporation's Petition to Correct Technical Error and Affidavit of Michael R. Baranowski
January 5, 2004	Docket No. 42070 Duke Energy Corporation v. CSX Transportation, Inc., Supplemental Evidence of CSX Transportation, Inc.
January 26, 2004	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company, Joint Supplemental Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company
March 22, 2004	Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Supplemental Reply Evidence of The Burlington Northern and Santa Fe Railway Company
April 9, 2004	Docket No. 41185 Arizona Public Service Company and Pacificorp v. The Burlington Northern and Santa Fe Railway Company, The Burlington Northern and Santa Fe Railway Company's Reply Evidence on Reopening
May 24, 2004	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
June 23, 2004	Docket No. 42057 Public Service Company of Colorado d/b/a Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Petition to Correct Technical and Computational Errors
March 1, 2005	Docket No. 42071 Otter Tail Power Company v BNSF Railway Company, Supplemental Evidence of BNSF Railway Company
April 4, 2005	Docket No. 42071 Otter Tail Power Company v BNSF Railway Company, Reply of BNSF Railway Company to Supplemental Evidence
July 20, 2005	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Evidence of BNSF Railway Company
May 1, 2006	Docket No. Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases, Verified Statement Supporting Comments of BNSF Railway Company

May 31, 2006	Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases; Verified Statement Supporting Reply Comments of BNSF Railway Company
June 15, 2006	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 15, 2006	Docket No. 41191 (Sub 1) AEP Texas North Company v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 30, 2006	Docket No. Ex Parte 657 (Sub-No. 1) Major Issues in Rail Rate Cases; Verified Statement Supporting Rebuttal Comments of BNSF Railway Company
February 4, 2008	Docket No. 42099 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc.
February 4, 2008	Docket No. 42100 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc.
February 4, 2008	Docket No. 42101 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSX Transportation, Inc
May 1, 2008	Docket No. Ex Parte 679 Petition of the AAR to Institute a Rulemaking Proceeding to Adopt a Replacement Cost Methodology to Determine Railroad Revenue Adequacy, Verified Statement of Michael R. Baranowski
July 14, 2008	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Third Supplemental Reply Evidence of BNSF Railway Company
July 14, 2008	Docket No. AB-515 (Sub-No. 2) Central Oregon & Pacific Railroad, Inc. -- Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line)
August 8, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Evidence of BNSF Railway Company
August 11, 2008	Docket No. 42014 Entergy Arkansas, Inc. and Entergy Services, Inc. v Union Pacific Railroad Company and Missouri & Northern Arkansas Railroad Company, Inc.; Finance Docket No. 32187 Missouri & Northern Arkansas Railroad Company, Inc. – Lease, Acquisition and Operations Exemption – Missouri Pacific Railroad Company and Burlington Northern Railroad Company, Reply Evidence and Argument of Union Pacific
September 5, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Reply Evidence of BNSF Railway Company
September 12, 2008	Docket No. AB-515 (Sub-No. 2) Central Oregon & Pacific Railroad, Inc. – Abandonment and Discontinuance of Service -- in Coos, Douglas, and Lane Counties, Oregon (Coos Bay Rail Line); Rebuttal to Protests
August 24, 2009	Docket No. 42114 US Magnesium, L.L.C v. Union Pacific Railroad Company, Opening Evidence of Union Pacific Railroad Company
October 22, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Rebuttal Evidence of Union Pacific Railroad Company

January 19, 2010	Docket No. 42110 Seminole Electric Cooperative, Inc. v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.

US District Court for Northern District of Oklahoma

January 2, 2007	Case No. 06-CV-33 TCK-SAJ, Grand River Dam Authority v. BNSF Railway Company; Report of Michael R. Baranowski
February 2, 2007	Case No. 06-CV-33 TCK-SAJ, Grand River Dam Authority v. BNSF Railway Company; Reply Report of Michael R. Baranowski

Circuit Court of Pulaski County, Arkansas

August 17, 2007	Case No. CV 2006-2711, Union Pacific Railroad v. Entergy Arkansas, Inc. and Entergy Services, Inc., Expert Witness Report of Michael R. Baranowski
December 14, 2007	Case No. CV 2006-2711, Union Pacific Railroad v. Entergy Arkansas, Inc. and Entergy Services, Inc., Reply Expert Witness Report of Michael R. Baranowski

U.S. District Court for the Eastern District of Wisconsin

February 15, 2008	Case No. 06-C-0515, Wisconsin Electric Power Company v. Union Pacific Railroad Company, Expert Reply Report of Michael R. Baranowski

Arbitrations and Mediations

March 7, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Expert Report on behalf of BNSF Railway Company
March 28, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Rebuttal Expert Report on behalf of BNSF Railway Company
April 12, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Supplemental Expert Report on behalf of BNSF Railway Company
April 19, 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Supplemental Rebuttal Expert Report on behalf of BNSF Railway Company
April/May 2005	Arbitration Case #181 Y 00490 04 BNSF Railway Company and J.B. Hunt Transport, Inc., Hearings before Arbitration Panel
February 20, 2007	In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Expert Report of Michael R. Baranowski
March 19, 2007	In the Matter of the Arbitration between the Detroit Edison Company, et al, and BNSF Railway Company, Supplemental Expert Report of Michael R. Baranowski
February 12, 2009	In the Matter of the Arbitration between Wisconsin Public Service Corporation and Union Pacific Railroad Company, Rebuttal Expert Report of Michael R. Baranowski
October 16, 2009	In the Matter of Arbitration Between Norfolk Southern Railway Company and Drummond Coal Sales, Inc., Expert Report of Michael R. Baranowski

GARY E. BECHDOL, P.E.

Mr. Bechdol is a civil engineer with more than 35 years of experience on bridge and rail design. He has performed location and hydraulic/hydrologic studies, surveying, design, and construction inspection for a variety of road and highway, railway, and bridges. Mr. Bechdol has worked extensively with freight railroads. Mr. Bechdol has extensive experience as both project engineer and project manager on rail projects ranging from track to bridge construction. Mr. Bechdol holds a Bachelor of Civil Engineering degree from the Georgia Institute of Technology.

Mr. Bechdol's resume is attached hereto.

Mr. Bechdol is sponsoring portions of Section III.F. of defendants' Reply Evidence relating to track construction and construction schedule. Mr. Bechdol 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 4, 2010

Gary Bechdol

Gary E. Bechdol, P.E.

Project Design Engineer

Mr. Bechdol is a civil engineer with more than 35 years of experience on bridge and rail design. He has performed location and hydraulic/hydrologic studies, surveying, design, and construction inspection for a variety of road and highway, railway, and bridges. Mr. Bechdol has worked extensively with freight railroads and is currently working in the Norfolk Southern Public Improvements Office as an extension of their bridge department staff and is managing public improvement projects throughout their system.

Employee No.
91366

Department No.
53

Office Location
Duluth, GA

Date joined firm
10/3/94

Years with other firms
24

Education
Bachelor of Civil Engineering; Georgia Institute of Technology (1970)

Professional Registrations
Professional Engineer; Georgia (#9666/exp. 12/31/10) and Kentucky (#19455/exp. 6/30/11)

Memberships
American Railway Engineering and Maintenance of Way Association (AREMA); Light and Short Line Railways Committee Member

Project Experience

Norfolk Southern Public Improvement Projects - Project Engineer
Working in the bridge department of the Norfolk Southern Public Improvements Office in Atlanta, GA, to assist the public improvements engineers with the management of several hundred publicly funded projects across the Norfolk Southern system. Mr. Bechdol's responsibilities include preliminary review of plans, agreement reviews, coordination with state and local authorities, and project coordination with railroad personnel at the division level. (2004 - Present)

Norfolk Southern/CSX Triangle Transit Authority Transit Double-Track Project - Project Engineer
Performed QA/QC for a proposed double-track transit line parallel to CSX and Norfolk Southern in Raleigh and Durham, NC. Mr. Bechdol represented Norfolk Southern at project progress meetings. (2001 - 2004)

Norfolk Southern Saulsbury Passing Siding - Project Manager
Coordinated track design for a 10,000-foot-long passing siding track in Saulsbury, TN. Mr. Bechdol coordinated with state and county officials for permitting and surveying. (2000)

CSX/Conrail Bridge Inspection - Project Engineer
Performed scheduling for seven teams and progress tracking for this critical bridge inspection project involving approximately 750 Conrail bridges in five states that were acquired by CSX Transportation. The fast-track project was completed in just three months. (1998)

Norfolk Southern 4th Street Bridge GEC - Project Engineer
Provided design for raising the 4th Street Bridge in Waynesboro, VA, and the nearby CSX Bridge over Norfolk Southern by one foot to improve clearance on Norfolk Southern's Shenandoah Valley Line. (1997)

NCDOT Newton-Conover Eastern Loop - Track Design Engineer
Performed track design for a single-track, 3-span, 195-foot-long steel deck plate girder railroad bridge carrying the Norfolk Southern over a multi-lane

roadway on new location in Catawba County, NC. The project included relocating track during construction. (1997)

Norfolk Southern Automobile Mixing Facility - Project Engineer
Acted as a liaison with Norfolk Southern Railroad for an automobile mixing facility in Shelbyville, KY. The project involved preliminary and final hydraulic/hydrologic, railway, roadway, highway bridge, and railway bridge design, as well as field inspection during construction. The project included 2,500,000 cubic yards of earthwork, 18 miles of track installation, a 45-acre paved vehicle storage yard, three bridges, and two access roads. (1996)

CSX Bridge Replacement over South Roan Street - Track Design Engineer
Performed track design for a single-span, 100-foot-long railroad bridge replacement in Johnson City, TN. The steel plate thru-girder design incorporated a ballasted concrete deck. Tall abutments were founded on steel piling and on rock bearing spread footings. The project also included 2-stage shoring for the single track. (1996)

Norfolk Southern US 52 Improvements - Project Engineer
Performed plan review for widening and other roadway improvements along US 52 that would potentially impact the Norfolk Southern right-of-way in Prichard and Cyrus, WV. (1995 - 1996)

Amtrak Olympic Service Temporary Facilities - Project Engineer
Performed a location study and platform and conceptual design for a temporary Amtrak facility for the 1996 Atlanta Olympics in Atlanta, GA. (1995)

Florida Department of Transportation - Former Railroad Safety Manager
Managed the State FRA Safety Inspection Program for the state of Florida and supervised a staff of nine people for track inspections, operating practices, and motive power and equipment. (1979 - 1994)

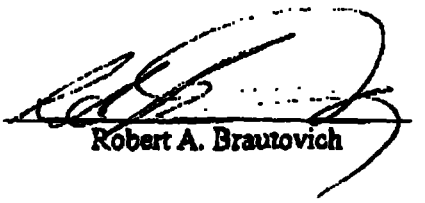
Robert A. Brautovich

Robert A. Brautovich is the Assistant Vice President, Coal Marketing for BNSF. His business address is 2650 Lou Menk Drive, Fort Worth, Texas 76131-0051. Mr. Brautovich has been with BNSF's Coal Marketing Group since 1992. In his Coal Marketing Group positions, Mr. Brautovich has been responsible for managing specific coal customer accounts and a geographic territory that includes the account with AEPCO for the Apache Generating Station.

Mr. Brautovich is sponsoring evidence in Section III.A that rates for the issue traffic would be different if the interchanges were altered.

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 __, 2010



Robert A. Brautovich

RICHARD BROWN

Mr. Brown is a Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, Washington, DC 20005. With 28 years of experience in the railroad industry, Mr. Brown specializes in providing financial, economic and analytical consulting services to North America's largest railroads.

Mr. Brown received a BA in Economics from Syracuse University in 1963, and an MBA from Northwestern University in 1971. Prior to joining FTI, Mr. Brown spent 28 years with The Burlington Northern & Santa Fe Railway (BNSF), and its predecessor The Atchison, Topeka and Santa Fe Railway (ATSF). While at BNSF, Mr. Brown focused on strategic issues including the negotiation and implementation of the agreements between UP and BNSF that were effected to facilitate the UP-SP merger. Additionally, he took a lead role in the analysis of the potential impact of regulatory changes on railroad marketing strategy.

Mr. Brown held numerous positions in Strategic Planning and Marketing at ATSF. He was involved in merger analysis and planning and played a key role in the attempted merger between ATSF and Southern Pacific. Mr. Brown headed ATSF's Bulk Commodity Marketing which included Chemicals and Coal. In this role, he re-engineered a field sales organization with regional directors responsible for coaching and mentoring account managers. He also led ATSF's rail-truck retail efforts and negotiated several joint venture and business partnerships. While in this capacity, he developed a program for using rail truck transfer to increase car utilization. He implemented a joint venture with a major bulk truck line to bring intermodal rail service to dry bulk shippers.

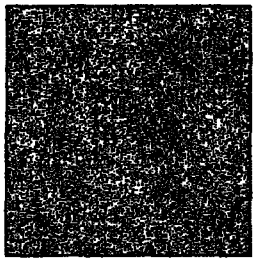
Mr. Brown has provided expert testimony in merger proceedings before the Interstate Commerce Commission and The Surface Transportation Board.

Mr. Brown is sponsoring portions of Sections III.D of defendants Reply Evidence. Mr. Brown 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 5, 2010

Richard W. Brown



Richard Brown

Director - Economic Consulting

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Fax (202) 312-9101

Education
MBA from Northwestern University Graduate School of Management

BS in Economics from Syracuse University

Richard Brown is a Director in FTI's Economic Consulting practice. With 28 years of experience in the railroad industry, Mr. Brown specializes in providing financial, economic and analytical consulting services to North America's largest railroads. Mr. Brown has provided expert testimony in merger proceedings before the Interstate Commerce Commission and The Surface Transportation Board. Mr. Brown is assigned to the DC office, however works from his home office at 100 Windwood Circle; Breckenridge, Colorado 80424.

Mr. Brown joined FTI Consulting in 1999. Much of the NIS group's work focuses on the economic and financial analysis of network industries, in particular different aspects of transportation. While at FTI, he has been involved in the analysis of rates, costs, and service in the railroad industry. Mr. Brown has worked extensively to develop expert testimony before the Surface Transportation Board ("STB") examining the reasonableness of railroad rates, railroads' applications for mergers and acquisitions. He also supported railroad internal strategic planning needs with respect to mergers and acquisitions and the impact of potential regulatory changes.

Prior to joining FTI, Mr. Brown spent 28 years with The Burlington Northern & Santa Fe Railway (BNSF), and its predecessor The Atchison, Topeka and Santa Fe Railway (ATSF). While at BNSF, he focused on strategic issues including the negotiation and implementation of the agreements between UP and BNSF that were effected to facilitate the UP-SP merger. Additionally, he took a lead role in the analysis of the potential impact of regulatory changes on railroad marketing strategy.

Mr. Brown held numerous positions in Strategic Planning and Marketing at ATSF. He was involved in merger analysis and planning and played a key role in the attempted merger between ATSF and Southern Pacific. He headed ATSF's Bulk Commodity Marketing which included Chemicals and Coal. In this role, Mr. Brown re-engineered a field sales organization with regional directors responsible for coaching and mentoring account managers; started a subsidiary company to handle tank containers as a retail intermodal options; and expanded on that with a joint venture with Bulkmatic, a major dry bulk truck line, to initiate a retail intermodal option for bulk containers.

Mr. Brown holds a Bachelors Degree in Economics from Syracuse University and an MBA degree from Northwestern University Graduate School of Management.

TESTIMONY

Surface Transportation Board

September 20, 2002 Docket No. 42070. Duke Energy Corporation v. CSX Transportation, Inc., Written Reply Evidence and Argument of CSX Transportation, Inc.

September 30, 2002 Docket No. 42069. Duke Energy Corporation v. Norfolk Southern Railway Company, Written Reply Evidence and Argument of Norfolk Southern Railway Company.

October 11, 2002	Docket No. 42072. Carolina Power & Light v. Norfolk Southern Railway Company, Written Reply Evidence and Argument of Norfolk Southern Railway Company.
January 19, 2010	Docket No. 42110. Seminole Electric Cooperative, Inc. v. CSX Transportation, Inc., Written Reply Evidence of CSX Transportation, Inc.
February 5, 2010	CV No. 3:08-CV-415-BR. -BNSF Railway Company v. Albany and Eastern Railroad Company, et al.

RICHARD C. DUMMAR, R.A.

Mr. Dummar is a project architect with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Dummar, NCARB-certified, is a registered architect in three states with more than 35 years of experience managing and designing railroad facilities across the country.

Mr. Dummar oversees teams of architects, as well as subconsultants and contractors, while managing projects from concept to completion. Mr. Dummar has experience with the design of new and renovated rail facilities, including offices, maintenance, roundhouse, and unloading facilities. He is also skilled at performing administrative tasks, such as cost estimating, schedule and budget management, and acting as liaison with clients. Mr. Dummar holds a Bachelor of Architecture from University of Nebraska-Lincoln.

Mr. Dummar's resume is attached hereto.

Mr. Dummar is sponsoring Section III.F.7 of defendants' Reply Evidence relating to facilities. Mr. Dummar 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 5, 2010

Richard C. Dummar

Richard C. Dummar, R.A.

Project Architect

Mr. Dummar, NCARB-certified, is a registered architect in three states with more than 35 years of experience managing and designing railroad facilities across the country. He oversees teams of architects, as well as subconsultants and contractors, while managing projects from concept to completion. Mr. Dummar has experience with the design of new and renovated rail facilities, including offices, maintenance, roundhouse, and unloading facilities. He is also skilled at performing administrative tasks, such as cost estimating, schedule and budget management, and acting as liaison with clients.

Employee No.
05079

Department No.
53

Office Location
Charlotte, NC

Date joined firm
7/20/09

Years with other firms
35

Education
Bachelor of Architecture; University of Nebraska-Lincoln (1974)

Professional Registrations
Registered Architect: Nebraska (2005/#A3518/exp. 12/31/11), Colorado (1994/#B-3122/exp. 7/31/11), Minnesota (2005/#44068/exp. 8/30/10)

Training/Certifications
National Council of Architectural Registration Boards (NCARB) (2005/#59363/)

Memberships
Member of Committee 6 - Building and Support Facilities, American Railway Engineering and Maintenance-of-Way Association (AREMA)

Computer Skills
MS Word, MS Excel, MS PowerPoint

Project Experience

BNSF Railway Wyo-Ben Building Interior Renovation - Architect Project Manager
Project Scope: To renovate a 12,000 square foot uninsulated pre-engineered metal warehouse building into finished office space.
Project Location: BNSF Yard, Gillette, Wyoming.
Scope of Work Included: Construction of new interior partitions, insulation of all perimeter walls, install new flooring, wall finishes, ceilings, light fixtures, doors and cabinets; installation of plumbing for new men and women restrooms; installation of new HVAC equipment.
My Role/Responsibilities: Worked with local BNSF management to put together a building program of space requirements for the renovation, designed preliminary plans and specifications, developed a project cost estimate and project schedule, hired and managed a design consultant to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 1-08 thru 10-08
Total Project Cost: $720,000

BNSF Railway New Maintenance of Way (MOW) Facility - Architect Project Manager
Project Scope: To construct a new 4,000 square foot Maintenance of Way Facility to move personnel from existing leased office building.
Project Location: BNSF Yard, Grants, New Mexico.
Scope of Work Included: Complete construction of new Maintenance of Way (MOW) Facility using wood stud framing on the perimeter walls and steel studs for interior partitions. Insulation of all perimeter walls, install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation of plumbing for new men and women restrooms, unisex shower; installation of new HVAC equipment; site grading, parking lot and construction of outdoor fenced storage area.

My Role/Responsibilities: Worked with local BNSF management to put together a building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, hired and managed a design consultant to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 10-07 thru 7-08
Total Project Cost: $780,000

BSNF Railway Cicero Yard Locker Room Expansion - Architect Project Manager
Project Scope: To renovate a 4,200 square foot masonry office building into a new locker room with break room, showers and men & women restrooms.
Project Location: BNSF Yard, Cicero, Illinois.
Scope of Work Included: Demolition of existing interior area as required, construction of new interior partitions, insulation of all perimeter walls, install new lockers, flooring, wall finishes, ceilings, light fixtures, doors and cabinets; installation of plumbing for new men and women restrooms; installation of new HVAC equipment; installation of new roof.
My Role/Responsibilities: Worked with local BNSF management to put together a building program of space requirements for the renovation, designed preliminary plans and specifications, developed a project cost estimate and project schedule, hired and managed a design consultant to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 3-06 thru 11-06
Total Project Cost: $525,000

BSNF Railway New Yard Office Facility - Architect Project Manager
Project Scope: To construct a new 4,500 square foot Yard Office Facility.
Project Location: BNSF Yard, Savanna, Illinois.
Scope of Work Included: Complete construction of new Maintenance of Way (MOW) Facility using wood stud framing on the perimeter walls and steel studs for interior partitions. Insulation of all perimeter walls, install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation of plumbing for new men and women restrooms, unisex shower; installation of new HVAC equipment; site grading, parking lot and construction of outdoor fenced storage area. Demolition of existing yard office after moving personnel into the new facility.
My Role/Responsibilities: Worked with local BNSF management to put together a building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, hired and managed a design consultant to finalize plans and specifications for bidding the project. Conducted pre-bid

and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 10-07 thru 7-08
Total Project Cost: $830,000

UPRR Severe Weather Survivability Study - Project Design Manager
Project Scope: Feasibility study to show construction options and costs to prevent building damage, to the UPRR Spring Regional Office Facility, from a severe weather occurrence.
Project Location: UPRR Spring Regional Office Facility, Spring, Texas.
Scope of Work Included: Listing the building options with the most economical solution first to the most expensive solution, what the percentage of survivability the building would be able to attain with each option, what the total cost of construction would be to accomplish that percentage and the time for construction of each option. After all construction options and costs were completed, a spreadsheet was developed to show the feasibility of each option comparing construction time, costs and survivability percentages.
My Role/Responsibilities: Discussed construction options with Facilities Design Group at UPRR Headquarters in Omaha, NE. to begin the project. I put together a program of requirements for the feasibility study that would determine the type of severe weather storm damage would be prevented from each construction solution. Managed the development of all construction solutions and costs. Items to be prevented included: Projectiles coming thru windows, walls and roof; power outages; dispatching center not functioning.
Project Duration: 8-04 thru 3-05
Total Project Cost: $140,000 (Costs for Study – No construction was done)

UPRR New Maintenance of Way (MOW) Facility - Design Manger
Project Scope: To construct a new 4,200 square foot Maintenance of Way (MOW) Facility to move personnel from existing office building.
Project Location: UPRR Yard, Albany, Oregon.
Scope of Work Included: Complete construction of new Maintenance of Way (MOW) Facility using pre-engineered metal building with steel studs for interior partitions. Insulation of all perimeter walls, install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation of plumbing for new men and women restrooms, unisex shower; installation of new HVAC equipment; site grading, parking lot and construction of outdoor fenced storage area.
My Role/Responsibilities: Worked with local UPRR management to put together a building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the design consultant team, at Utility Engineering, to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 1-03 thru 11-03

Total Project Cost: $750,000

BNSF Railway Auto Facility Office Remodeling - Design Manager
Project Scope: To renovate and remodel an existing 6,000 square foot office building into new office space, locker rooms, breakroom, restrooms and conference room.
Project Location: BNSF Auto Facility, Renton, Washington.
Scope of Work Included: Construction of new interior partitions, install new flooring, wall finishes, ceilings, light fixtures, doors and cabinets; installation of plumbing for new men and women restrooms; new lockers; installation of new HVAC equipment and electrical components.
My Role/Responsibilities: Worked with local BNSF management to put together a building program of space requirements for the renovation, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the design consultant team, at Utility Engineering, to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 2-02 thru 8-02
Total Project Cost: $460,000

BNSF Railway Yard Office Facility Study - Design Manager
Project Scope: Building design study to show floor plan layout, site grading work required and parking lot size to accommodate all personnel that will be using the new facility.
Project Location: BNSF Yard, Whitefish, Montana.
Scope of Work Included: Building code investigation. Design of conceptual building floor plans; site, grading and parking lot layout. Preliminary budgetary design and building construction costs. Provided preliminary design and building construction schedules.
My Role/Responsibilities: Attended pre-design meeting in Whitefish, MT. with BNSF design team and local management to discuss space requirements for the new Yard Office. To direct the design team in the development of all portions of this building design study.
Project Duration: 7-01 thru 10-01
Total Project Cost: $95,000 (Costs for Study – No construction was done)

UPRR Auto Unloading Facility New Office Building - Lead Architect
Project Scope: To construct a new 3,800 square foot office building for Auto Unloading Facility.
Project Location: UPRR Yard, West Memphis, Arkansas.
Scope of Work Included: Complete construction of new office building for Auto Unloading Facility using pre-engineered metal building with steel studs for interior partitions. Insulation of all perimeter walls, install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation

of plumbing for new men and women restrooms, unisex shower; installation of new HVAC and electrical equipment; site grading.
My Role/Responsibilities: Developed building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the UPRR design team. Managed design consultant firm to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 2-97 thru 10-97
Total Project Cost: $580,000

UPRR New Yard Office Facility - Lead Architect
Project Scope: To construct a new 5,000 square foot Yard Office Facility.
Project Location: UPRR Yard, Livonia, Louisiana.
Scope of Work Included: Complete construction of new masonry Yard Office Facility for the Livonia Yard with steel studs for interior drywall partitions. Concrete footings and foundations and insulation of all perimeter walls. Install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation of plumbing for new men and women restrooms, showers and drying area; installation of new HVAC and electrical equipment; site grading; parking lot.
My Role/Responsibilities: Developed building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the UPRR design team. Managed design consultant firm to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 5-95 thru 3-96
Total Project Cost: $820,000

UPRR Western Regional Office Building Renovations - Lead Architect
Project Scope: To renovate and remodel the existing 11,000 square foot Southern Pacific Railroad office building into new office space, locker rooms, breakroom, IT equipment room, storage areas, mailroom, restrooms and conference rooms, for the UPRR merger.
Project Location: UPRR Western Regional Office Building, Roseville, California.
Scope of Work Included: Demolition of interior partitions, flooring, ceilings, electrical and plumbing as required. Construction of new interior drywall partitions over steel studs, install new flooring, wall finishes, ceilings, light fixtures, doors w/glass sidelights, floor and wall cabinets; installation of plumbing for new men and women restrooms; installation of new HVAC and electrical equipment; site grading as required; modifications to existing parking lot.

My Role/Responsibilities: Developed building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the UPRR design team. Managed design consultant firm to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Worked with furniture contractor to develop needs and requirements for purchasing of all new furniture. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 5-94 thru 2-95
Total Project Cost: $985,000

UPRR Roseville Yard Site Development and Office Building - Lead Architect
Project Scope: To develop all building site work for the new Yard Office Building. To construct a new 6,800 square foot Yard Office Building for the new Roseville Yard.
Project Location: Roseville Yard, Roseville, California.
Scope of Work Included: Complete site development of the new office building area that included: site grading and drainage, new parking lot, site lighting and landscaping. Construction of new masonry Yard Office Building with concrete footings and foundation. Building construction included: interior drywall partitions over steel studs, installation of new flooring, wall finishes, ceilings, light fixtures, doors w/glass sidelights, floor and wall cabinets; installation of plumbing for new men and women restrooms; wiring; installation of new HVAC and electrical equipment;
My Role/Responsibilities: Prepared preliminary site plans for the new Yard Office Building area. Developed building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule for the site development and new building, was manager of the UPRR design team. Managed design consultant firm to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Worked with furniture contractor to develop needs and requirements for purchasing of all new furniture. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 4-93 thru 5-94
Total Project Cost: $1,200,000

UPRR Steam Locomotive and Roundhouse Renovations - Lead Architect
Project Scope: To renovate, remodel, reroof and repair the existing 12,000 square foot Steam Locomotive Shop. To renovate, repair and reroof the 10,500 square foot, 7 bay, Roundhouse Building. Renovation of the Roundhouse Building earned the UPRR tax credits and a place on the National Register of Historical Landmarks.
Project Location: Cheyenne Yard, Cheyenne, Wyoming.

Scope of Work Included: Steam Locomotive Shop: Demolition of interior space as required. Install new acoustical tile ceiling, new light fixtures, flooring, wall finishes, new HVAC and electrical equipment. Remove existing clerestory windows and replace with opaque panels; construct new men and women restrooms, unisex shower; construct new offices, breakroom, storage room and conference room; remove existing roof and replace with new EPDM roof. Roundhouse Building: All construction work had to follow requirements of the National Register of Historical Landmarks to keep the character of the original building. Remove the existing windows and install custom designed Marvin metal windows. Wash the exterior face brick and wash down the interior walls. Remove the existing 7 large pairs of locomotive doors at each entrance into the building with new custom doors. Remove the existing roof with new roof to match what was removed. Remove all existing metal trim, gutters and downspouts with new metal to match existing. Installation of new heating and electrical equipment.
My Role/Responsibilities: Worked with UPRR Steam Locomotive Shop manager to discuss the building requirements for the renovation work that was to be done. Met with the State of Wyoming, Department of the Interior, to secure the direction the Roundhouse Building renovation and repairs would be accomplished. Developed building program of space requirements for the new building, designed preliminary plans, details and specifications, developed a project cost estimate and project schedule for the work, was manager of the UPRR design team. Managed and coordinated the UPRR design team to finalize plans and specifications for bidding the renovation project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 4-88 thru 3-89
Total Project Cost: $1,320,000

UPRR New Intermodal Office Building - Lead Architect
Project Scope: To construct a new 3,400 square foot Intermodal Office Building.
Project Location: Commerce Intermodal Yard, Commerce, California.
Scope of Work Included: Complete construction of new pre-engineered metal Intermodal Office Building for the Commerce Intermodal Yard using steel stud framing on the insulated perimeter walls and interior partitions. Install new flooring, wall finishes, ceilings, light fixtures, lockers, doors and cabinets; installation of plumbing for new men and women restrooms, unisex shower; installation of new HVAC and electrical equipment; site grading; parking lot.
My Role/Responsibilities: Developed building program of space requirements for the new building, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the UPRR design team. Managed and coordinated UPRR design team to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor

throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 1-86 thru 10-86
Total Project Cost: $480,000

UPRR Superintendent Facility Renovation - Lead Architect
Project Scope: To renovate and remodel an existing 7,500 square foot office building into new office space, locker rooms, breakrooms, restrooms, conference rooms, storage rooms, IT equipment room and mechanical space.
Project Location: Little Rock Yard, Little Rock, Arkansas.
Scope of Work Included: Selected demolition of interior partitions, ceilings, flooring, electrical and mechanical modifications; construction of new interior partitions, install new flooring, wall finishes, ceilings, light fixtures, doors and cabinets; modification of existing plumbing for remodeling men and women restrooms; new lockers; installation of new HVAC equipment and electrical components.
My Role/Responsibilities: Meeting with local UPRR management to put together a building program of space requirements for the renovation, designed preliminary plans and specifications, developed a project cost estimate and project schedule, was manager of the UPRR design team. Managed and coordinated UPRR design team to finalize plans and specifications for bidding the project. Conducted pre-bid and pre-construction meetings. Directed building contractor throughout construction phase of the project, reviewed shop drawing submittals. Final building walkthrough at completion of project construction.
Project Duration: 3-85 thru 11-85
Total Project Cost: $810,000

BENTON V. FISHER

Mr. Fisher is a Senior Managing Director at FTI Consulting, Inc., an economic and consulting firm with offices located at 1101 K Street, NW, 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 degree in Engineering and Management Systems 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 Courts, and State Utility Commissions. He has previously sponsored evidence in numerous railroad rate reasonableness proceedings, including evidence regarding the topics identified above.

Mr. Fisher's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Fisher is sponsoring portions of Sections II, III.A, III.C, and III.D of defendants' Reply Evidence relating to variable costs, traffic and revenues, calculation of equipment counts, and operating costs other than MOW and G&A. 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 5, 2010

Benton V. Fisher

Benton V. Fisher

Senior Managing Director - Economic Consulting

benton.fisher@fticonsulting.com

1101 K Street, NW
Suite B100
Washington DC 20005
Tel (202) 312-9100
Fax (202) 312-9101

Education
B.S. in Engineering and Management Systems, Princeton University

Benton V. Fisher is a Senior Managing Director of FTI's Economic Consulting group, located in Washington, D.C. Mr. Fisher has nearly 20 years of experience in providing financial, economic and analytical consulting services to corporate clients dealing with transportation, telecommunications, and postal subjects.

North America's largest railroads have retained FTI both to assist them in making strategic and tactical decisions and to provide expert testimony in litigation. FTI's ability to present a thorough understanding of myriad competitive and regulatory factors has given its clients the necessary tools to implement and advance their business. Mr. Fisher has worked extensively to develop these clients' applications for mergers and acquisitions and expert testimony justifying the reasonableness of their rates before the Surface Transportation Board. In addition to analyzing extensive financial and operating data, Mr. Fisher has worked closely with people within many departments at the railroad as well as outside counsel to ensure that the railroads' presentations are accurate and defensible. Additionally, Mr. Fisher reviews the expert testimony of the railroads' opponents in these proceedings, and advises counsel on the necessary course of action to respond.

AT&T and MCI retained FTI to advance its efforts to implement the Telecommunications Act of 1996 in local exchange markets. Mr. Fisher was primarily responsible for reviewing the incumbent local exchange carriers' (ILEC) cost studies, which significantly impacted the ability of FTI's clients to access local markets. Mr. Fisher analyzed the sensitivity of multiple economic components and incorporated this information into various models being relied upon by the parties and regulators to determine the pricing of services. Mr. Fisher was also responsible for preparing testimony that critiqued alternative presentations.

Mr. Fisher assisted in reviewing the U.S. Postal Service's evidence and preparing expert testimony on behalf of interveners in Postal Rate and Fee Changes cases. He has also been retained by a large international consulting firm to provide statistical and econometric support in their preparation of a long-range implementation plan for improving telecommunications infrastructure in a European country.

Mr. Fisher has sponsored expert testimony in rate reasonableness proceedings before the Surface Transportation Board and in contract disputes in Federal Court.

Mr. Fisher graduated from Princeton University with a Bachelor of Science degree in Engineering and Management Systems.

TESTIMONY

Surface Transportation Board

January 15, 1999	Docket No. 42022 FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
March 31, 1999	Docket No. 42022 FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
April 30, 1999	Docket No. 42022 FMC Corporation and FMC Wyoming Corporation v. Union Pacific Railroad Company, Rebuttal Verified Statement of Christopher D. Kent and Benton V. Fisher
July 15, 1999	Docket No. 42038 Minnesota Power, Inc. v. Duluth, Missabe and Iron Range Railway Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
August 30, 1999	Docket No. 42038 Minnesota Power, Inc. v. Duluth, Missabe and Iron Range Railway Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
September 28, 1999	Docket No. 42038 Minnesota Power, Inc. v. Duluth, Missabe and Iron Range Railway Company, Rebuttal Verified Statement of Christopher D. Kent and Benton V. Fisher
June 15, 2000	Docket No. 42051 Wisconsin Power and Light Company v. Union Pacific Railroad Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
August 14, 2000	Docket No. 42051 Wisconsin Power and Light Company v. Union Pacific Railroad Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
September 28, 2000	Docket No. 42051 Wisconsin Power and Light Company v. Union Pacific Railroad Company, Rebuttal Verified Statement of Christopher D. Kent and Benton V. Fisher
December 14, 2000	Docket No. 42054 PPL Montana, LLC v. The Burlington Northern Santa Fe Railway Company, Opening Verified Statement of Christopher D. Kent and Benton V. Fisher
March 13, 2001	Docket No. 42054 PPL Montana, LLC v. The Burlington Northern Santa Fe Railway Company, Reply Verified Statement of Christopher D. Kent and Benton V. Fisher
May 7, 2001	Docket No. 42054 PPL Montana, LLC v. The Burlington Northern Santa Fe Railway Company, Rebuttal Verified Statement of Christopher D. Kent and Benton V. Fisher

October 15, 2001	Docket No. 42056 Texas Municipal Power Agency v. The Burlington Northern Santa Fe Railway Company, Opening Verified Statement of Benton V. Fisher
January 15, 2002	Docket No. 42056 Texas Municipal Power Agency v. The Burlington Northern Santa Fe Railway Company, Reply Verified Statement of Benton V. Fisher
February 25, 2002	Docket No. 42056 Texas Municipal Power Agency v. The Burlington Northern Santa Fe Railway Company, Rebuttal Verified Statement of Benton V. Fisher
May 24, 2002	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Opening Evidence and Argument of Norfolk Southern Railway Company
June 10, 2002	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Opening Evidence and Argument of Norfolk Southern Railway Company
July 19, 2002	Northern States Power Company Minnesota v. Union Pacific Railroad Company, Union Pacific's Opening Evidence
September 30, 2002	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
October 4, 2002	Northern States Power Company Minnesota v. Union Pacific Railroad Company, Union Pacific's Reply Evidence
October 11, 2002	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Reply Evidence and Argument of Norfolk Southern Railway Company
November 1, 2002	Northern States Power Company Minnesota v. Union Pacific Railroad Company, Union Pacific's Rebuttal Evidence
November 19, 2002	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
November 27, 2002	Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Rebuttal Evidence and Argument of Norfolk Southern Railway Company
January 10, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Opening Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
February 7, 2003	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Opening Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad

April 4, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
May 19, 2003	Docket No. 42057 Public Service Company of Colorado D/B/A Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
May 27, 2003	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Joint Variable Cost Reply Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad
May 27, 2003	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
June 13, 2003	Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Opening Evidence of The Burlington Northern and Santa Fe Railway Company
July 3, 2003	Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad, Joint Variable Cost Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad
October 8, 2003	Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Reply Evidence of The Burlington Northern and Santa Fe Railway Company
October 24, 2003	Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company Supplemental Evidence of Norfolk Southern Railway Company
October 31, 2003	STB Docket No. 42069 Duke Energy Corporation v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Duke Energy Company's Supplemental Evidence
November 24, 2003	STB Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Supplemental Evidence of Norfolk Southern Railway Company
December 2, 2003	STB Docket No. 42072 Carolina Power & Light Company v. Norfolk Southern Railway Company, Reply of Norfolk Southern Railway Company to Carolina Power & Light Company's Supplemental Evidence
January 26, 2004	STB Docket No. 42058 Arizona Electric Power Cooperative, Inc. v. The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company, Joint Supplemental Reply Evidence and Argument of The Burlington Northern and Santa Fe Railway Company and Union Pacific Railroad Company

March 1, 2004	STB Docket No. 41191 (Sub-No 1) AEP Texas North Company v. The Burlington Northern and Santa Fe Railway Company, Opening Evidence and Argument of The Burlington Northern and Santa Fe Railway Company
March 22, 2004	STB Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Supplemental Reply Evidence of The Burlington Northern and Santa Fe Railway Company
April 29, 2004	STB Docket No. 42071 Otter Tail Power Company v. The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company
May 24, 2004	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
March 1, 2005	Docket No. 42071 Otter Tail Power Company v. BNSF Railway Company, Supplemental Evidence of BNSF Railway Company
April 4, 2005	Docket No. 42071 Otter Tail Power Company v BNSF Railway Company, Reply of BNSF Railway Company to Supplemental Evidence
April 19, 2005	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Opening Evidence of BNSF Railway Company
July 20, 2005	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Evidence of BNSF Railway Company
July 27, 2004	STB Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. The Burlington Northern and Santa Fe Railway Company, Rebuttal Evidence of The Burlington Northern and Santa Fe Railway Company
September 30, 2005	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Rebuttal Evidence of BNSF Railway Company
October 20, 2005	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Surrebuttal Evidence of BNSF Railway Company
June 15, 2006	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
June 15, 2006	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Reply Supplemental Evidence of BNSF Railway Company
March 19, 2007	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Reply Third Supplemental Evidence of BNSF Railway Company

March 26, 2007	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Reply Second Supplemental Evidence of BNSF Railway Company
July 30, 2007	Docket No. 42095 Kansas City Power & Light v. Union Pacific Railroad Company, Union Pacific's Opening Evidence
August 20, 2007	Docket No. 42095 Kansas City Power & Light v. Union Pacific Railroad Company, Union Pacific's Reply Evidence
February 4, 2008	Docket No. 42099 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSXT
February 4, 2008	Docket No. 42100 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSXT
February 4, 2008	Docket No. 42101 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Opening Evidence of CSXT
March 5, 2008	Docket No. 42099 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Reply Evidence of CSXT
March 5, 2008	Docket No. 42100 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Reply Evidence of CSXT
March 5, 2008	Docket No. 42101 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Reply Evidence of CSXT
April 4, 2008	Docket No. 42099 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Rebuttal Evidence of CSXT
April 4, 2008	Docket No. 42100 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Rebuttal Evidence of CSXT
April 4, 2008	Docket No. 42101 E.I. DuPont De Nemours and Company v. CSX Transportation, Inc., Rebuttal Evidence of CSXT
July 14, 2008	Docket No. 42088 Western Fuels Association, Inc. and Basin Electric Power Cooperative, Inc. v. BNSF Railway Company, Third Supplemental Reply Evidence of BNSF Railway Company
August 8, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Evidence of BNSF Railway Company
September 5, 2008	Docket No. 41191 (Sub-No. 1) AEP Texas North Company v. BNSF Railway Company, Fourth Supplemental Reply Evidence of BNSF Railway Company
October 17, 2008	Docket No. 42110 Seminole Electric Cooperative, Inc. v. CSX Transportation, Inc., CSX Transportation, Inc.'s Reply to Petition for Injunctive Relief, Verified Statement of Benton V. Fisher
August 24, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Opening Evidence of Union Pacific Railroad Company

September 22, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Reply Evidence of Union Pacific Railroad Company
October 22, 2009	Docket No. 42114 US Magnesium, L.L.C. v. Union Pacific Railroad Company, Rebuttal Evidence of Union Pacific Railroad Company
January 19, 2010	Docket No. 42110 Seminole Electric Cooperative, Inc. v. CSX Transportation, Inc., Reply Evidence of CSX Transportation, Inc.

U.S. District Court for the Eastern District of North Carolina

March 17, 2006	Civil Action No. 4:05-CV-55-D, PCS Phosphate Company v. Norfolk Southern Corporation and Norfolk Southern Railway Company, Report by Benton V. Fisher

U.S. District Court for the Eastern District of California

January 18, 2010	E.D. Cal. Case No. 08-CV-1086-AWI, BNSF Railway Company v. San Joaquin Valley Railroad Co., et al.

Arbitrations and Mediations

July 10, 2009	JAMS Ref. # 1220039135; In the Matter of the Arbitration Between Pacer International, Inc., d/b/a/ Pacer Stacktrain (f/k/a/ APL Land Transport Services, Inc.), American President Lines, Ltd. And APL Co. Pte. Ltd. And Union Pacific Railroad Company; Rebuttal Expert Report of Benton V. Fisher

ROBERT FISHER

Rob Fisher is a Director in the Network Industries Strategies group of the FTI Economic Consulting practice and is based in Washington, D.C. Mr. Fisher provides financial and economic consulting services to the transportation, energy and telecommunications industries.

Mr. Fisher holds an M.B.A. (with distinction) from the University of Michigan and a B.S. from the School of Foreign Service at Georgetown University. Prior to joining FTI, Mr. Fisher worked for two technology companies, most recently as Vice President of Strategic Marketing, where he held P&L responsibility for the company's largest product. Before that, he spent 10 years as a strategy consultant, working with dozens of telecom clients on financial analysis, marketing strategy and operational improvement.

Mr. Fisher has developed expert testimony for railroad clients in litigation disputes involving the delivery of large coal shipments to energy customers. He also has directed financial analysis to demonstrate the reasonableness of railroad rates before the Surface Transportation Board, including leading the analysis for the first small-shipper case before the Board.

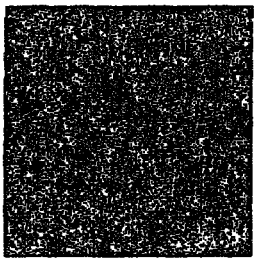
Mr. Fisher's curriculum vitae, which identifies representative engagements and cases in which he has sponsored expert testimony, is attached hereto.

Mr. Fisher is sponsoring portions of Section III.A of defendants' Reply evidence relating to traffic and revenue. 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 6, 2010

Robert Fisher



Rob Fisher

Director - Economic Consulting

Robert.Fisher@FTIConsulting.com

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Suite B100
Washington, DC 20005
Tel: (202) 312-9100
Fax. (202) 312-9101

Education
MBA (with distinction) from University of Michigan

BS from School of Foreign Service at Georgetown University

Rob Fisher is a director in the Network Industries Strategies group of the FTI Economic Consulting practice and is based in Washington, D.C. Mr. Fisher provides financial and economic consulting services to the transportation, energy and telecommunications industries.

Mr. Fisher has developed expert testimony for railroad clients in litigation disputes involving the delivery of large coal shipments to energy customers. He also has directed financial analysis to demonstrate the reasonableness of railroad rates before the Surface Transportation Board, including leading the analysis for the first small-shipper case before the Board.

In addition, Mr. Fisher has supported a consortium of manufacturers to gain anti-leakage provisions in the pending greenhouse gas legislation. His report, which measured the energy and trade intensity and the emissions of each industry, has been entered into Congressional testimony.

Prior to joining FTI, Mr. Fisher worked for two technology companies, most recently as Vice President of Strategic Marketing, where he held P&L responsibility for the company's largest product. Before that, he spent 10 years as a strategy consultant, working with dozens of telecom clients on financial analysis, marketing strategy and operational improvement.

Mr. Fisher holds an M.B.A. (with distinction) from the University of Michigan and a B.S. from the School of Foreign Service at Georgetown University.

RANDALL G. FREDERICK

Mr. Frederick is a Project Manager/Senior Engineer/Associate with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Frederick, has more than 30 years of experience as a project manager and senior engineer managing underground wireline and pipeline utility installations and construction engineering and inspection (CE&I) services for highway and railway bridges and tunnels.

As a former CSX Principal Engineer, Mr. Frederick functioned as the primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters. He managed the system and network of the company's Computer Aided Dispatching System (CADS), Rail-Highway Grade Crossing Warning Systems, and Incremental Train Control Signaling (ITCS). Mr. Frederick holds a Bachelor of Arts, Business Administration from Cedarville University.

Mr. Frederick's resume is attached hereto.

Mr. Frederick is sponsoring portions of Section III.F of defendants' Reply Evidence relating to earthwork and public improvements. Mr. Frederick 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 4, 2010

Randall G. Frederick

Randall G. Frederick

Project Manager/Senior Engineer
Associate

Mr. Frederick has more than 30 years of experience as a project manager and senior engineer man aging underground wireline and pipeline utility installations and construction engineering and inspection (CE&I) services for highway and railway bridges and tunnels. As a former CSX Principal Engineer, Mr. Frederick functioned as the primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters. He managed the system and network of the company's Computer Aided Dispatching System (CADS), Rail-Highway Grade Crossing Warning Systems, and Incremental Train Control Signaling (ITCS).

Employee No.
91665

Department No.
53

Office Location
Jacksonville, FL

Date joined firm
9/12/05

Years with other firms
30

Education
Bachelor of Arts, Business Administration; Cedarville University (1987)

Training/Certifications
FRA Roadway Worker
Environmental and Industrial Safety Course
AREMA Highway Crossing Interconnection

Memberships
NCUTCD Railroad & Light Rail Transit Highway Grade Crossings Technical Committee

Computer Skills
MS PowerPoint, Project, Access

Project Experience

CSX Siding Capacity Project - Project Manager/Senior Engineer
Managing the design and construction of a 7,200-foot passing siding in Goldsboro, NC. Mr. Frederick is responsible for site survey, environmental permitting, development of design documents, and the supervision of construction. (2007 - Present)

CSX Montgomery Sanitary Sewer Installation - Project Manager
Managing CE&I services for the micro-tunneling and installation of a 96-foot sanitary sewer beneath the CSX main line tracks in Montgomery, AL. Mr. Frederick is preparing estimates, coordinating with CSX personnel, and managing the budget. (2007 - Present)

CSX Railroad Bridge over Asbury Road Rehabilitation - Project Manager
Managing preliminary engineering reviews and development of railroad force account estimates and contract management for the rehabilitation of a single-span railroad bridge over Asbury Road at Erie International Airport in Erie, PA. Mr. Frederick is coordinating with CSX personnel and managing the budget. (2006 - Present)

CSX I-370 Bridge Widenings - Construction Manager
Managing CE&I services for the widening of dual highway bridges on I-370 over the CSX right-of-way in Derwood, MD. Mr. Frederick is preparing estimates, coordinating with CSX personnel, and managing the budget. (2006 - Present)

CSX Wireline and Pipeline Installations - Construction Manager
Managing more than 35 underground wireline and pipeline utility installations across CSX property in 23 states, some of which go under and

others parallel to the CSX right-of-way. Mr. Frederick is preparing estimates, coordinating with CSX personnel, and managing the budget. (2005 - Present)

Republic of China Ministry of Rail ITCS Signal System - Designer
Served as a member of the design management team for a state-of-the-art, GPS-based, Incremental Train Control Signaling (ITCS) system on 1,400 km of rail line between Beijing and Tibet for the Republic of China's Ministry of Rail. Mr. Frederick led a team of engineers and CAD operators in the application engineering department of GE Transportation Systems in Jacksonville, FL, to ensure on-time project completion within pre-established budgetary constraints. (2004 - 2005)

GE Transportation Systems - Former Signal Engineer
Responsible for oversight and management of the grade crossing warning system and as-in-service train control projects. This position required solid knowledge and experience in railroad signal design, inspection and installation, FRA, FHWA, and MUTCD standards, as well as a thorough understanding of the federal (ISTEA/TEA-21/SAFETEA-LU) funding programs. (2000 - 2005)

CSX Public Projects - Former Principal Engineer, Public Projects
Responsible for project management and administration of publicly funded projects, within a 11-state area including Ohio, Michigan, Indiana, Illinois, Pennsylvania, Kentucky, Tennessee, West Virginia, Virginia, Maryland, Washington, D.C., and Ontario, Canada. The position entailed monitoring, scheduling, and coordination of key project milestones necessary for successful implementation. Responsibilities necessitated close interaction, communication, and negotiation with state and local government authorities for review and execution of contractual agreements. The position required detailed knowledge and application of state and federal laws and regulations, as they relate to railroad operations, permitting, and associated issues. The job periodically required appearances as the railroad's expert witness for grade crossing accident and Public Utility Commission hearings and litigation. Mr. Frederick also functioned as the railroad's primary representative in the mediation of legal proceedings, public safety issues, and other politically-sensitive railroad-related matters. (1994 - 2000)

CSX Technology - Former Software Engineer
Managed the system and network of the company's Computer Aided Dispatching System (CADS) in Jacksonville, FL. Duties included system monitoring, performance tuning, supervision, implementation and management of software/hardware upgrades, and disaster recovery planning within a high-volume, mission-critical operation. (1992 - 1994)

CSX Technology - Former Electronic Signal Technician
Responsible for coordination and implementation of new software installations necessary to update the Computer Aided Dispatching System (CADS) in Jacksonville, FL. Duties included managing and directing field

personnel in the identification, analysis, and resolution of signal code system problems. (1988 - 1992)

CSX Technology - Former Division Signal Maintainer
Performed signal design, installation, maintenance, and electronic trouble shooting of automatic signal and grade crossing warning systems in Newark, OH. (1974 - 1988)

ROBERT GUARDIA, P.E.

Mr. Guardia is a Vice President with Shannon & Wilson, Inc., a consulting firm dedicated to providing a full range of geotechnical and environmental engineering services.. Mr. Guardia is a geotechnical engineer with 25 years of experience including the last 18 years in tunneling, microtunneling and horizontal directional drilling projects.

Mr. Guardia has been involved in the construction and rehabilitation of over 150 tunnels in the US and overseas. Other areas of expertise include tunnel support, grouting, and shotcrete. He has been Resident Engineer for the enlargement of approximately 25 railroad tunnels. Mr. Guardia has served as Project Manager for the design and plans and specifications for construction, enlargement and rehabilitation of railroad, highway and conveyance tunnels. Mr. Guardia has a BS, Civil Engineering and a MS, (Geotechnical) Civil Engineering from University of Illinois.

Mr. Guardia's resume is attached hereto.

Mr. Guardia is sponsoring portions of Section III.F.2, and III.F.4 of defendants' Reply Evidence relating to geological conditions, equipment selection, and tunnels and related structures. Mr. Guardia 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 4, 2010

Roberto Guardia

Roberto J. Guardia, PE | Vice President

GEOTECHNICAL ENGINEER

EDUCATION

MS, (Geotechnical) Civil Engineering, University of Illinois, 1978
BS, Civil Engineering, University of Illinois, 1976

REGISTRATION

Professional Engineer, Washington, 26086, 1989
Professional Engineer, Oregon, 66833PE, 2001
Professional Engineer, California, C63333, 2002
Professional Engineer, Florida, 63761, 2006
Professional Engineer, Georgia, PE032289, 2007
Professional Engineer, Alabama, 30515
Professional Engineer, South Carolina, 27552
Professional Engineer, Panama, 81-006-053, 1981
Approved Examiner and Trainer for American Concrete Institute Shotcrete Nozzlemen Certification

ADDITIONAL TRAINING

Health and Safety Training for Hazardous Waste Operations (40-Hour 29 CFR, 1910.120)
Short Course - Applied Rock Mechanics, ASCE, 1998
Short Course – Deep Foundations, Deep Foundation Institute, 1993
Short Course – Mechanical Excavation and Ground Support, Colorado School of Mines, 1994
Short Course- Project Delivery System, Transpeed, 2001
Various Short Courses organized by the Seattle Section of ASCE

Roberto Guardia is a geotechnical engineer with 25 years of experience including the last 18 years in tunneling, microtunneling and horizontal directional drilling projects. Roberto has been involved in the construction and rehabilitation of over 150 tunnels in the US and overseas. Other areas of expertise include tunnel support, grouting, and shotcrete. He has been Resident Engineer for the enlargement of approximately 25 railroad tunnels. Mr. Guardia has served as Project Manager for the design and plans and specifications for construction, enlargement and rehabilitation of railroad, highway and conveyance tunnels.

Microtunneling

1 ***Health Ministry/ Nippon Koei, Panama, Sewer Collection Tunnel, Panama City, Panama.*** As Project Geotechnical Manager, Roberto provided Geotechnical services for the 8-kilometer 3.0-meter diameter sewer collector tunnel. The first phase of exploration included 22 deep borings up to 40 meters deep in soil and rock and a preliminary engineering report of conditions encountered and recommendations for design and tunneling machine selection. The rock samples were characterized by performing unconfined compressive strength tests, tri-axial tests, point load tests and slake durability tests. In-place permeability tests were performed at the bottom of the boreholes utilizing packer tests. The second phase included 42 deep borings to further explore

difficult areas and included the preparation of tunneling specifications and a Geotechnical Baseline Report for the Design-Build project. Tunneling machine is an earth pressure balance tunneling machine and support provided with a segmental concrete lining.

2 ***King County, Henderson Combined Sewer Overflow (CSO), Seattle, Washington.*** A 1,000-foot segment of the project consisted of a 72-inch-diameter concrete pipe that was installed by microtunneling under an eight-lane section of Interstate-5 and the BNSF and Union Pacific Railroad corridor into Seattle. Three-dimensional tomography methods were utilized to identify potential obstructions. Horizontal directional drilling was used to install three 4 ½-inch high-density polyethylene (HDPE) pipes around the future tunnel to run the tomography probes. Roberto managed the exploration program, prepared a geotechnical baseline report, and plans and specifications related to the 72-inch crossing. Obstructions found during tunneling confirmed the anticipated obstructions identified by the three-dimensional tomography.

3 ***King County, Henderson Combined Sewer Overflow (CSO), Seattle, Washington.*** Roberto was Project Manager assisting Construction Management Team in reviewing geotechnical related submittals, weekly progress meetings, assessing construction methods, special inspections for shotcrete supported circular shafts and monitoring and analyzing ground behavior while tunneling under two important water mains. The 3,500-foot-long, 15-foot diameter storage tunnel was excavated with an earth pressure balance machine and supported with gasketed segmental liner. Compaction grouting was utilized for an area of excessive ground settlement and as a precautionary measure under the main waterlines. Five microtunnels ranging from 48- to 78-inch-diameter and up to 750 feet long were part of the project connecting between shafts.

4 ***Bonneville Power Administration, Pipe Jacking, Vancouver, Washington.*** As Project Engineer, Roberto provided design and plans and specifications for the construction of a 48-inch pipe jack to replace an existing distressed concrete pipe at the Cold Creek diversion pipeline of the Bonneville Power Administration in Vancouver. The design-construct contract was structured to allow concrete, fiberglass, and steel pipe as alternates. A Data Report and a Baseline Report were provided as part of the project documents. Lateral loads were provided for the design of three shafts up to 80 feet deep connecting the three segments of the 2,250 feet long pipeline. Provided Engineer's cost estimate, submittal review, and overseeing construction activities with participation in progress meetings as required. A slurry excavation microtunneling machine and a closed shield machine were used simultaneously in different segments.

5 ***Burns & McDonnell, Lake Ft. Smith Water Supply Intake Works, Fort Smith, Arkansas.*** The water supply intake structures consisted of an intake tower built in a shaft on the shore of Lake Ft. Smith, a 1,300 feet long multi-use tunnel and outlet portal structure. The shaft and tunnel were excavated by drill and blast methods and supported by steel fiber reinforced shotcrete and rock dowels. The tunnel was lined with cast-in-place concrete and will be used for flood control discharge. There are two water supply pipes below the invert of the tunnel. Two lake taps of 72-inch-diameter and 300 feet aggregate length were excavated from the intake shaft below lake level utilizing microtunneling methods. Roberto served as Project Manager/Designer for this project preparing plans and specifications.

6 ***Cascade Water Alliance, Waterline Central Segment, Seattle, Washington*** The Cascade Water Alliance, composed by several utilities and cities of eastern Seattle are building a new 42-inch diameter waterline to meet the needs of the growing east side communities. The 10-mile long Central segment has four undercrossings that will be excavated by microtunneling methods installing 48 to 56-inch diameter casings. Obstacles include a BNSF railroad line/ Jenkins Creek,

four-lane with median SR-18, Little Soos Creek and a major avenue Kent-Kangley Road. Roberto was Project Manager for the exploration consisting of eight borings and Geotechnical recommendations for the new crossings with lengths between 135 to 355 feet utilizing microtunneling methods. Slug tests in cased boreholes were conducted to estimate the groundwater inflow during dewatering of the alluvial deposits at Jenkins Creek. Both slurry pressure balanced and auger microtunneling methods were recommended. Recommendations were provided for shafts, thrust blocks and construction dewatering.

7 ***City of Seattle Duwamish River Crossing, Seattle, Washington.*** As Project Engineer, Roberto provided submittal reviews for two 80-foot-deep frozen ground shafts and 10-foot-diameter concrete pipes installed by pipe-jacking with a slurry-circulation microtunneling machine. The 540-foot-long crossing traversed saturated silts and fine sands. Participated in construction monitoring during the difficult shaft construction due to freeze-pipe complications and evaluated instrumentation including inclinometer/magnetic switch extensometers, piezometers, and thermistor strings.

8 ***City of Everett, I-5 Crossing, Everett, Washington.*** Roberto was Project Engineer for a 60-inch steel pipe jacked under I-5 near Everett. Provided construction monitoring during chemical grouting of the heading material consisting of soft organic soils and hydraulically placed fill. Performed cube compression test on grouted sand samples. The pipe was jacked with an open face shield and spoils removed with an auger.

9 ***City of Kennewick, Kennewick Treatment Plant, Kennewick, Washington.*** Roberto was Project Engineer for the design, plans, and specifications for 10-foot-diameter jacked steel pipe crossing a BNSF mainline embankment. Also provided the engineer's cost estimate and lateral pressures for the design of the reaction shoring. The 160 feet long pipe jack will be used to convey a 2-foot-diameter treated sewer line and pedestrian traffic.

10 ***BNSF, Pipe Jacking, Tacoma, Washington.*** As Project Engineer, Roberto reviewed submittals and provided partial construction monitoring for a 540-foot-long, 68-inch-diameter steel pipe jacked under a BNSF railyard in Tacoma. The tunnel was driven with a slurry microtunneling machine excavating through consolidated silts, sands, and clays with the ground water located 3 feet below the ground surface. Logs were encountered in the course of the excavation, which were crushed by the slurry machine. The project was completed without significantly disturbing the railyard tracks as verified by survey settlement points.

Tunnels

11 ***Oregon Department of Transportation, In-Depth Tunnel Inspections, Oregon.*** As Project Manager, Roberto performed in-depth tunnel inspections of nine highway tunnels in Oregon and provided tunnel inspection training to their engineering and maintenance personnel. The inspection reports had detailed information regarding tunnel design and detailed tunnel maps. Tunnel portals, adjacent slopes, and tunnel drainage systems were also evaluated during the tunnel inspections. Recommendations were provided for immediate, short-term and long-term maintenance and the scope and budget of the anticipated repairs. A tunnel inspection training manual was prepared with basic tunnel design concepts, descriptions of tunnel liners, and specific tunnel inspection procedures adapted to each kind of tunnel liner. One-day and half-day long training seminars were developed for engineering and maintenance personnel respectively. The seminars included examples of liner distress for various kinds of liners, as identified during the

tunnel inspections, and discussion of tunnel maintenance and rehabilitation recommendations for each tunnel.

12 ***Washington State Department of Transportation, Interstate 90 Tunnel Feasibility, Hyak, Washington.*** Roberto was Project Manager for the feasibility study and preliminary cost estimate for the 3,000-feet long, 36-foot wide roadway twin tunnels through volcanic and sedimentary rocks. Geologic reconnaissance of the portals and terrain over the tunnel alignment provided basic geologic information that was used in the preliminary rock support design. The preliminary design of the 190 foot high west portal rock cut was developed based on existing topography and existing highway constraints. An engineer's cost estimate was developed for construction of the tunnel and portals based on unit costs and estimated quantities. A geotechnical exploration program for final design including core drilling along the alignment and portals and the use of the boring optical televiewer and a pilot bore along the tunnel alignment was developed.

13 ***Oregon Department of Transportation, Cape Creek Tunnel Rehabilitation, Florence, Oregon.*** Roberto was Project Manager for the geotechnical investigation, testing, design, plans, specifications, and construction observation for Cape Creek Tunnel Rehabilitation. The 714-foot-long tunnel built in 1933 has approximately 450 feet of timber lining that was later covered with a reinforced concrete lining. The rest of the tunnel was left unlined. Geotechnical investigations included drill probes through the concrete lining and six coreholes drilled through the arch form within the tunnel to a depth of 25 feet. The concrete linings were also tested with ground penetration radar and sonic testing to determine the strength and thickness of the lining, and to get an indication of loose rock and voids above the lining. The investigation found that a segment of the concrete lining had areas of thinner concrete and signs of distress and corrosion with high rock loading. The lining near the south portal was designed for replacement with lattice girders and shotcrete and cement grouting in the tunnel arch. The rest of the concrete linings will be backfilled with lightweight grout to fill the existing voids. The unlined areas will be supported with rock bolts and shotcrete.

14 ***Union Pacific, Clearance Improvements for Double-Stack Cars of Coos Bay Tunnels, Oregon.*** Roberto is Project Manager for the ongoing evaluation of 9 tunnels in the Coos Bay area to determine preliminary feasibility and construction costs for providing double-stack container car clearance. The condition of the tunnels was assessed and surveyed cross-sections were evaluated to determine the depth of tunnel clearance required by location. Concrete notching, complete timber set removal with new tunnel support and track lowering are under consideration to obtain the clearance improvements.

15 ***RailAmerica, Tunnel 13, Siskiyou, Oregon.*** Tunnel 13 had extensive damage due to a fire and after rehabilitation there were two segments of the tunnel that did not meet State requirements for vertical and side clearance. Roberto was Project Manager for determining the impediments by laser survey and developing the design and specifications for the tunnel clearance improvements. Existing steel sets had to be removed and replaced with new steel sets located in a new centerline. The work involved the use of steel fiber reinforced shotcrete, steel dowels and new steel sets. We also participated during construction with submittal review and construction observation on a full-time basis.

16 ***Union Pacific Railroad, Tunnel No. 2, Keddie, California.*** Roberto served as resident engineer for the mining of a collapsed tunnel in foliated schist providing additional support with spilling, grouting and shotcrete as required for the Union Pacific Railroad. A top heading excavation

method was utilized in a portion of the tunnel that collapsed up to the ground surface. Liner consisted of steel sets and channel lagging backfilled with concrete.

17 ***Union Pacific Tunnel Clearance Improvements, Feather River and Fremont, California.*** Roberto served as resident engineer for notching railroad tunnels to improve clearance. Notching was performed with a roadheader mounted on a rail car. Resin encapsulated rock bolts were installed through the existing concrete liners to provide additional liner support or to replace existing rock bolts located in the notched area. Responsible for measuring air flows and toxic gases during the operation. Notching was performed in 10 tunnels located in the Feather River Canyon and one tunnel in Fremont.

18 ***Southern Pacific, Tehachapi Tunnel Clearance Improvement Project, Caliente and Tehachapi, California.*** Roberto served as resident engineer for this project. Twelve tunnels between Caliente and Tehachapi were enlarged to accommodate double-stack container trains. The work consisted of installing crown rock bolts and sidewall tiebacks, pumping cement grout behind the concrete liner to fill voids, and notching with a roadheader.

19 ***Conrail, Tunnel Enlargement, Gallitzin, Pennsylvania.*** The brick liner of the 3,600-foot-long tunnel was removed and the tunnel enlarged from a single-track to a double-track configuration. Coal mines were present over the tunnel and caused several collapses. Support consisted of rock dowels and pre-stressed rock bolts with steel-fiber-reinforced wet mix shotcrete. Provided construction management services and supervised six engineers and technicians on three shifts per day. Roberto served as Resident Engineer.

20 ***ICF-Kaiser, Berry Street Tunnel Rehabilitation and Enlargement Project, Pittsburgh, Pennsylvania.*** The project involved enlargement of a 100-year-old brick railroad tunnel and conversion to a bus tunnel, excavation of shale and sandstone, lattice girder, shotcrete and rock dowel support, and new drainage systems. Roberto collaborated in the design approach, plans and specifications, engineer's cost estimate, and Geotechnical Design Summary Report. He also reviewed contractor's value engineering proposal.

21 ***La Nacional, Loma Larga Tunnels, Monterrey, Mexico.*** Project Manager for alternate design and blasting recommendations for the construction of the tunnels. The 2,350 feet long twin highway tunnels have a semi-circular shape with a horizontal diameter of 58 feet making it a large underground cavern. Reviewed available borings and site geology and provided design for various support categories based on the RMR and Q methods. Proposed liner was of fiber-reinforced shotcrete and rock bolts in lieu of the original design of wire mesh and plain shotcrete. Further analysis of the benefits of utilizing rock bolt was conducted by numerical methods (FLAC). Provided tunnel blasting recommendations for optimizing drillhole diameter, spacing and blast sequence of the benched heading. The perimeter of the tunnel was blasted by innovative smooth blasting methods.

22 ***Wheeling & Lake Erie, Robertsville Tunnel Rehabilitation, Robertsville, Ohio.*** The 550-foot-long railroad tunnel supported by timber sets has erodible shales, which weaken the sidewalls and requires continuous ditch maintenance. Roberto served as Project Manager and provided field investigation and alternative recommendations with cost estimates followed by plans and specifications for shotcreting the sidewalls and providing shotcrete and rock bolt support to one portal and a new portal excavation.

23 ***Oregon Department of Transportation (DOT), Elk Creek Highway Tunnel, Elkton, Oregon.*** Roberto was Project Manager for the rehabilitation of the 1,150 feet long Elk Creek highway tunnel. Performed tunnel exploration by probes through wood liner and ground penetration radar methods. Accomplished geological mapping and rock mass classification of the tunnel including Schmidt rebound hammer and point load testing of the rock. Developed design of tunnel ground support for the new clearance envelope, consisting of fiber-reinforced shotcrete, rock bolts, lattice girders, and steel sets. Prepared plans and specifications for Oregon DOT for the ground support and portal structures. Included engineer's cost estimate, which was within 10 percent of successful bidder's proposal.

24 ***BNSF, Tunnel Enlargement, Martinez, California.*** As Project Manager, Roberto provided preliminary design and cost estimate for the enlargement of three tunnels in Martinez. The concrete-lined tunnels were enlarged in 1989 for double stack clearance by performing notches that exceeded 2 feet and undercutting. The proposed notching is to achieve Chrysler car clearance. The work will involve notching with a road header and installing new resin-grouted rock bolts above and below the new notch.

25 ***Union Pacific, Clearance Improvement Program of the Donner Pass Tunnels, Sacramento, California to Reno, Nevada.*** As Project Manager, Roberto prepared plans and specifications for enlarging 25 tunnels for double stack and Chrysler car clearance. Several of the tunnels will require remining or undercutting. Prior to notching with a road header the tunnels will be grouted and reinforced with rock bolts. Construction costs were estimated in the order of $12 million.

26 ***BNSF, Ostrander Tunnel Rehabilitation, Kelso, Washington.*** The timber set and lagging supported tunnel was burned to ashes after a forest fire. The 430-foot-long tunnel built in vesicular basalt was literally cooked by the fire and had to be scaled by mechanical methods. Final support was achieved with the installation of resin-grouted rock bolts and steel fiber-reinforced shotcrete. Bidding documents were prepared in an accelerated schedule and the work was completed in 28 working days. Roberto was Project Manager.

27 ***Puget Sound Energy, Lower Baker Tunnel In-Depth Inspection, Concrete, Washington.*** The Lower Baker Tunnel has had a long history of water flows on the downstream abutment partially originating from the concrete lined tunnel. When the 22-foot-diameter tunnel is dewatered inflows are in the order of 800 gallons per minute originating in cracks and previously installed grout pipes. The tunnel was mapped indicating existing cracks, construction joints, and areas of seepage and leaks. Nondestructive testing consisting of ground penetration radar and sonic/ultrasonic methods were utilized to determine the extent of poor concrete and the location of voids in the concrete and between the concrete and rock. Probe holes drilled through the concrete liner verified and calibrated the ground penetration radar and sonic measurements. Roberto served as Project Manager for this project.

28 ***Puget Sound Energy, Lower Baker Tunnel Rehabilitation, Concrete, Washington.*** Roberto served as Project Manager for this project. Based on the results of the Lower Baker Tunnel In-Depth Inspection, a rehabilitation program was implemented consisting of cement and chemical grouting of voids behind the concrete liner and within the concrete liner. A valve attached to a steel plate anchored to the concrete was used to seal one grout pipe that was leaking approximately 300 gallons per minute. Once the flow was stopped, polyurethane grout was injected into the grout pipe successfully stopping the flow. Significant cracks were grouted through holes drilled into the liner. Other work consisted of surface repairs of cavitation areas and sealing cracks on the surface.

PUBLICATIONS

Lake Ft. Smith Microtunneling Lake Tap, Guardia, R., Winkler, K., Rasmussen, P., and Lewtas, T. Proceedings Rapid Excavation and Tunneling Conference, Seattle, June 2005.

Rehabilitation of the Cape Creek Highway Tunnel Under Traffic, Robinson, R. A., Shell, T., Guardia, R., Rodolf, S., Proceedings Rapid Excavation and Tunneling Conference, Seattle, June 2005.

Predicted versus Actual Obstructions for Two Pipe-jacked Tunnels of The Henderson CSO, Seattle, Washington, Cowles, B., Guardia, R., Robinson, R., Andrews, R., Molvik, D., Proceedings Rapid Excavation and Tunneling Conference, Seattle, June 2005.

"Conceptual Design for a Deep Underground Science and Engineering Laboratory," by H.C. Haxton, J.F. Wilkerson, R. Robinson, and R. J. Guardia, Proceedings of the Rapid Excavation and Tunneling Conference, June 2005.

Godlewski, P.M., and Guardia, R.J., 2003, Transportation Tunnel Rehabilitation *in* Rapid Excavation and Tunneling Conference, New Orleans, La., June 2003, Proceedings, New Orleans, La..

Neil, D.M., and Guardia, R.J., 2002, Tomographic Ground Imaging for the Henderson CSO Treated Tunnel Alignment, King County, Washington, Proceedings North American Tunneling, Seattle, May.

Guardia, R.J., Robinson, R.A., Godlewski, P.M., and Hultman, W.A., 2002, Reconditioning of Transportation Tunnels in the Pacific Northwest, Proceedings North American Tunneling, Seattle, May.

Parker, H.W., Godlewski, P.M., and Guardia, R.J., 2002, The Art of Tunnel Rehabilitation with Shotcrete, Shotcrete Magazine, American Shotcrete Association, Fall.

Fisk, P.S., Guardia, R.J., and Porter, W.D., 2002, Lower Baker Tunnel Investigation and Repairs, Proceedings North American Tunneling, Seattle, May.

Robertson, C.A., Guardia, R.J., Robinson, R.A., and Rustvold, J.W., 2001, Bonneville Power Administration Cold Creek Pipeline Replacement, Proceedings Rapid Excavation and Tunneling Conference, San Diego, June.

Parker, H.W., Robinson, R.A., Godlewski, P.M., Hultman, W.A., and Guardia, R.J., 2001, Tunnel Rehabilitation in North America, Proceedings International Tunneling Association World Tunnel Congress, Milan, June.

Guardia, R.J., Robertson, R.A., and Laird, J.R., 2000, Tunnel Inspection Manual, prepared for Oregon Department of Transportation, June, 96 p.

PROFESSIONAL ASSOCIATIONS

American Society of Civil Engineers
American Shotcrete Association; Individual Member
American Railway Engineering and Maintenance of Way Association; Associate Member

David J. Hughes

Mr. Hughes has 30 years of experience as a professional engineer in railroad engineering and in railroad operations and maintenance supervision. His business address is 1401 S. Ocean #601, Hollywood, Florida 33019. From 1967 to 1975, he held numerous positions at Southern Pacific Railroad, including first line supervision of track maintenance and bridge and building maintenance. From 1975 through 1980, he was Vice President of Engineering for the Boston and Maine Railroad, where he was responsible for all track structures, signal systems maintenance, and for planning the reconfiguration and reconstruction of 155 route miles of mainline. From 1980 through 1985, he was President of Pandrol, Inc. and Speno Rail Services, where he assisted railroads in developing high-performance track components and mechanized rail and ballast maintenance practices. From 1985 through 1991, he was President of the Bangor & Aroostook Railroad, a 430-mile regional railroad in the northeastern United States. From 1999 to 2006, as Chief Engineer for the National Railway Passenger Corporation ("Amtrak"), he was responsible for track structures, signal systems, maintenance, and construction. From 2005 through 2006, Mr. Hughes was Acting President and Chief Executive Officer of Amtrak.

Mr. Hughes has also been active in industry organizations. He was Chairman of Regional Railroads of America, a director of the American Railway Engineering Association, and a member of the Engineering Division of the Association of American Railroads ("AAR"), the AAR's Operating and Transportation Committee, the AAR's Track Research Committee, and the AAR Board of Directors.

Mr. Hughes is sponsoring evidence relating to maintenance-of-way costs set forth in Section III.D.4. Mr. Hughes 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 3, 2010

David J. Hughes

Mark Kotter

Mark Kotter is a railroad transportation consultant, with over 33 years of experience in railroad operations. Mr. Kotter has held nearly every operating management position within the BNSF railroad. From 1991 until 1996, Mr. Kotter was the Division Superintendent for the Colorado Division (which included responsibility for the rail operations from Sterling, Colorado to Amarillo, Texas). From 1996 to 1997, he was Assistant Vice President ("AVP") Coal Operations, where he was responsible for operating oversight of the BNSF system coal business unit. During this time, he had direct input and management oversight of major construction and expansion programs in the Powder River Basin (PRB) of Wyoming. He was also responsible for coordination and efficient operation of the Orin Line (Joint Line with the Union Pacific) between Donkey Creek and Shawnee Jct. where the Union Pacific entered the line. From 1997 to 1999, Mr. Kotter was AVP of Network Operations, where he was responsible for the oversight of the BNSF Dispatching Center in Ft. Worth. In this position his duties included the hiring, discipline, training, and scheduling of the dispatchers in the Ft. Worth Network Operations Center. In this role he also set up dispatching territories and dispatching desks for the BNSF system. From 1999 to 2007 Mr. Kotter held the positions of AVP Northern Operating Region, then VP Northern Operating Region and finally VP Central Operating Region. When the operating region territories were re-aligned and Mr. Kotter became VP Central Operating Region, the major coal routes were assigned to him due to his extensive knowledge of the coal train operations. While in these positions he was responsible for geographic territories, including Laurel, Montana, thru Gillette, Wyoming; Gillette, Wyoming down the Orin Line thru Guernsey, Wyoming; and Guernsey, Wyoming thru Sterling, Brush, Denver, Pueblo, LaJunta, Colorado to and thru Amarillo, Texas.

Based on his experience in these senior operating positions, Mr. Kotter is familiar with all the operating characteristics of the territories mentioned above. Besides being responsible for the safe and efficient operations of these Operating Regions, he was also responsible for providing significant input into and approval of the Capital Maintenance and Expansion plans for his territory. While not directly responsible for the maintenance and engineering activities on the Operating Region, he was responsible for input and oversight of the planning and scheduling of these activities to minimize their impact on overall train operations.

In 2008, Mr. Kotter worked as transportation consultant for TranSystem, a railroad transportation and engineering company.

Mr. Kotter sponsors evidence relating to Operational considerations set forth in Section III.B and III.C in the Reply Evidence. Mr. Kotter 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 5, 2010

Mark Kotter

JOHN F. MACDONALD, P.E.

Mr. MacDonald is an independent conslutant with more than 25 years of experience in designing, constructing, and developing cost estimates for tunnel projects all over the world. He has provided project management and engineering services on numerous projects. Mr. MacDonald has also served on numerous technical review boards. Mr. MacDonald holds a Bachelor of Science, Physics and Math from Lewis and Clark College and a Bachelor of Science, Civil Engineering from the University of Washington.

Mr. MacDonald's resume is attached hereto.

Mr. MacDonald is sponsoring portions Section III.F.4 of defendants' Reply Evidence relating to tunnel costs. Mr. MacDonald 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 4, 2010

John F. MacDonald

John F. MacDonald, P.E.

PO Box 246
Twin Peaks, CA 92391
Tel - (909) 336-2429; cell – (951) 205-7545; e-mail – jmacdonald@aaahawk.com

EXPERIENCE

Independent Consultant **8/01 to Present**

As an independent consultant I have worked for owners, engineers and contractors. I have been on Technical Review Boards, Value Engineering Boards, a Disputes Review Board, prepared estimates for Owners and Engineers, reviewed Contractor change orders for Owners, prepared underground estimates for Contractors, and worked with Contractors to start up major underground projects.

Technical Review Boards

- Alaskan Way Viaduct Tunnel – Cut and cover highway tunnel – Seattle, WA – client: WashDOT
- Brightwater Conveyance System – 3 EPB and Slurry TBM soft ground tunnels – Seattle, WA – client: King County
- DUSEL (Deep Underground Science & Engineering Lab) Site Selection Team (S3) – client: National Science Foundation
- DUSEL Large Cavity Board – client: University of California, Berkley and National Science Foundation
- Enbridge Gateway Pipeline Project – two hard rock tunnels – near Kitimat, B.C. Canada – client: Enbridge Inc.
- Port Mann Water Tunnel – soft ground TBM – Vancouver, B.C., Canada - client: Greater Vancouver Water District
- Seymour-Capilano twin tunnels –drill & blast and TBM hard rock tunnels – Vancouver, BC, Canada – client: Greater Vancouver Water District
- Singapore's underground mass transit and highways – soft ground/marine clay tunnels and cut and cover structures – Singapore - client: Singapore Land Transport Authority

Value Engineering Sessions/Boards

- Caldecott Fourth Bore Highway Tunnel – drill & blast rock tunnel – Oakland, CA - owner: CalTrans
- Kicking Horse Canyon Project, Phase III – multiple drill & shoot hard rock tunnels – Golden, B.C., Canada – owner: British Columbia Ministry of Transportation
- Seymour-Capilano twin tunnels –drill & blast and TBM hard rock tunnels – Vancouver, BC, Canada – owner: Greater Vancouver Water District
- Transbay Terminal Caltrain Extension – soft ground sequential excavation tunnels– San Francisco, CA – owner: San Francisco County Transportation Authority
- University Link Transit Project – soft ground EPB tunnels & cut and cover stations – Seattle, WA – owner: Sound Transit
- Vermont Relief Sewer – soft ground tunnel – Los Angles, CA – owner: City of Los Angeles

Disputes Review Board

- Little Walnut South Tunnel – hard rock tunnel - Austin, TX

Partial or complete underground estimates prepared for Owners/Engineers:

- Avenue 45 Replacement Sewer – soft ground – City of Los Angeles – client: Lee & Ro
- Baumgartner Tunnel – hard rock – St. Louis, Missouri – client: Shannon & Wilson
- Beacon Hill Shaft – soft ground – Seattle, Washington – client: Hatch Mott MacDonald
- Brightwater Conveyance Tunnel East – soft ground – client: URS
- Brightwater Conveyance Tunnel Central – soft ground – client: URS & Jacobs Civil
- Brightwater Conveyance Tunnel West - soft ground – client: URS & Jacobs Civil
- California Aqueduct East Branch Extension – soft rock – Redlands, California – client: Krieger & Stewart
- Cape Creek Tunnel – hard rock tunnel rehabilitation – western Oregon – client: Shannon & Wilson
- Oil Sands Pilot Tunnel – soft ground – northern Canada – client: OSUM

Review of Contractors Change Orders

City of Los Angeles East Central Interceptor Sewer – soft ground – client: Parsons Brinkerhoff Construction Services

Baumgartner Tunnel – hard rock - client: Shannon & Wilson

Partial or complete underground estimates prepared for Contractors:

Arrowhead Tunnels, second bid – TBM soft rock – San Bernardino, California
Bay Tunnel – soft ground – San Francisco bay area, California
Big Walnut Augmentation/Rickenbacker Interceptor Sewer – soft ground - Columbus, Ohio
Caldecott Fourth Bore Highway Tunnel – drill & blast – Oakland, California
Devil's Slide Tunnels – Sequential excavation method tunneling – Pacifica, California
Elm Road Intake – drill & shoot and TBM hard rock tunnel – Milwaukee, Wisconsin
Nancy Creek Tunnel – drill & blast and TBM hard rock tunnel – Atlanta, Georgia
North Shore Connector Tunnel – soft ground – Pittsburgh, PA
Northeast Interceptor Sewer – soft ground – Los Angeles, California
Northwest Side Relief Sewer – hard rock – Milwaukee, Wisconsin
OSIS Augmentation & Relief Sewer – drill & blast, TBM – Columbus, Ohio
PC-765 Detroit near Surface Work – Drill & blast - Detroit, Michigan
Upper Northwest Interceptor Sewer 1&2 – soft ground – Sacramento, California
Upper Rouge River Tunnel – South Tunnel – drill & blast, TBM – Detroit, Michigan
San Vicente Dam Raising – RCC dam, new D&B tunnel – San Diego County, California
San Vicente Water Tunnel – hard rock & soft ground – San Diego County, California
Seattle Transit Tunnel retrofit & Expansion – soft ground – Seattle, Washington
South Cobb Tunnel – hard rock – Cobb County (Atlanta area), Georgia

Project startups

Los Angeles Eastside Light Rail Transit Extension – client: Washington Group International $600 million soft ground/surface light rail project, Los Angeles, California – prepared the detailed project schedule, wrote subcontracts, prepared work plans, and reviewed support of excavation designs.

Nancy Creek Tunnel - $140 million hard rock tunnel, Atlanta, Georgia – client: Obayashi prepared the detailed project schedule, chose subcontractors and wrote subcontracts, hired personnel, set up project procedures, and supervised initial field work.

Project Management and Engineering for Contractors

Prior to being an independent consultant I worked twenty eight years for Contractors in increasing levels of responsibility. The major projects I managed or was assigned to as an engineer are listed below in reverse chronological order.

Project Manager **10/86 to 8/01**

As Project Manager I was responsible for all supervisory, technical, administrative, and contractual aspects of the projects I managed. During my 14 years as project manager I managed 5 separate projects. They were:

Arrowhead West Tunnel, San Bernardino, CA. Contractor: Shank/Balfour Beatty
The 21,000 lf 17' excavated diameter water tunnel was to be driven using a shielded tunnel boring machine. The final liner consists of an internally installed steel/concrete pipe backfilled with cellular concrete. The contract includes the installation of over 6,500 lineal feet of 12' diameter buried pipeline. The contract was cancelled by the owner after the pipeline was installed due to permitting issues.

The following projects were all with Guy F. Atkinson Construction Co.

Belleville Hydroelectric Plant, Belleville WV.
A 73 million-dollar low head hydroelectric project located at an existing lock and dam on the Ohio River. The work consisted of constructing a temporary cellular cofferdam, excavating more than 1,000,000 cy of common excavation, drilling, shooting, and excavating 150,000 cy of rock, placing 105,000 cy of concrete, and installing twin 21 megawatt bulb turbine-generators. 30 salaried staff and 290 hourly personnel.

Mud Mountain Dam Intake Replacement, Enumclaw Washington.
The work included the construction of a 370' high intake structure, construction of new 9' and 23' tunnels and the demolition of existing works. The tunnels were constructed through rock using drill & blast methods and were lined with concrete and high strength steel. The project received the Army Corp of Engineer's Civil Works Construction Contractor or the Year for 1995.

Pershing Square subway station, downtown Los Angeles, CA.
The 800' long station was constructed using the cut & cover method. Temporary support consisted of drilled soldier piles with wood lagging and internal wales and struts. The contract included relocation of utilities, excavation and excavation support, station concrete, backfill, and restoration of utilities and the street.

Seattle Bus Tunnels, Seattle, WA.
The work consisted of the construction of twin 4,900' long bus tunnels through the middle of downtown Seattle and the excavation and support of an underground bus station using cut and cover methods. The soft ground tunnels were excavated simultaneously using open face tunneling machines. Chemical, jet, and compaction grouting were all used to successfully stabilize the face and surrounding ground. Dewatering techniques included deep wells, vacuum well points and eductor well points.

Project Engineer **Contractor: Guy F. Atkinson Construction Co.** **2/79 - 10/86**

As Project Engineer I was responsible for all engineering functions performed on the two projects to which I was assigned. These included design of construction and excavation methods, project scheduling, form work design, subcontractor coordination, project submittals, and preparation of pay requests. The two projects were:

Mt. Baker Ridge Tunnel, Seattle, WA.
This multi-level, 1300' long soft ground highway tunnel had an excavated diameter of 93'. It was constructed using the stack drift method using a shield and precast concrete segmental lining for initial support of the drifts, with solid concrete backfill once each drift was complete. Mass excavation of the interior commenced after the ring of concreted drifts was complete.

Pacheco tunnel east of Gilroy California.
This 5.2 mile long, 12' horseshoe tunnel was driven using drill and blast methods through the highly varied Franciscan Formation. The tunnel was originally classified as potentially gassy. It was reclassified gassy after methane and sulphur dioxide gasses were encountered.

Construction Engineer **Contractor: Guy F. Atkinson Construction Co.** **6/73 - 2/79**

The responsibilities during this time frame varied depending on the project to which I was assigned. The projects and my responsibilities were:

11/78 - 2/79 - Contract administrator at WPPSS Nuclear units 3 & 5 near Satsop Washington. Responsible for pricing change orders and claims.

4/75 - 10/78 - Assigned to Sabana Yegua Dam in the Dominican Republic. The first 18 months I was responsible for the design of construction excavation methods for three 5.2 meter finished diameter diversion tunnels and valve chambers and the design of a valued engineered access adit in lieu of a shaft. Upon completion of the underground works I

assumed the responsibility for concrete form/falsework design and concrete lift drawings. I also became responsible for the coordination and control of record keeping for contract documents, progress reports, drawings, vendor correspondence, and general project files.

4/74 - 4/75 - 600' high rockfill New Melones Dam, Sonora, California. Responsibilities included construction engineering for a 60' diameter by 400' deep surge shaft, developing and maintaining the project schedule, and the design of the project's major haul roads.

6/73 - 4/74 - Office engineer in the company's division office assisting estimators estimating new work.

EDUCATION

Bachelor of Science, Civil Engineering — **1973**
UNIVERSITY OF WASHINGTON — **SEATTLE, WA**
Bachelor of Science, Physics and Math — **1968**
LEWIS AND CLARK COLLEGE — **PORTLAND, OREGON**

OTHER

- **Registered Civil Engineer in the State of Washington**
- **Past Chairman of the Underground Technology Research Council**
- **The author of papers for Rapid Excavation and Tunneling Conferences and ASCE**

DAVID A. MAGISTRO, P.E.

Mr. Magistro is a Senior Engineer/Project Manager with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Magistro has more than 10 years of experience with structural design, the last 9 years of which were focused on movable bridges and railroad structures.

Mr. Magistro's experience includes structural steel design, fixed bridge and movable bridge inspection, fixed bridge and movable bridge design including structural and mechanical aspects, plan production, and project management for numerous railroad and transportation agency clients. Mr. Magistro holds a Bachelor of Science, Civil Engineering from Kansas State University.

Mr. Magistro's resume is attached hereto.

Mr. Magistro is sponsoring Section III.F.5 of defendants' Reply Evidence relating to bridges. Mr. Magistro 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 4, 2010

David A. Magistro

David A. Magistro, P.E.

Senior Engineer/Project Manager

Mr. Magistro has more than 10 years of experience with structural design, the last 9 years of which were focused on movable bridges and railroad structures. His experience includes structural steel design, fixed bridge and movable bridge inspection, fixed bridge and movable bridge design including structural and mechanical aspects, plan production, and project management for numerous railroad and transportation agency clients.

Employee No.
04910

Department No.
53

Office Location
Overland Park, KS

Date joined firm
3/30/09

Years with other firms
11

Education
Bachelor of Science, Civil Engineering; Kansas State University (1998)

Professional Registrations
Professional Engineer: Missouri (2003/#2003001064/exp. 12/31/09), Kansas (2009/# 20754/exp. 4/30/11), Oklahoma

Memberships
American Railway Engineering and Maintenance-of-Way Association (AREMA) (2005 - Present), Including Committee 10 (2009 - Present) and Committee 15 (2009 - Present) Member

Heavy Movable Structures (HMS) (2001), Registrar

Project Experience

Burlington Northern Santa Fe Bridge 231.4 Structural Inspection, Load Rating and Structural Repairs - Project Manager / Field Inspector / Design Engineer
Responsible for the comprehensive structural inspection and load rating of the floor system for the roadway portions of this double-deck structure over the Mississippi River in Fort Madison, IA. The inspection and load rating was followed by a structural repairs phase of work. Mr. Magistro was responsible for the design and construction sequencing of the structural steel repairs for approach span through plate girders and floor system components including stringers and floorbeams. (6/08 - 3/09)

Burlington Northern Santa Fe Bridges 5.8, 6.2, and 6.7 Structural Inspection, Load Rating and Structural Repairs - Project Manager / Field Inspector
Responsible for comprehensive inspection and load rating analysis of these three structures over north Willamette Boulevard, north Lombard Street, and north Fessenden Street in Portland, OR. All three structures consist of a combination of deck plate girder spans and deck truss spans resting on either structural steel towers or concrete piers. Mr. Magistro also managed the follow-up project to design structural retrofits to increase the load capacity of these structures. (1/08 - 12/08)

Burlington Northern Santa Fe Bridge 117.35 Electrical / Mechanical Rehabilitation - Project Manager / Mechanical Design Engineer
Responsible for the replacement of the drive system on this span drive vertical lift bridge over the Illinois River in Beardstown, IL. The project included replacing the existing central reducer, drive motors, auxiliary drive system, shafts, bearings, and couplings. (9/07 - 11/08)

Norfolk Southern Bridge Rehabilitation - Design Engineer
Responsible for the replacement of the curved segments on the rolling girders of this double track rolling bascule span over the South Branch Elizabeth River in Gilmerton, VA. The project included structural design and detailing, plan production, construction specifications, construction sequencing and contractor coordination. (5/07 - 1/09)

Canadian Pacific Rail Bridge Bearing Repair & Truss Jacking - Project Manager / Design Engineer
Responsible for design and detailing of jacking frames used to longitudinally jack two approach spans through trusses adjacent to this 360-foot swing span over the Mississippi River in La Crosse, WI. The project included construction sequencing and field assistance during construction. (5/07 - 12/07)

Virginia Department of Transportation I-264 Berkley Bridge Rehabilitation - Design Engineer
Participated in the rehabilitation of a 4-leaf bascule bridge over the New Elizabeth River in Norfolk, VA. The project consisted of design and integration of a new drive system and machinery on top of an existing system of equipment and machinery. The design includes two complete designs to accommodate the original 2-leaf bascule built in 1950 and the second bascule pair built in 1992. Mr. Magistro's responsibilities included design of the new mechanical equipment, as well as structural retrofits required for installation of the new equipment. (6/06 - 9/07)

Burlington Northern Santa Fe Abo Canyon Double Track Capacity Design Project - Bridge Lead Engineer / Design Engineer
Responsible for bridge layouts, design, quantity calculations and cost estimates for 9 bridge structures along a 5-mile stretch of second mainline track for the BNSF Railroad through Abo Canyon, NM. (10/04 - 3/06)

Burlington Northern Santa Fe Bridge 0.80 Emergency Stringer Replacement - Project Manager / Design Engineer
Responsible for this emergency replacement of eight stringers in the movable span floor system of this 450-foot swing span over the Missouri River in Kansas City, MO. The scope of the project also included shop inspection during fabrication of the fracture critical stringers. (8/04 - 10/04)

Canadian Pacific Rail Bridge Span Alignment Lock Design - Project Manager / Design Engineer
Responsible for design and detailing of a new span alignment and span locking device for this 360-foot swing span over the Mississippi River in La Crosse, WI. The project included structural modifications to the approach span where the new device was located. (12/03 - 10/04)

Burlington Northern Santa Fe Bridge 37.0 Fender Replacement - Project Manager / Design Engineer
Responsible for design and detailing of a new fender system for the 260-foot swing span over the Snohomish River in Everett, WA. (5/03 - 4/04)

Burlington Northern Santa Fe Richmond Turntable Rehabilitation - Project Engineer
Responsible for design of the new mechanical components in the rehabilitation of this 110-foot turntable structure in Richmond, CA. The project included design and details for new end trucks, new enclosed gear

reducer to replace open gear set, new shafts and bearings, and new structural supports. (8/02 - 5/03)

Burlington Northern Santa Fe Bridge 14.2 Pier Rehabilitation - Project Engineer
Assisted in development and design of rehabilitation details for the rest pier, bridge bearings, lift tower structural support steel, and end floorbeam top flange replacement for this bridge located near Steilacoom, WA. The rest pier was rehabilitated and the live load bearing was replaced while maintaining both rail and navigation traffic. (3/02 - 11/03)

Elgin Joliet & Eastern Bridge 198 Mechanical Rehabilitation - Design Engineer
Responsible for the mechanical rehabilitation of this skewed 306-foot tower drive vertical lift bridge over the Des Plaines River in Joliet, IL. The project included replacement of an open gear set with an enclosed gear reducer, as well as replacement of all impacted shafts, pinions, bearings, and couplings. Mr. Magistro was also responsible for the design of new mechanical system components, construction sequence, and field assistance during construction. (5/01 - 11/02)

Elgin Joliet & Eastern Bridge Mechanical Rehabilitation - Design Engineer
Responsible for the mechanical rehabilitation of this Scherzer single leaf rolling bascule span over the East Chicago Canal in Gary, IN. The project included replacement of the drive motor and central reducer, and all associated shafts, bearings, and couplings; installation of a new auxiliary motor and clutch; and upgrade of the control system. Mr. Magistro was also responsible for the design of the structural support system rehabilitation for new mechanical components, and construction sequencing and field assistance during construction. (4/01 - 5/03)

CSX Transportation Bridge L653.4 Span Replacement - Project Engineer
Participated in the inspection to evaluate the existing condition of the movable span for purposes of the United States Coast Guard Cost Apportionment. Mr. Magistro was responsible for the new bridge deck details including timber ties, steel ties, and rail joints for this on-line swing span replacement with a new 360-foot vertical lift span over the Mobile River near Hurricane, AL. (5/00 - 2/03)

Burlington Northern Santa Fe Bridge 1136.3 Rail Joint Replacement - Design Engineer
Responsible for the replacement of the rail joints on this Abbott Style single leaf bascule bridge over the Old River in Orwood, CA. The project also involved installation of steel ties under the new joints, replacement of one approach span and rehabilitation of the span lock. Responsibilities also included engineering design, plan production and field assistance during construction. (5/00 - 4/01)

Jeffrey Maier

Mr. Maier is Assistant Vice President – Energy Marketing for Union Pacific Railroad Company. Mr. Maier began working for Union Pacific in the Marketing & Sales Department in 1981. His currently responsibilities include negotiating contract rates and terms, establishing tariff rates and terms, and, when necessary, coordinating with connecting railroads to establish rates, terms and conditions for interline movements. Terms and conditions for interline movements include, but are not limited to, interchange locations, train size, locomotive assignments, fuel recovery mechanisms, etc.

Mr. Maier is sponsoring evidence in Section III.A that rates that Arizona Electric Power Cooperative is challenging in this proceeding would be different if the interchange were altered as assumed in Arizona Electric Power Cooperative's Opening Evidence.

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 6, 2010

Jeffrey W. Maier

Thomas Murphy

Thomas Murphy is a rail transportation consultant with 41 years of experience in rail industry operations. He began his career with the Milwaukee Railroad in 1967. In 1975 he was promoted to trainmaster. In 1979 Mr. Murphy joined the Chicago & North Western Railway Company, where he held various positions, including General Manager of the Transportation Center in Chicago. In that position, he was responsible for the safe and efficient dispatching of trains, locomotives, and crews for the CNW system, served as the point of contact for all interchange railroads on the system, and directed activities on CNW's line into the Powder River Basin.

Following the 1996 merger of CNW with UP, Mr. Murphy worked with the merger team to combine the CNW dispatching center into the Harriman Dispatch Center in Omaha. In 1996 he became General Superintendent of UP's Central Region, with responsibility for safety, transportation, and budget for the UP territories from St. Louis to Texarkana and Kansas City to Yuma, California. In 1998 Mr. Murphy was promoted to General Manager of the Harriman Dispatch Center. In addition to managing the Harriman Center, his responsibilities in this position included the acquisition of locomotives, short term lease of locomotives, and balancing of horsepower hours between UP and other Class I railroads.

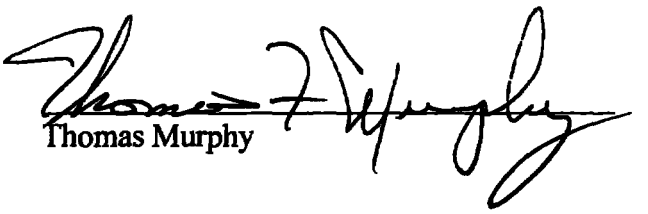
In 1999 Mr. Murphy was promoted to Assistant Vice President of Operations for UP's Western Region, with responsibility for safety, transportation, dispatching, and budget for the region. The Western Region covered nine states, from Kansas to California, and to Idaho and Nevada. Mr. Murphy retired from UP in 2009.

Based on his experience described above, Mr. Murphy is familiar with the operating characteristics of the UP lines replicated for purposes of AEPCO's SARR and defendants'

SARR alternatives, as well as with rail operations more generally. Mr. Murphy sponsors evidence relating to rail operations set forth in Sections III.B and III.C of the Reply Evidence above.

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 3 2010



Thomas Murphy

ROBERT C. PHILLIPS, P.E.

Mr. Phillips is a Vice President of the Rail Division of STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Phillips has more than 30 years of experience with track design and maintenance, grade crossings, bridge construction, signal and communication systems, maintenance and protection of traffic, and the installation of fiber-optic cable within railroad rights-of-way.

Mr. Phillips is responsible for overseeing and directing STV/RWA's commuter and freight rail planning and engineering projects. Mr. Phillips worked for Norfolk Southern in various capacities for 12 years, where he gained operating experience in engineering, track maintenance, and train operations. His responsibilities included supervising and training train crews, ensuring operating rules compliance, and investigating accidents and injuries. Mr. Phillips holds a Bachelor of Science, Civil Engineering from Virginia Polytechnic Institute and a Master of Business Administration from Averett College.

Mr. Phillips' resume is attached hereto.

Mr. Phillips is sponsoring portions of Section III.F of defendants' Reply Evidence. 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 5, 2010

Robert C. Phillips

Robert C. Phillips, P.E.

Vice President/Project Manager

Mr. Phillips, Vice President of the Rail Division, is responsible for overseeing and directing STV/RWA's commuter and freight rail planning and engineering projects. He has more than 30 years of experience with track design and maintenance, grade crossings, bridge construction, signal and communication systems, maintenance and protection of traffic, and the installation of fiber-optic cable within railroad rights-of-way. Mr. Phillips worked for Norfolk Southern in various capacities for 12 years, where he gained operating experience in engineering, track maintenance, and train operations. His responsibilities included supervising and training train crews, ensuring operating rules compliance, and investigating accidents and injuries.

Employee No.
91356

Department No.
53

Office Location
Charlotte, NC

Date joined firm
6/2/94

Years with other firms
19

Education
Master of Business Administration; Averett College (1992)

Bachelor of Science, Civil Engineering; Virginia Polytechnic Institute (1975)

Professional Registration
Professional Engineer: Virginia (1997/#030702/exp. 2/28/11) and Pennsylvania (2000/#PE056524-E/exp. 9/30/11)

Project Experience

Norfolk Southern Heartland Corridor Clearance Improvements CM - Senior Project Manager

Overseeing this $200 million project to provide clearance improvements to 29 railroad tunnels and seven bridges on the 530-mile-long Heartland Corridor, which extends from Columbus, OH, to Norfolk, VA. The improvements will facilitate a new, faster route for freight rail traffic between the Atlantic coast and the heartland of the United States, while also generating local development opportunities for the states through which the lines run. A key goal is to increase clearance in the 29 tunnels in Virginia, West Virginia, Kentucky, and Ohio by raising tunnel roofs and lowering tunnel floors. Mr. Phillips' services include creating overhead bridge jacking plans to obtain vertical clearances, modifying slide fences, providing utility coordination, creating stormwater pollution prevention plans (SWPPPs) at tunnel portals, creating railroad bridge lowering plans, and reviewing track design. His responsibilities also include conducting preconstruction meetings with contractors as well as weekly progress meetings, reviewing construction schedules, monitoring and documenting contractor work, reviewing monthly contractor pay estimates, and coordinating between the contractor and railroad forces. This project constitutes an innovative public-private partnership venture between the Norfolk Southern, various participating states, and the Federal Highway Administration (FHWA). (4/07 - Present)

Norfolk Southern Railway On-Call Services Contract - Principal-in-Charge

Responsible for plan review and CE&I services on an on-call, as-needed basis for over 700 projects involving proposed roadway, bridge, and retaining wall construction affecting railway facilities throughout the 22-state Norfolk Southern system. Projects included overseeing construction on overhead bridges, underpasses, floodwalls, utility crossings, parallel

construction of utilities, roadways, bikeways, and grade crossings. (2/04 - Present)

CSX Post-Hurricane Katrina/Rita Emergency Rail Reconstruction Project - Principal-in-Charge
Oversaw design and construction inspection for this $100 million emergency rail reconstruction project. Mr. Phillips was in charge of assessing damage to the six major rail bridges ranging to over 10,000 feet in length, developing repair or replacement plans, providing project management and construction management, and providing on-site inspection during the reconstruction period. In total, over 75 miles of track was severely damaged and in need of emergency repair. (8/05 - 9/07)

STB Railroad Coal Rate Case Litigation Cost Assessments - Project Manager
Led a team of project managers, senior engineers, and other railroad consultants in assembling the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad in Charlotte, NC, as part of a cost assessment for a several coal rate cases. Cost assessments included major earthwork, bridge and culvert construction, track, communications and signalization, engineering design, construction management, material costs and logistics, mobilization, and contingencies. Cases included Norfolk Southern (NS) vs. Duke Energy, NS vs. CP&L, CSX vs. Duke Energy, AEC vs. BNSF & UP, Otter Tail vs. BNSF, AEP Texas North vs. BNSF. (2002 - 2004)

Norfolk Southern Fiber-Optic Cable Installation - Project Manager
Responsible for the construction management of the installation of the fiber backbone along Norfolk Southern's right-of-way along several routes: Cleveland, OH, to Boyce, VA, via Pittsburgh and Harrisburg, PA; Kalamazoo to Dearborn, MI; Dearborn, MI, to Toledo, OH; Toledo to Cleveland, OH; Cleveland, OH, to Buffalo, NY; and Cleveland, OH, to Pittsburgh, PA. Mr. Phillips oversaw staffing, permitting, inspection, safety operations, and final route approval. More than 100 managers and inspectors were involved in this major trunk line installation. Mr. Phillips also provided safety training, led Norfolk Southern operations meetings, attended weekly scheduling meetings, coordinated work trains and flagmen, and provided engineering reviews, change orders, and construction administration. (1999 - 2002)

Norfolk Southern Fiber-Optic Cable Installation in North and South Carolina - Project Manager
Coordinated with Norfolk Southern personnel and monitored the installation of fiber-optic cables belonging to Qwest Communications along several hundred miles of Norfolk Southern right-of-way in North Carolina and South Carolina. All phases of installation were involved, including plow train operations, long directional bores, and bridge attachments. Mr. Phillips provided periodic progress reports to Norfolk Southern and authorized minor changes from the approved construction plans to meet local conditions. He

was also responsible for monitoring the railroad safety aspects of the installations. (1998 - 1999)

CSX System-Wide Grade Crossing Sign Project - Team Leader
Led one of seven teams for this project which required the installation of standard identification signs at every roadway grade crossing on the CSX Transportation system. During this process STV/RWA was able to completely update the CSX grade crossing inventory list. (1997 - 1998)

CSX Systemwide Grade Crossing Inventory - Project Manager
Managed multiple teams to perform a grade crossing inventory encompassing over 35,000 grade crossings on the CSX Transportation system in 21 states, to meet a Federal Railroad Administration (FRA) deadline. The project included deployment of multiple teams to inventory crossings, installing standard identification signs at every crossing to enhance safety and reporting, and updating CSX's inventory, including digital imagery of each crossing. All work was performed under a tight deadline of 180 days and completed one month ahead of schedule. (10/97 - 6/98)

NCDOT Norfolk Southern over Route 220 Bridge Replacement - Field Engineer
Provided construction field coordination between Norfolk Southern and the North Carolina Department of Transportation (NCDOT) for the replacement of a Norfolk Southern single-track, single-span railroad bridge with a double-track, 4-span railway bridge over US 220 in Price, NC. (1996 - 1997)

Norfolk Southern Automobile Mixing Facility - Field Engineer
Responsible for shop inspection of structural steel at the fabrication plant in Colfax, NC, to be utilized in construction of this new automobile mixing facility in Shelbyville, KY. STV/RWA provided preliminary and final hydraulic/hydrologic design as well as railway, roadway, highway bridge, and railway bridge design. (1996)

Norfolk Southern over US 401 Bridge Replacement - Field Engineer
Handled the construction field coordination between Norfolk Southern and the North Carolina Department of Transportation for replacement of the Norfolk Southern Bridge over US 401 in Fuquay-Varina, NC. (1995 - 1996)

Norfolk Southern Merritt Drive Improvements - Field Engineer
Responsible for construction observation for a detour bridge and replacement of the existing Norfolk Southern railroad bridge on Merritt Drive in Greensboro, NC. (1995 - 1996)

Norfolk Southern Route 250 Bridge Replacement - Project Manager
Provided construction field coordination between Norfolk Southern and the Virginia Department of Transportation for the construction of a temporary detour bridge and a new thru-plate girder replacement railroad bridge in Waynesboro, VA. (1994 - 1995)

Norfolk Southern - Former Trainmaster

Supervised train crews and yard personnel, ensured operating rules compliance, investigated all accidents and injuries, scheduled local train and yard engine operations, and trained employees on Federal Railroad Administration and Norfolk Southern operating rules through annual operating rule classes for track and transportation employees in Manassas and Danville, VA. (1981 - 1987)

Norfolk Southern - Former Track Supervisor
Supervised track maintenance crews and production gangs, responsible for track inspection program, and ensured FRA Track Safety Standards for Class of track were in compliance. Mr. Phillips maintained the Norfolk Southern Safety Program over assigned territory and investigated all accidents and injuries, scheduled track maintenance operations, and trained employees on FRA Track Safety Standards and Norfolk Southern track maintenance policy. (1975 - 1980)

DENNIS K. PREWITT

Mr. Prewitt is a Construction Project Manager with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Prewitt has more than 25 years of experience providing construction engineering and inspection services for railway projects.

Mr. Prewitt applies his extensive expertise to bridge inspections, bridge replacements requiring maintenance and protection of traffic, structural steel protective coatings, siding and mainline track upgrades, and earthwork.

Mr. Prewitt's resume is attached hereto.

Mr. Prewitt is sponsoring portions of Section III.F of defendants' Reply Evidence relating to earthwork. Mr. Prewitt 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 6, 2010

Dennis Prewitt

Dennis K. Prewitt

Dennis K. Prewitt

Construction Project Manager

Mr. Prewitt has more than 25 years of experience providing construction engineering and inspection services for railway projects. He applies his extensive expertise to bridge inspections, bridge replacements requiring maintenance and protection of traffic, structural steel protective coatings, siding and mainline track upgrades, and earthwork.

Employee No.
91687

Department No.
53

Office Location
Duluth, GA

Date joined firm
11/4/96

Years with other firms
15

Education
Coursework in Physics; Wright State University (1978)

Coursework in Physics; Washington & Jefferson College (1977)

Training/Certifications
Roadway Worker Safety Protection; CSX Transportation (2007/#49CFR214C/exp. 2/18/10)

On-Track Machinery; CSX Transportation (2009/#49CFR214D/exp. 2/18/10)

Contractor Safety; CSX Transportation (2009/exp. 2/18/10)

Environmental Awareness; CSX Transportation (2009/exp. 2/18/10)

Security Awareness ; CSX Transportation (2009/exp. 2/18/10)

Roadway Worker Safety; Norfolk Southern Safety Program (2009/#49CFR214C/exp. 1/5/10)

Project Experience

RAIL

CTA Ravenswood and North Main Tie Renewal - Construction Manager
Overseeing construction services, including reviewing and reporting coordination between the client and contractor, for the $20 million Ravenswood and North Main tie renewal for the Chicago Transit Authority. Mr. Prewitt is analyzing and validating the construction strategy and schedule and providing constructability review to verify that the schedule is properly sequenced and the durations are reasonable. He is monitoring and reviewing the contractor's requests and receipt of Illinois Department of Transportation (IDOT) permission for lane closures in accordance with the schedule. In addition, Mr. Prewitt is reviewing the contractor's schedule updates and confirming that the schedule is in accordance with the specifications. He is coordinating and processing the contractor's request for inspection and CTA's acceptance of work prior to putting the track back in service after any shutdown; as well as at the closeout of each milestone. Additionally, Mr. Prewitt is confirming that the contractor's traffic control procedures are implemented in accordance with the permit and include a precondition survey identifying conditions on the ground beneath and immediately adjacent to the CTA structures. (2008 - Present)

Norfolk Southern Rickenbacker Intermodal Facility - Inspector
Provided construction management and inspection for the construction of a new $33 million intermodal freight facility in Lockbourne, OH. The facility will be used for the transfer of shipping containers between trains and trucks. The new intermodal facility will provide increased capacity and improved levels of service, thereby allowing Central Ohio to regain and expand shipping and economic opportunities, including job creation and other public benefits. (2006 - 2008)

Norfolk Southern Route 330 Bridge Replacement - Inspector
Provided protection of railway interests by checking to make sure the railroad tracks were not affected during the demolition and construction of the new Route 330 Bridge over Norfolk Southern in Corinth, KY. The project included the demolition of the existing structure, excavation to

bedrock for abutments and piers, construction of piers and grading adjacent to track, setting of steel girders over tracks, and erosion control. (2006)

Norfolk Southern US 27 Bridge - Inspector
Made sure that railroad tracks and operations were not affected during the construction of two bridges on US 27 over Norfolk Southern tracks in Norwood, KY. Construction included blasting adjacent to tracks for new roadway, temporary shoring installations for excavation to bedrock for abutments and piers, setting steel girders over tracks, erosion control, and erecting concrete bridge decks and parapet walls over the Norfolk Southern right-of-way. (2006)

CSX Timber Trestle Replacement - Inspector
Performed construction inspection for the replacement of existing timber trestles with a concrete-and-timber-ballast deck structure for this bridge in Stephensport, KY. Work included construction layout staking, driving 30-inch pipe piles to bedrock and auger spoils from pipe piles, placement of re-bar cages and concrete in piles, construction of concrete abutments and pier caps, removal of the existing open deck trestle and replacement with timber ballast deck, and installation of walkways and handrails. (2006)

Norfolk Southern Monticello Street Bridge - Inspector
Verified that the railroad track and operations were protected during construction of the new Monticello Street Bridge over Norfolk Southern right-of-way in Somerset, KY. Construction included blasting adjacent to tracks for new roadway and sewer installations, excavation to bedrock for abutments and piers, construction of temporary towers, setting curved steel girders over tracks, erosion control, construction of a Mechanically Stabilized Earth (MSE) wall, and placement of the concrete bridge deck over Norfolk Southern tracks. (2006)

CSX Bridge over the Wabash River Thru-Truss Repair and Swing Span Replacement - Inspector
Performed construction inspection for the repair of a 5-span thru-truss and replacement of the swing span of this bridge in Vincennes, IN. Work included the replacement of existing bottom-flange-angles on all floor beams, bottom lateral bracing, and lateral-to-chord gussets. Mr. Prewitt inspected the removal of the existing swing span and its replacement with a deck plate girder bridge. (2006)

Norfolk Southern NC 54 Underpass - Inspector
Inspected the construction of a new double-track railroad bridge in Clegg, NC. Mr. Prewitt provided construction inspection during the installation of temporary retaining walls; drilling of eight, 72-inch caissons; driving H-piles for abutment footings; construction of concrete abutments and piers; setting of steel girders; and placement of cast-in-place concrete deck and parapet walls. (2004 - 2005)

Norfolk Southern Noise Abatement Walls - Inspector

On-Track Machinery; Norfolk Southern Safety Program (2009/#49CFR214D/exp. 1/5/10)

Bridge Worker Safety; Norfolk Southern Safety Program (2009/#49CFR214B/exp. 1/5/10)

Contractor Safety; Norfolk Southern Safety Program (2009/exp. 1/5/10)

Environmental Awareness; Norfolk Southern Safety Program (2009/exp. 1/5/10)

Security Awareness; Norfolk Southern Safety Program (2009/exp. 1/5/10)

e-RAILSAFE System Badge; NS, CSX, BNSF, UP, KCS (2008/exp. 5/18/10)

Bituminous Concrete Inspector - Level I; Ohio DOT

Portland Cement Concrete Inspector - Level I; Ohio DOT

Certified Inspector, Corrugated Metal Culverts over 10-foot Spans; Ohio DOT

Certified Inspector, Structural Steel Protective Coatings with Lead Abatement; Ohio DOT

Bridge Inspector, Concrete and Structural Steel

Computer Skills
Microsoft Project

Provided construction management and inspection for several miles of noise abatement walls along the Norfolk Southern right-of-way in Cleveland. (2003 - 2004)

Norfolk Southern Livernois Intermodal Yard Improvements - Inspector
Performed construction management and inspection for this intermodal yard upgrade in Detroit. Improvements to the rail yard included storm sewers, detention ponds, new loading and storage tracks, grading, new roadway, security fencing and gates, high-mast tower lighting, new water and electric services, new electrical distribution and site lighting, and demolition and removal of structures and features. (2003)

Norfolk Southern System-wide Fiber-Optic Cable - Inspector
Responsible for conducting daily on-site observation at all work locations and verifying compliance of construction to approved plans and specifications for the system-wide installation of fiber-optic technology along the Norfolk Southern right-of-way between Cleveland, and Washington, D.C. Mr. Prewitt assured right-of-way integrity during outside contractor operations and created a database for tracking pay items, offsets, depths, mileposts, and completion percentages. (2000 - 2002)

CSX Bridge over Neil Avenue - CSX Construction Manager/Inspector
Responsible for construction observation for a 2-track railroad bridge over Neil Avenue in Columbus, OH. The project included detour track and one mile of new mainline track. Mr. Prewitt maintained daily communication with designated representatives and verified compliance of construction to approved plans and specifications. He also maintained a daily and weekly status report of construction events. In addition, Mr. Prewitt ordered materials for CSX crews for completion of the work. (2000)

CSX New York State Bridge Inspections - Team Leader
Evaluated 100 CSX railway bridges from Buffalo to Albany, NY, and provided detailed inspection reports, photographs, and video with audio description for all structures. (1999)

Norfolk Southern New Mainline Construction - Inspector
Performed construction inspection for drainage improvements, roadway, railway bridge construction, and new track along eight miles of new mainline in Tateville, KY. Mr. Prewitt was responsible for inspecting more than 1 million cubic yards of earthwork and eight miles of track installation. Ninety percent of the grading required blasting of the existing rock high-wall cuts. (1998)

CSX MCI/Worldcom and Williams Communication Fiber-Optic Cable - Inspector
Completed construction engineering and inspection services for fiber-optic cable installation within the CSX right-of-way in Akron, OH. Mr. Prewitt provided engineering representation for pre-bid and progress meetings and final inspection. He performed daily on-site observation at all work locations

on CSX property and provided worker safety orientation and enforced compliance with safety rules. Mr. Prewitt maintained daily communication with designated representatives and verified compliance of construction to approved plans and specifications. He also maintained a daily and weekly status report of construction events. (1998)

CSX Grade Crossing Signs System-Wide - Team Leader
Led a team for the installation of 8,000 standard identification signs at every roadway grade crossing on the CSX railway system in Michigan, Ohio, and Indiana. The signs were installed at each crossing facing traffic. Each sign is about the size of an automobile license plate and carries the AAR crossing inventory number, the railroad milepost (including letter prefix to identify subdivision), and a toll-free telephone number for emergencies. (11/97 - 4/98)

CSX Bridge No. 270 over Buck Run - Inspector
Provided construction inspection for the partial replacement of the 846-foot-long, single-track railway bridge over Buck Run in Okeana, OH. Approximately 646 feet of timber trestle were replaced with an open timber deck steel girder superstructure. Foundations were established using 30-inch pipe piles. Intermediate bents were constructed of steel with bolted connections. Railroad traffic was maintained during construction by using span-by-span construction and temporary spans. (1997)

CSX Bridge over SR 126 - Inspector
Observed construction operations for this 2-track railroad bridge over SR 126 in Woodlawn, OH. The project included a double-track detour with new embankment, and temporary detour trestle. (1997)

Norfolk Southern US 52 Relocation - Inspector
Verified that the railroad right-of-way was protected during the adjacent construction of US 52 in Pritchard, WV. Roadway construction included blasting adjacent to the right-of-way, crossing the railroad right-of-way with new drainage, and a temporary construction haul road that crossed the railroad. (1997)

Norfolk Southern Automobile Mixing Facility - Inspector
Inspected structures on an as-needed basis for an automobile mixing facility in Shelbyville, KY. The project included preliminary and final hydraulic/hydrologic, railway, roadway, highway bridge, and railway bridge design. The project also included 2.5 million cubic yards of earthwork and blasting, 18 miles of track installation, a 45-acre paved vehicle storage yard, three bridges, and two access roads. (1996)

Norfolk Southern SR 32 Bridges - Inspector
Provided construction inspection for new railroad bridges and tracks in Piketon, OH. Work included construction of approximately a one-mile, double-track run-around detour and one temporary trestle; installation of H-piles for high-wall abutment foundations and piers; construction of concrete

high-wall abutments and piers; placement of steel girders; placement of cast-in-place concrete deck; and construction of approximately one mile of new track. (1994)

Norfolk Southern Kenton Lands Road - Inspector
Provided construction inspection for a new railroad bridge and tracks in Erlanger, KY. Work included construction of run-around track detour; installation of two 40-foot-deep sheet-pile cofferdams to bed rock for high-wall abutment foundations; blasting of bed rock for required footing rock socket; construction of concrete high-wall abutments; construction of several hundred feet of concrete retaining wall for new Kenton Lands Road underpass approaches; and placement of steel girders, ballast, and track for the new bridge. (1993)

ROADWAY AND BRIDGES

ODOT I-71, I-75, and I-74 Bridge Inspections - Inspector
Provided inspection of structural steel protective coating for 26 bridges along interstate highways for the Ohio Department of Transportation (ODOT). Work included grit-blasting all structural steel to near white finish; application of primer, intermediate, and finish coats of paint; lead abatement; and site clean-up. (1996)

Clermont County Sewer District Cook Road Force Main and Automated Pump Station - Inspector
Provided construction inspection for a new 12-inch ductile iron pipe force main and automated pump station in Miami Township, OH. Work included construction of one automated pump station with all associated equipment, valves, switching equipment, computer controls, sumps, vaults, emergency generator, and chemical storage facilities. The project included the installation of approximately 1.5 miles of 12-inch force main with associated pressure relief valves, vaults, and pressure testing. (1995)

Clermont County Water District Clough Pike Water Main - Inspector
Provided construction inspection for a new 24-inch water main in Clermont County, OH. Work included the installation of approximately two miles of 24-inch water main with associated fire hydrants, valves, stream crossings, service taps, casing installation, and pressure testing. (1995)

Hamilton County Engineer Culvert Inspections - Inspector
Completed inspections of all culverts greater than 10 feet in width in Hamilton County, OH. Culverts were measured at specified points, measurement points were referenced, defects were documented, and the culvert was rated per the State of Ohio Bridge Rating System. Each culvert was re-visited for three years and measurements were taken at the referenced points to ascertain if the culverts were stable or moving. Mr. Prewitt also checked for scour, metal deterioration, cracks, joint separations, and rust perforations. (1993 - 1995)

Butler County Cin-Day Road Improvements and Signalization - Inspector
Performed construction inspection for roadway improvements and signalization for the Butler County Engineer in West Chester, OH. Work included installation of a new storm sewer system; approximately 0.5 mile of new embankment and roadway with curb, gutters, and sidewalks; installation of a 12-inch water main; and signalization of the re-aligned intersection. (1994)

ODOT SR 131 Bridge Replacements - Inspector
Completed construction inspection for three bridge replacements in Newtonsville, OH. Work included the demolition of two single-span bridges and one 8-foot-by-8-foot box culvert; replacement of one bridge with single-span cast-in-place concrete deck and new approach pavements; and the replacement of the other bridge with two 8-by-8-foot precast concrete box culverts. The project required approximately 0.25 mile of new embankment and pavement along improved road profiles. (1992)

ODOT US 50 Bridge Replacements - Inspector
Provided construction inspection for three bridge replacements along US 50 in Marathon, OH. Work included the demolition of three single-span bridges; replacement of one bridge with single-span, prestressed concrete box beams and new approach pavements; replacement of two bridges with 8-by-8-foot precast concrete box culverts; and placement of approximately 0.5 mile of new embankment and pavement along improved road profiles. (1992)

Emery Industries New Truck Bridge - Inspector
Provided construction inspection for a new 100-ton truck bridge over Mill Creek and new access roads for coal trucks entering the Emery Industries power plant in Cincinnati. Work included driving of 18-inch closed-bottom, pipe piles approximately 70 feet deep for each of the 3-span structure's abutments and piers; placement of rebar cages and super plasticized concrete into each pipe pile; placement of concrete and rebar for abutments and piers; construction of a pre-stressed concrete box beam bridge deck; placement of deck waterproofing; placement of parapets and curbs; and construction of approximately 0.25 mile of embankment, subbase, and concrete pavement. (1991)

County of Clermont McKeever Pike Bridge Replacement - Inspector
Provided construction inspection for replacement of the McKeever Pike Bridge over the East Fork of the Little Miami River in Williamsburg, OH. Work included demolition of two spans of a historic 3-span, thru-truss and preservation of the third span; construction of a new 3-span, prestressed, concrete, box-beam bridge; and construction of approximately 1,000 linear feet of new pavement and bridge approaches. (1990)

ODOT I-275/Winton Road Entrance Ramp - Inspector

Inspected the construction of a new entrance ramp along I-275 in Mount Healthy, OH. Work included construction of a 0.75 mile of new embankment; placement of under drains, storm sewers, and a concrete box culvert; and approximately one mile of paving consisting of a 12-inch aggregate subbase, 9-inch concrete base, and 6-inch asphalt overlay. (1989)

ODOT Bituminous Concrete Lab - Inspector/Lab Technician
Conducted testing to certify aggregate stockpiles in Lebanon, OH, for use in Ohio DOT (ODOT) bituminous concrete mixes for District 8 paving projects. Mr. Prewitt conducted sieve analysis, bitumen analysis, specific gravity analysis, and air volume analysis of asphalt during production at various ODOT-certified mixing facilities. (1987 - 1988)

ODOT SR 350 Bridge - Inspector
Provided construction inspection for a new highway bridge over a stream in Fort Ancient, OH. Work included construction of cast-in-place concrete deck of a single-span bridge with abutments and wing walls and a new channel alignment for the stream. (1987)

City of Oxford Sewer Rehabilitation - Inspector
Performed construction inspection for the rehabilitation of a clay pipe sewer system in Oxford, OH. Work included pressure cleaning of all clay pipe sewer lines in the city; video inspection and pressure testing of all pipe joints; pressure grouting of all joints failing pressure tests; pressure cleaning and grout slurry coating of all manholes; and replacing sewer runs that were too deteriorated to rehabilitate. (1986)

ODOT Tylersville Road Improvements - Inspector
Completed construction inspection for roadway improvements in Mason, OH. Work included grading for a new 4-lane highway; installing storm sewers, sanitary sewers, and under drains; placement of subbase; placement of new concrete and asphalt overlays; and placement of right-of-way fencing. (1986)

ODOT I-75 Widening - Inspector
Provided construction inspection during bridge repair and the widening of I-75 in Dayton, OH. Work included demolition of existing curb and railing on bridges; placement of new concrete Jersey-type barriers on bridges; bridge deck sounding and removal of deteriorated concrete; placement of micro-silica and latex concrete on bridge decks; new high-mast tower lighting; grading and embankment for new traffic lanes; placement of subbase; and placement of new concrete and asphalt overlays. (1985)

SEWER & WASTEWATER TREATMENT

Clermont County Sewer District Middle East Fork Wastewater Treatment Plant Phase II - Inspector

Performed construction inspection for this wastewater treatment plant in Batavia, OH. Work included the construction of primary settling tanks and associated equipment, aeration tanks and associated equipment, sludge tanks and associated equipment, clarifiers and associated equipment, a million gallon overflow lagoon, a computerized control building, and solar-powered sludge drying beds. (1991 - 1992)

Village of Williamsburg Wastewater Treatment Plant - Inspector
Completed construction inspection for a new wastewater treatment plant in Williamsburg, OH. Construction work included a new control building and operations center; a new sewage treatment process using a sequential batch reactor; a primary sewage sump; new bar screens; and new sewer lines and manholes throughout the village. (1990)

Clermont County Sewer District Interceptor Sewer - Inspector
Inspected the installation of five miles of new 18-inch interceptor sewer, one mile of 6-inch force main, and one mile of 12-inch force main in Stonelick Township, OH. Installation of the 18-inch gravity sewer included manholes and service taps, and the force mains included pressure relief valves and pump stations. Blasting was required for the installation of pump station sumps and vaults. (1989)

OTHER

Cincinnati Gas & Electric Company William H. Zimmer Nuclear Power Station - Document Controller
Performed document control and expedited Nuclear Regulatory Commission quality assurance documents within the construction and engineering division for this nuclear power station in Moscow, OH. (1981 - 1984)

JOHN T. SHARKEY, P.E.

Mr. Sharkey is Vice President–Technology for Campbell Technology Corporation, CTC, which provides design, project management, construction inspection and other consulting engineering services for railroads, public agencies and other consulting engineering firms. Mr. Sharkey is a registered professional engineer in Illinois and Texas with over 37 years of experience in the railroad signal industry.

Mr. Sharkey's experience includes 27 years in management in a class I railroad Communication & Signal department, with 10 years as General Manager of the department. He spent 9 years in management at a leading North American C&S Manufacturing/Engineering company and holds patents on the "out of service" feature of, and "railed based communications" with, the latest generation constant warning time device. He has been involved in all aspects of design, installation, and maintenance of railroad signal systems including accident investigations and litigation. He has been a member of hundreds of diagnostic survey teams. He was Vice Chair of the Signal Liaison Committee of the Association of American Railroads (AAR) C&S Division during the Federal Railroad Administration Highway- Part 234 – Grade Crossing Signal System Safety rulemaking and participated in the development of the draft regulations. Mr. Sharkey holds an A.S. Electronic Technology from Elgin Community College, a B.S.E.E. from University of Illinois, and a M.B.A. from Illinois Institute of Technology.

Mr. Sharkey's resume is attached hereto.

Mr. Sharkey is sponsoring portions of Section III.F of defendants' Reply Evidence relating to signals and communications. Mr. Sharkey 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 5, 2010

John T. Sharkey

John T. Sharkey, P.E.

Summary

John T. Sharkey, P.E., is Vice President–Technology for Campbell Technology Corporation, CTC, which provides design, project management, construction inspection and other consulting engineering services for railroads, public agencies and other consulting engineering firms. He is a registered professional engineer in Illinois and Texas. He has over 37 years of experience in the railroad signal industry. This includes 27 years in management in a class I railroad Communication &Signal department, with 10 years as General Manager of the department. He spent 9 years in management at a leading North American C&S Manufacturing/Engineering company and holds patents on the "out of service" feature of, and "railed based communications" with, the latest generation constant warning time device. He has been involved in all aspects of design, installation, and maintenance of railroad signal systems including accident investigations and litigation. He has been a member of hundreds of diagnostic survey teams. He was Vice Chair of the Signal Liaison Committee of the Association of American Railroads (AAR) C&S Division during the Federal Railroad Administration Highway- Part 234 – Grade Crossing Signal System Safety rulemaking and participated in the development of the draft regulations.

Relevant Professional Experience

- Chairs the American Railway Engineering and Maintenance-of-Way Association, AREMA, Committee 36, Highway-Rail Grade Crossing Warning Systems, since 1998.
- Currently involved as engineering expert in matters involving railroad-highway grade crossing issues.
- Developed the "3-wire" and "6-wire" supervised interconnect circuits for highway-rail grade crossings, which has been adopted as an AREMA recommended practice and an Illinois Commerce Commission policy.
- Developed and taught application design classes for latest generation of Constant Warning Time device and control systems. These classes were given to Class 1 railroad signal design engineers, consultants, and contractors in North America and the United Kingdom.
- Designed, or approved the design of, approximately 1200 Highway-Rail Grade Crossing Warning System projects.
- Designed, or approved the design of approximately 800 miles of railroad centralized traffic control systems
- Performed "in-service" operational tests, or supervised the in-service operational tests of, approximately 600 Highway-Rail Grade Crossing Warning System projects and 800 miles of CTC.
- Chaired the Association of American Railroads C&S Division, 1994-1995

Education

- M.B.A., Illinois Institute of Technology, 1988
- B.S.E.E., University of Illinois, 1972
- A.S. Electronic Technology, Elgin Community College, 1969

Employment History

- Campbell Technology Corporation, Vice President – Technology, 2008 to present
- Safetran Systems Corporation, General Manager – Technology & Standards, 2003-2008
    - US Patent 7,441,727
    - US Patent 7,575,202
- Safetran Systems Corporation, General Manager – Marketing & Technology, 1999-2003
- Elgin Community College, Electronic Technology Instructor, 1980
- Illinois Central Railroad (now CN Ry), General Manager–C&S, 1994 -1999
- Illinois Central Railroad, Engineer –Signals, 1989-1994
- Illinois Central Gulf Railroad, Signal Operations Engineer, 1986-1989

- Illinois Central Gulf Railroad, Signal Planning Engineer, 1983-1986
- Illinois Central Gulf Railroad, Signal Design Engineer, 1979-1983
- Illinois Central Gulf Railroad, Signal Supervisor,1978-1979
- Illinois Central Gulf Railroad, Field Signal Engineer, 1975-1978; Assistant Engineer-Signals, 1974-1975; Junior Engineer-Signals, 1972-1974

Professional Organizations

- Association of American Railroads Communication and Signal Division, member 1975 to 1998
- AAR ATCS Strategic Planning Committee 1993- 1999
- National Committee of Uniform Traffic Control Devices 1988 to present
- American Railway Engineering & Maintenance-of-Way Association (AREMA) 1998 to present
- Institute of Transportation Engineers – Grade: Member – 1997 to present
- FHWA Technical Working Group on Highway-Rail Traffic Control Systems – 1999 to 2003
- Transportation Research Board AHB60 – Railroad Highway Grade Crossings – 1999 to present
- National Cooperative Highway Research Program – September 2002 to present
- Institute of Electrical and Electronic Engineers – 2007 to present
- American Public Works Association – 2009 to present

Recent Publications

- Co-author "Supervised Interconnection Circuits at Highway-Rail Grade Crossing" March 1998, Mansel, Waight & Sharkey, ITE Journal
- Co-author "Supervised Interconnection Circuits at Highway-Rail Grade Crossing" January 2000, Mansel, Waight & Sharkey, TRB Paper
- Author "Supervised Interconnection Circuits at Highway-Rail Grade Crossing" Sharkey, RT&S (Railroad Track & Structures Magazine) , February 2000
- Contributor ITE Recommended Practice "Preemption of Traffic Signals at or Near Railroad Grade Crossings", 2004
- Railroad-Highway Grade Crossing Handbook – Revised 2nd Edition – 2007
  - Notable Contributor to section on Train Detection, Signal Maintenance, and LED signal design considerations.

Recent Presentations

2009 University of Wisconsin - Highway-Rail Grade Crossing Safety Course, Madison, WI - May, 2009
Instruction: 1.Train Detection and Warning Systems,
2. Traffic Signal Preemption, and
3. Wayside Horn Systems

2008 Mid-States Highway-Rail Grade Crossing Safety Conference, Grapevine, TX – May, 2008
Presentation: Use of New Technologies for Highway-Rail Intersections and Train Controls

2008 University of Wisconsin - Highway-Rail Grade Crossing Safety Course, Madison, WI - Jan, 2008
Instruction: Train Detection and Warning Systems

2008 Transportation Research Board Annual Meeting, Washington D.C. – Jan, 2008
Panelist: Session 466 : Intermodal Pedestrian & Trespass Issues

2007 Eastern Rail-Highway Safety Conference, Albany, NY – Oct, 2007
Presentation: Recent Technical Developments Generated by Crossing Accidents

2007 Southeastern Rail-Highway Safety Conference and Workshop, Louisville, KY – May, 2007
Presentation: Industry Technical Update

2007 University of Wisconsin - Highway-Rail Grade Crossing Safety Course, Madison, WI - Mar, 2007

Instruction: Train Detection and Warning Systems

2006 Transportation Research Board Annual Meeting , Washington D.C. – Jan, 2006
Panelist: Session 408: Pedestrian Issues at Highway Rail Grade Crossings

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.

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 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.

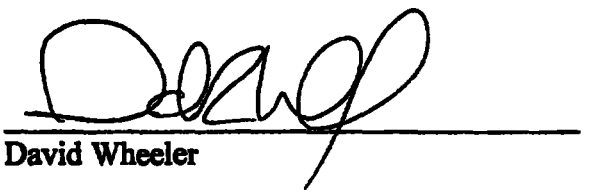
Mr. Wheeler held a number of leadership positions within the Union Pacific Railroad Company (UP). During his tenure with UP, Mr. Wheeler led teams within Finance, Capacity Planning, Network & Capital Planning and Network Design & Integration. He has submitted testimony in previous stand-alone cost cases 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 led 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 SARR capacity requirements and cycle times. His evidence is contained in Sections III.A, III.B and III.C of defendants' Reply Evidence. 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 4, 2010



David Wheeler

WILLIS S. WHITE, III, P.E.

Mr. White is a Project Manager/Senior Engineer/Associate with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. White is a senior civil engineer and project manager with more than 25 years of experience in the design and construction of highway and railway bridges and infrastructure improvements.

Mr. White has particular expertise in hydrology/hydraulics, drainage design, stormwater management, and bridge scour evaluations. Mr. White has been responsible for environmental permitting for work in sensitive watersheds and waterways requiring coordination with the U.S. Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA). He is experienced in the use of the HEC-RAS and HEC-2 software, and the USGS/FHWA Step Backwater Program "WSPRO." Mr. White also has considerable experience with construction staging and the design of falsework and excavation shoring. Mr. White holds a Bachelor of Science, Civil Engineering and a Master of Science, Civil Engineering; from Virginia Polytechnic Institute and State University.

Mr. White's resume with additional project experience is attached hereto.

Mr. White is sponsoring Section III.F.5 of defendants' Reply Evidence relating to bridges. Mr. White 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 4, 2010

Willis S. White, III

Willis S. (Bill) White, III, P.E.

Project Manager/Senior Engineer
Associate

Mr. White is a senior civil engineer and project manager with more than 25 years of experience in the design and construction of highway and railway bridges and infrastructure improvements. He has particular expertise in hydrology/hydraulics, drainage design, stormwater management, and bridge scour evaluations. Mr. White has been responsible for environmental permitting for work in sensitive watersheds and waterway requiring coordination with the U.S. Army Corps of Engineers (USACE) and the Federal Emergency Management Agency (FEMA). He is experienced in the use of the HEC-RAS and HEC-2 software, and the USGS/FHWA Step Backwater Program "WSPRO." Mr. White also has considerable experience with construction staging and the design of falsework and excavation shoring.

Employee No.
91111

Department No.
53

Office Location
Jacksonville, FL

Date joined firm
7/5/78

Years with other firms
0

Education
Master of Science, Civil Engineering; Virginia Polytechnic Institute and State University (1978)

Bachelor of Science, Civil Engineering; Virginia Polytechnic Institute and State University (1972)

Professional Registration
Professional Engineer: Alabama (1990/#17993/exp. 12/31/09), Florida (1995/#49112/exp. 2/28/11), Georgia (1991/#PE019183/exp. 12/31/10), Kentucky (1993/#17923/exp. 6/30/10), Louisiana (1985/#22084/exp. 3/31/11), Mississippi (1990/#10971/exp. 12/31/09), Missouri (1990/#E-024331/exp. 1/31/10), North Carolina (1981/#10156/exp. 12/31/09), Ohio (1991/#E-55253/exp. 12/31/09), South Carolina (1987/#11882/exp. 6/30/10), Tennessee (1990/#21496/exp. 12/31/11), Virginia (1984/#014715/exp. 5/31/11), and West Virginia (1994/#11330/exp. 6/30/10)

Project Experience

Norfolk Southern Lacy Siding - Senior Engineer
Responsible for environmental permitting with the St. Johns River Water Management District and FEMA coordination for the construction of the Lacy Siding in Jacksonville, FL. The project consists of constructing 1.5 miles of track, including a new 186-foot single-track bridge to carry the track over Six-Mile Creek. (2007 - Present)

The Parc Group Nocatee Parkway Phase II - Senior Engineer
Leading bridge hydraulics design in accordance with FEMA requirements for the Durbin Creek Bridge and the US 1 Flyover Bridge, as part of Phase II of this project to design a parkway serving a new development in St. Johns and Duval Counties, FL. Mr. White is providing input for the bridge design recommendations, and is responsible for the Bridge Hydraulics Report. (3/06 - Present)

CSX Public Projects GEC - Senior Engineer
Providing bridge design review and shop drawing review in accordance with CSX guidelines for various projects that impact CSX Railroad in Georgia, Indiana, Maryland, North Carolina, and Pennsylvania. These projects are being designed by state agencies or outside private entities. Mr. White is responsible for providing guidance on construction inspection estimates. (1/06 - Present)

CSX Bridge Replacements/Repairs GEC - Senior Engineer
Responsible for bridge hydraulics design to meet FEMA requirements, as well as bridge permitting with municipal, state, and federal regulatory agencies, for the replacement or repair of more than 25 bridges in Alabama, Florida, Georgia, Illinois, Indiana, Kentucky, Mississippi, New York, Ohio, South Carolina, and West Virginia, under several consecutive General

Engineering Contracts (GEC) with CSX. Mr. White is coordinating with agencies responsible for environment, waterway navigation, stormwater management, state-owned real estate easements, historic/archaeological assessment, and construction activity. One particularly notable project was the replacement of Bridge SG573.6 over Tanyard Creek in Atlanta, GA, which involved meetings with local civic groups, the City Parks Commission, and the City Council. Mr. White worked closely with CSX's Vice President of Public Relations for Georgia and Florida to obtain permitting for this project. Another project, Bridge No. 23 over the St. Louis Bay in Bay St. Louis, MS, won the design award for Best Non-Highway Bridge from the Precast/Prestressed Concrete Institute. (1/05 - Present)

Norfolk Southern Heartland Corridor Clearance Improvements - Senior Engineer
Provided erosion control design review and QA/QC of erosion control plans for the Heartland Corridor Clearance Project, a public-private clearance improvement initiative funded by the Federal Highway Administration (FHWA), local state governments (Ohio, Kentucky, West Virginia, and Virginia), and the Norfolk Southern Corporation. The 530-mile-long corridor, which runs from Columbus, OH, to Norfolk, VA, currently contains 37 tunnels and 31 bridges with clearance limitations for today's larger freight rail movements. This project will remove those clearance restrictions by raising tunnel roofs and lowering tunnel floors, which will provide a new, quicker route for freight rail traffic between the Atlantic coast and the heartland of the United States. The Heartland Project is projected to be complete in 2010. (6/07 - 7/07)

ITL Technology Contrail Development - Senior Engineer
Provided structural design review and QA/QC plan review for a transitional beam system designed to allow for the efficient transport of cargo on oceangoing container ships in Jacksonville, FL. (4/07 - 5/07)

Kansas City Southern Meridian Rail Siding - Senior Engineer
Provided final design review of the track layout and stormwater management plan for the addition of 1.6 miles of new double-track rail siding in Meridian, MS. (2/07 - 5/07)

Florida East Coast Railway Bridge Construction Program - Senior Engineer
Performed field inspection, plan and calculation checking and revision, and all required hydraulic analysis and construction permitting for various bridges over waterways throughout the state of Florida on the Florida East Coast Railway. Mr. White has applied for and received bridge construction permits for between four and six bridges per year, working primarily with the Florida Water Management Districts. He has also provided all coordination with FEMA for rail bridges over waterways at various locations. (2002 - 2007)

CSX Various Bridge Construction Projects - Senior Engineer

Certifications
Roadway Worker Protection Training Facilitator; CSX Transportation (2/16/07/exp. 12/31/09)

Memberships
American Society of Civil American Engineers

American Society of Highway Engineers

Society of American Military Engineers

American Railway Engineering and Maintenance of Way Association (AREMA): Chairman, Subcommittee 1 of Committee 15 (Steel Structures)

Computer Skills
HEC-RAS backwater computer software, HEC-2 software, WSPRO Step Backwater Program

Performed field inspection, plan and calculation checking and revision, and all required hydraulic analysis and construction permitting for between 12 and 18 bridges over waterways per year throughout CSX right-of-way across the southeastern United States. Mr. White has applied for and successfully received bridge construction permits from the U.S. Army Corps of Engineers (USACE), various state departments of the environment, the U.S. Coast Guard, and several municipal agencies, and has coordinated with FEMA for rail bridges over waterways at numerous locations. The client's satisfaction with the work over a 4-year period led to the establishment of a subsequent 3-year General Engineering Contract for these services. (2001 - 2007)

Norfolk Southern Rocky Creek Bridge Replacement - Senior Engineer
Provided project permitting with the U.S. Army Corps of Engineers (USACE) Savannah District, City of Macon, and Bibb County Engineering Departments (acting as the FEMA Floodplain Administrator) for the replacement of this 122-foot single-track thru-truss span over Rocky Creek in Macon, GA. The single-truss span was replaced with three precast concrete box beam spans. Mr. White performed permitting and hydraulic modeling, which was difficult because of the water level effects of Tobesofkee Creek, which shares the floodplain with Rocky Creek at this location. (2006)

CN Bridge MM 1.95 over Three Mile Creek Replacement - Senior Engineer
Provided bridge hydraulics design, project permitting, and structural design and plans for the replacement of an approximately 180-foot, single-track bridge over a tidal channel in Mobile, AL, for Canadian National (CN). (9/04 - 11/06)

CN Bridge LZ 11.8 over Comite River Span Replacements - Senior Engineer
Responsible for bridge hydraulics design, permitting, and structural design and plans for the replacement of the 734-foot, single-track timber approach spans on either side of the channel span on this bridge in Stevensdale, LA, for Canadian National (CN). (6/04 - 11/06)

CN Bridge LZ 12.9 over Amite River Span Relocation - Senior Engineer
Provided bridge hydraulics design and project permitting for this Canadian National (CN) project in Denham Springs, LA, involving the relocation of a 115-foot, single-track, thru-girder span on the bridge and the replacement of the span's piers. Mr. White was also responsible for structural design and plans. (5/03 - 11/06)

CSX Hurricane Katrina Bridge Repairs/Replacements - Senior Engineer
Responsible for construction inspection and regulatory agency coordination for the repairs and replacements of CSX's six major bridges that were damaged or destroyed by Hurricane Katrina. Bridges included Bridge 709.5 over Singing River near Gautier, MS; Bridge 723.6 over Biloxi Bay in Biloxi, MS; Bridge 752.5 over the St. Louis Bay in Bay St. Louis, MS; Bridge 769 over Pearl River near Rigolets, LA; Bridge 775.4 over Rigolets Pass in Rigolets, LA; and Bridge 776.8 over Blind Rigolets. (2005)

Norfolk Southern Swift Creek Trestle Replacement - Senior Engineer
Provided project permitting for the replacement of a single-track, 173-foot-long timber trestle in Genoa, FL, over Swift Creek. The trestle was replaced with a 182-foot, single-track precast concrete trestle. Mr. White provided all coordination with Florida's Suwanee River Water Management District, including application for a Sovereign Submerged Land Easement for the project. (2002)

CSX MCI WorldCom/Williams Communication Fiber-Optic Builds - Project Manager
Supervised the fiber-optic construction engineering and inspection services on CSX right-of-way across the southeastern United States. Mr. White coordinated and monitored activities of field and office staff and acted as a liaison with CSX management. (1997 - 2001)

CSX Railroad Timber Trestle Replacements - Project Manager/Senior Engineer
Provided field survey and design of the replacement for more than 4,000 feet of timber trestle at 40 locations in the southeastern United States. The existing timber structures were replaced with rehabilitated steel spans or precast concrete spans placed on substructures, which included specially designed steel or concrete bents. At some locations, portions of the existing structure were retained. (1995 - 2000)

FDOT District-Wide Scour Evaluations - Project Manager
Oversaw in-depth bridge scour evaluations in accordance with the Florida Department of Transportation (FDOT) Guidelines for Scour Evaluation Studies on numerous bridges for District 2 in northern Florida. Mr. White submitted scour study reports for each structure evaluated. Projects included data collection and qualitative analysis (Phase I); hydrologic/assessment for scour analysis (Phase II); geotechnical and structural scour assessment (Phase III); and recommended plan of action (Phase IV). (1995 - 2000)

FDOT Bridge Scour Projects - Project Manager
Managed Phases I, II, III, and IV FDOT and NCDOT bridge scour evaluation studies for more than 200 bridges in North Carolina and Florida. Mr. White also oversaw the design for structural repairs and bridge scour countermeasures. (1990 - 2000)

NCDOT Bridge Scour Projects - Project Manager
Managed Phases I, II, III, and IV FDOT and NCDOT bridge scour evaluation studies for more than 200 bridges in North Carolina and Florida. Mr. White also oversaw the design for structural repairs and bridge scour countermeasures. (1990 - 2000)

CSX Increased Train Traffic Signs - Project Manager
Managed the sign installation work at approximately 800 highway grade crossings in Ohio, Indiana, Michigan, and Illinois. Mr. White was responsible for all organization and direction of work. The project was

completed on time even though some installations were performed during severe winter weather. (1999)

Norfolk Southern Miscellaneous Engineering Services - Project Manager
Supervised plan review and CE&I services on an on-call, as-needed basis for more than 700 highway and railway grade separation bridges throughout the 22-state Norfolk Southern system. Mr. White supervised services including temporary structures, falsework, excavation bracing, detours, site drainage, and erosion control. (1985 - 1999)

CSX Conrail Bridge Inspection Program - Project Manager
Directed the critical bridge inspections of approximately 750 Conrail bridges acquired by CSX in Indiana, Ohio, Pennsylvania, New York, and Illinois. The project was completed on time under a fast-track 3-month schedule. (1998)

CSX Emergency Grade Crossings - Project Manager
Managed the installation of special signing at approximately 23,000 grade crossings in 17 states, using a field crew of 35 personnel. The project was completed ahead of schedule and under budget. (1998)

CSX System-Wide and Conrail Acquisition Grade Crossing Signs - Project Manager
Managed the installation of standard identification signs at every roadway grade crossing on the CSX railway system. The project involved more than 28,000 crossings. (1997 - 1998)

CSX Tar River Trestle Replacement - Senior Engineer
Provided the field survey and design of the replacement of approximately 1,800 feet of timber trestle in Greenville, NC. The existing timber structure was replaced with precast concrete components, tied to existing channel spans which were retained. (1996)

Norfolk Southern Automobile Mixing Facility - Senior Engineer
Performed structure design and stream hydrology in connection with two steel deck plate girder railroad structures for an automobile mixing facility in Shelbyville, KY. The project included preliminary and final hydraulic/hydrologic, railway, roadway, highway bridge, and railway bridge design. Mr. White also assisted in obtaining USACE permits. The project included 2.5 million cubic yards of earthwork, 18 miles of track installation, a 45-acre paved vehicle storage yard, three bridges, and two access roads. (1996)

SCDOT Hydraulic, Hydrologic, and Bridge Scour Services - Project Manager
Oversaw services for more than 70 projects for the South Carolina Department of Transportation (SCDOT) involving stormwater management, NPDES, wetland evaluation, sediment and erosion control and bridge scour studies throughout South Carolina. (1993 - 1996)

NCDOT Highway Storm Drainage Systems - Designer/Senior Engineer/Project and Program Manager
Designed open and enclosed systems, stormwater retention and detention, stream crossings, and erosion control for more than 400 miles of storm drainage systems on roadways ranging from 2-lane private roads to multi-lane interstate highways in North and South Carolina. (1985 - 1996)

SCDOT Highway Storm Drainage Systems - Designer/Senior Engineer/Project and Program Manager
Designed open and enclosed systems, stormwater retention and detention, stream crossings, and erosion control for more than 400 miles of storm drainage systems on roadways ranging from 2-lane private roads to multi-lane interstate highways in North and South Carolina. (1985 - 1996)

City of Charlotte Chipley/Fugate Area Storm Drainage Improvement Planning Study - Project Manager
Provided planning and modeling services for a drainage basin starting at the intersection of Mayview Drive/Monroe Road and ending at Briar Creek in Charlotte, NC. Services included the preparation of a planning report, hydraulic/hydrologic analysis, citizen involvement process, and field surveys. Mr. White utilized city standard watershed models, including HEC-1 and HYDRA. (1995)

CSX over Trenholm Road and O'Neil Court - Senior Engineer
Designed a 183-foot steel deck plate girder railway bridge and a 178-foot steel deck plate girder railway bridge in Columbia, SC. (1992 - 1993)

USACE Military Ocean Terminal - Project Manager/Senior Engineer
Managed the design of the rehabilitation of 3.5 miles of railroad track on concrete wharves at Military Ocean Terminal in Sunny Point, NC. (1992)

Beverly Crest Development Corporation Beverly Crest Dam - Project Manager
Managed the design, plans, specifications, permits, and construction inspection for an earthfill dam and spillways impounding 31 acres in Charlotte, NC. (1992)

City of Greensboro Merritt Drive Improvements - Senior Engineer
Provided railway and structural engineering for a new 180-foot, 5-lane highway bridge in Greensboro, NC. Mr. White was also responsible for a 155-foot, 4-track railroad underpass carrying Norfolk Southern over Merritt Drive, including a 2-track temporary trestle and a railroad at-grade crossing. (1992)

Village of Raintree Earth Dam Spillway Improvements - Project Manager/Senior Engineer
Managed complete investigation and modification of three dams owned by the Village of Raintree in Charlotte, NC, including the enlargement of emergency spillways. Mr. White also supervised the complete dam and spillway replacement of the Homewood Suites Inn to comply with the Dam

Safety Act. He prepared plans and specifications and performed project bidding and construction inspection. Mr. White also coordinated all reviews with the North Carolina State Dam Safety Engineer. (1989 - 1991)

RF&P Railroad Bridge over Braddock Road - Senior Engineer
Responsible for the design and plan preparation of the Richmond, Fredericksburg, and Potomac railroad bridge over Braddock Road in Alexandria, VA. The project included urban widening, a 4-track railroad bridge, and all staged construction to maintain rail traffic. (1991)

Mecklenburg County Westside Basins Stormwater Management Master Plan - Senior Engineer
Supervised field data collection for the Westside Basins stormwater management master plan in Mecklenburg County, NC. (1991)

NCDOT Bridge Waterway Studies - Senior Engineer
Conducted channel hydraulics studies for bridge replacements on the Toe River, New River, Watauga River, and Yadkin River in western North Carolina, as well as the Caney Fork Creek, Wayehutta Creek, and Sardis Branch. (1985 - 1990)

Goulston Company Bearskin Creek Flood Study - Senior Engineer
Revised the floodplain and floodway for 1.3 miles of the improved Bearskin Creek channel in Monroe, NC, including the submission of the Letter of Map Revision to FEMA. (1989)

Zaremba Centerpoint Inc. Campbell Creek Channel Relocation - Senior Engineer
Designed the channel relocation for approximately 1,000 feet of Campbell Creek to permit property development and for all FEMA Floodway revisions and environmental permitting for the Independence Square East Shopping Center in Charlotte, NC. Mr. White also handled special channel design to accommodate stream biological requirements and hydraulic analysis. (1989)

NCDOT I-95 Bridge Widenings - Project Manager/Senior Engineer
Provided field survey and design for the raising, widening, and rehabilitation of eight bridges on or over I-95 in Harnett and Johnston Counties, NC. (1988)

Seaboard Coast Line Railroad Bridge over Decker Boulevard - Senior Engineer
Designed a railroad overpass in Cayce, SC, for the Seaboard Coast Line Railroad. (1988)

NCDOT US 258 over Meherrin River - Senior Engineer
Responsible for bridge hydraulics, wetlands mitigation, Coastal Area Management Act (CAMA) permit drawings, and roadway drainage for the bridge replacement and roadway approaches in Murfreesboro, NC. (1988)

SCDOT I-26 Bridge Widenings - Senior Engineer

Designed the widening of dual bridges at four locations on I-26 over railways and roadways in Dorchester and Lexington Counties, SC. (1987)

Norfolk Southern over Charlotte Outer Loop - Project Manager
Responsible for the design and construction engineering of a 2-track, 449-foot-long welded steel girder structure, including a detour track in Charlotte, NC. (1986)

NAVFAC Cherry Point Air Station Storm Drainage System - Senior Engineer
Designed storm drainage system rehabilitation for the Marine Corps Air Station in Cherry Point, NC. (1986)

NCDOT Storm Drainage Systems - Senior Engineer
Designed storm drainage systems for the Harris Boulevard Extension, the 5.5-mile-long Tyvola Road Extension from I-77 to Billy Graham Parkway, Rama Road Widening, and Kannapolis Loop in Charlotte, NC. (1982 - 1986)

USACE Storm Drainage System - Senior Engineer
Designed a storm drainage system for a $40.5 million project at an East Coast military base at a classified location. (1984)

NCDOT I-40 Bridge Design - Senior Engineer
Provided design for highway bridges on I-40 between Warsaw and Burgaw, NC. (1984)

Southern Railway Bridge over I-277 - Senior Engineer
Designed a 4-span steel deck plate girder structure in downtown Charlotte, NC. (1983)

Southern Railway Bridge over I-277 - Senior Engineer
Responsible for the design of a 4-span steel deck plate girder structure in downtown Charlotte, NC. (1983)

City of Columbia Railroad Relocation Project - Hydraulic and Structure Design Engineer
Provided hydraulic and structural design for large culverts for the Columbia, SC, railroad relocation. The project included a lowered rail corridor through downtown Columbia and interrupted every major drainage system between the downtown area and the Congaree River. (1982 - 1983)

NCDOT Interstate Highway Bridge Widening - Senior Engineer
Conducted the field survey and design for raising, widening, and rehabilitating bridges on or over I-95 and I-26 at 12 locations in various counties in North and South Carolina. (1982 - 1983)

Boy Scouts of America Earth Dam Improvements - Design Engineer
Responsible for the enlargement of a vegetation lined emergency spillway and additional embankment height for a dam and lake on Hoppers Creek as

required by the Dam Safety Act at this Boy Scouts of America Camp in McDowell County, NC. (1982)

ET&WNC Railroad Bridge - Design Engineer
Designed the East Tennessee and Western North Carolina Railroad (ET&WNC) open deck thru-girder railroad bridge over State Route 67 in Johnson City, TN. (1982)

Cone Mills Buffalo Lake Dam Spillway Enlargement - Senior Engineer
Prepared hydraulic calculations, plans, and specifications for a reinforced concrete emergency spillway to comply with the Dam Safety Act in Greensboro, NC. (1981)

Southern Railway Bridge over Brookwood Interchange - Design Engineer
Responsible for the design of trapezoidal steel deck plate girder spans to carry an industrial lead track with turnouts on the Southern Railway Bridge over the Brookwood Interchange in Atlanta, GA. (1979)

NCDOT I-85 over Catawba River - Design Engineer
Designed a 1,074-foot, 9-lane highway bridge on I-85 over the Catawba River in Mecklenburg County, NC, which required construction staging to maintain the four lanes of interstate traffic. (1979)

IBM Plant Site Development - Design Engineer
Designed storm drainage for the Charlotte, NC, IBM plant parking facilities. Mr. White also designed a small pond and earth dam for the site landscaping plan. (1978 - 1979)

Publications

Amendments to Chapter 15 (Steel Structures), AREMA *Manual for Railway Engineering.*

Presentations/Teaching

Facilitator, Norfolk Southern/CSX Railway Roadway Worker Safety Training.
Presenting approved training classes to railroad contractors in accordance with FRA requirements as detailed in 49CFR Part 214 for roadway worker safety. (1/06 - Present)

Presentation on Railroad Bridge Engineering, R.E. Lee Engineering Magnet High School, Jacksonville, FL. (10/06)

Railroad Bridge Rating Class, RWA University. (8/06)

GEORGE T. ZIMMERMAN

Mr. Zimmerman is a Project Manager/Senior Engineer with STV/RWA, a professional firm offering engineering, architectural, planning, environmental and construction management services. Mr. Zimmerman is a project manager and railway engineer with nearly 30 years of experience on roadway and bridge projects and particular expertise in freight planning, design, and construction management.

Mr. Zimmerman's resident engineering and inspection experience includes grade crossings and roadway, railway, and highway bridges. Mr. Zimmerman manages STV's relationship with Norfolk Southern, working with the railroad on a daily basis and assisting in the preparation of proposals and contracts. In addition, Mr. Zimmerman provides structural design and plan reviews for railway and bridge projects. Mr. Zimmerman holds a Bachelor of Science, Civil Engineering from West Virginia University.

Mr. Zimmerman's resume with additional project experience is attached hereto.

Mr. Zimmerman is sponsoring portions of Section III.F of defendants' Reply Evidence relating to track construction. Mr. Zimmerman 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 5, 2010

George T. Zimmerman

George T. Zimmerman, P.E.

Project Manager/Senior Engineer

Mr. Zimmerman is a project manager and railway engineer with nearly 30 years of experience on roadway and bridge projects and particular expertise in freight planning, design, and construction management. His resident engineering and inspection experience includes grade crossings and roadway, railway, and highway bridges. Mr. Zimmerman manages STV's relationship with Norfolk Southern, working with the railroad on a daily basis and assisting in the preparation of proposals and contracts. In addition, Mr. Zimmerman provides structural design and plan reviews for railway and bridge projects.

Employee No.
91137

Department No.
53

Office Location
Duluth, GA

Date joined firm
5/16/79

Years with other firms
0

Education
Bachelor of Science, Civil Engineering; West Virginia University (1979)

Professional Registration
Professional Engineer: Georgia (#019811/exp. 12/31/10), Kansas (#17069/exp. 4/30/09), Missouri (#2003000042/exp. 12/31/09), Ohio (#65833/exp. 12/31/09), and South Carolina (#12625/exp. 6/30/10)

Memberships
American Railway Engineering and Maintenance of Way Association (AREMA); Roadway and Ballast Committee Member

American Society of Civil Engineers

Project Experience

Rochester & Southern Railroad Silver Springs Connection Track - Project Manager
Reviewing design for rail design on the Rochester & Southern Railroad in Silver Springs, NY. The connecting track will allow unit coal train movement from Norfolk Southern Railroad to the Rochester & Southern Railroad. Mr. Zimmerman is also coordinating with Norfolk Southern. (2007 - Present)

Vulcan Materials Company Skippers Quarry Loop Track - Project Manager
Providing project administration and coordinating staff in multiple offices for the preliminary and final design of a 0.75-mile loop track, including a 100-foot-long open deck railroad trestle, for Vulcan Materials Company at Skippers Quarry in Skippers, VA. The track will be used for loading unit rail trains with railroad ballast and other crushed aggregate materials. (1/07 - Present)

Norfolk Southern Heartland Corridor Clearance Improvements - Project Manager
Coordinating various teams working on portions of the Heartland Corridor Clearance Project, a public-private clearance improvement initiative funded by the Federal Highway Administration (FHWA), local state governments (Ohio, Kentucky, West Virginia, and Virginia), and the Norfolk Southern Corporation. The 530-mile-long corridor, which runs from Columbus, OH, to Norfolk, VA, currently contains 37 tunnels and 31 bridges with clearance limitations for today's larger freight rail movements. This project will remove those clearance restrictions by raising tunnel roofs and lowering tunnel floors, which will provide a new, quicker route for freight rail traffic between the Atlantic coast and the heartland of the United States. Mr. Zimmerman is overseeing staff for the raising of a bridge at Harding Street in Bluefield, WV; stormwater and erosion control plans at various tunnel sites; and numerous bridge lowering and slide fence clearance tasks. (1/07 - Present)

Norfolk Southern On-Call Services Contract - Project Manager
Managing plan review and CE&I services on an on-call, as-needed basis for more than 750 proposed roadway, bridge, and retaining wall construction projects affecting railway facilities throughout the 22-state Norfolk Southern system. Mr. Zimmerman has been overseeing construction on overhead bridges, underpasses, floodwalls, utility crossings, parallel construction of utilities, roadways, bikeways, and grade crossings since 1992. (1992 - Present)

Norfolk Southern Jeffersonville Road Widening - Project Manager
Managing the preliminary layout and design of a 4-span, 93.5-meter-long steel deck plate girder railroad bridge in Macon in Bibb County, GA. The single-track bridge will carry Norfolk Southern over Jefferson Road, which was widened from two to five lanes. The project includes track realignment to allow off-line construction. (2002 - 2007)

GDOT Railroad Bridges over Butler Street and Piedmont Avenue - Senior Engineer
Provided bridge design for the widening of two CSX railroad bridges over Butler Street and Piedmont Avenue in Fulton County, GA, and two retaining walls. (2002 - 2006)

STB Railroad Coal Rate Case Litigation Cost Assessments - Project Manager
Responsible for determining values for track work items and construction staging of the work plan for this project, which included assembling the planning, engineering, and construction costs to build a hypothetical contemporary operating railroad in Charlotte, NC, as part of a cost assessment for a several coal rate cases. Cost assessments included major earthwork, bridge and culvert construction, track, communications and signalization, engineering design, construction management, material costs and logistics, mobilization, and contingencies. Cases included Norfolk Southern (NS) vs. Duke Energy, NS vs. CP&L, CSX vs. Duke Energy, AEC vs. BNSF & UP, Otter Tail vs. BNSF, AEP Texas North vs. BNSF. (2000)

GDOT S.R. 3 Connector - Senior Engineer
Designed a replacement bridge and adjoining roadway over I-75 on the SR 3 Connector in Whitfield County, GA. The 8-lane bridge replaced a 2-lane structure of insufficient capacity. Work included horizontal and vertical design, construction plans, right-of-way plans, and construction staging plans, as well as pavement marking and signing plans. All design work was done in metric. (1995)

CSX Double-Track Program - Project Manager
Designed seven miles of track parallel to the CSX main line in Marietta, GA. The project included a study of several grade crossing eliminations and retaining wall structures. (1995)

Norfolk Southern Automobile Mixing Facility - Project Manager

Provided preliminary and final hydraulic/hydrologic, railway, roadway, highway, and railway bridge design for this Ford automobile mixing facility in Shelbyville, KY. The project included 2.5 million cubic yards of earthwork, 18 miles of track installation, a 45-acre paved vehicle storage yard, three bridges, and two access roads. (8/96 - 12/97)

Norfolk Southern Third Mainline Track - Project Manager
Managed engineering services for the design and construction of a 2.9-mile third main track from adjacent to CSX's Queensgate rail yard to Mitchell Avenue in Cincinnati, OH. Mr. Zimmerman provided project management as well as the design of all earthwork, track work, and retaining structures for Norfolk Southern. (6/94 - 7/95)

USCOE Omaha District Wharf Track Military Ocean Terminal - Senior Engineer
Provided engineering services for track material research for the rehabilitation of 3.5 miles of railroad track on concrete wharfs in Sunny Point, NC. (1994)

CSX Ronald Reagan Parkway - Project Manager/Resident Engineer
Managed the construction engineering inspection of the CSX bridge over Ronald Reagan Parkway near Lawrenceville in Gwinnett County, GA. (2/92 - 12/93)

Norfolk Southern I-64 over Norfolk Southern - Resident Engineer
Observed construction field activities and represented the Norfolk Southern Railroad for two bridges over the railway, one at milepost 4.43 VB, and one at milepost 5.04 NS in Norfolk, VA. (1/90 - 2/92)

City of Virginia Beach Pungo Ferry Bridge - Resident Engineer
Provided construction management and inspection services, and represented the City of Virginia Beach for the construction of the replacement of the obsolete swing span with a 3,400-foot highway bridge over the Intracoastal Waterway in Virginia Beach, VA. The project included roadway approaches and the placement of a geosynthetic stabilized embankment over adjacent wetlands. (1989 1992)

Norfolk Southern over Harris Boulevard - Resident Engineer
Provided construction management for a double-track Norfolk Southern underpass built using a temporary detour alignment in Newell, NC. (7/88 - 6/89)

City of Charlotte Tyvola Road Extension - Resident Structural Inspector
Inspected this 3.6-mile, 5-lane roadway extension in Charlotte, NC, including a new interchange with a 7-lane bridge over Billy Graham Parkway, eight reinforced concrete box culverts, and a 6-lane bridge over Sugar Creek. (6/87 - 6/89)

Piper Glen Development Corporation Rea Road Extension - Engineer

Provided construction coordination and management for 1.65-mile roadway extension to serve as the main thoroughfare for Piper Glen Development in Mecklenburg County, NC. The $2.5 million roadway and highway bridge project were built to be taken into the NCDOT system and connected to the Charlotte Outer Beltway. (6/87 - 6/89)

Private Developer Silas Creek Crossing Shopping Center - Resident Inspector
Provided construction observation for a 200,000-sf retail shopping center, highway bridge, and concrete box culvert in Winston Salem, NC. (7/88 - 3/89)

CSX Railroad over Monroe Road - Resident Engineer
Provided construction management and coordination with the railroad for this thru-girder single-track railroad structure in Charlotte, NC. The project included a temporary detour trestle, track realignment, staged construction, and coordination with the highway portion of the project. The underpass is located in what was one of the emerging growth corridors of the Charlotte area. (6/87 - 12/88)

CSX Railroad Relocation, Consolidation, and Grade Crossing Elimination - Contract "A" Resident Engineer, Contract "B" Assistant Resident Engineer
Supervised the $16.7 million construction of a railway roadbed, including 7,600 linear feet of grading, in Columbia, SC. The project included drainage, dewatering, utilities, and retaining walls. (4/83 - 4/87)

Graham County Development Corporation Graham County Railroad - Resident Engineer
Provided construction management and testing services for the $1.65 million rehabilitation of 12.65 miles of track and 13 small railroad bridges, including drainage improvements and 1.25 miles of track relayed with heavier rails on a steep mountainous grade, for this railroad between the re-established connection to the Southern Railway at Totpon, NC, to the Bemis Lumber Company yard in Robbinsville, NC. (1/81 - 4/83)

Statesville Redevelopment Authority Newtonville Subdivision - Resident Engineer
Provided construction management, inspection, and field testing services for the redevelopment of the $500,000 Newtonville Subdivision for the City of Statesville, NC. This project included the total removal of all existing facilities and the construction of all new infrastructure including excavation, drainage, utility installation, and street construction. (11/79 - 7/80)

IBM Research and Manufacturing Facility University Research Park - Engineer
Provided staging and design, earthwork, and site plan staging for balancing of cuts and fills for recreational facilities during construction of the building site and railway in Charlotte, NC. (5/79 - 11/79)

Teaching Experience

Instructor, Introduction to Construction Inspection, Module 13: General Structural Steel Inspection; North Carolina American Public Works Association (APWA) (1999 - Present)

Instructor, STV/RWA Railroad Inspector's Workshops on various subjects including Safety, Project Management, and Project Reporting (1995 - 2006)

226998

PUBLIC

BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Docket No. 42113

ENTERED
Office of Proceedings
MAY 7 - 2010
Part of
Public Record

ARIZONA ELECTRIC POWER COOPERATIVE, INC.
v.
BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

JOINT REPLY EVIDENCE AND ARGUMENT OF DEFENDANTS BNSF RAILWAY COMPANY AND UNION PACIFIC RAILROAD COMPANY

EXHIBITS

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J. Michael Hemmer
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ATTORNEYS FOR
UNION PACIFIC RAILROAD COMPANY

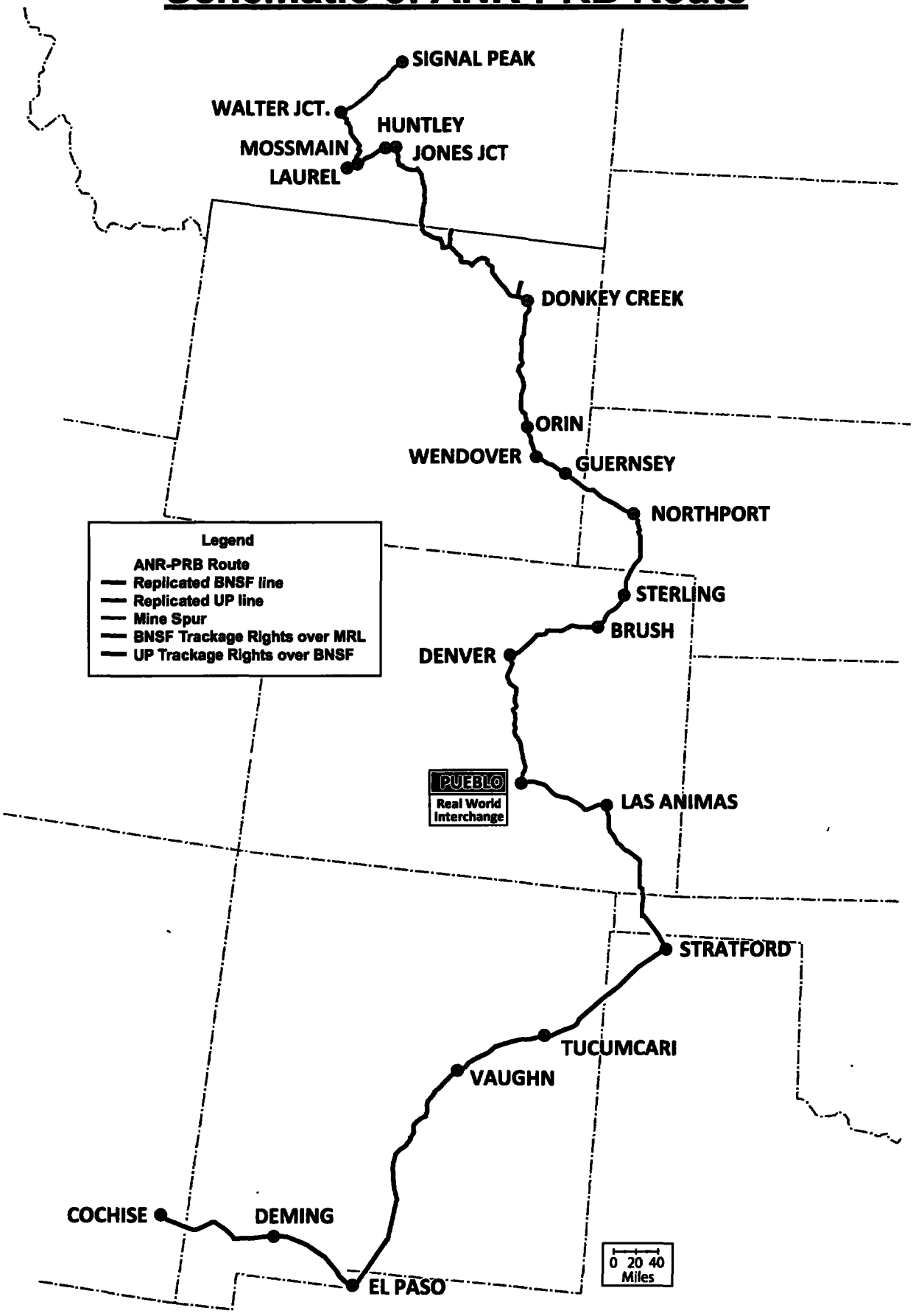
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Jill K. Mulligan
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ATTORNEYS FOR
BNSF RAILWAY COMPANY

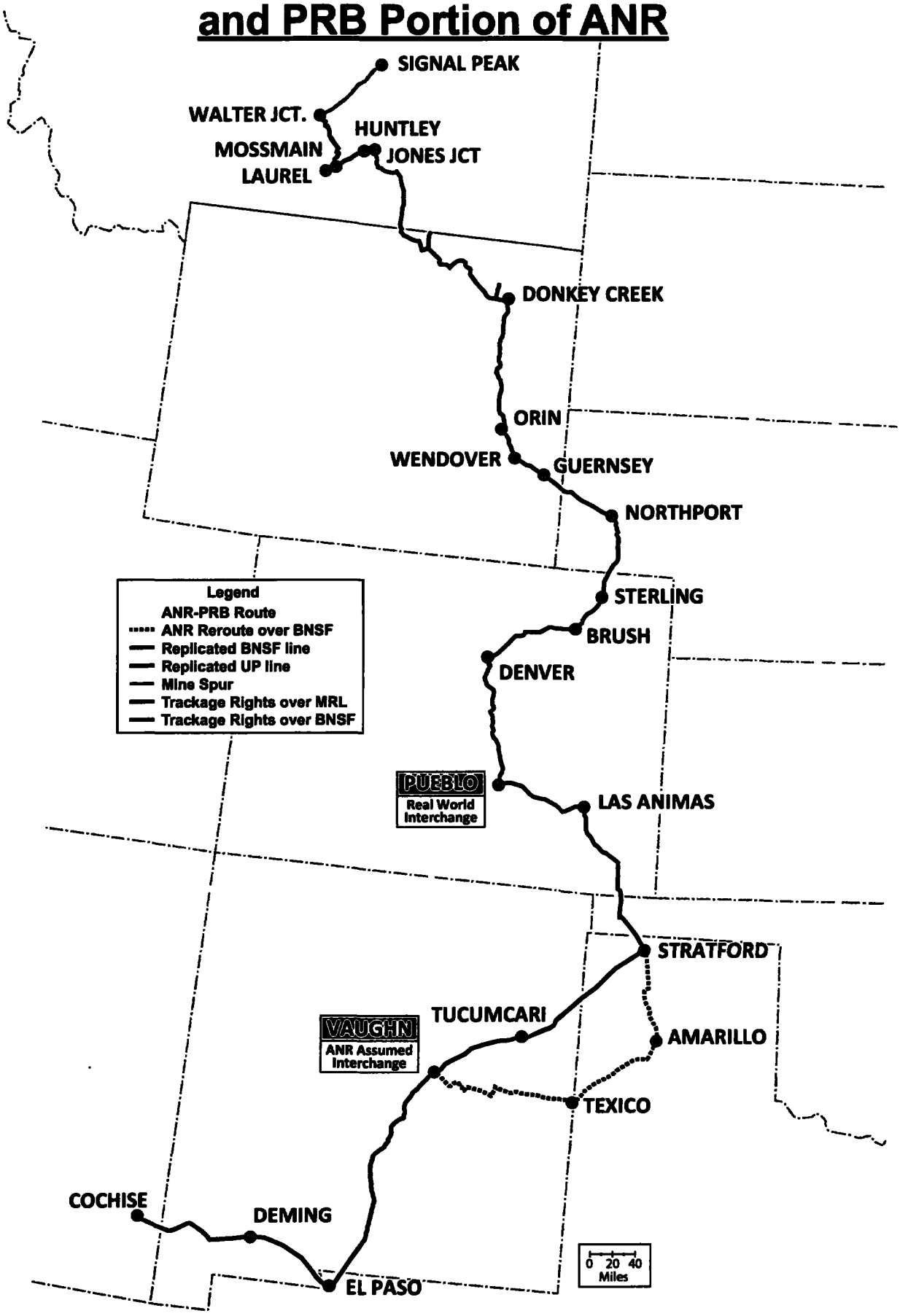
May 7, 2010

III.A: Traffic Group

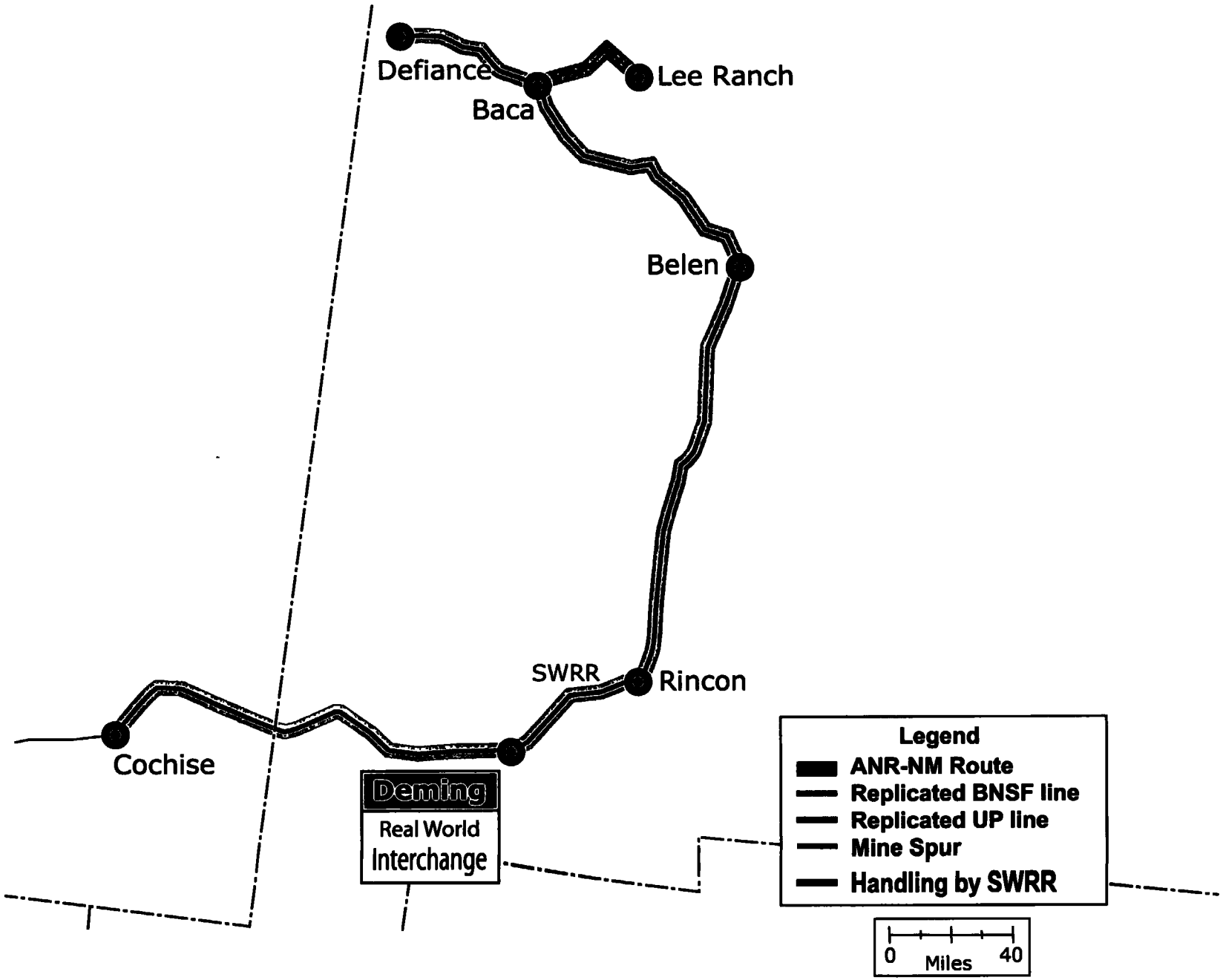
Schematic of ANR-PRB Route



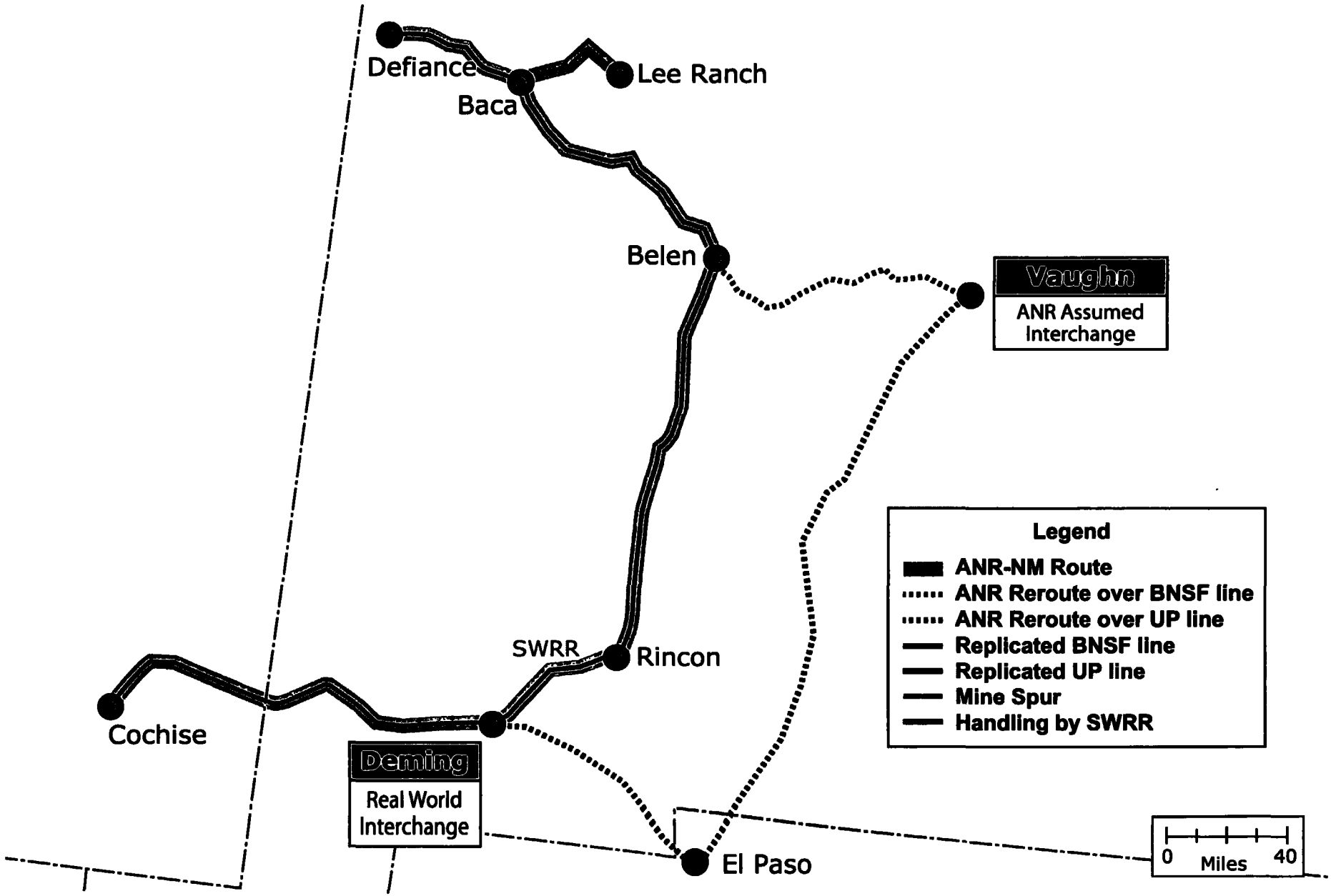
Comparison of ANR-PRB Route and PRB Portion of ANR



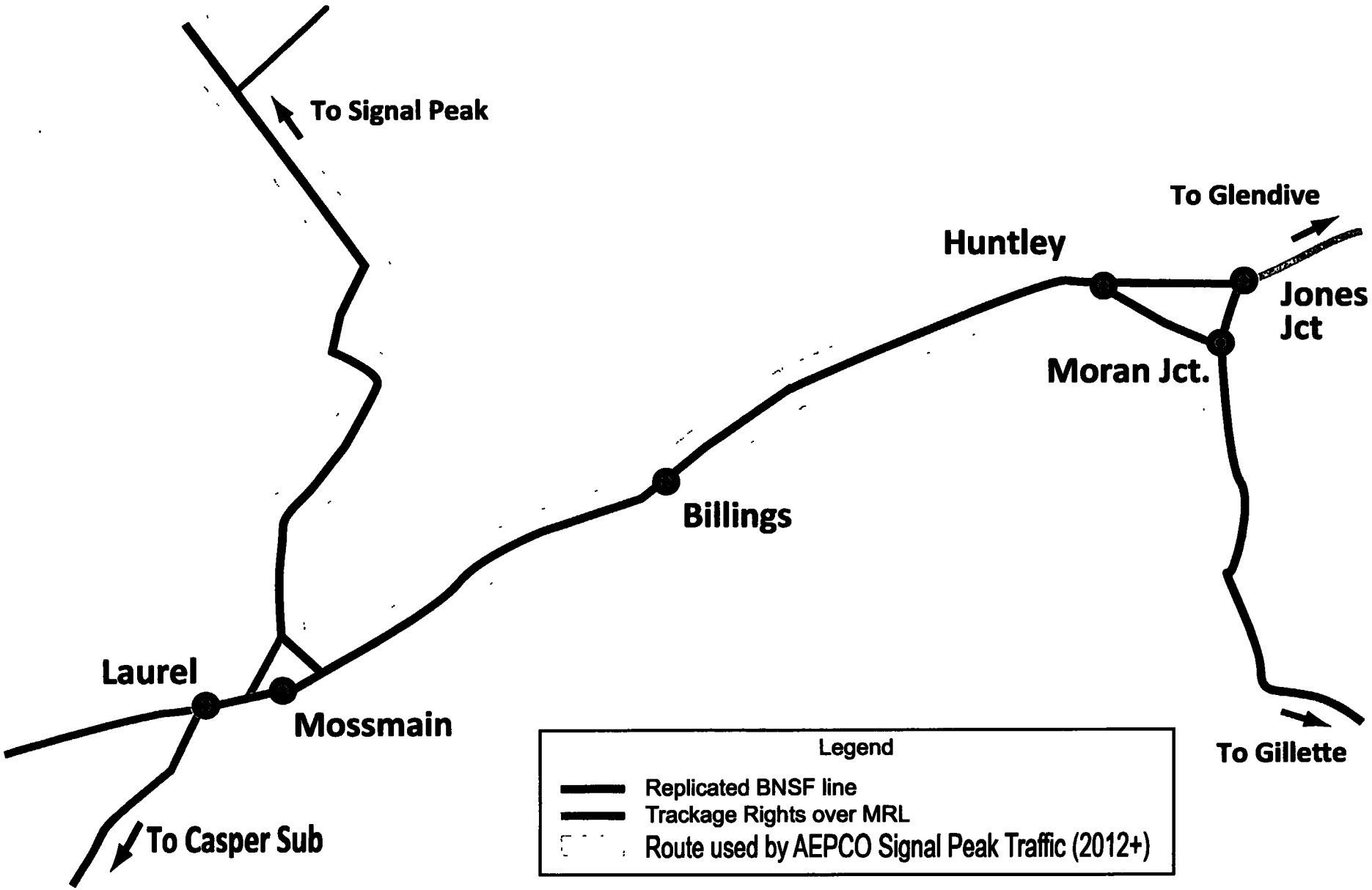
Schematic of ANR-NM Route



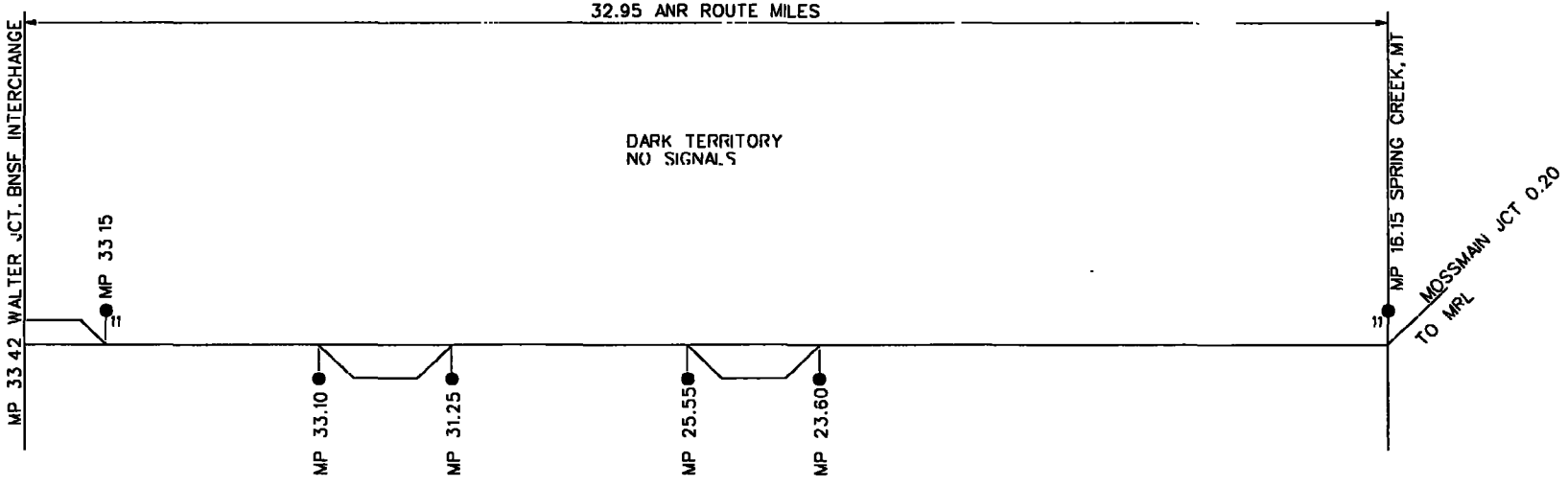
Comparison of ANR-NM Route and New Mexico Portion of ANR



MRL Trackage Rights Lines



III.B: Stand-Alone Railroad System



AEPCO

SUBDIVISION: MONTANA

DIVISION: LAUREL

FROM: WALTER JCT MP: 0.47 DATE: 05/06/10

TO: MOSSMAIN MP: 33.42 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

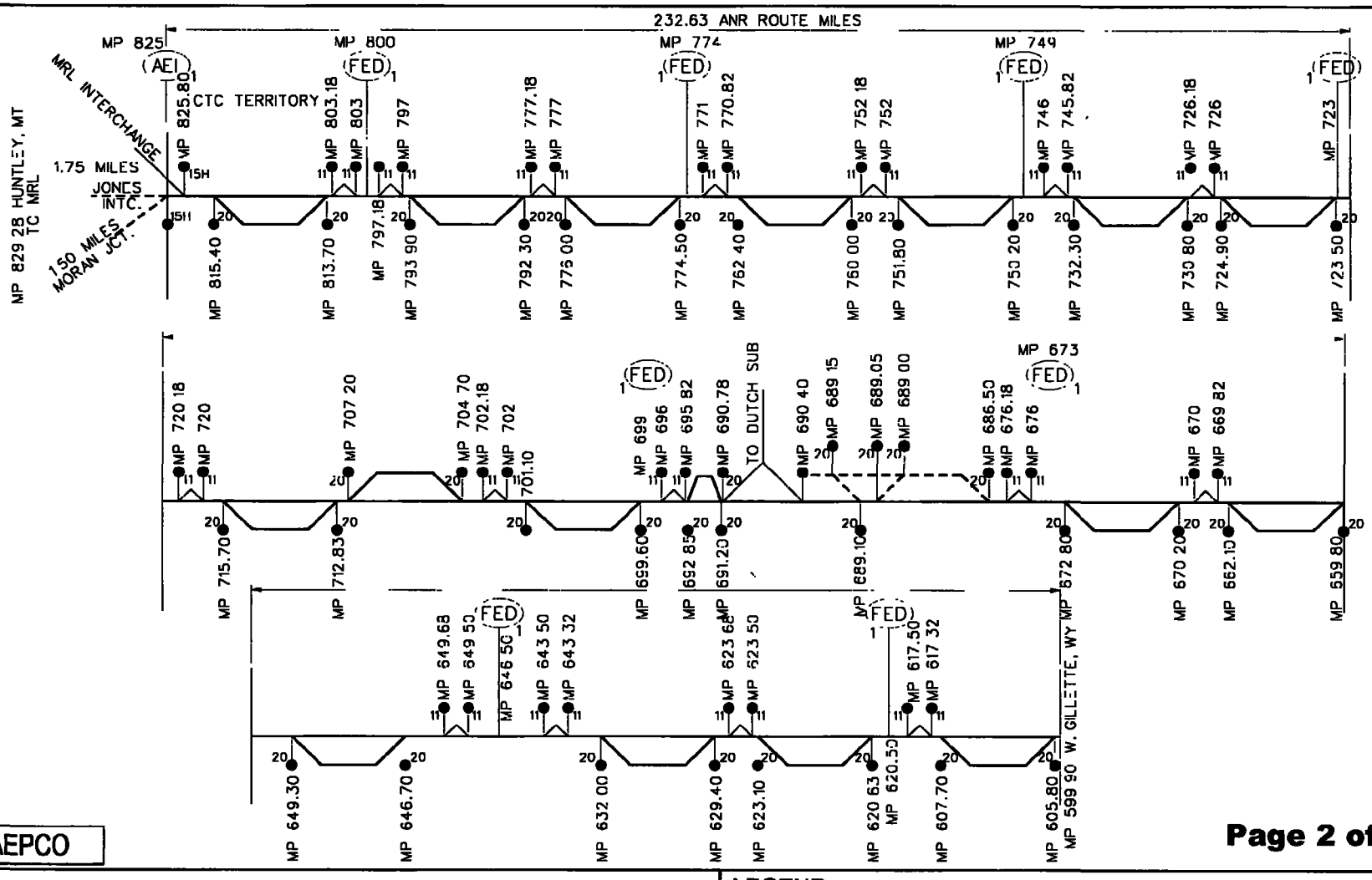
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15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: MONTANA

DIVISION: BIG HORN

FROM: HUNTLEY, MT MP: 829.28 DATE: 05/06/10

TO: WEST GILLETTE, WY MP: 599.90 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

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HW - HOT WHEEL DETECTOR

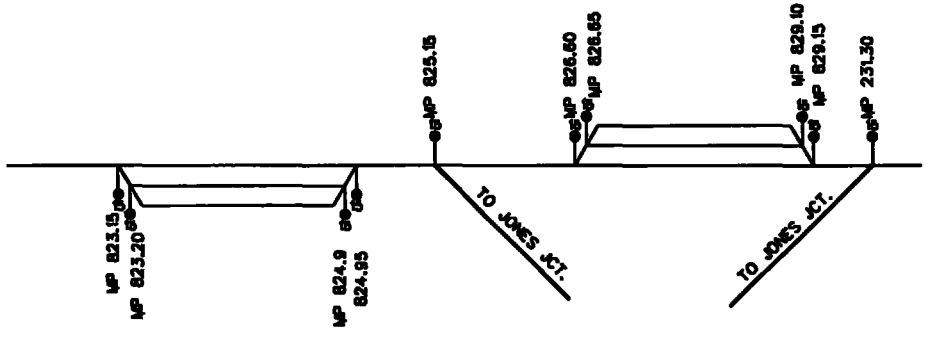
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15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



MORAN & HUNTLEY INTERCHANGE YARDS

AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: BIG HORN

FROM: MP 823.15 DATE: 05/06/10

TO: MP 829.15 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

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HW - HOT WHEEL DETECTOR

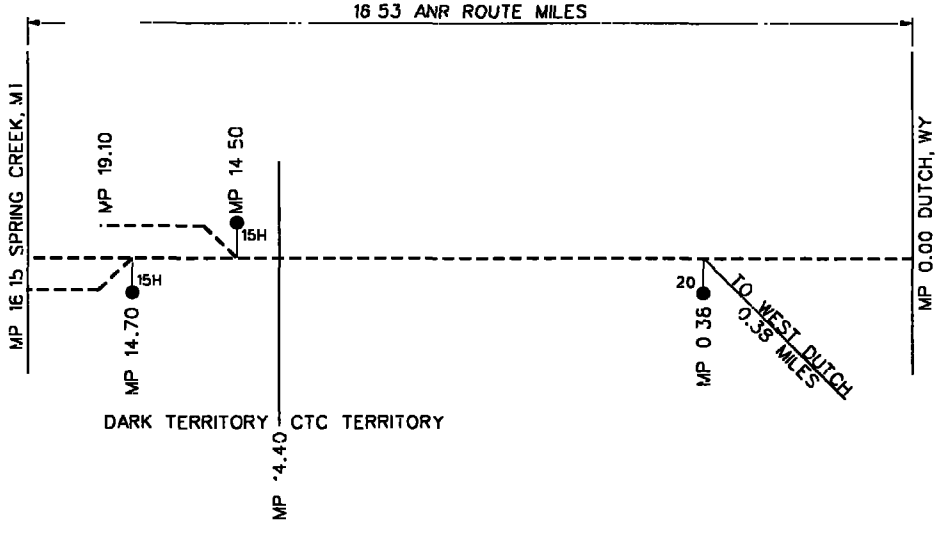
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15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: MONTANA

DIVISION: DUTCH

FROM: SPRING CREEK MP: 16.15 DATE: 05/06/10

TO: DUTCH MP: 0.00 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

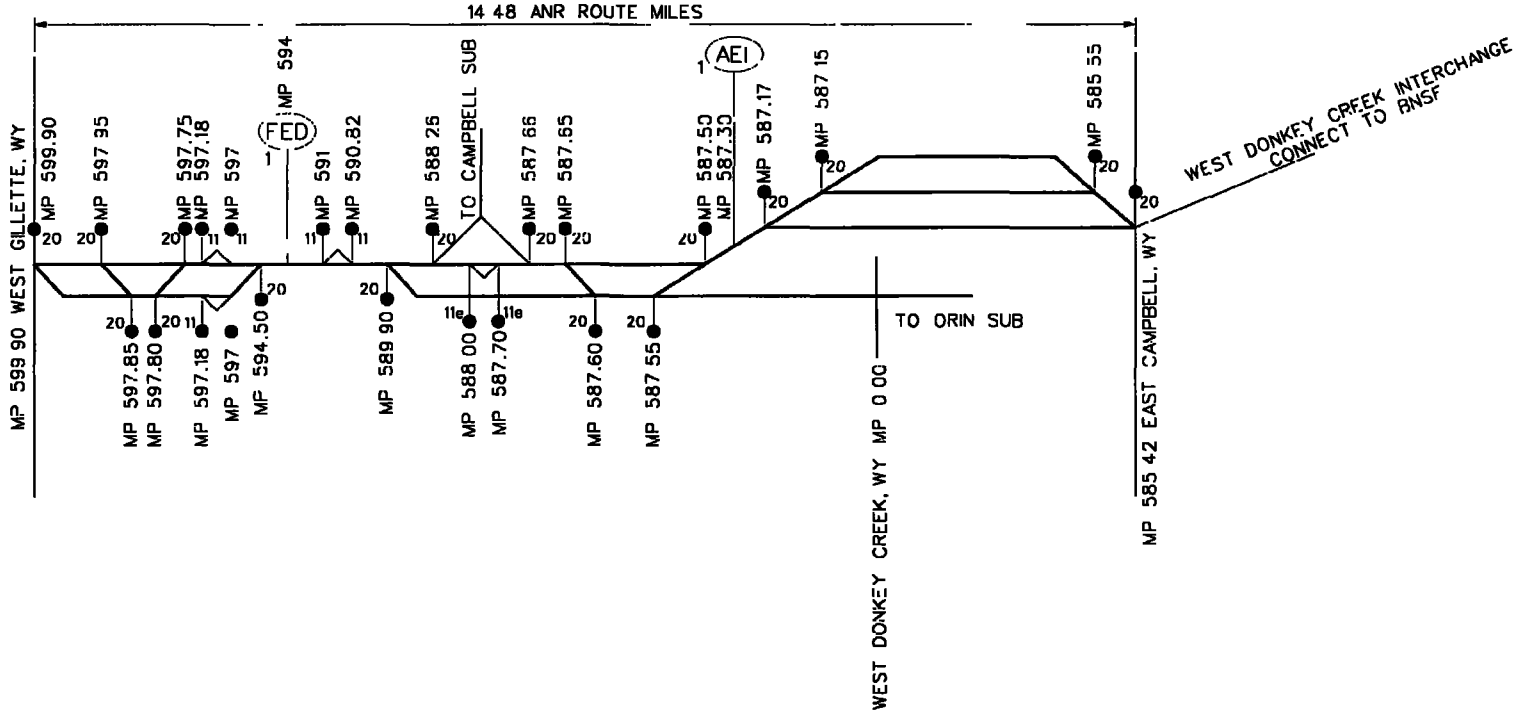
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15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: BIG HORN/BLACK HILLS

FROM: WEST GILLETTE MP: 599.90 DATE: 05/06/10

TO: WEST DONKEY CREEK MP: 587.66 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

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DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

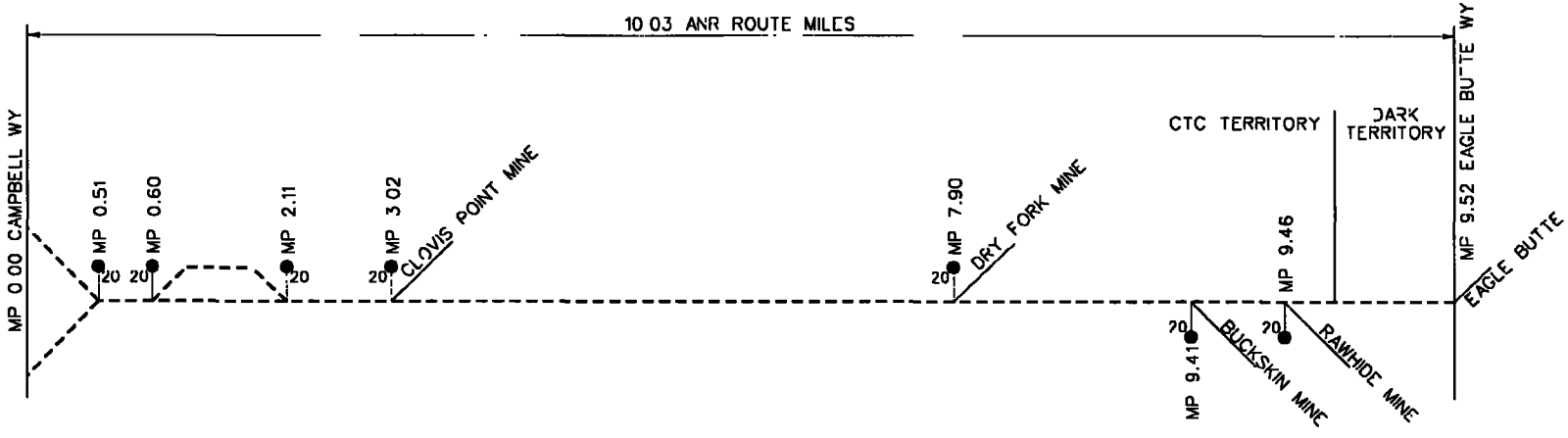
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×TURNOUT TYPES
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15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: **POWDER RIVER**

DIVISION: **CAMPBELL**

FROM: CAMPBELL, WY	MP: 0.00	DATE: 05/06/10
TO: EAGLE BUTTE, WY	MP: 9.52	NOT TO SCALE

LEGEND:

- ——— - 136# PREMIUM CWR
- - - - - - 136# STANDARD CWR
- ——— - 136# 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

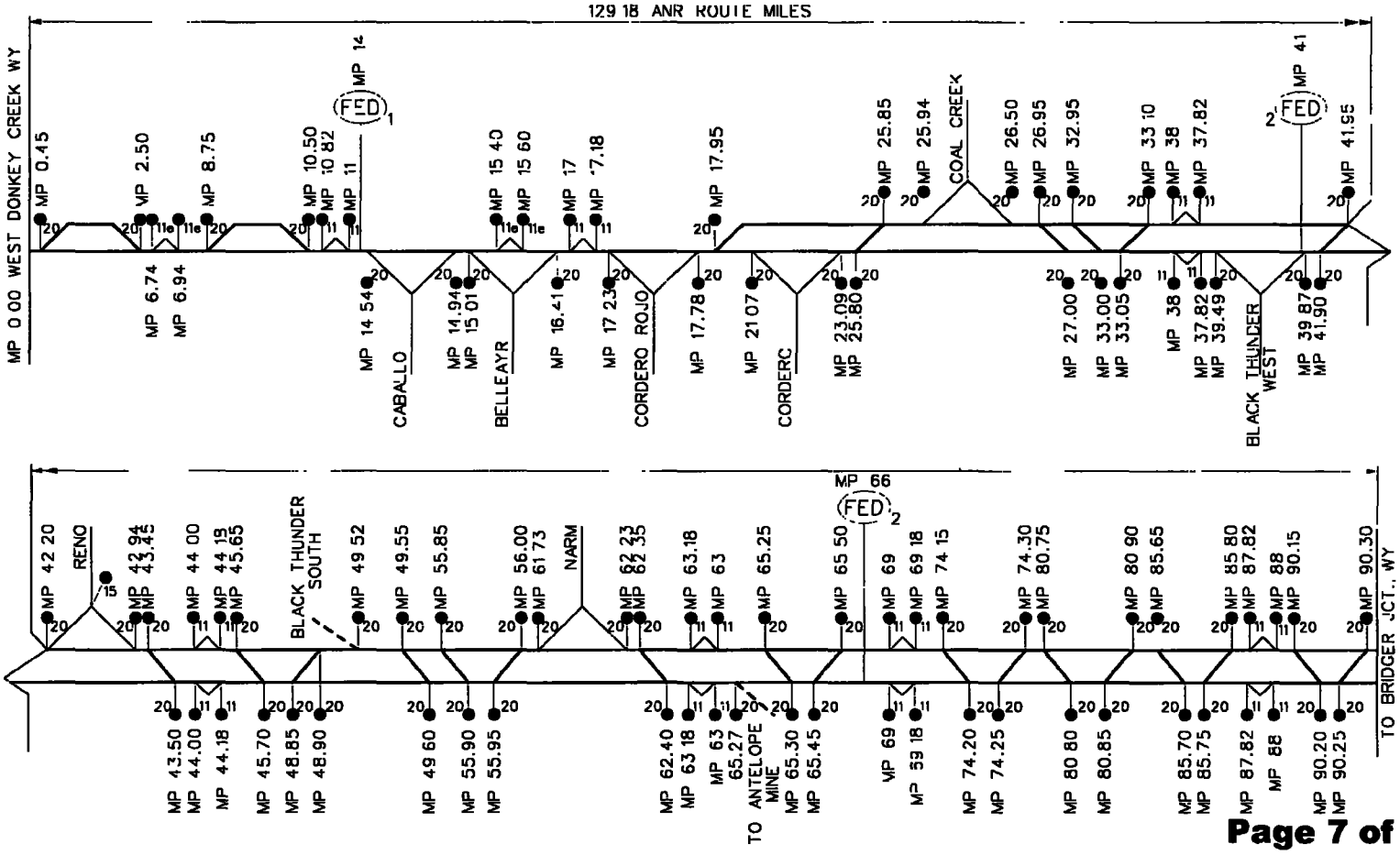
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: ORIN

FROM: WEST DONKEY CREEK MP: 0.00 DATE: 05/06/10

TO: BRIDGER JCT. MP: 127.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

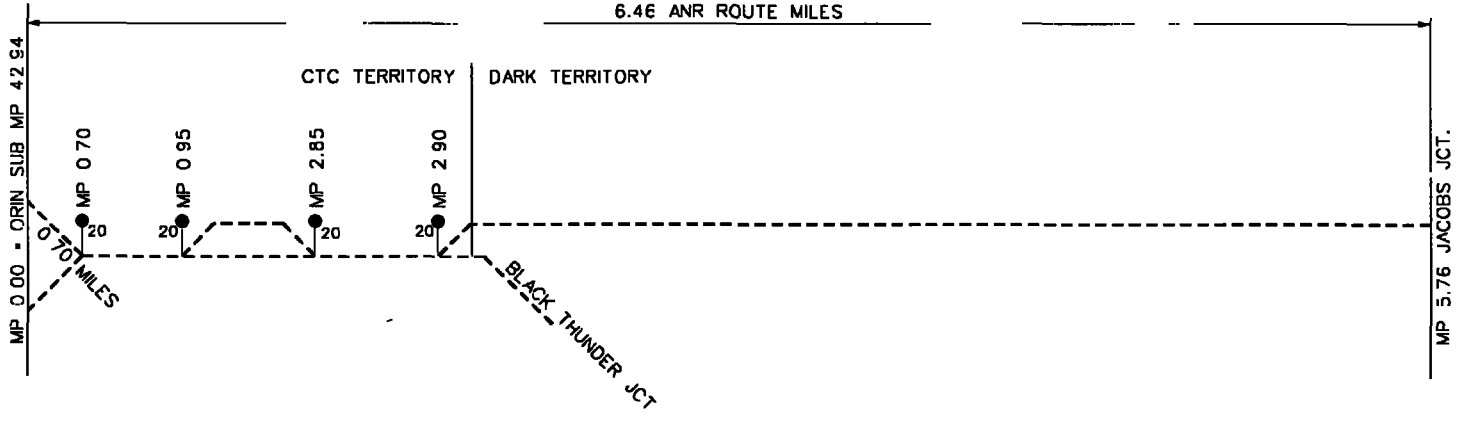
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: **POWDER RIVER**

DIVISION: **RENO** (RENO BRANCH)

FROM: ORIN SUB. SWITCHES	MP: 0.0	DATE: 05/06/10
TO: JACOBS JCT.	MP: 5.76	NOT TO SCALE

LEGEND:

- ——— - 136# PREMIUM CWR
- - - - - - 136# STANDARD CWR
- ——— - 136# 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

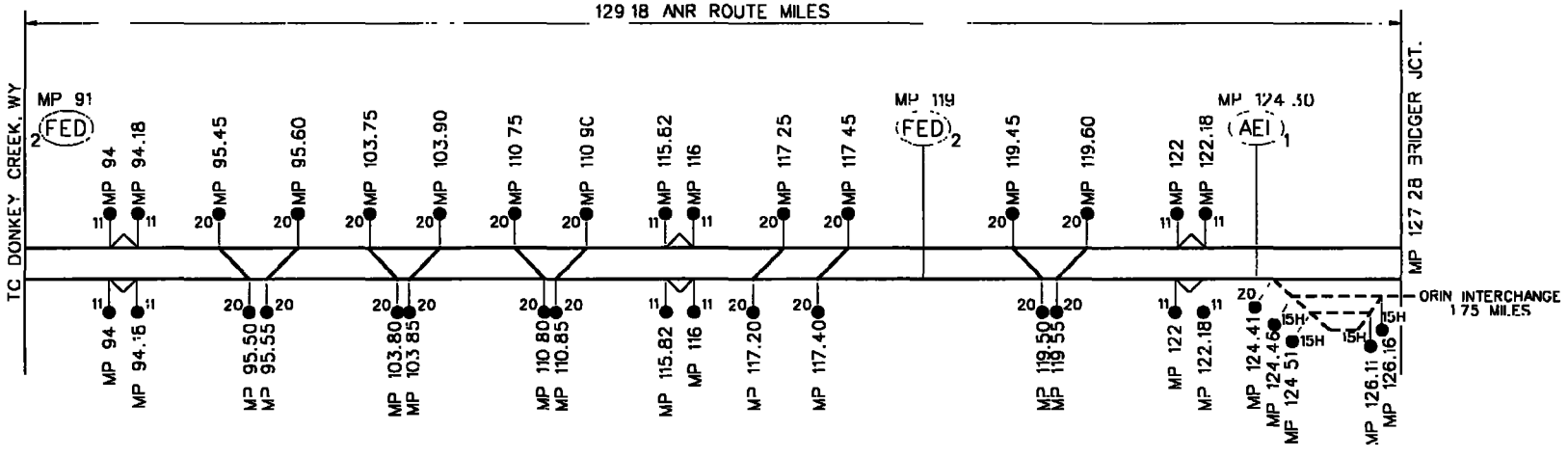
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: ORIN

FROM: DONKEY CREEK MP: 0.00 DATE: 05/06/10

TO: BRIDGER JCT. MP: 127.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

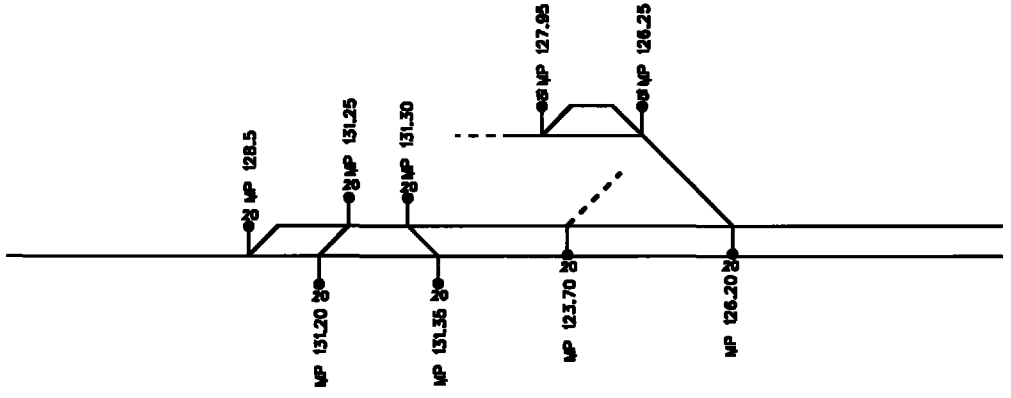
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE×

×TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



ORIN INTERCHANGE YARDS

AEPCO

SUBDIVISION: ORIN

DIVISION: POWDER RIVER

FROM: MP 126.20 DATE: 05/06/10

TO: MP 127.95 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

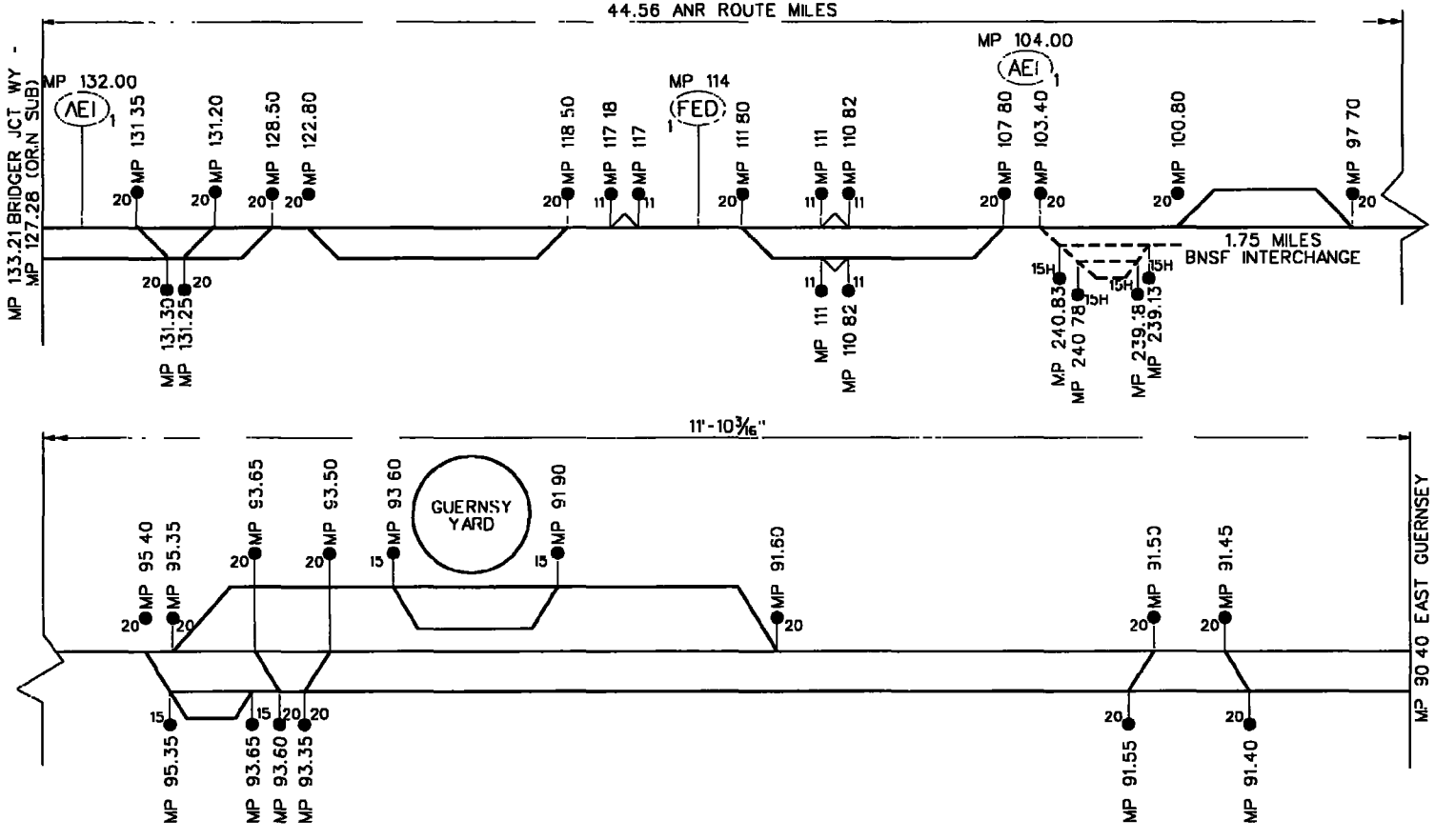
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: BRIDGER JCT MP: 133.21 DATE: 05/06/10

TO: EAST GUERNSEY MP: 90.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

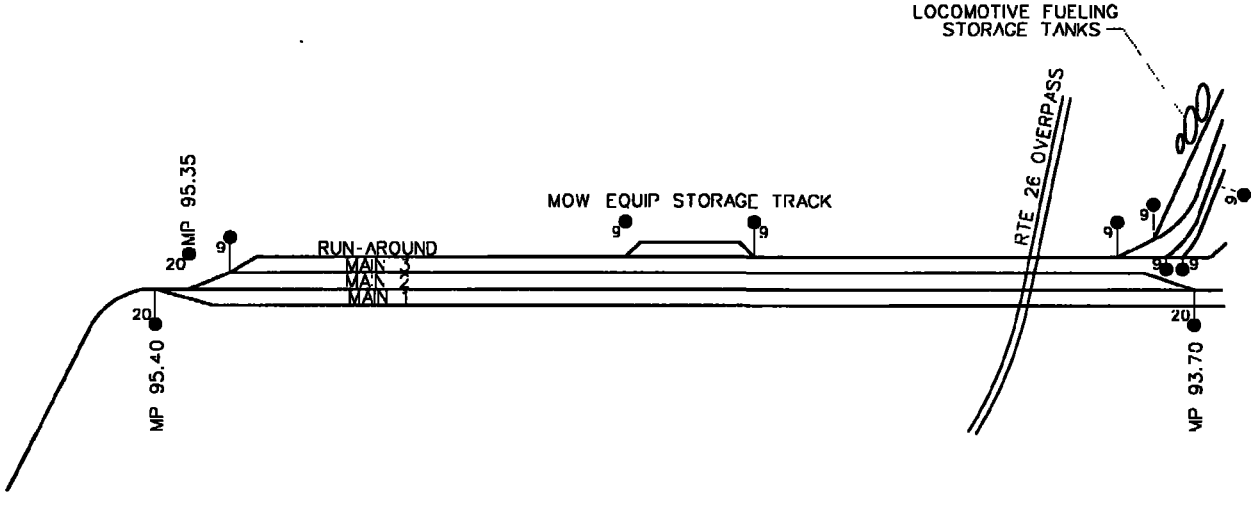
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE×

×TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



CONTINUED ON SHEET 9B

AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: GUERNSEY YARD WEST MP: 91.35 DATE: 05/06/10

TO: MP: 91.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

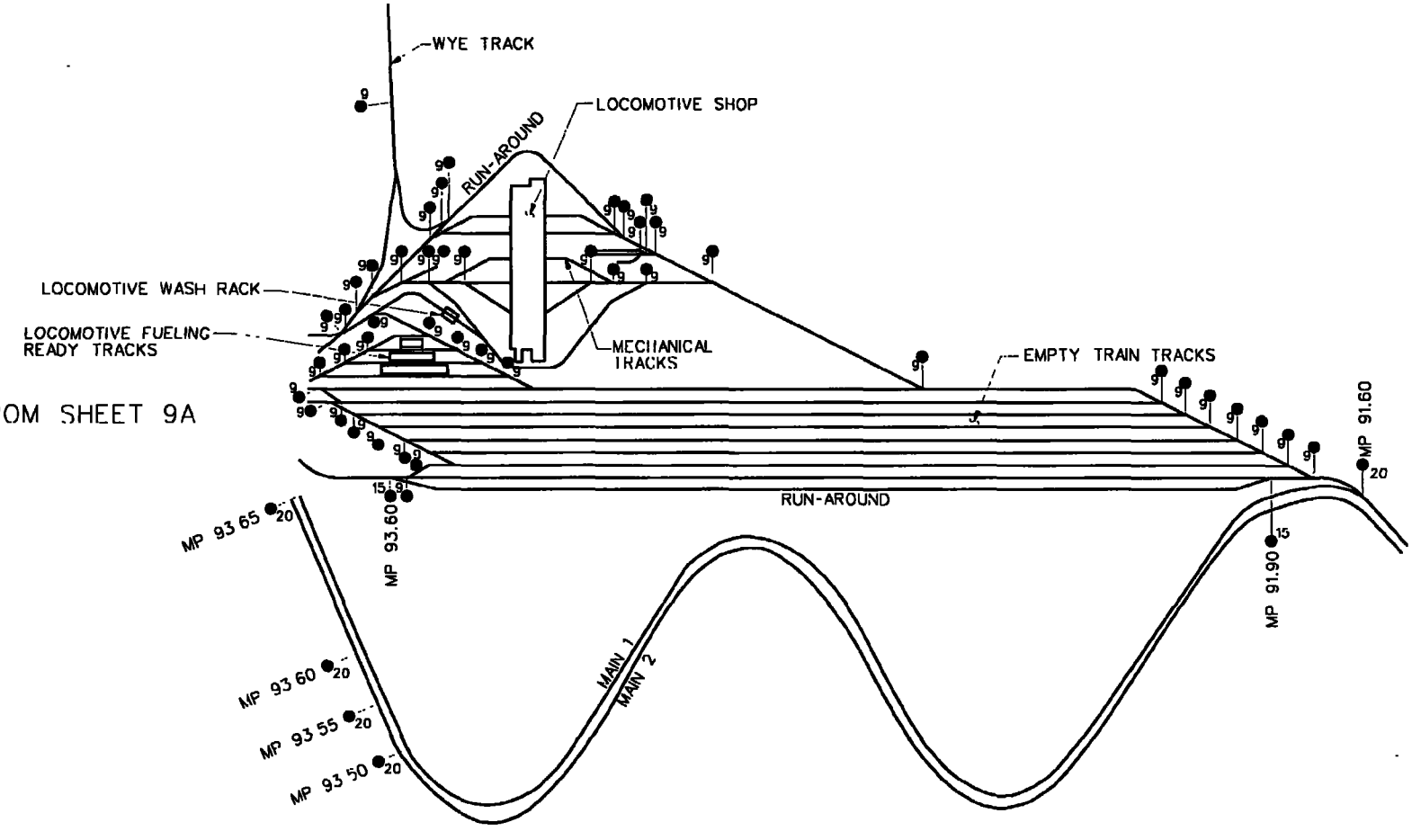
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE×

×TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



CONTINUED FROM SHEET 9A

AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: GUERNSEY YARD EAST MP: 93.35 DATE: 05/06/10

TO: MP: 91.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FFD) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

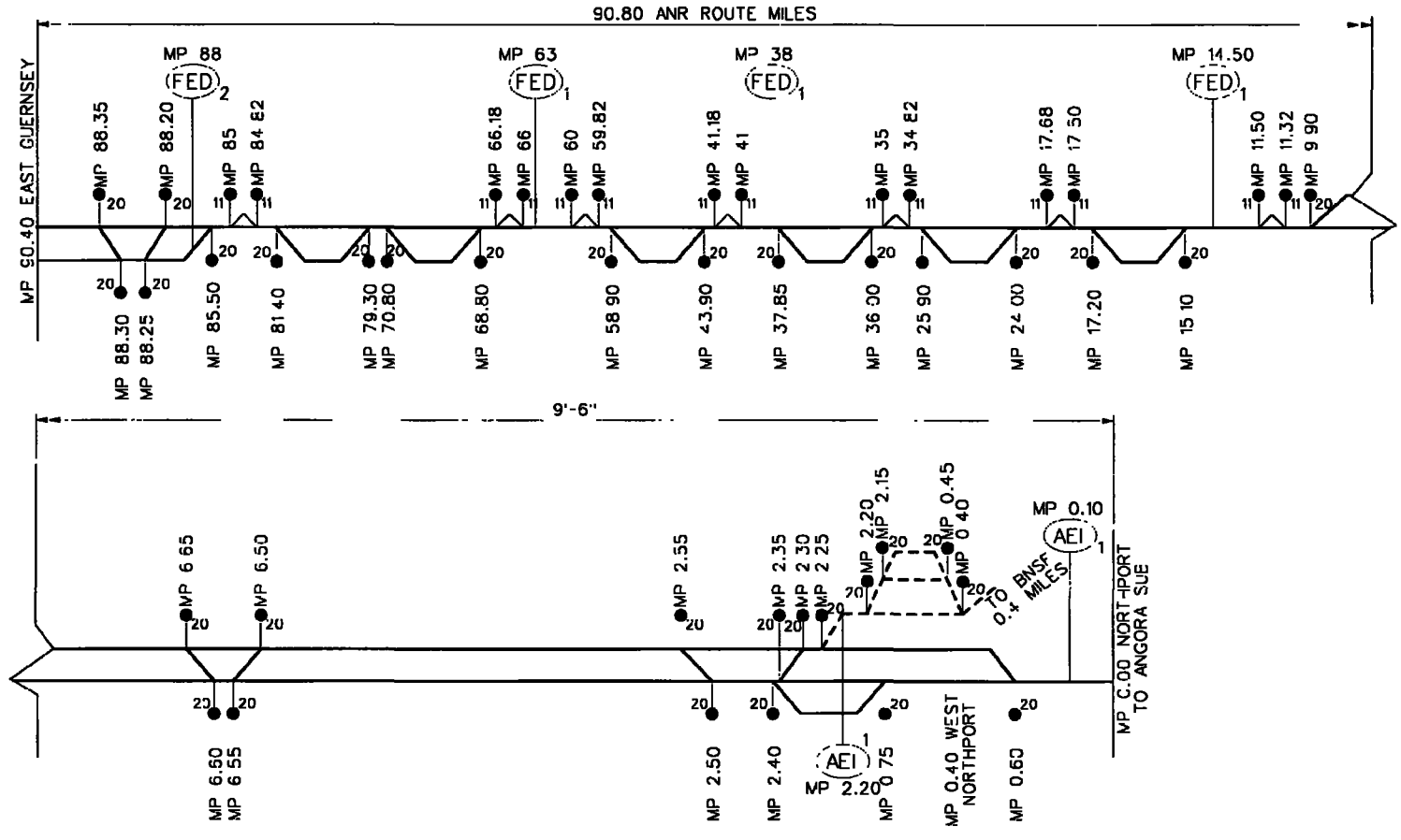
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: VALLEY

FROM: EAST GUERNSEY MP: 90.40 DATE: 05/06/10

TO: WEST NORTHPORT MP: 0.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

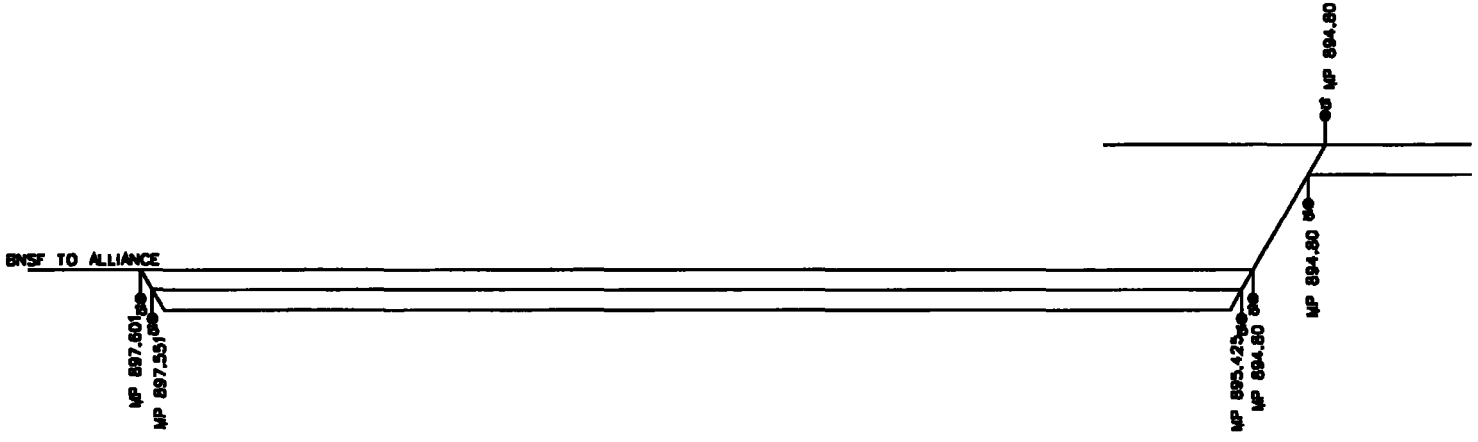
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE×

×TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



NORTHPORT - BNSF YARD

AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: GALLUP

FROM: MP 894.80 DATE: 05/06/10

TO: MP 897.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

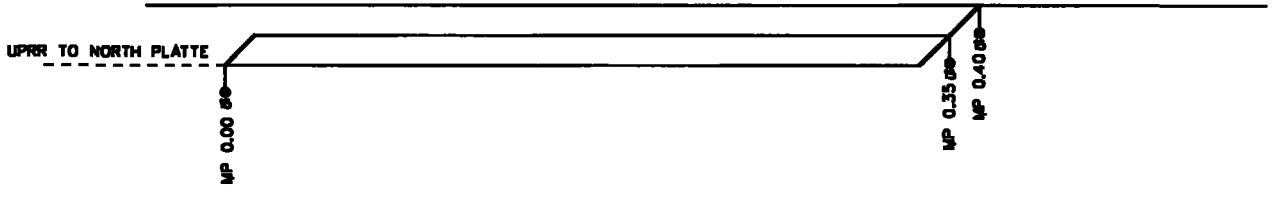
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



NORTHPORT - UPRR INTERCHANGE YARD

AEPCO

SUBDIVISION:

DIVISION: POWDER RIVER BASIN

FROM: MP 1078.68 DATE: 05/06/10

TO: MP 1080.20 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

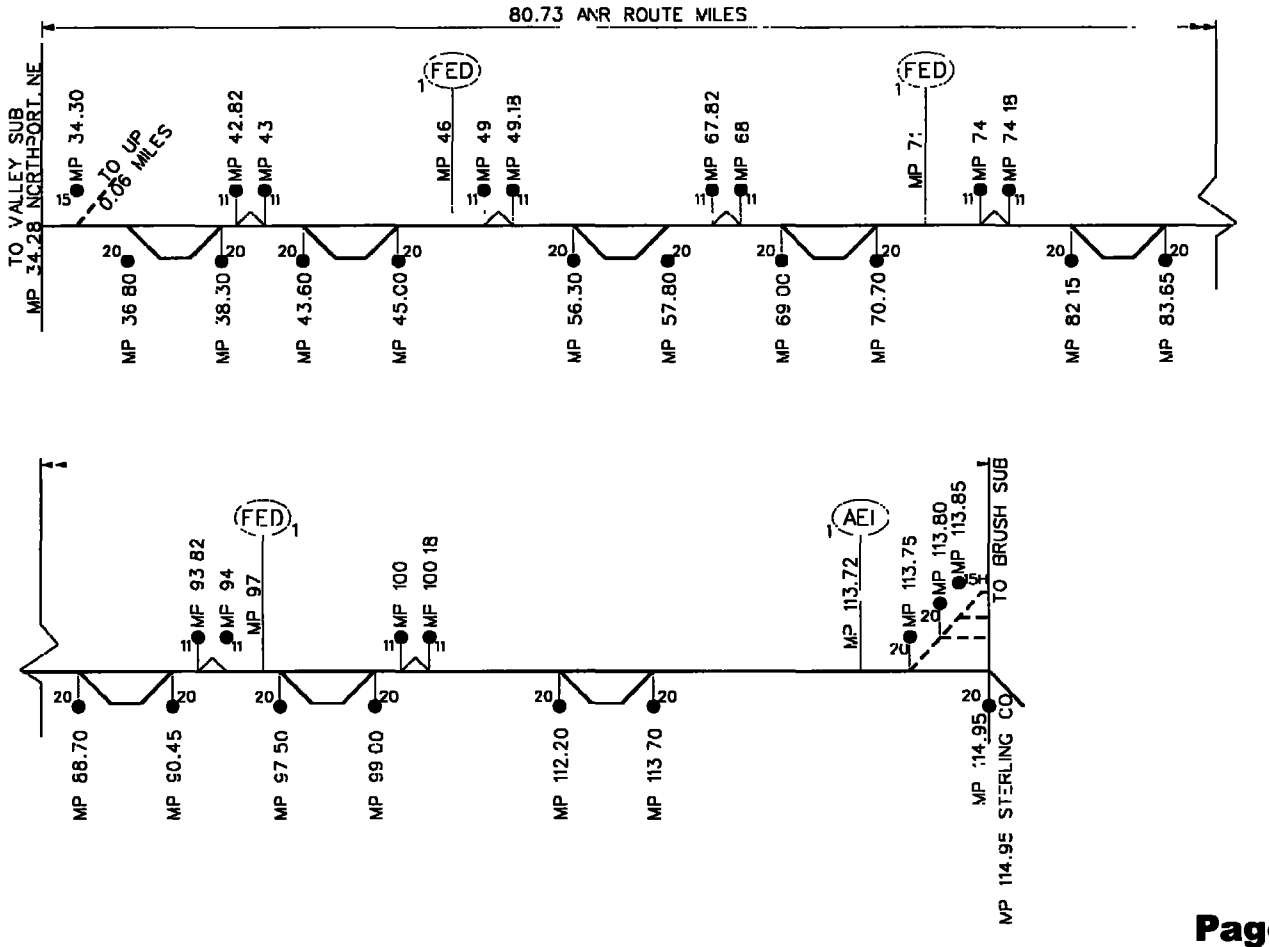
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: ANGORA

FROM: NORTHPORT MP: 34.28 DATE: 05/06/10

TO: STERLING MP: 114.95 NOT TO SCALE

LEGEND:

——— - 136# PREMIUM CWR

- - - - - - 136# STANDARD CWR

——— - 136# 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

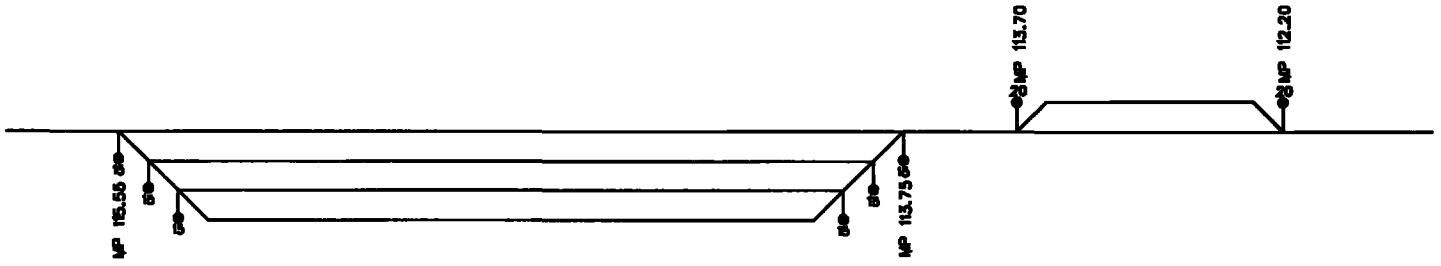
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

● 20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



STERLING INTERCHANGE YARD

AEPCO

SUBDIVISION: ANGORA

DIVISION: POWDER RIVER

FROM: MP 113.75 DATE: 05/06/10

TO: MP 115.55 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

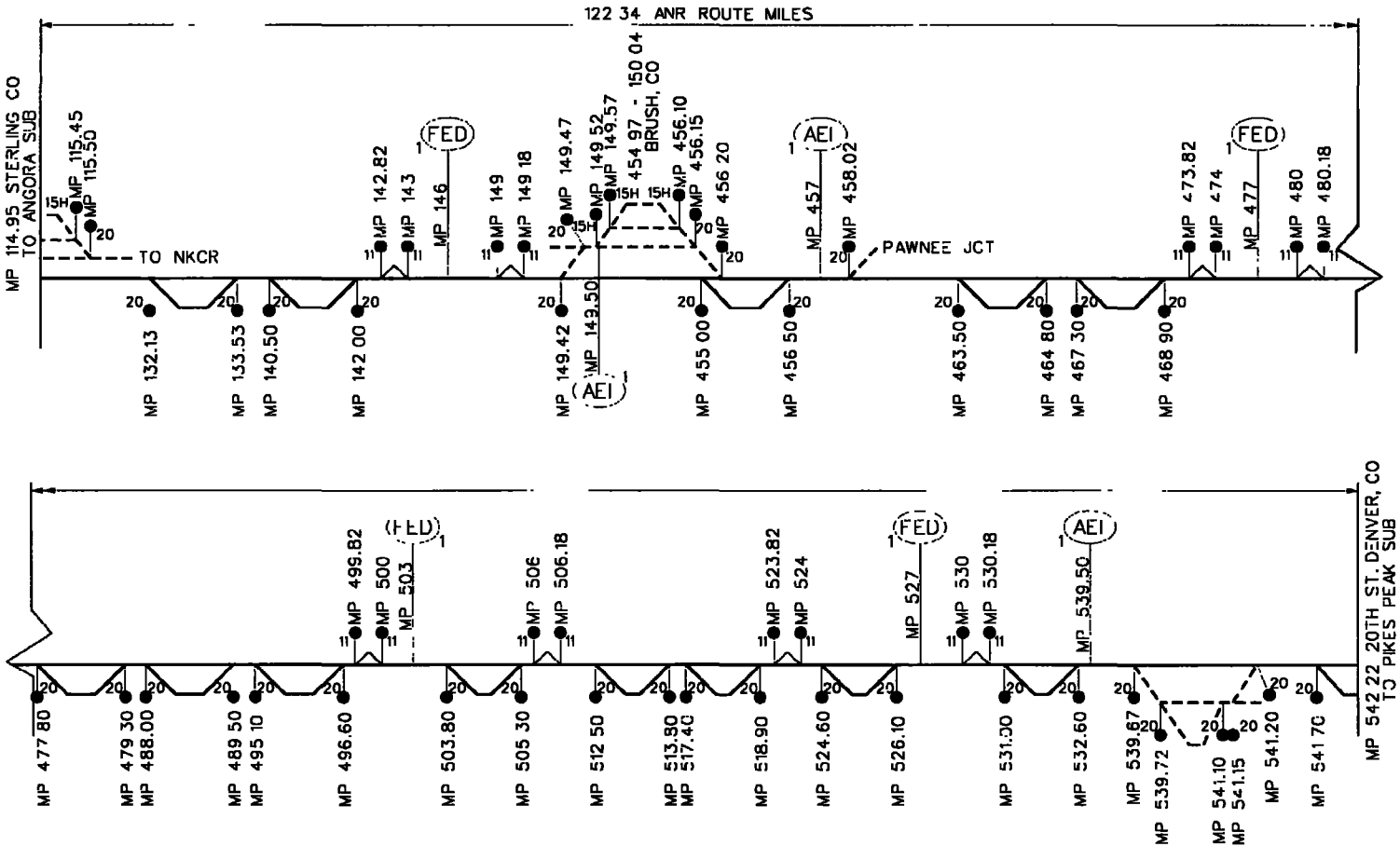
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: BRUSH

FROM: STERLING MP: 114.95 DATE: 05/06/10

TO: 20th STREET DENVER MP: 542.22 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DF OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

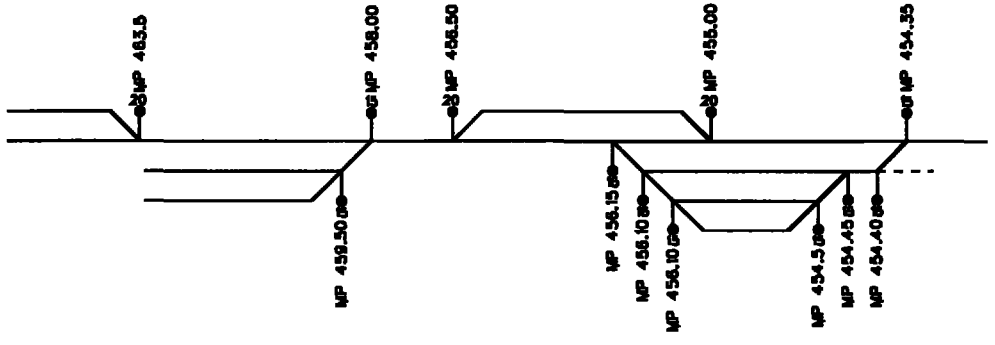
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



BRUSH INTERCHANGE YARDS

AEPCO

SUBDIVISION: **BRUSH**

DIVISION: **POWDER RIVER**

FROM: MP 454.35 DATE: 05/06/10

TO: MP 461.05 NOT TO SCALE

LEGEND:

——— - 136# PREMIUM CWR

– – – - 136# STANDARD CWR

——— - 136# 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

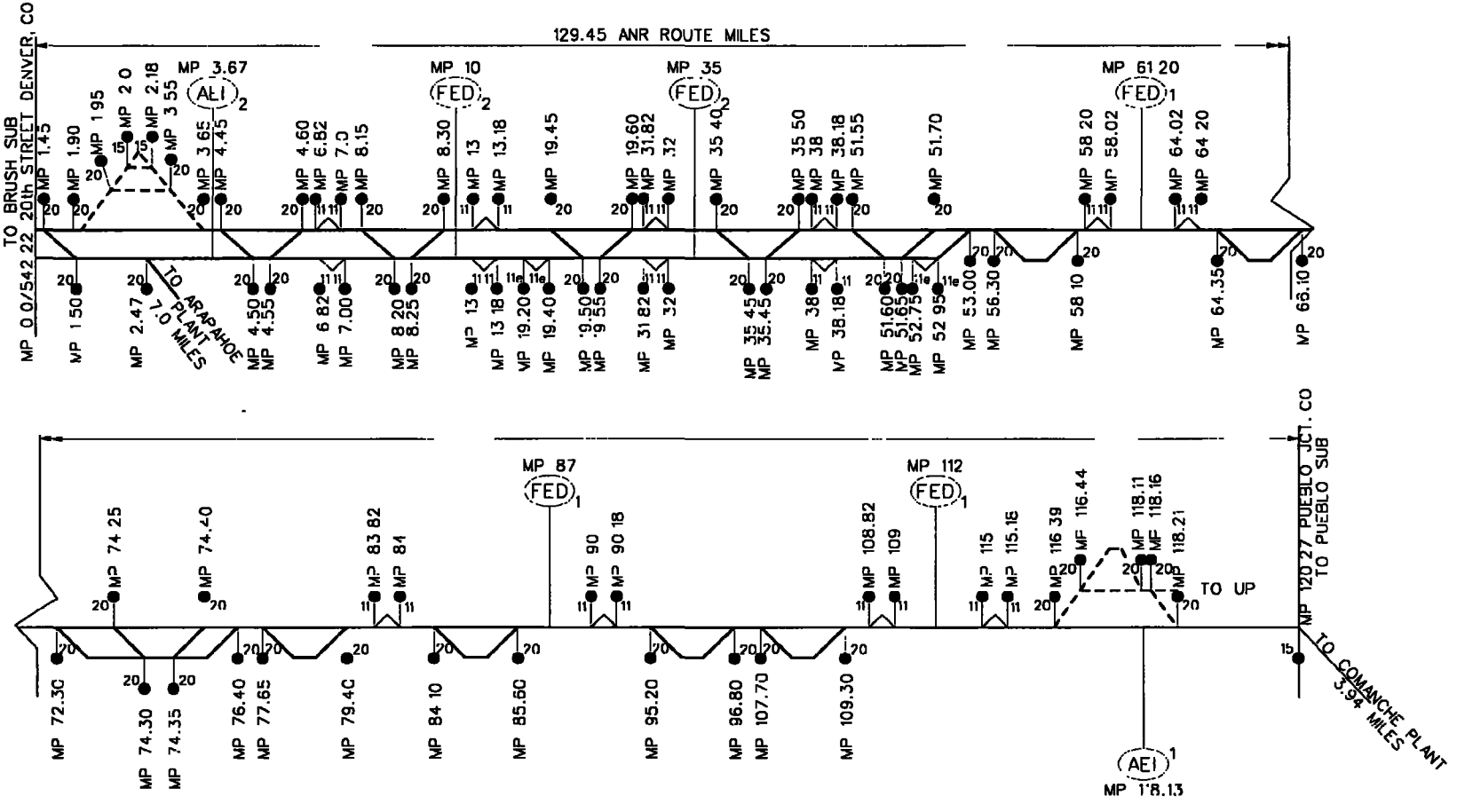
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: PIKES PEAK

FROM: 20TH STREET DENVER MP: 0.0 DATE: 05/06/10

TO: PUEBLO JCT. MP: 120.27 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

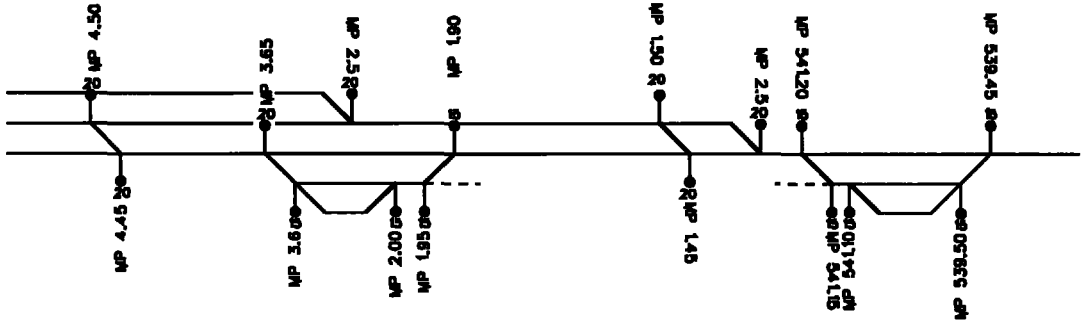
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



DENVER INTERCHANGE YARDS

AEPCO

SUBDIVISION: BRUSH

DIVISION: POWDER RIVER

FROM: MP 539.45 DATE: 05/06/10

TO: MP 3.85 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

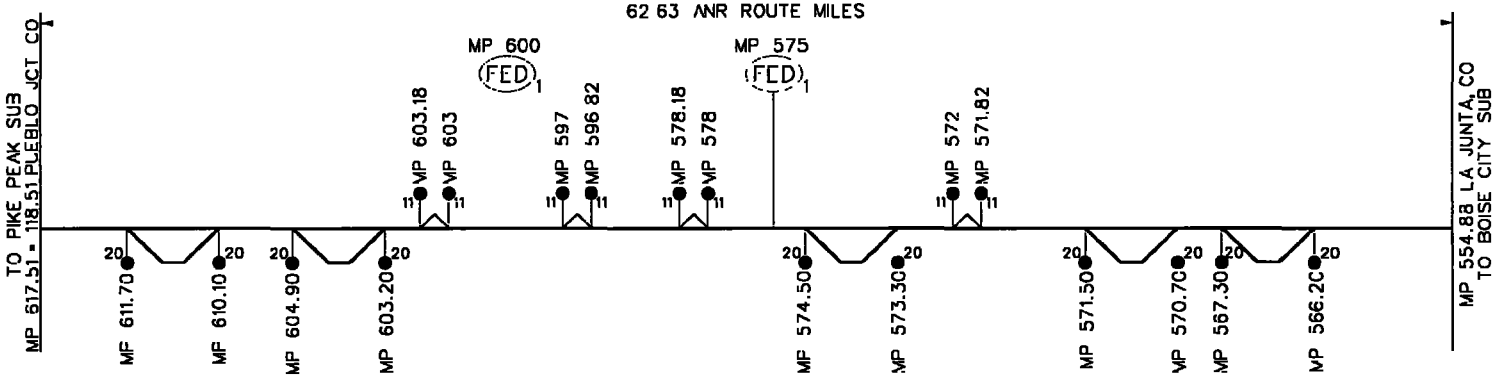
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: PUEBLO

FROM: PUEBLO, CO MP: 617.54 DATE: 05/06/10

TO: LA JUNTA, CO MP: 554.88 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

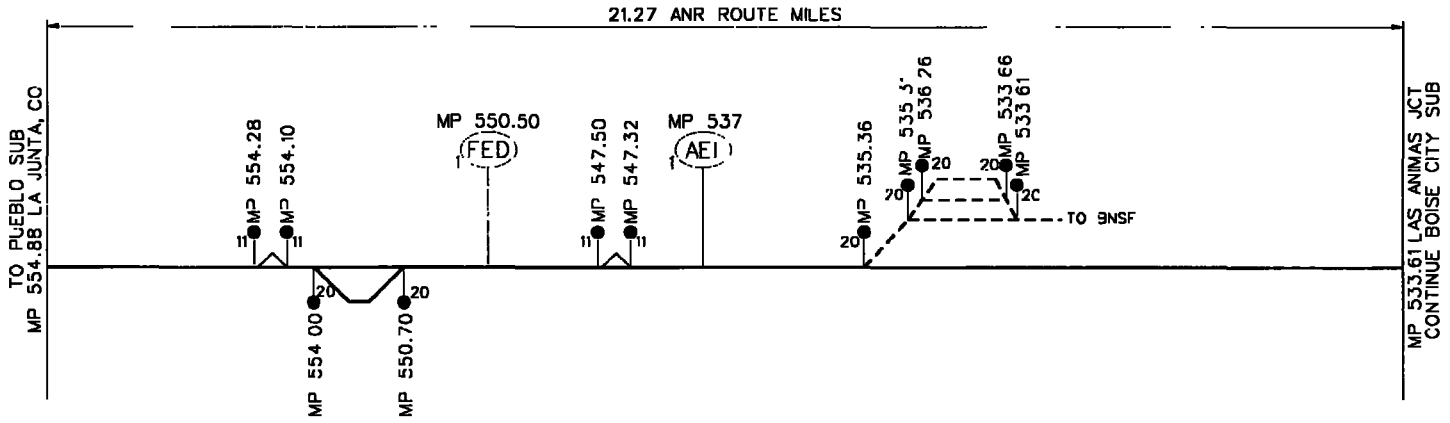
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: BOISE CITY

FROM: LA JUNTA, CO MP: 554.86 DATE: 05/06/10

TO: LA ANIMAS JCT, CO MP: 533.61 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

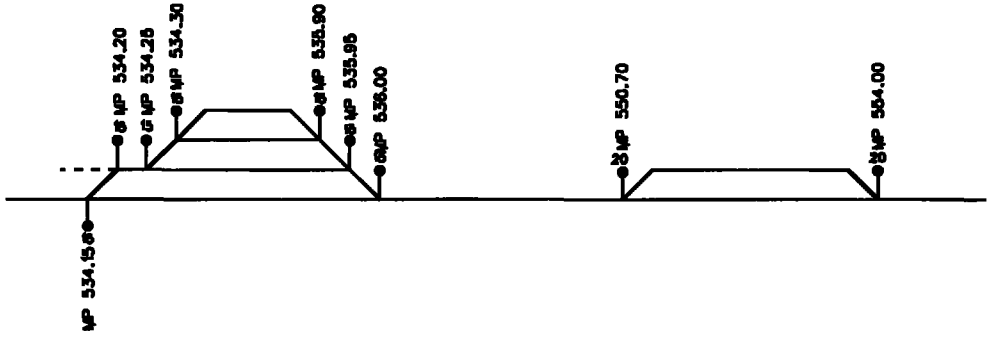
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



LAS ANIMAS JCT. INTERCHANGE YARD

AEPCO

SUBDIVISION: PUEBLO

DIVISION: POWDER RIVER

FROM: MP 534.15 DATE: 05/06/10

TO: MP 536.00 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

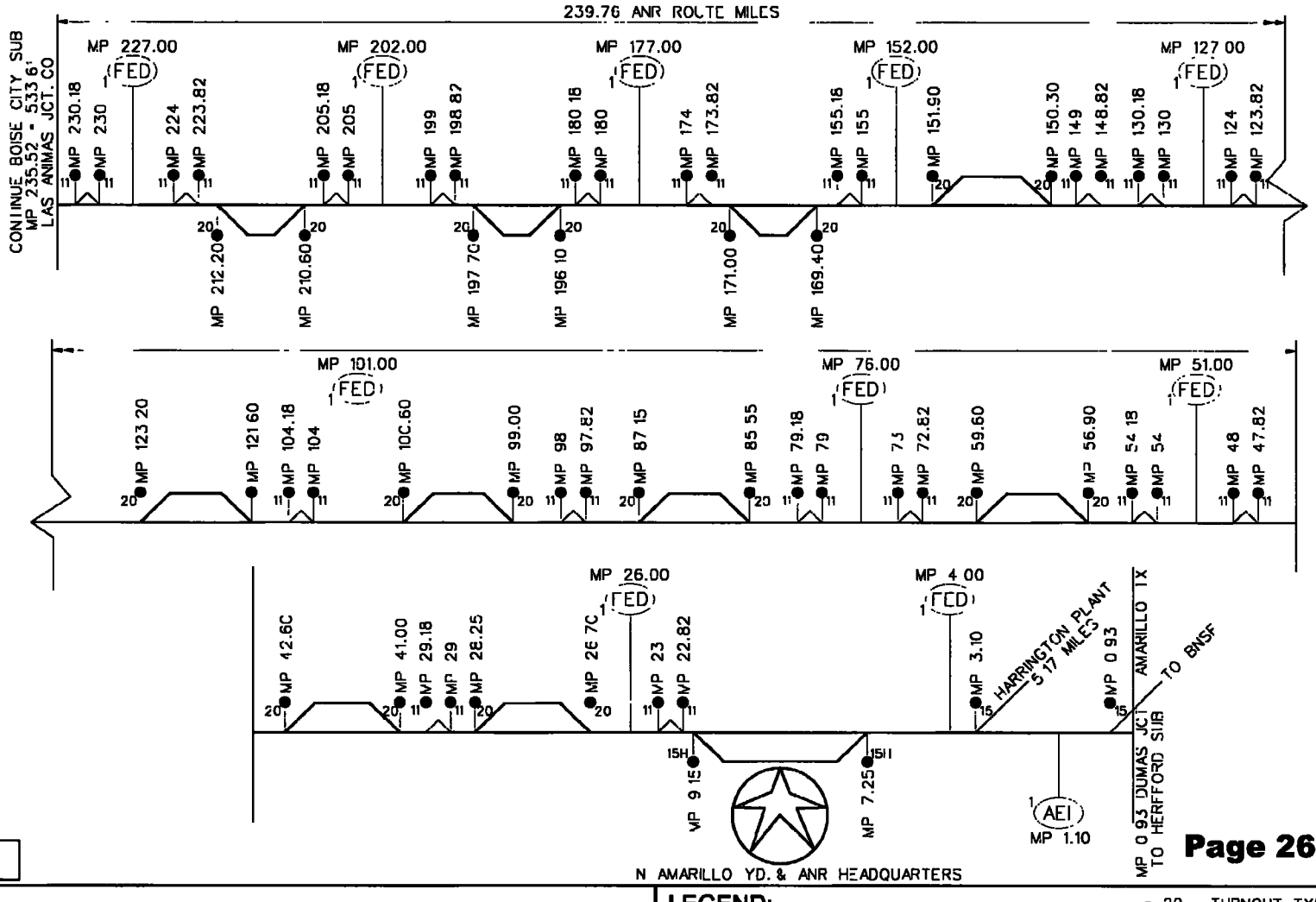
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: POWDER RIVER

DIVISION: BOISE CITY

FROM: LA ANIMAS JCT. MP: 235.52 DATE: 05/06/10

TO: DUMAS JCT. MP: 0.93 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

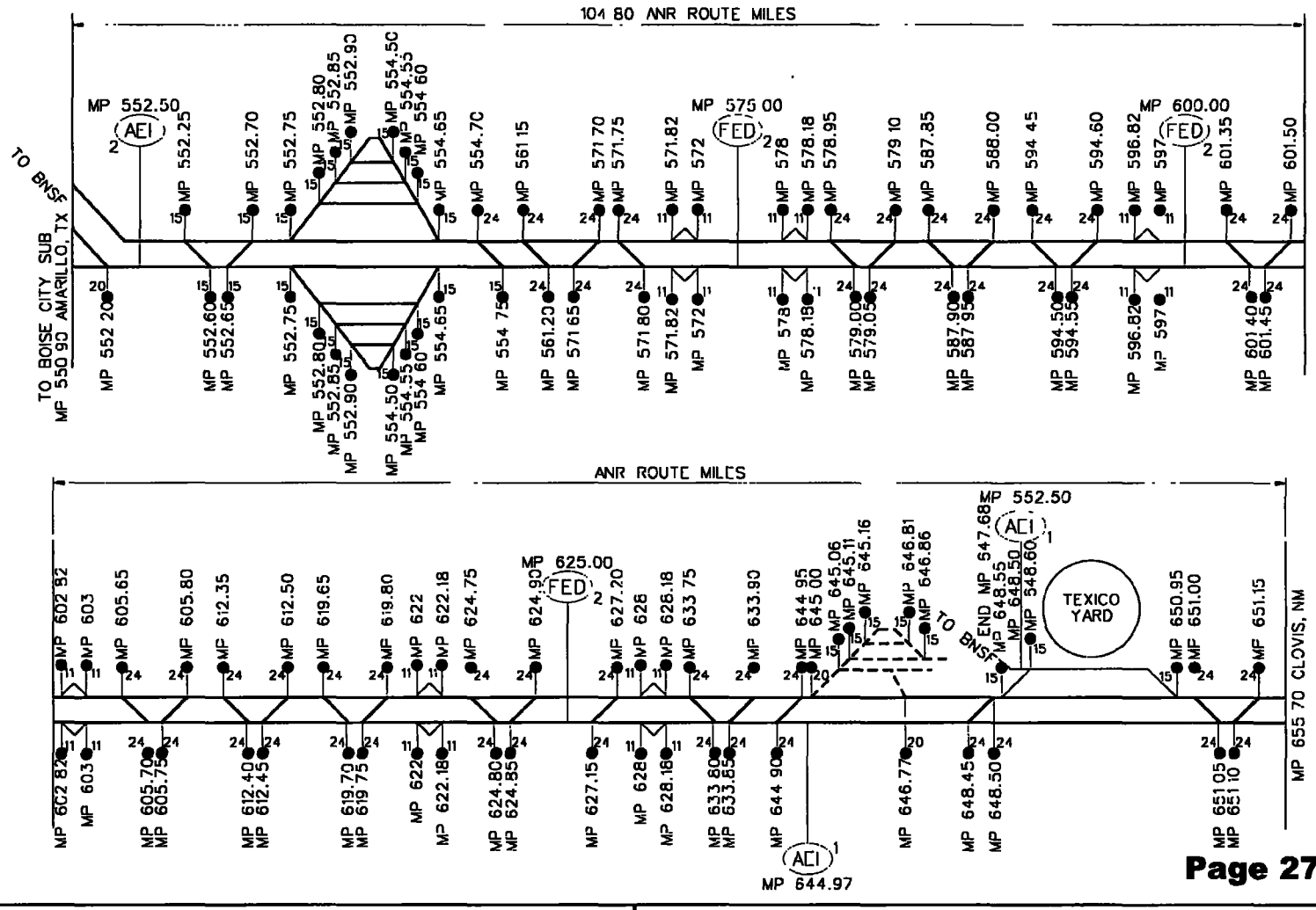
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: KANSAS

DIVISION: HEREFORD

FROM: AMARILLO MP: 550.90 DATE: 05/06/10

TO: CLOVIS MP: 655.70 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

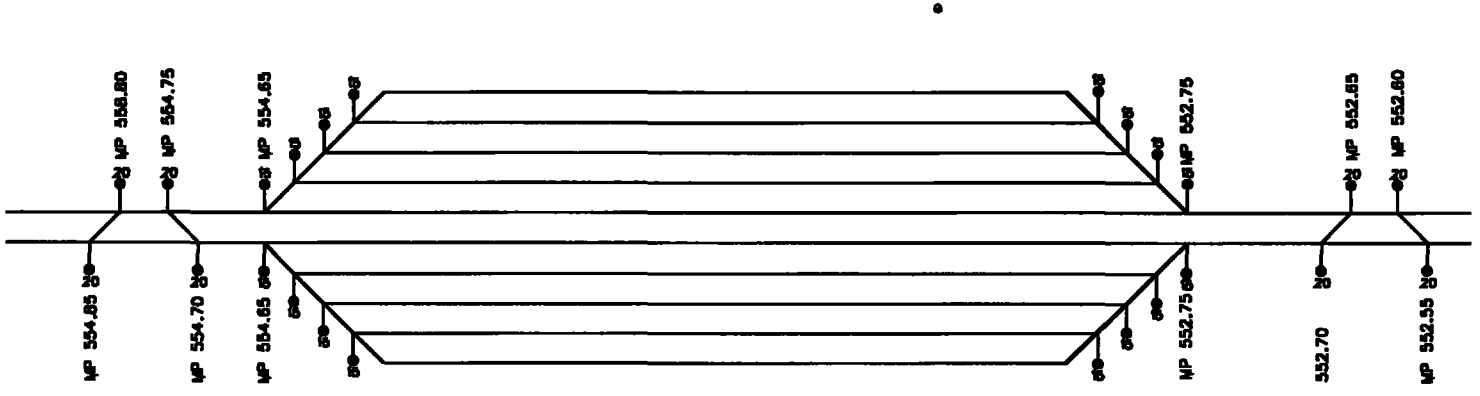
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



WEST AMARILLO INTERCHANGE YARD

AEPCO

SUBDIVISION: CLOVIS

DIVISION: SOUTHWEST

FROM: MP 552.75 DATE: 05/06/10

TO: MP 554.65 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

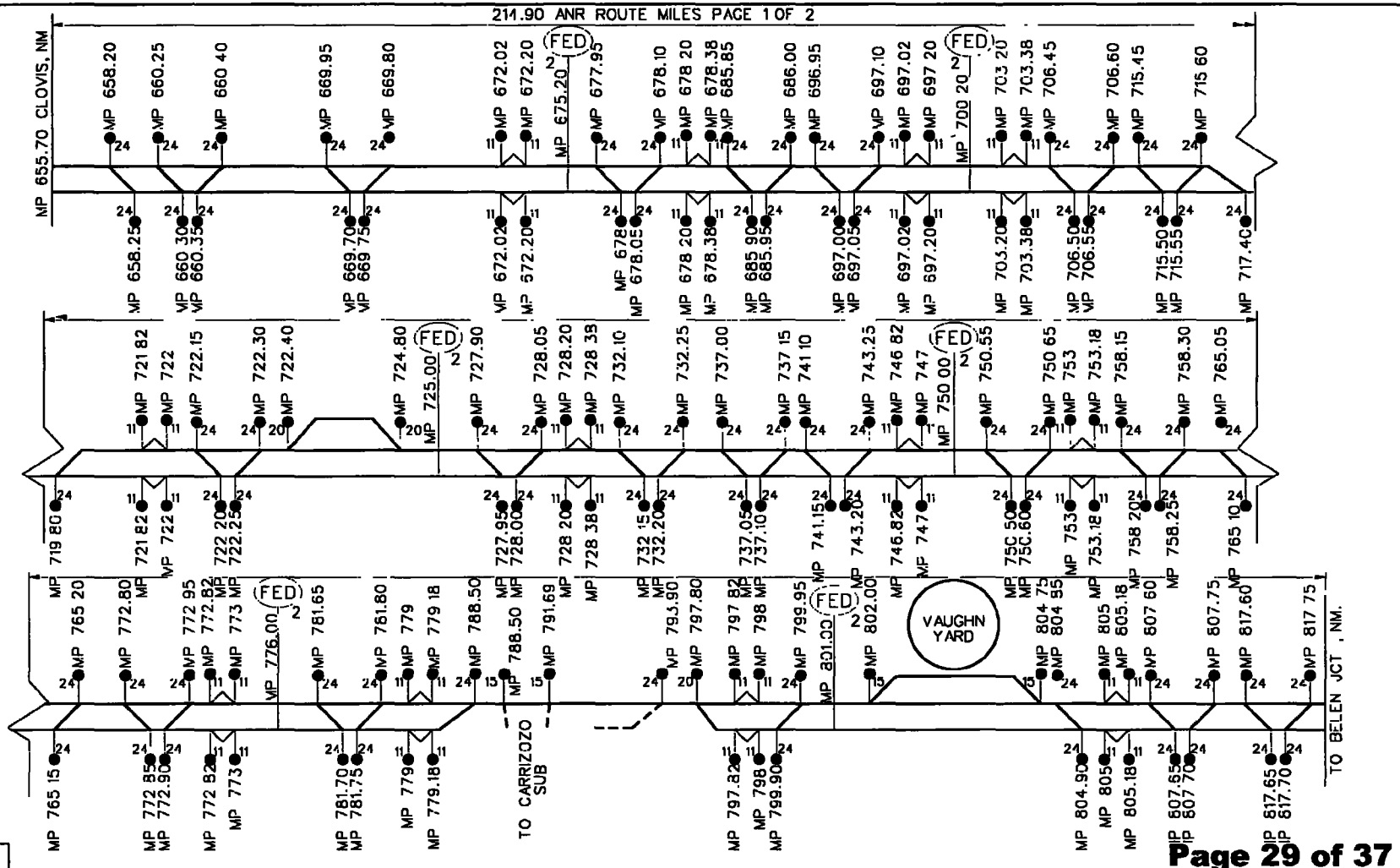
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: CLOVIS

FROM: CLOVIS MP: 655.70 DATE: 05/06/10

TO: BELEN JCT. MP: 897.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HH - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

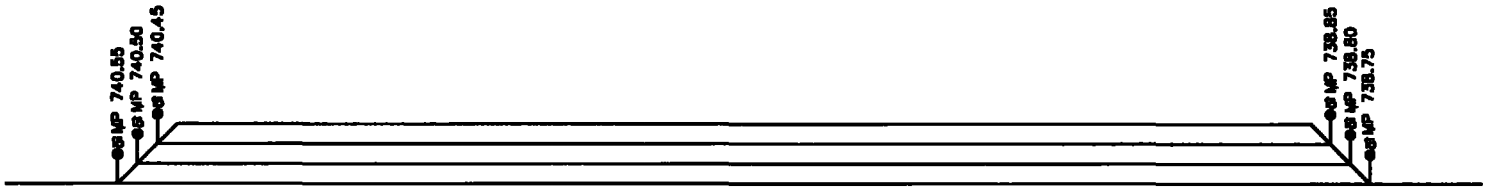
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE×

×TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



EAST VAUGHN YARD

AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: CLOVIS

FROM: MP 738.75 DATE: 05/06/10

TO: MP 740.55 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

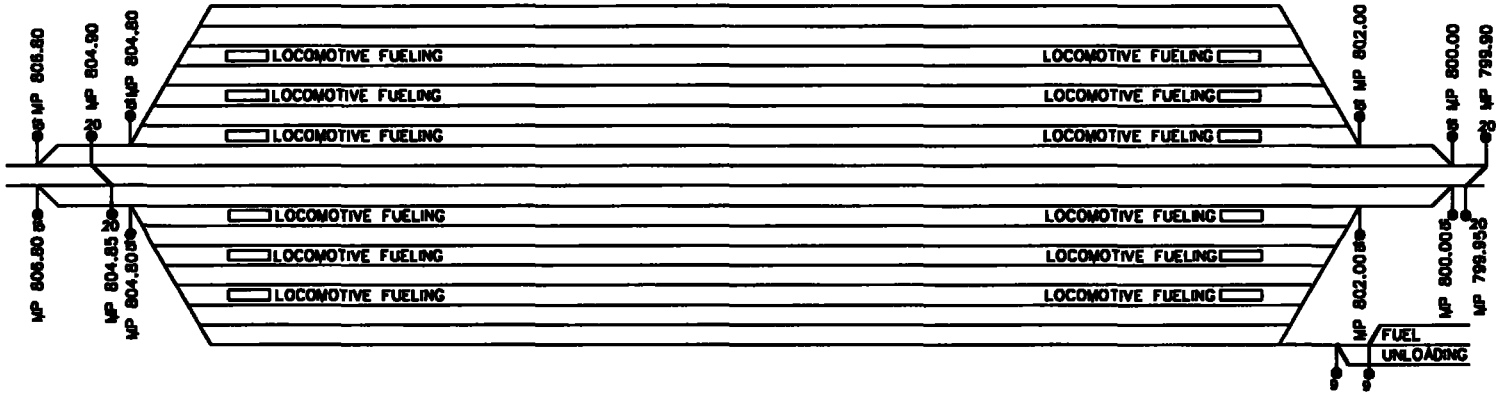
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



WEST VAUGHN YARD

AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: GALLUP

FROM: MP 800.00 DATE: 05/06/10

TO: MP 806.80 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

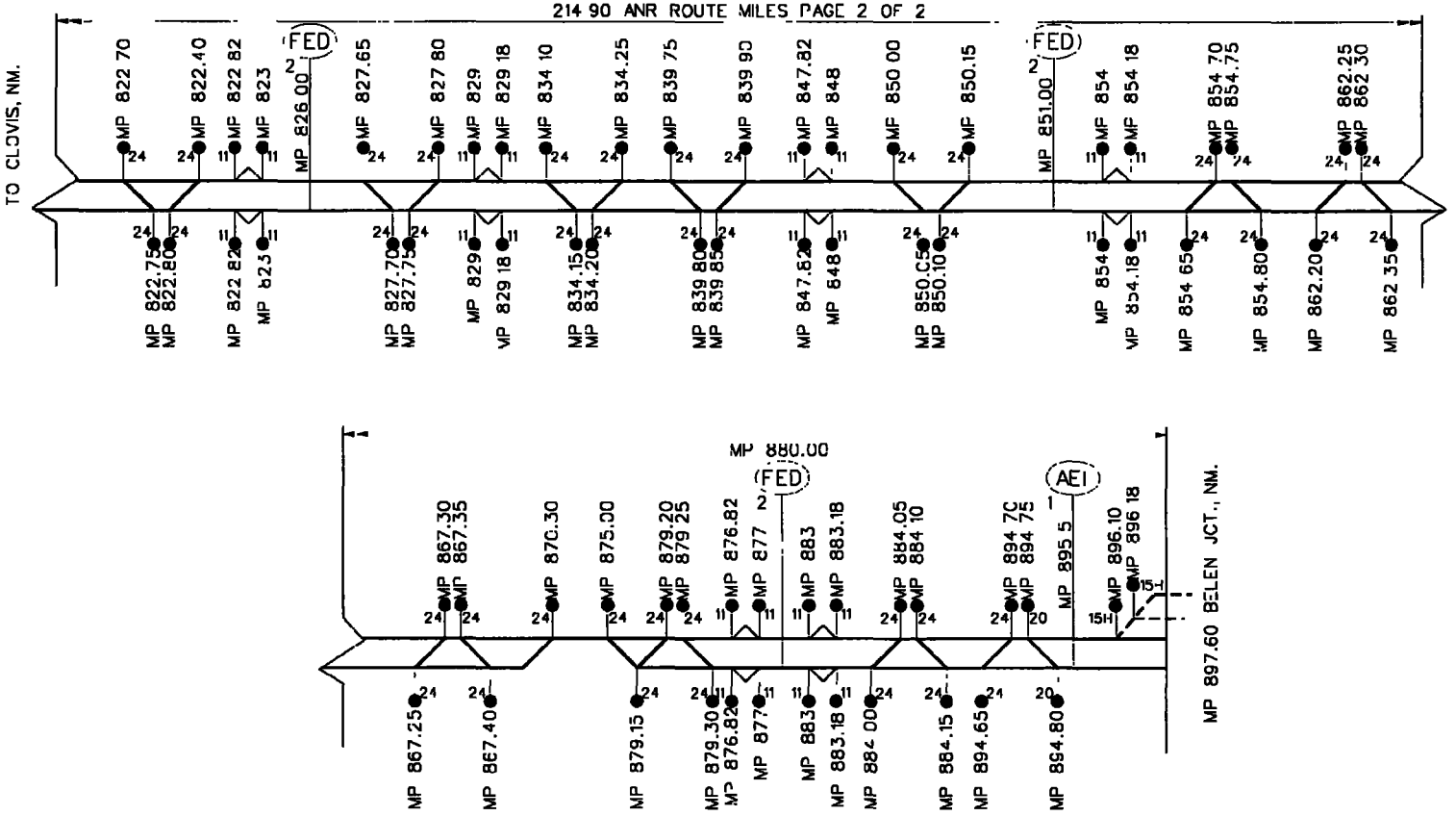
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY: STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: CLOVIS

FROM: CLOVIS MP: 655.70 DATE: 05/06/10

TO: BELEN JCT. MP: 897.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

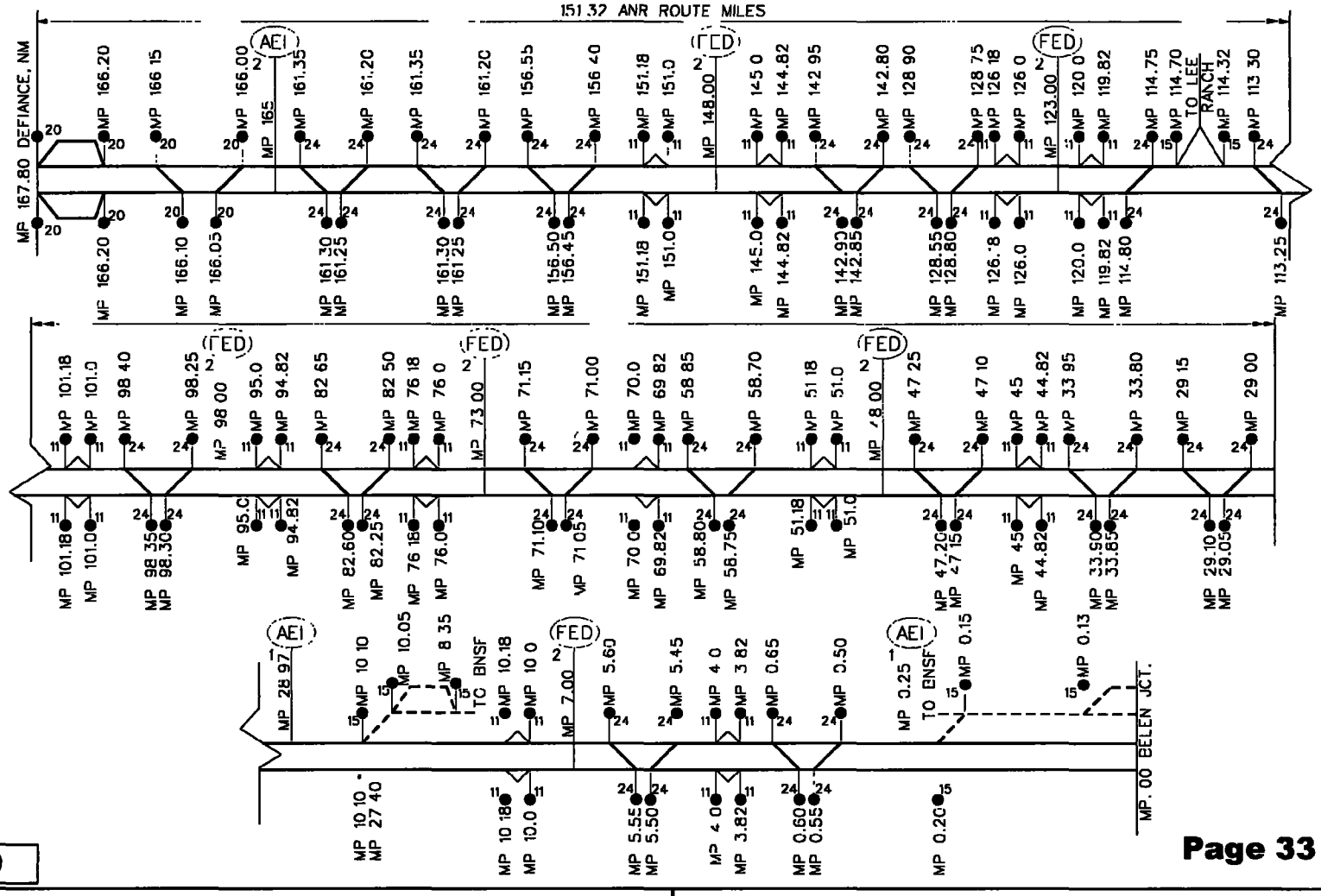
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: SOUTHWEST

DIVISION: GALLUP

FROM: BELEN JCT. MP: 0.00 DATE: 05/06/10

TO: DEFIANCE, NM MP: 167.80 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

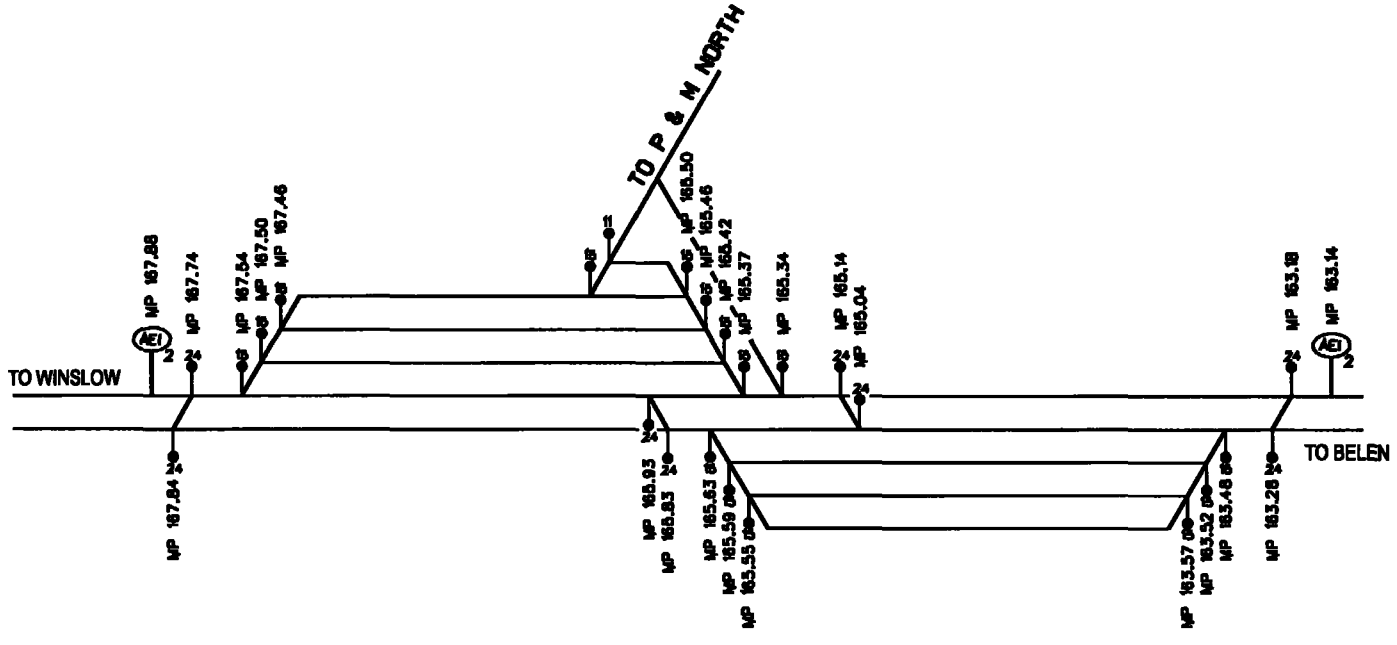
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



DEFIANCE, NM, INTERCHANGE YARD

AEPCO

SUBDIVISION: GALLUP

DIVISION: SOUTHWESTERN

FROM: MP 163.18 DATE: 04/16/10

TO: MP 167.84 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

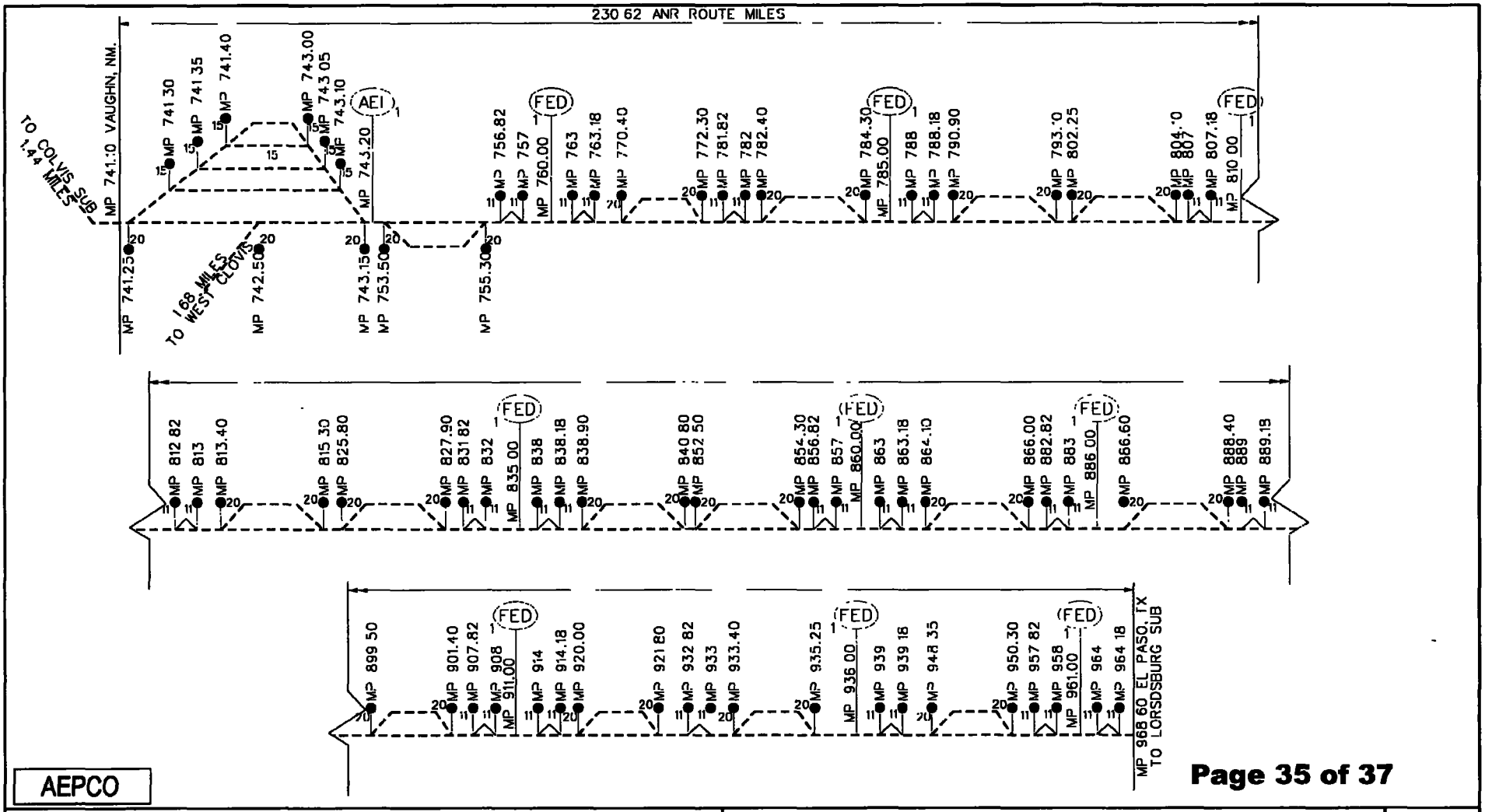
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY: STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: EL PASO

DIVISION: CARRIZOZO

FROM: VAUGHN MP: 739.19 DATE: 05/06/10

TO: EL PASO MP: 968.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

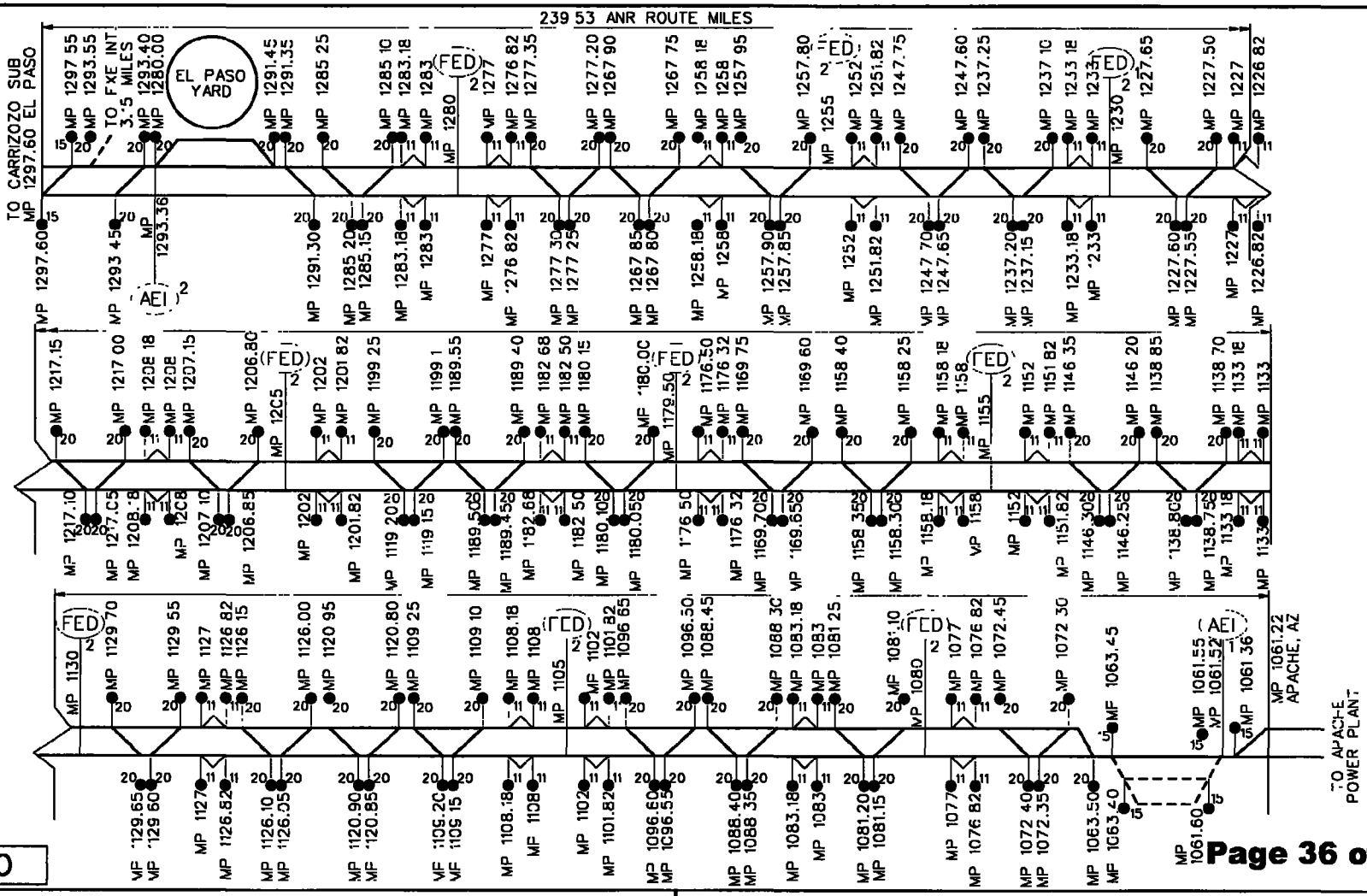
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



AEPCO

SUBDIVISION: TUSCAN

DIVISION: LORDSBURG

FROM: EL PASO, TX MP: 1297.60 DATE: 05/06/10

TO: APACHE, AZ MP: 1061.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

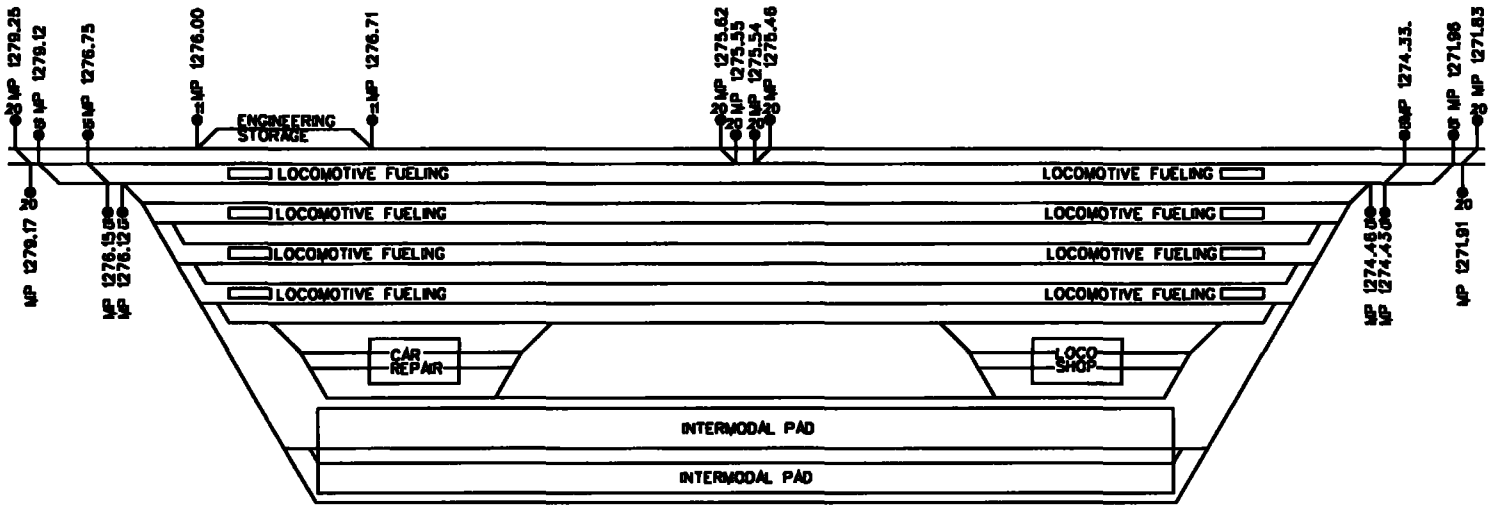
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



WEST EL PASO YARD

AEPCO

ALL TURNOUTS NO. 11 UNLESS OTHERWISE NOTED

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1271.83 DATE: 04/16/10

TO: MP 1279.25 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

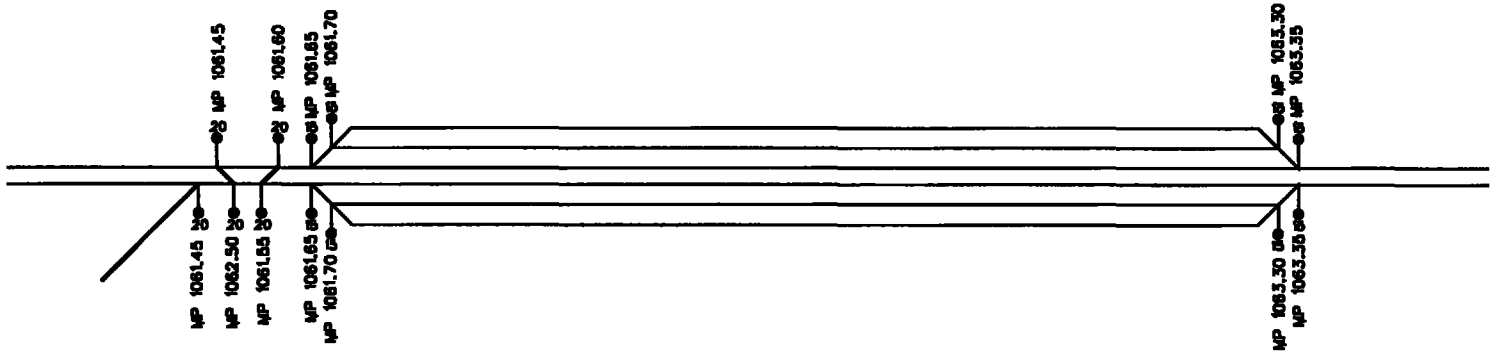
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1



COCHISE-APACHE YARD

AEPCO

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1061.65 DATE: 05/06/10

TO: MP 1063.35 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

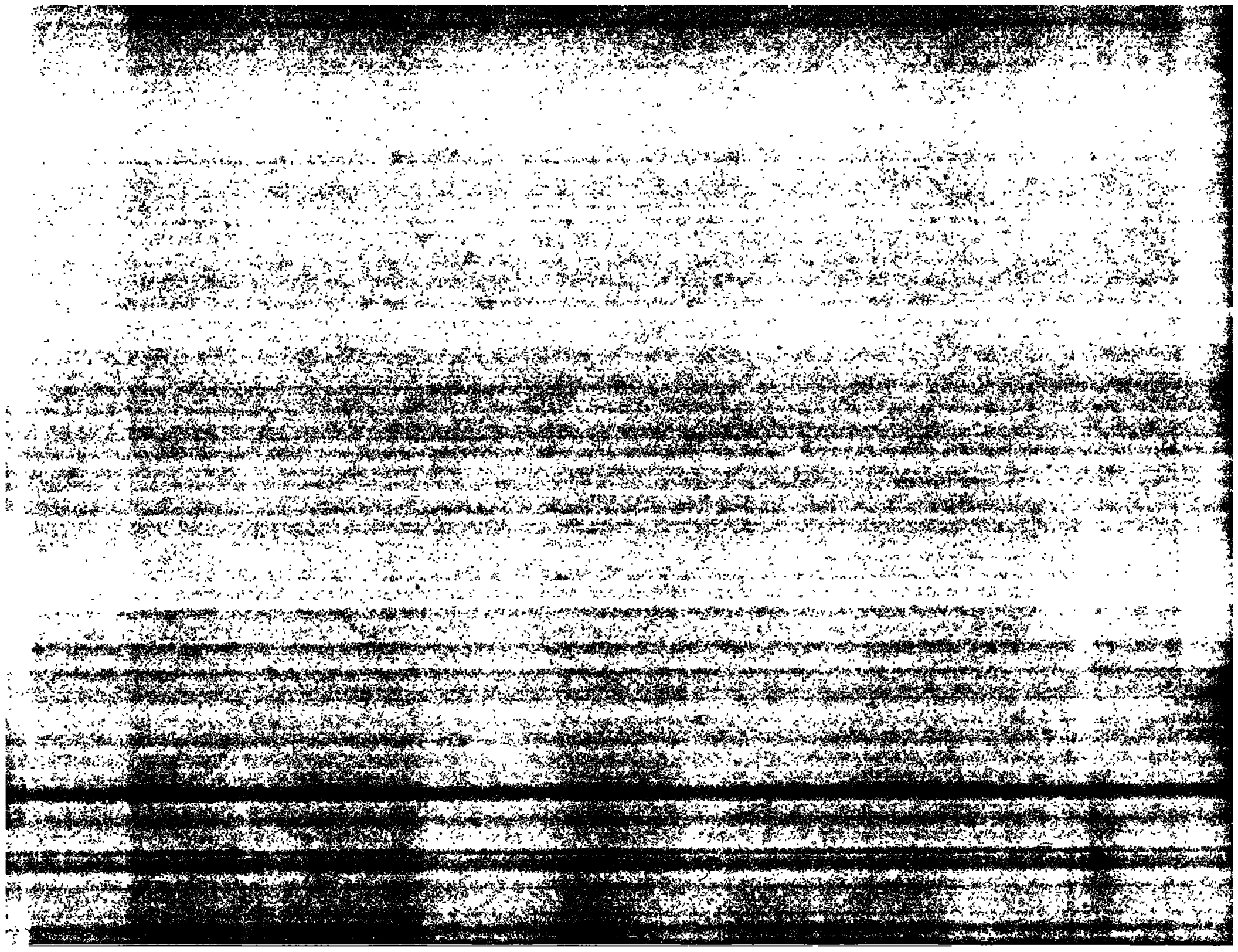
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

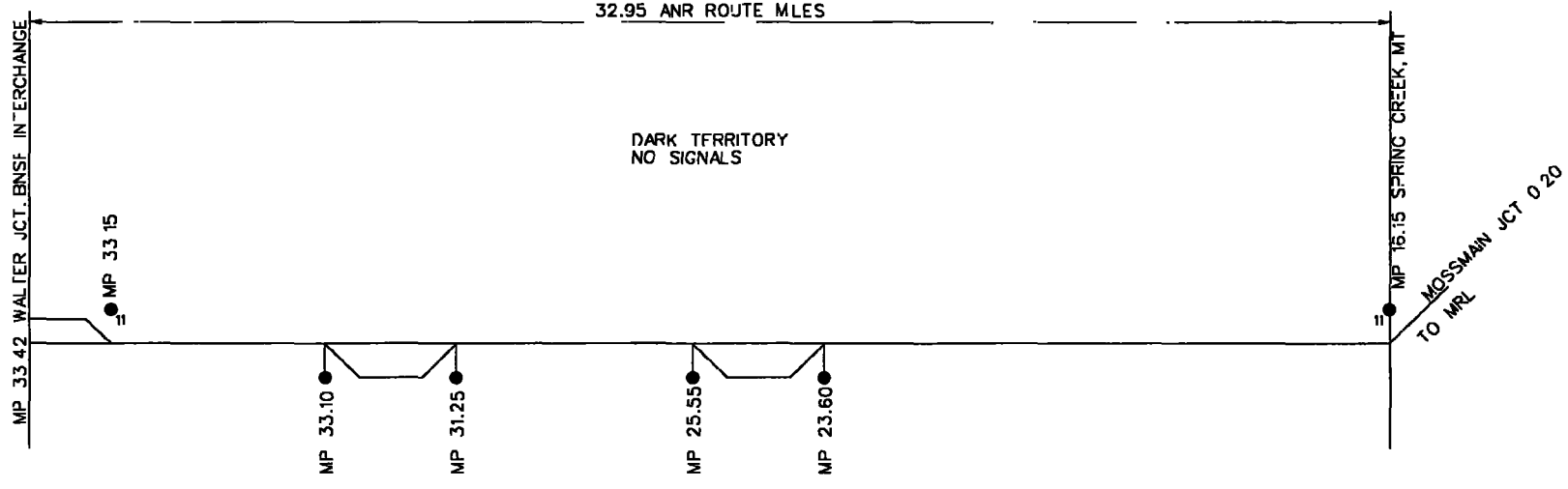
20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-1





PRB

SUBDIVISION: MONTANA

DIVISION: LAUREL

FROM: WALTER JCT MP: 0.47 DATE: 05/06/10

TO: MOSSMAIN MP: 33.42 NOT TO SCALE

LEGEND:

——— - 136# PREMIUM CWR

- - - - - - 136# STANDARD CWR

——— - 136# CWR CLASS 1 RELAY

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQIUPMENT DETECTOR
HW - HOT WHEEL DETECTOR

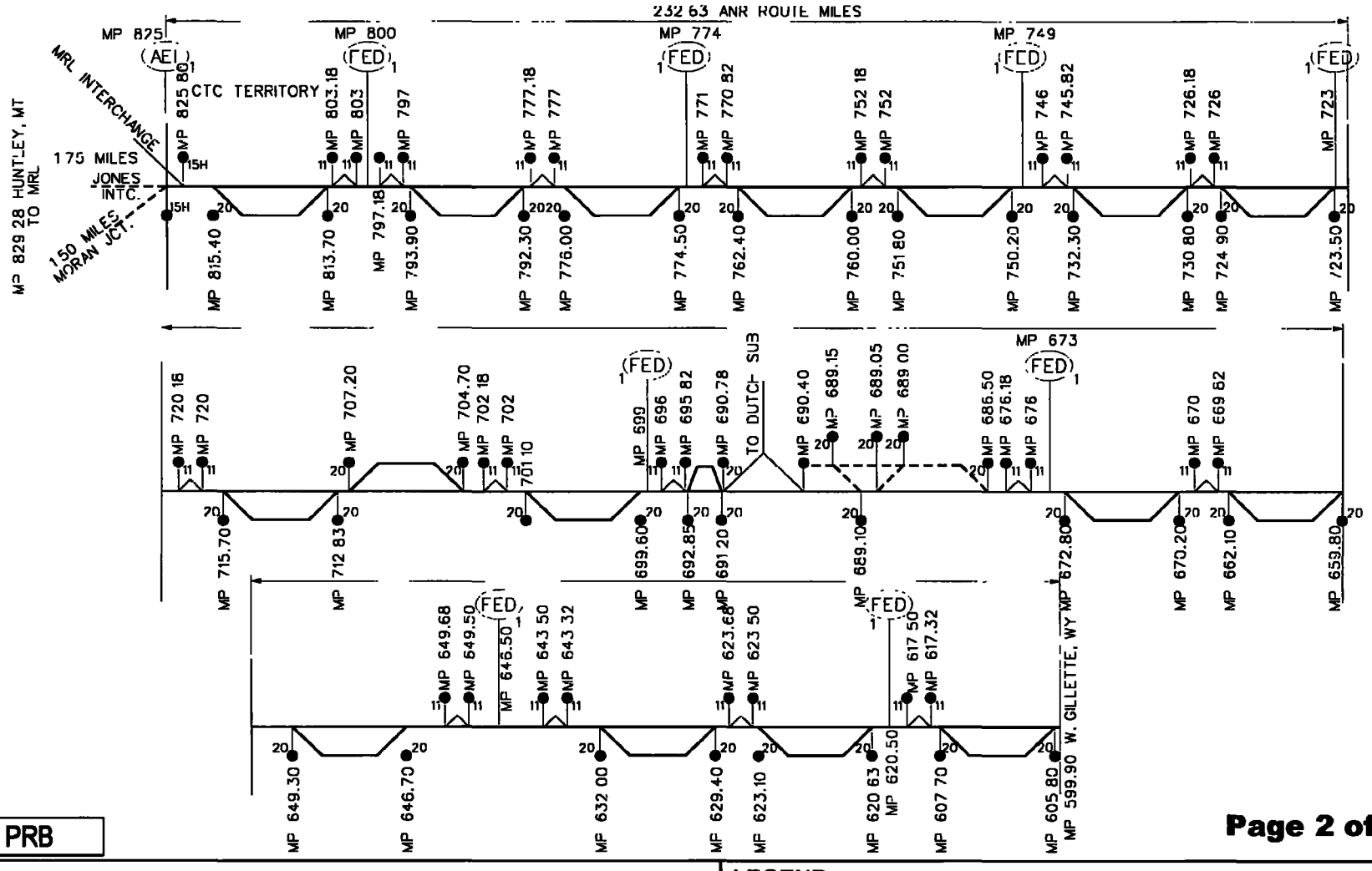
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: MONTANA

DIVISION: BIG HORN

FROM: HUNTLEY, MT MP: 829.28 DATE: 05/06/10

TO: WEST GILLETTE, WY MP: 599.90 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

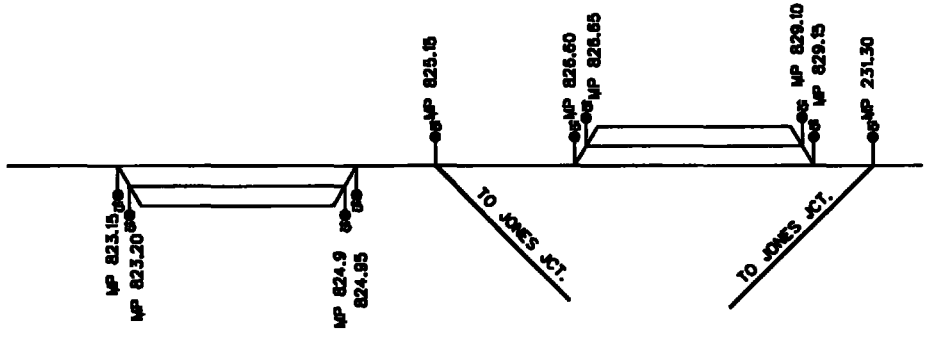
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



MORAN & HUNTLEY INTERCHANGE YARDS

Page 3 of 31

PRB

SUBDIVISION: POWDER RIVER

DIVISION: BIG HORN

FROM: MP 823.15 DATE: 05/06/10

TO: MP 829.15 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

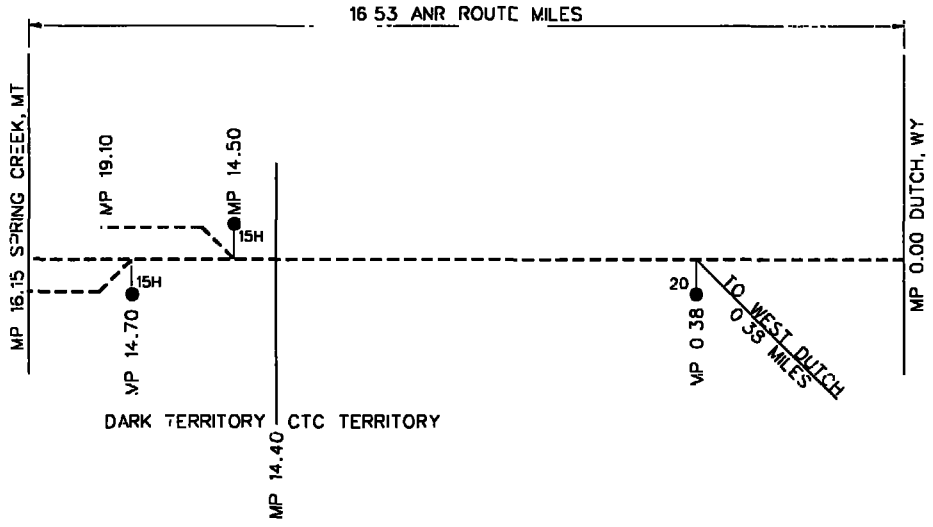
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #16 ELECTRIC
15H - #16 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY: STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: MONTANA

DIVISION: DUTCH

FROM: SPRING CREEK	MP: 16.15	DATE: 05/06/10
TO: DUTCH	MP: 0.00	NOT TO SCALE

LEGEND:

- ——— - 136# PREMIUM CWR
- - - - - 136# STANDARD CWR
- ——— - 136# 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

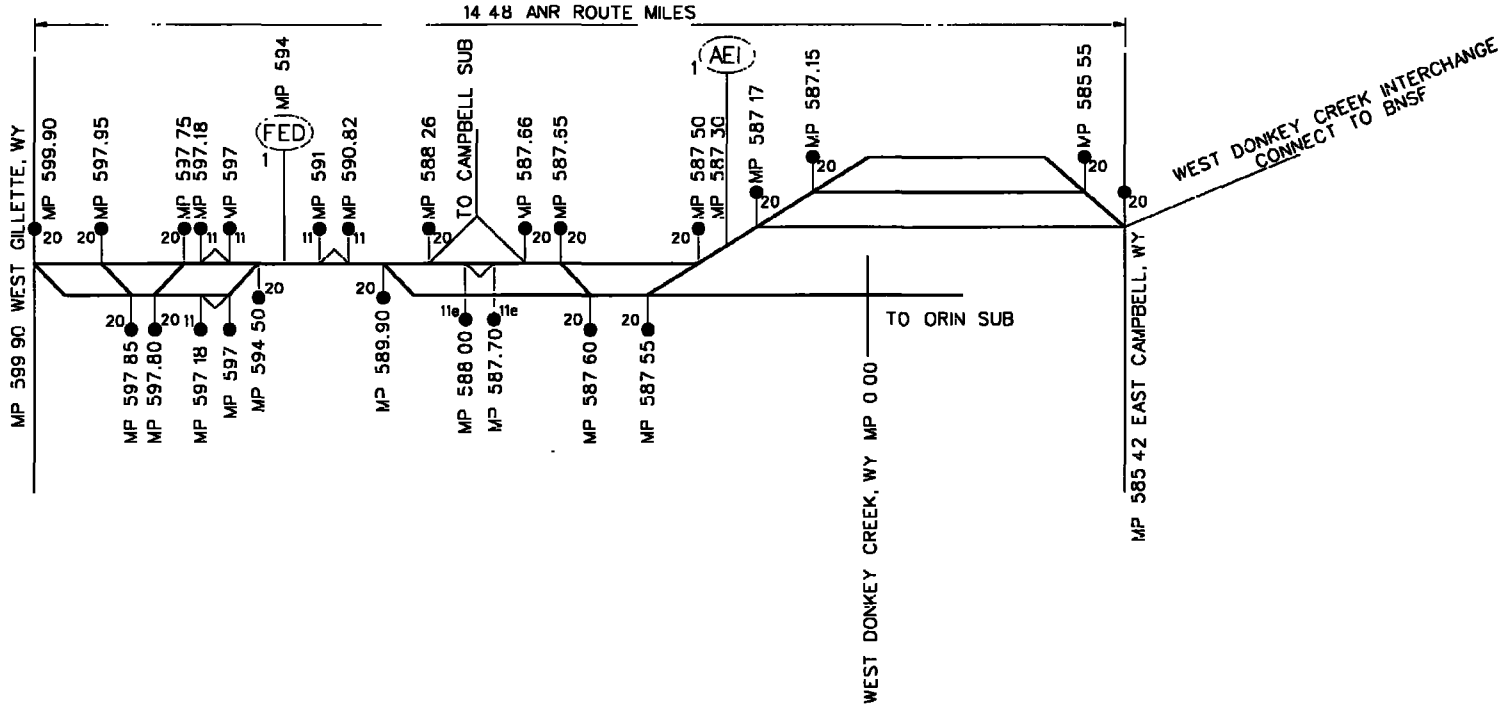
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: BIG HORN/BLACK HILLS

FROM: WEST GILLETTE	MP: 599.90	DATE: 05/06/10
TO: WEST DONKEY CREEK	MP: 587.66	NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

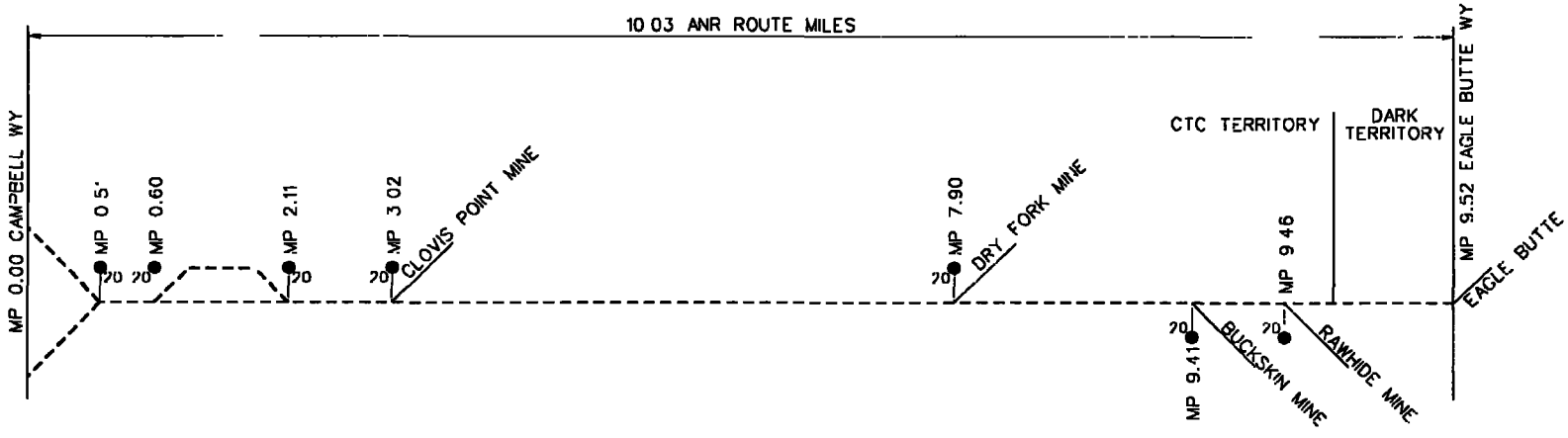
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: CAMPBELL

FROM: CAMPBELL, WY	MP: 0.00	DATE: 05/06/10
TO: EAGLE BUTTE, WY	MP: 9.52	NOT TO SCALE

LEGEND:

- ——— - 136# PREMIUM CWR
- - - - - - 136# STANDARD CWR
- ——— - 136# 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

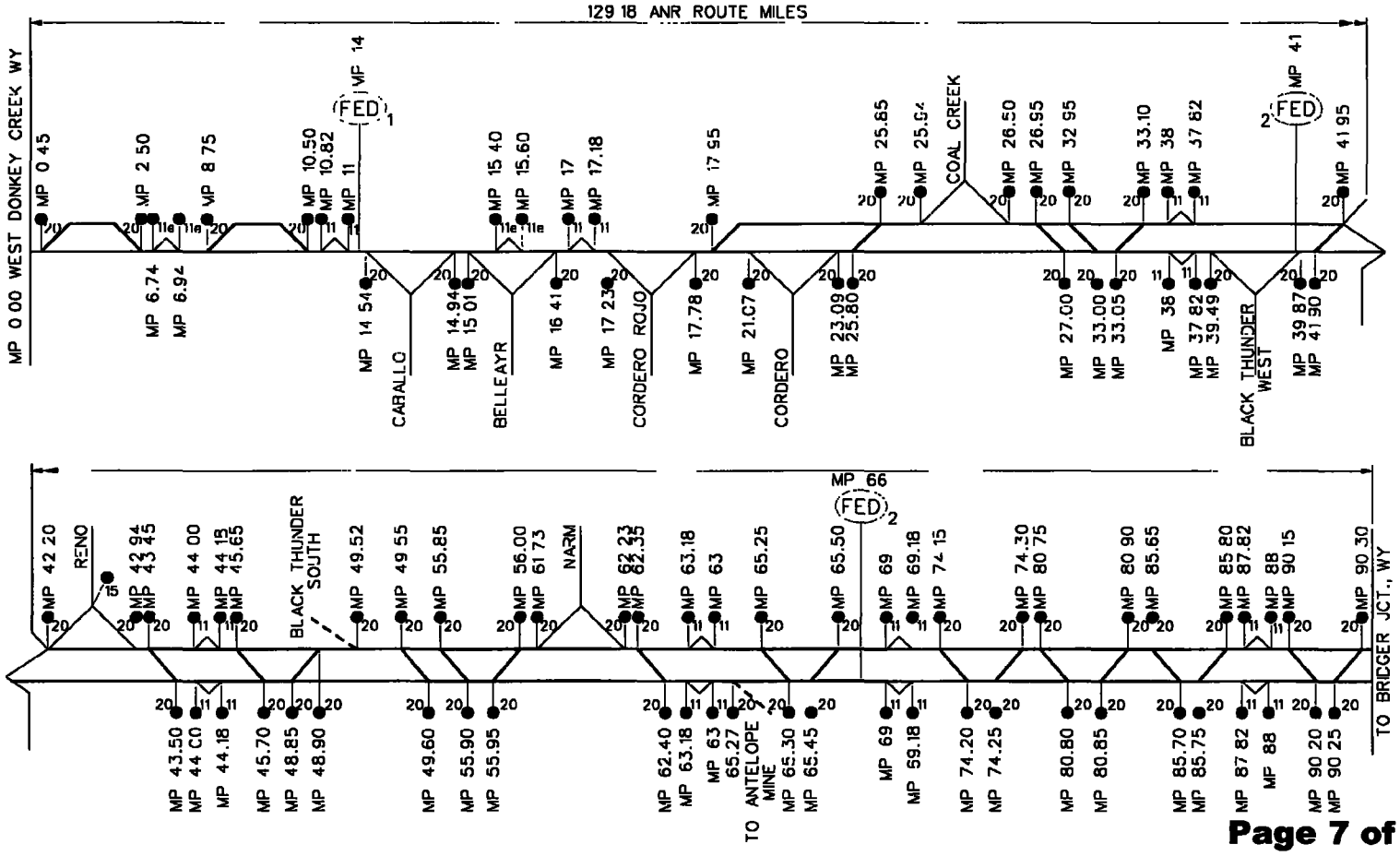
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

● 20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: ORIN

FROM: WEST DONKEY CREEK MP: 0.00 DATE: 05/06/10

TO: BRIDGER JCT. MP: 127.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

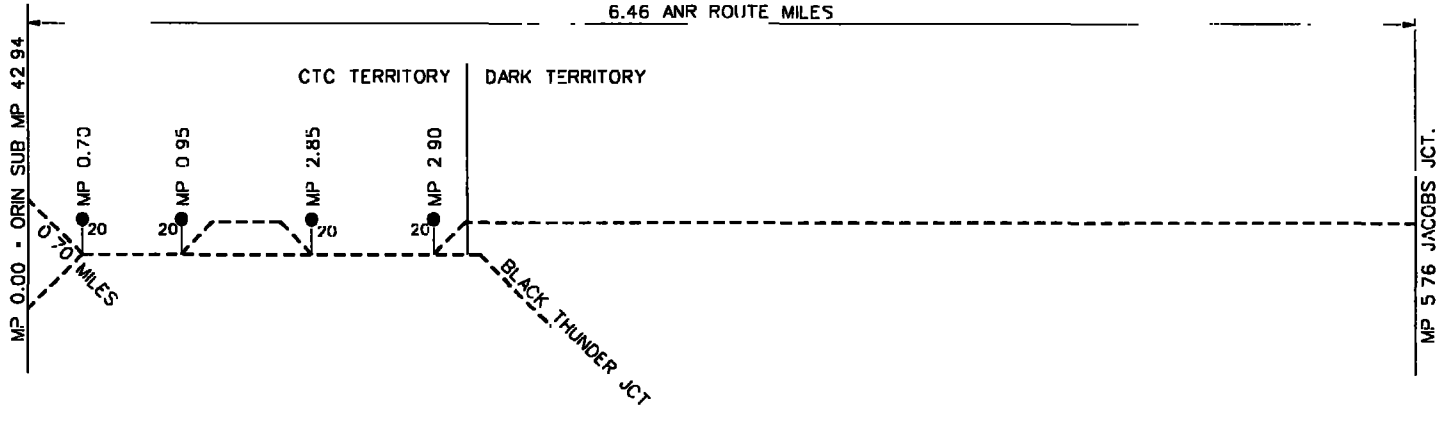
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: RENO (RENO BRANCH)

FROM: ORIN SUB. SWITCHES MP: 0.0 DATE: 05/06/10

TO: JACOBS JCT. MP: 5.76 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

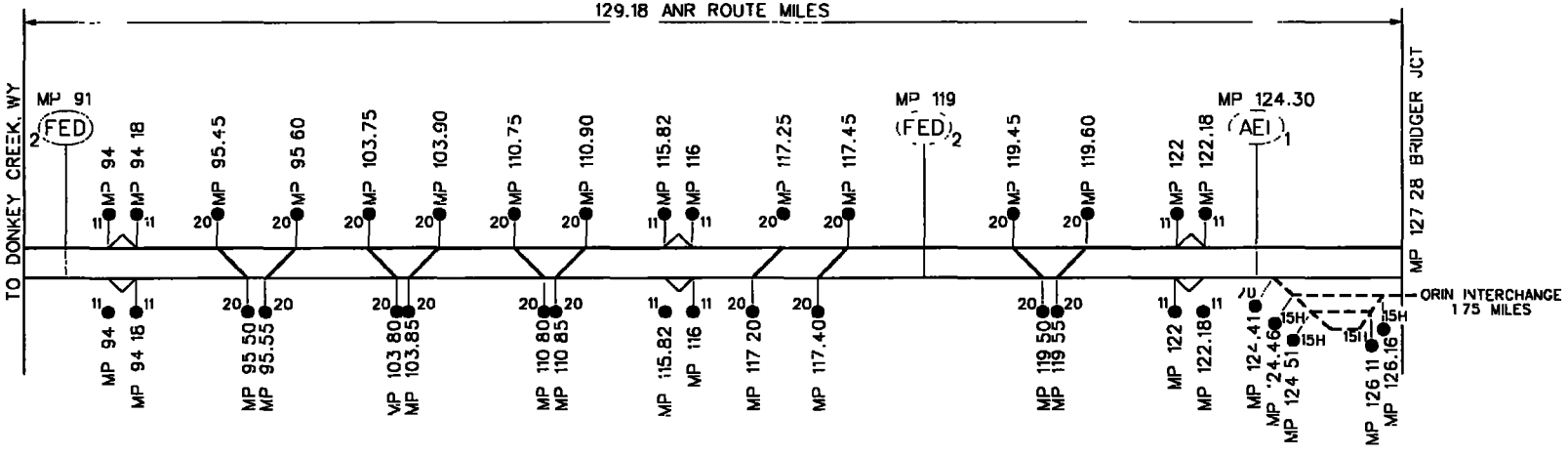
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: ORIN

FROM: DONKEY CREEK MP: 0.00 DATE: 05/06/10

TO: BRIDGER JCT. MP: 127.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

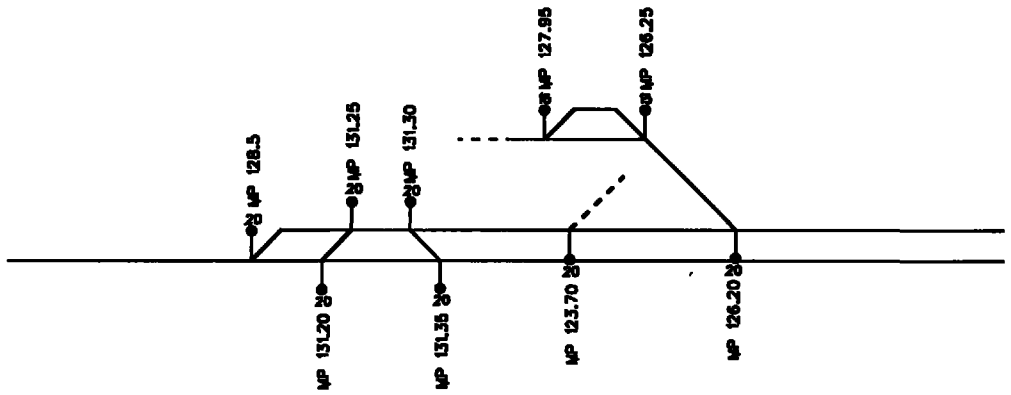
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



ORIN INTERCHANGE YARDS

PRB

SUBDIVISION: ORIN

DIVISION: POWDER RIVER

FROM: MP 126.20 DATE: 05/06/10

TO: MP 127.95 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

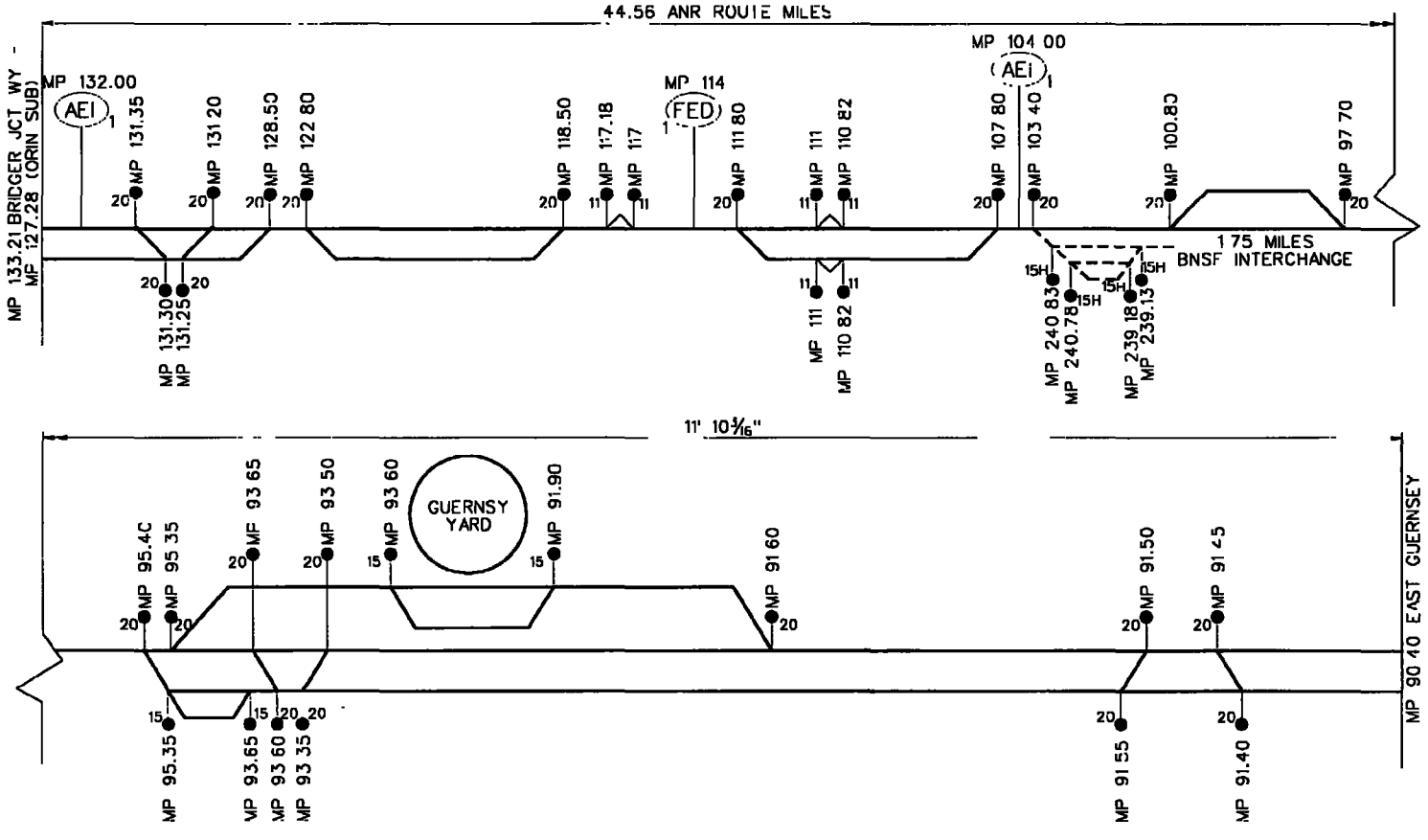
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY: STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: BRIDGER JCT MP: 133.21 DATE: 05/06/10

TO: EAST GUERNSEY MP: 90.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

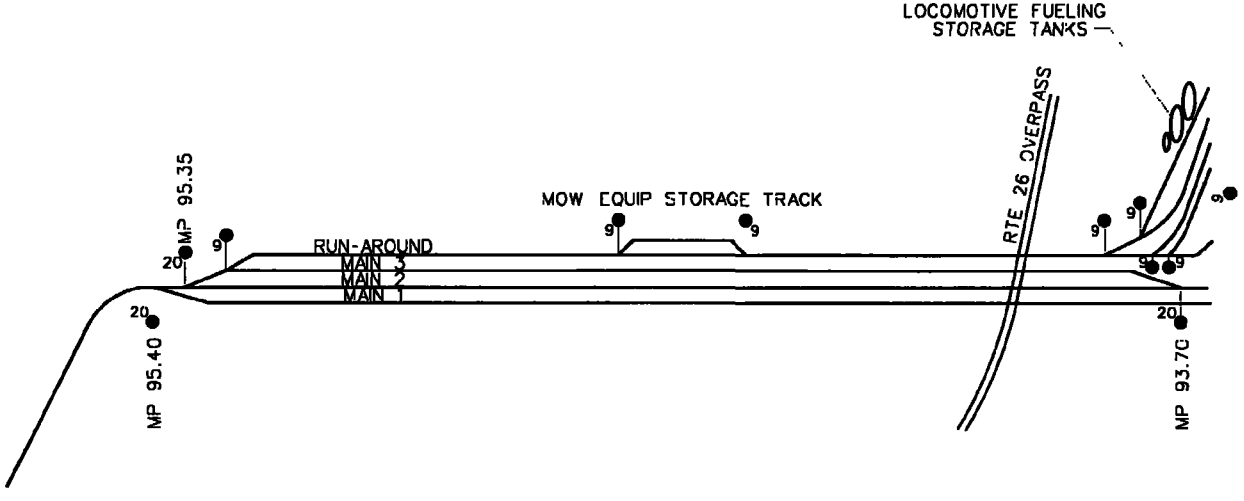
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



CONTINUED ON SHEET 9B

PRB

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: GUERNSEY YARD WEST MP: 91.35 DATE: 05/06/10

TO: MP: 91.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

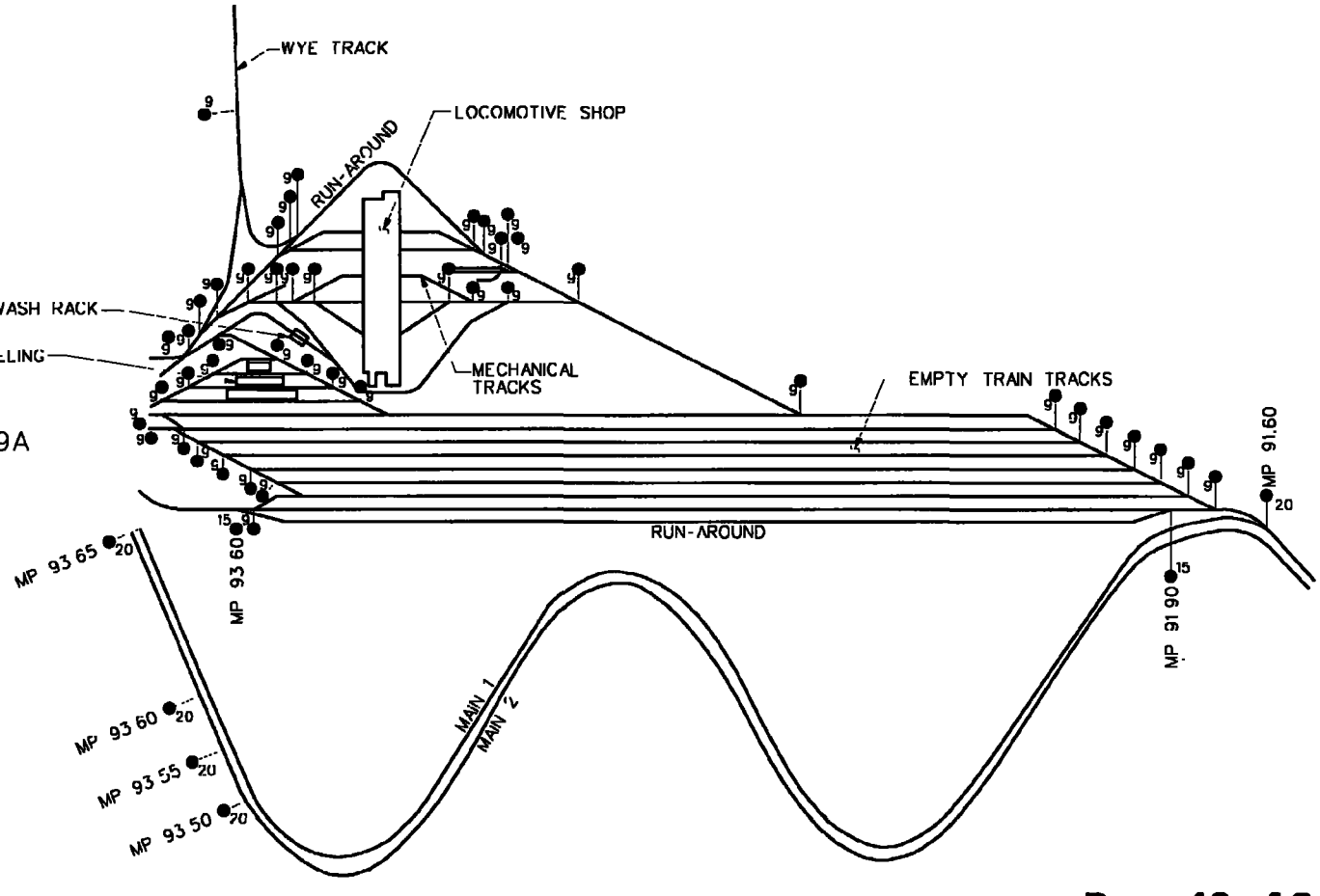
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



CONTINUED FROM SHEET 9A

PRB

SUBDIVISION: POWDER RIVER

DIVISION: CANYON

FROM: GUERNSEY YARD EAST MP: 93.35 DATE: 05/06/10

TO: MP: 91.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQIUPMENT DETECTOR
HW = HOT WHEEL DETECTOR

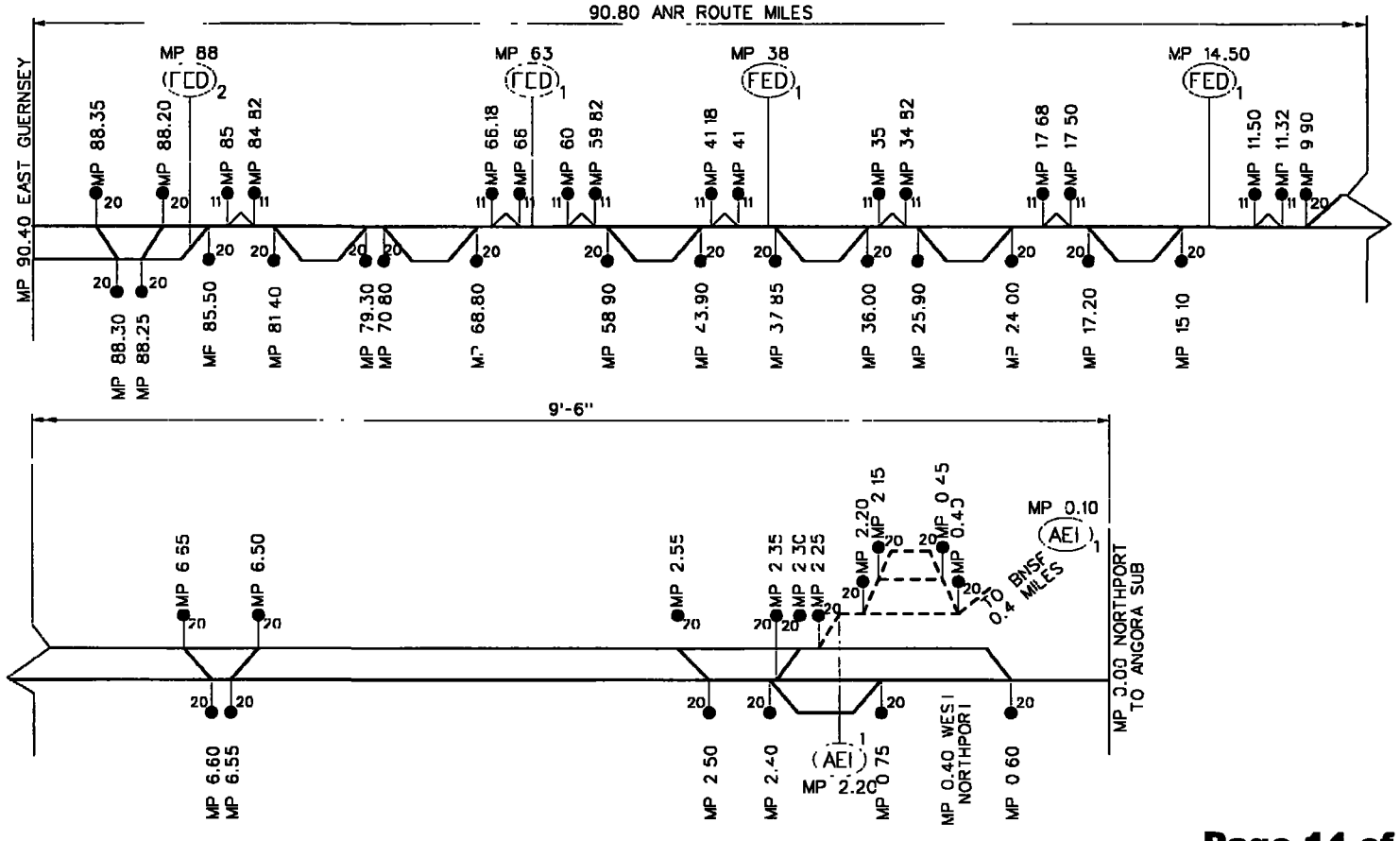
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: VALLEY

FROM: EAST GUERNSEY MP: 90.40 DATE: 05/06/10

TO: WEST NORTHPORT MP: 0.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DFD - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

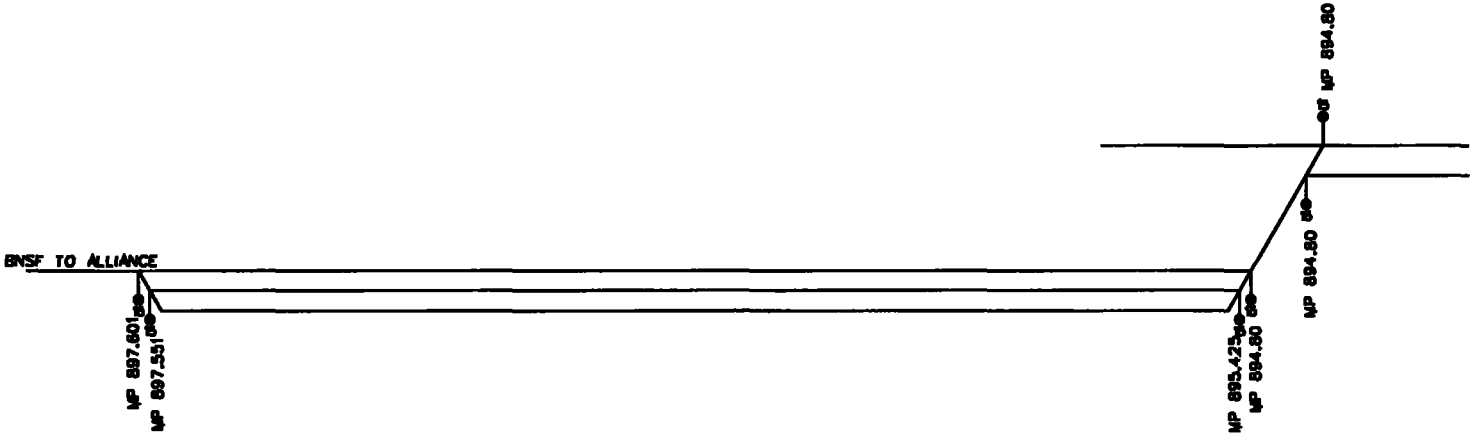
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



NORTHPORT - BNSF YARD

PRB

SUBDIVISION: SOUTHWEST

DIVISION: GALLUP

FROM: MP 894.80 DATE: 05/06/10

TO: MP 897.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

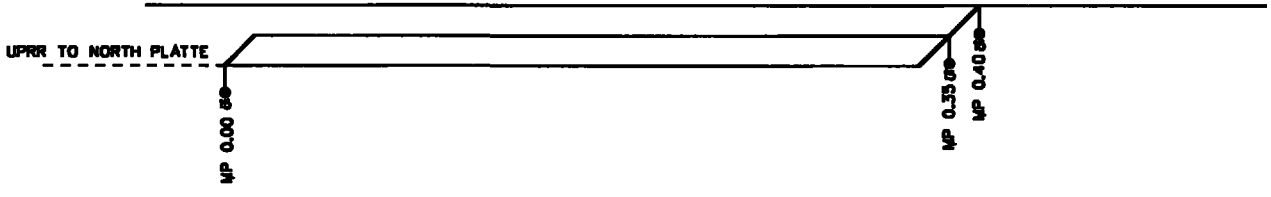
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



NORTHPORT - UPRR INTERCHANGE YARD

PRB

SUBDIVISION:

DIVISION: POWDER RIVER BASIN

FROM: MP 1078.68 DATE: 05/06/10

TO: MP 1080.20 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

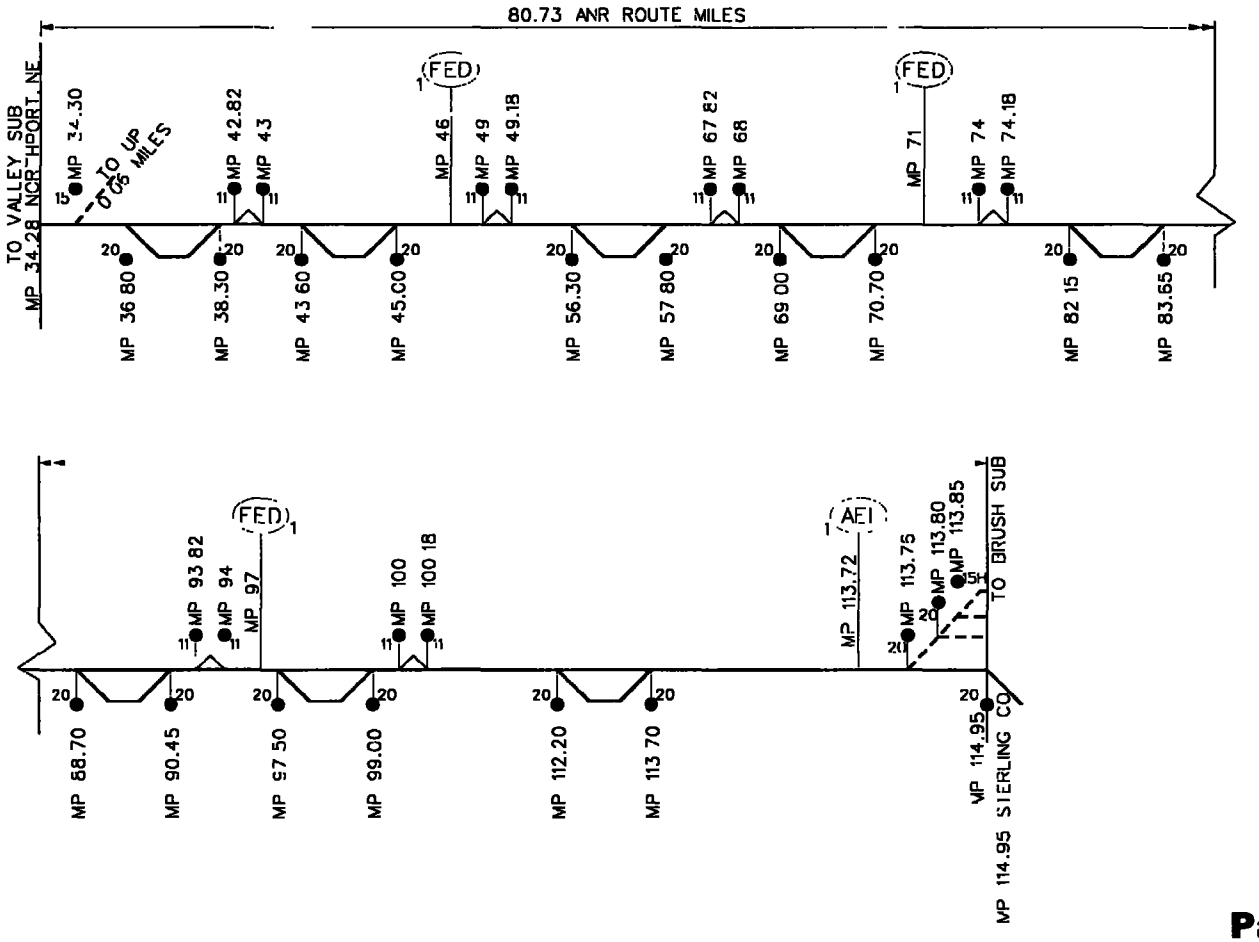
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: ANGORA

FROM: NORTHPORT MP: 34.28 DATE: 05/06/10

TO: STERLING MP: 114.95 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

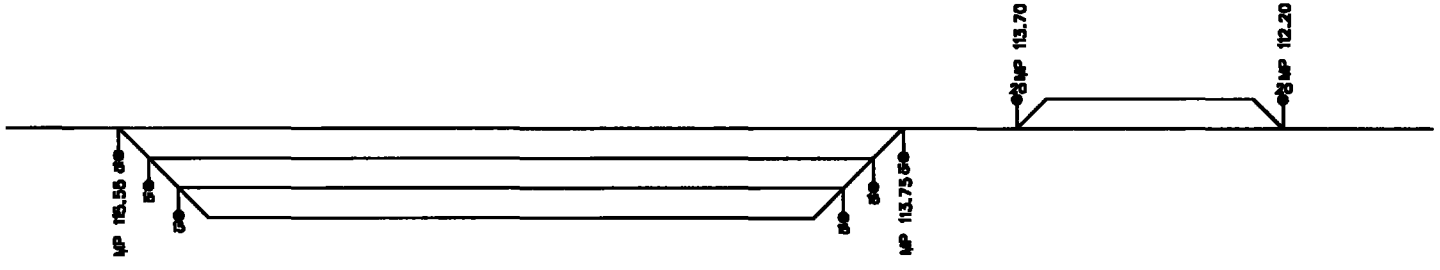
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



STERLING INTERCHANGE YARD

PRB

SUBDIVISION: ANGORA

DIVISION: POWDER RIVER

FROM: MP 113.75 DATE: 05/06/10

TO: MP 115.55 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

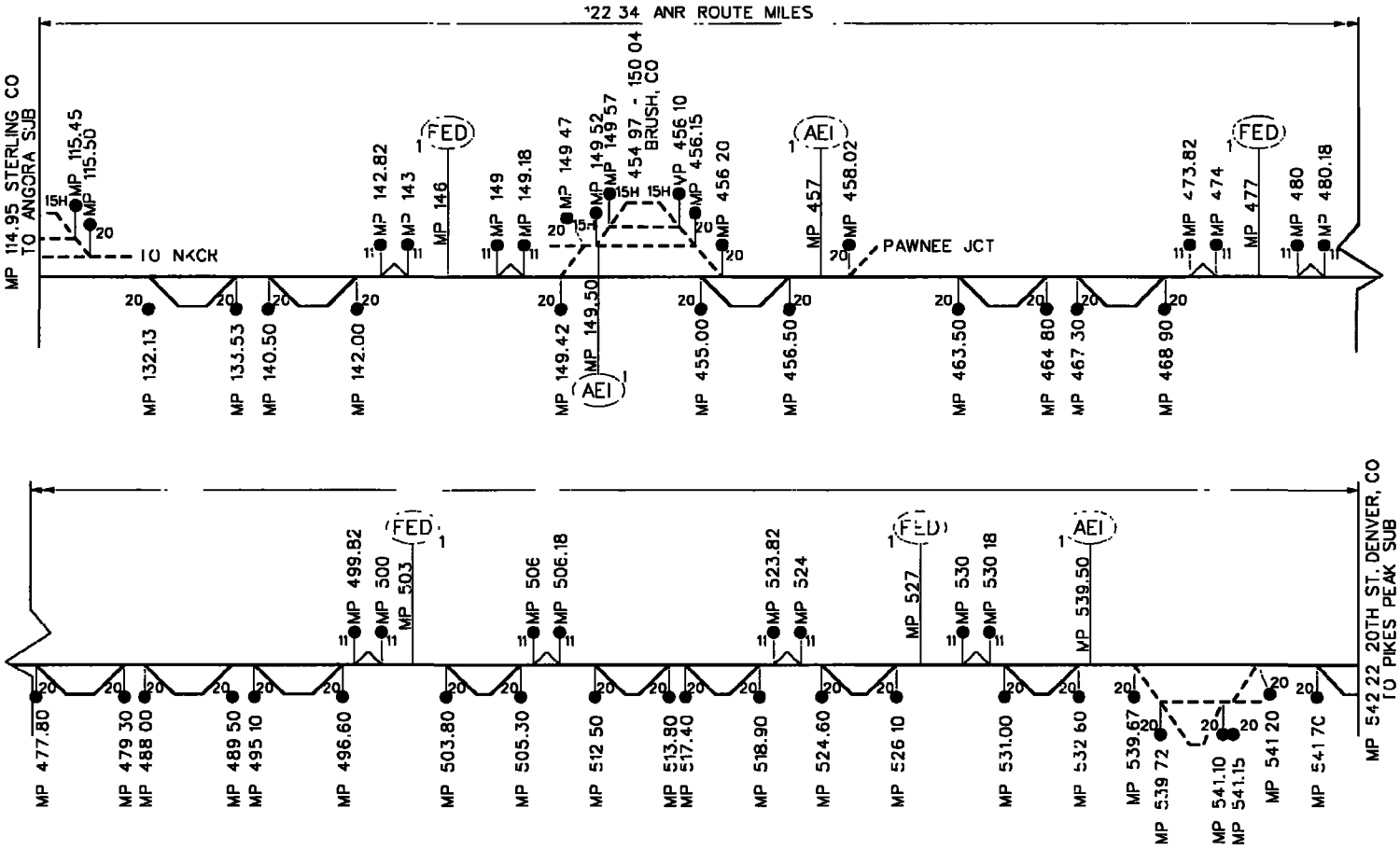
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: BRUSH

FROM: STERLING MP: 114.95 DATE: 05/06/10

TO: 20th STREET DENVER MP: 542.22 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

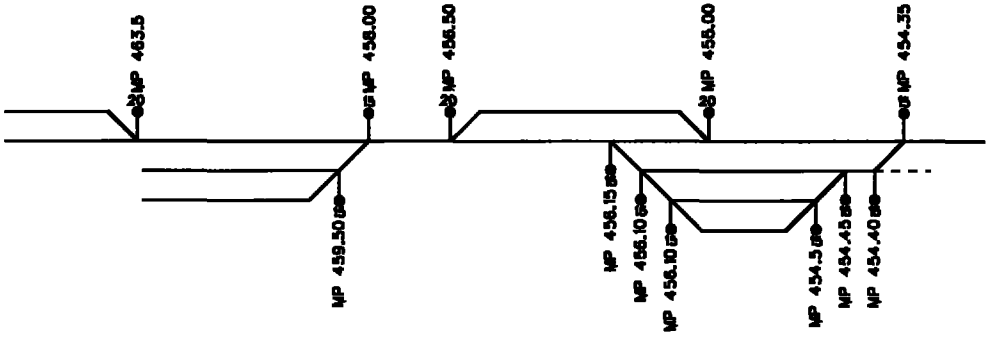
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



BRUSH INTERCHANGE YARDS

PRB

SUBDIVISION: BRUSH

DIVISION: POWDER RIVER

FROM: MP 454.35 DATE: 05/06/10

TO: MP 461.05 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

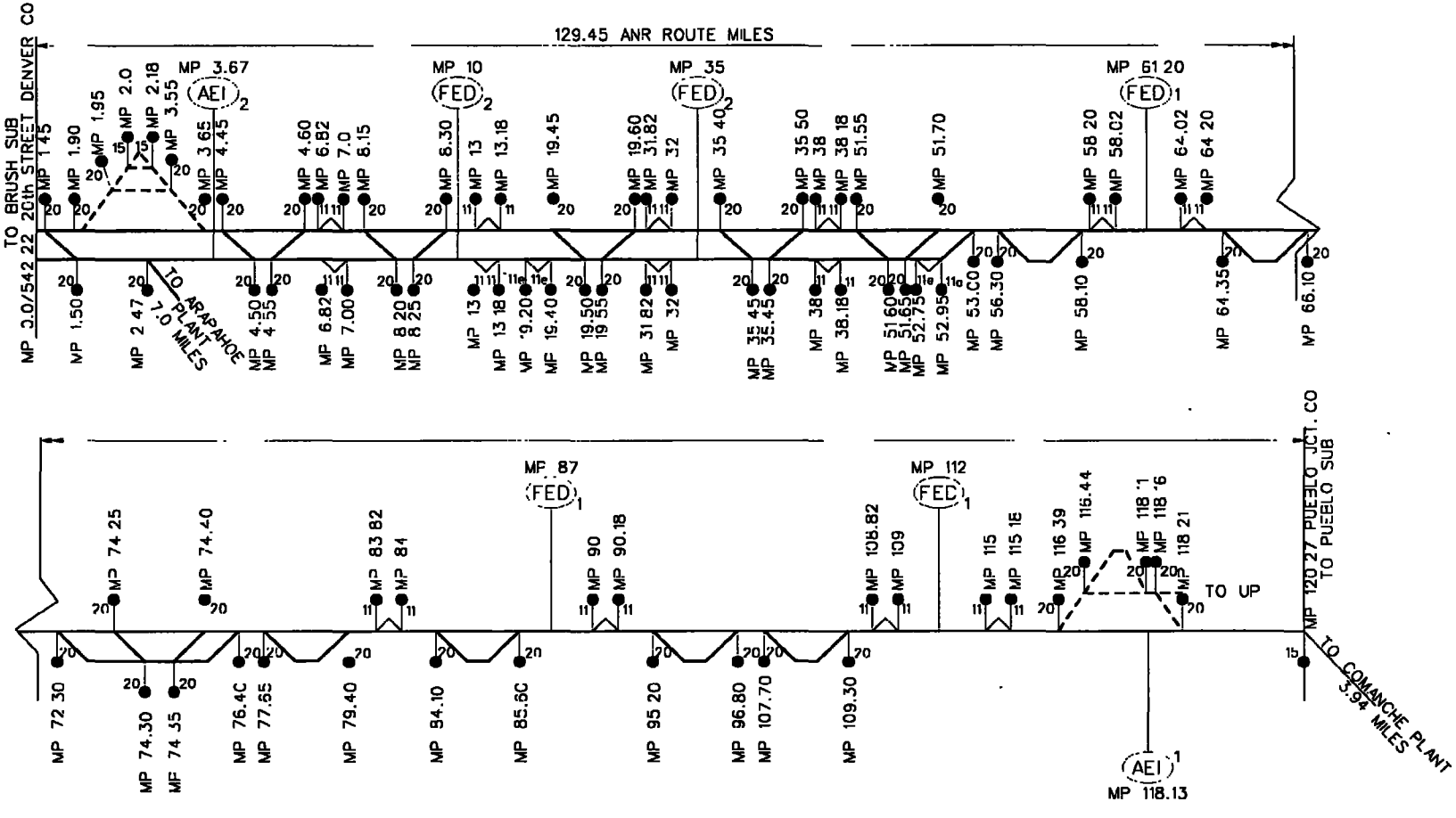
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: POWDER RIVER

DIVISION: PIKES PEAK

FROM: 20TH STREET DENVER MP: 0.0 DATE: 05/06/10

TO: PUEBLO JCT. MP: 120.27 NOT TO SCALE

LEGEND:

——— - 136# PREMIUM CWR

- - - - - - 136# STANDARD CWR

——— - 136# 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

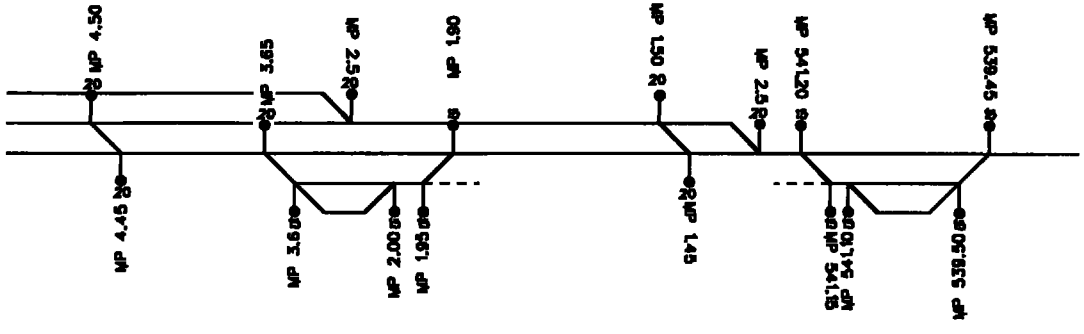
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



DENVER INTERCHANGE YARDS

PRB

SUBDIVISION: BRUSH

DIVISION: POWDER RIVER

FROM: MP 539.45 DATE: 05/06/10

TO: MP 3.85 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

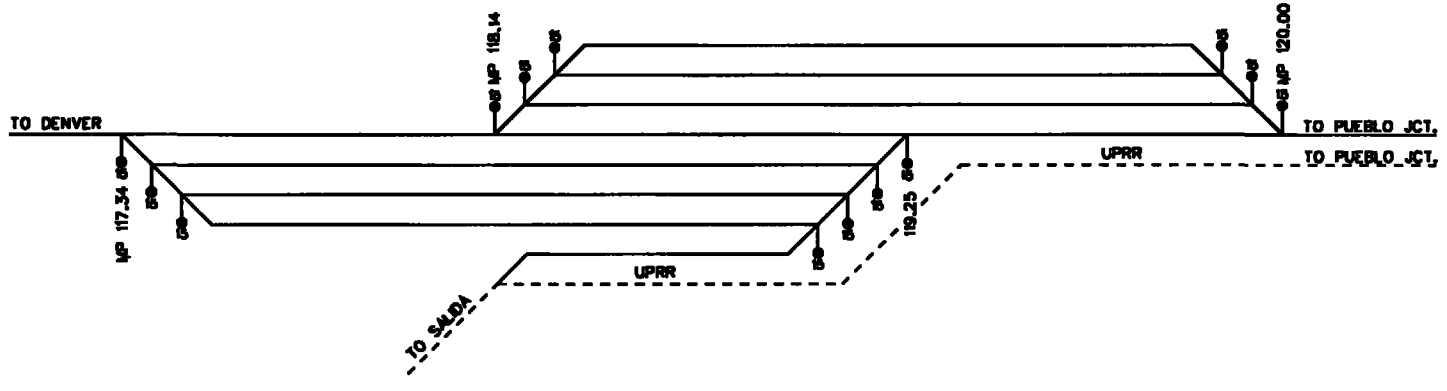
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PUEBLO INTERCHANGE YARD

PRB

SUBDIVISION: PIKES PEAK

DIVISION: POWDER RIVER

FROM: MP 117.34 DATE: 04/28/10

TO: MP 120.00 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

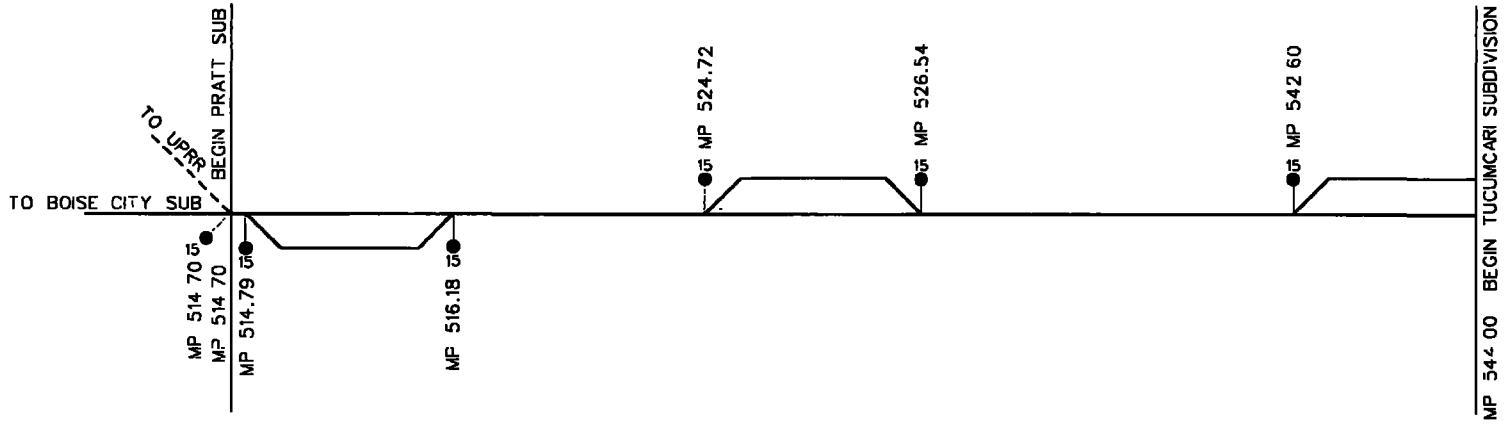
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT III-B-2



PRB

SUBDIVISION: PRATT

DIVISION: LORDSBURG

FROM: STRATFORD, TX MP: 514.70 DATE: 05/06/10

TO: DALHART, TX MP: 544.00 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

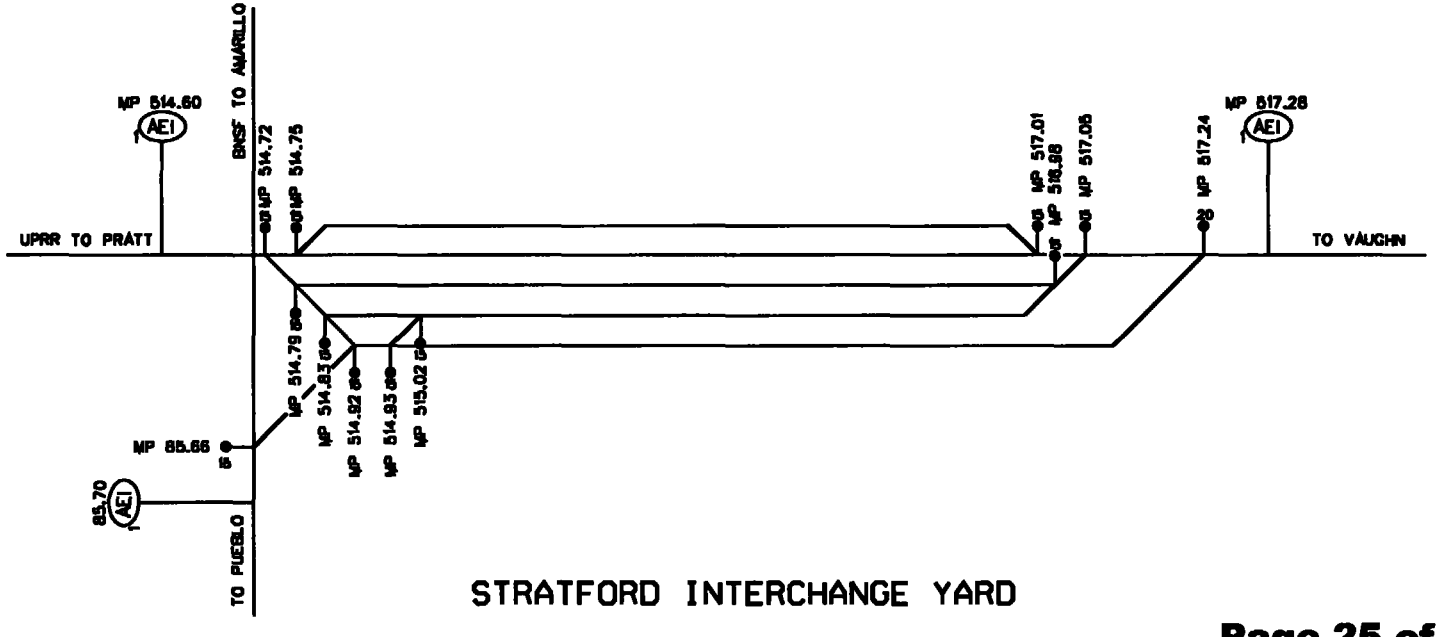
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



STRATFORD INTERCHANGE YARD

PRB

SUBDIVISION: PRATT

DIVISION:

FROM: MP 514.75 DATE: 04/16/10

TO: MP 517.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

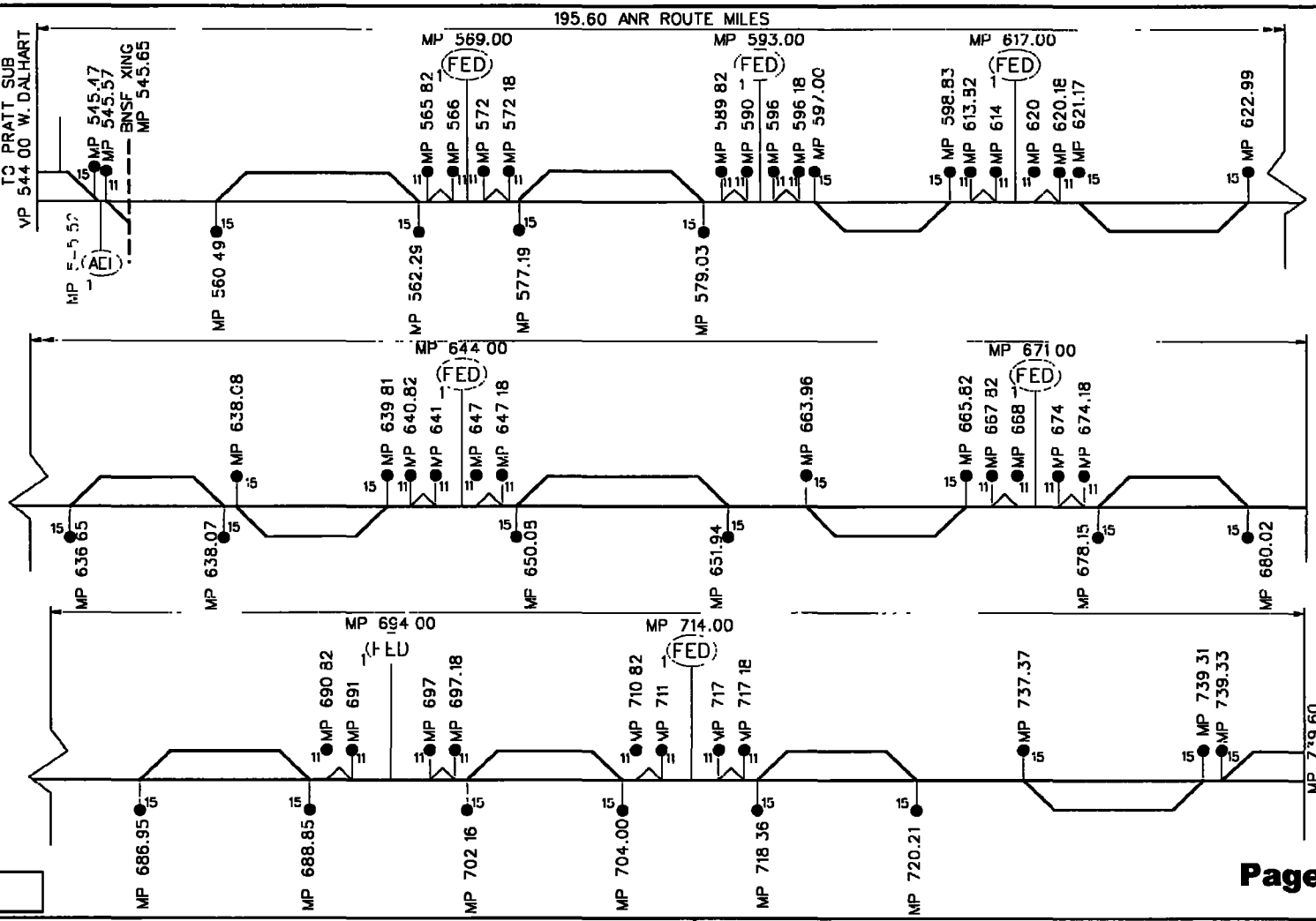
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: TUCUMCARI

DIVISION:

FROM: W. DALHART, TX MP: 544.00 DATE: 05/06/10

TO: VAUGHN, NM MP: 739.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

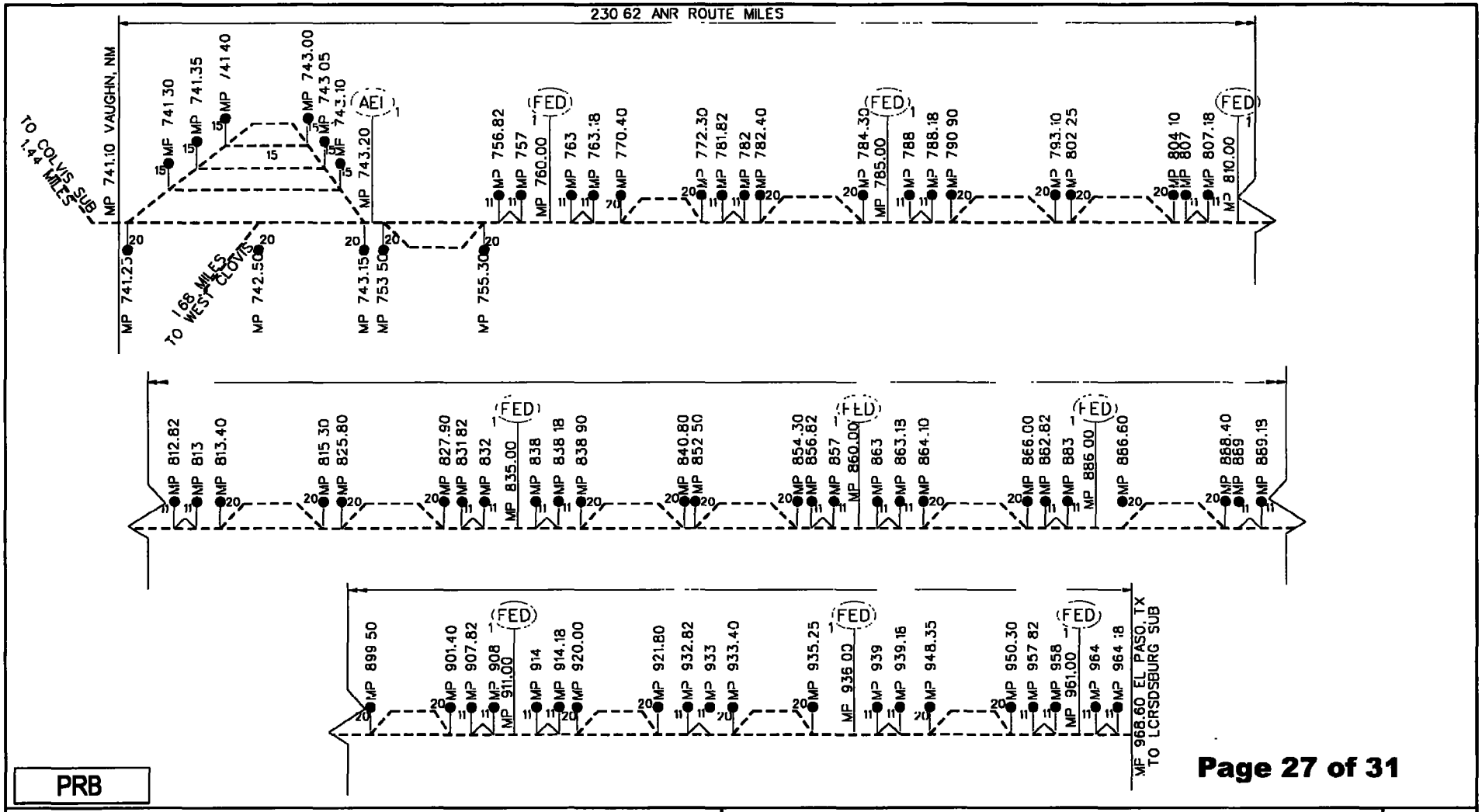
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



PRB

SUBDIVISION: EL PASO

DIVISION: CARRIZOZO

FROM: VAUGHN MP: 739.19 DATE: 05/06/10

TO: EL PASO MP: 968.60 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DFD - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

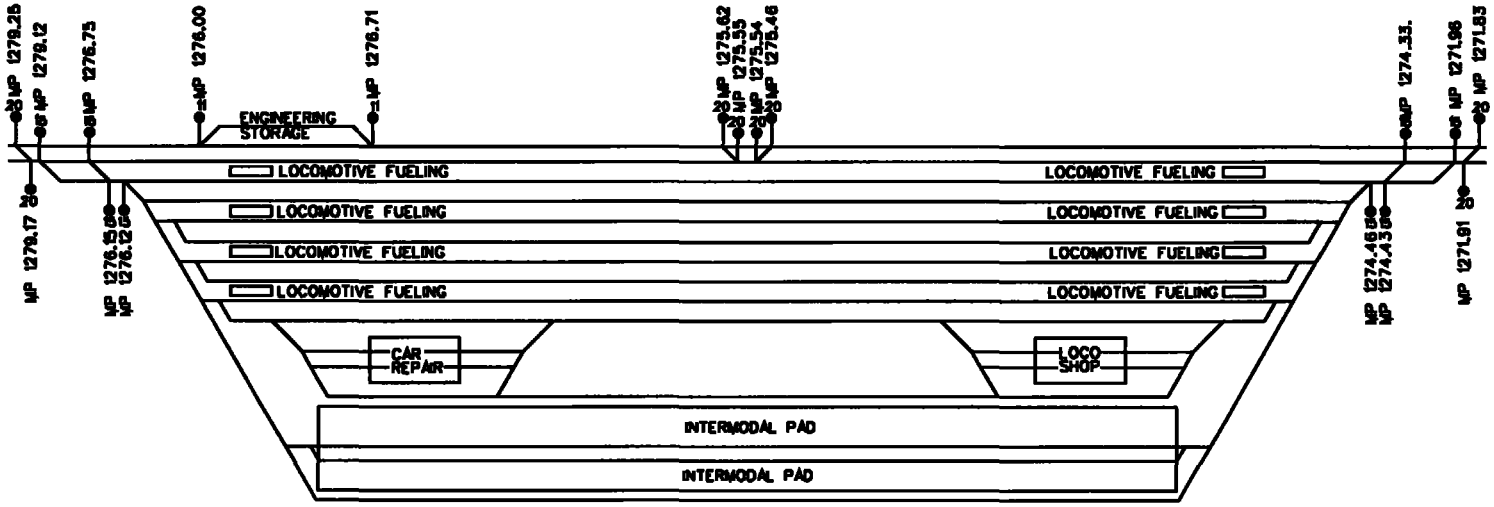
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



WEST EL PASO YARD

PRB

ALL TURNOUTS NO. 11 UNLESS OTHERWISE NOTED

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1271.83 DATE: 04/16/10

TO: MP 1279.25 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

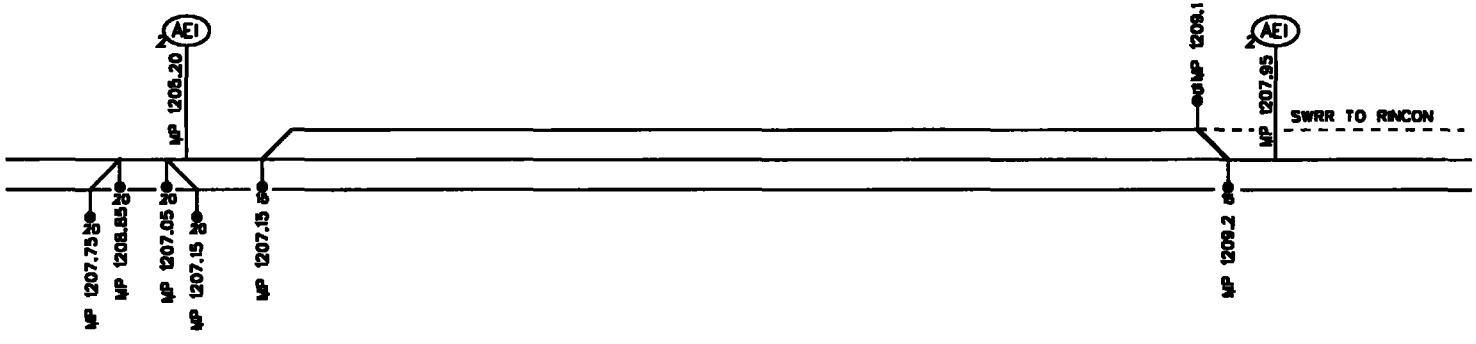
20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:

STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



DEMING INTERCHANGE YARD

PRB

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1204.86 DATE: 05/03/10

TO: MP 1208.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

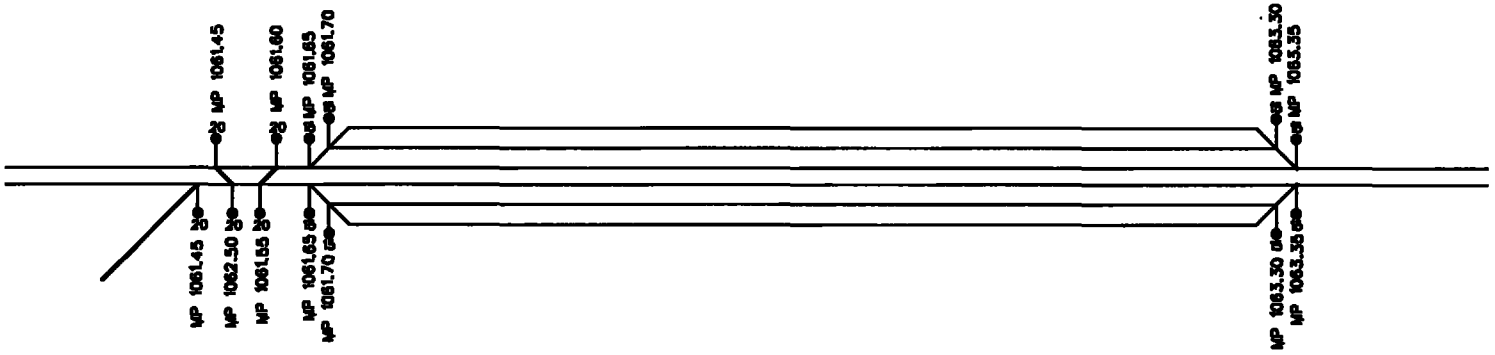
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2



COCHISE-APACHE YARD

PRB

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1061.65 DATE: 05/06/10

TO: MP 1063.35 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

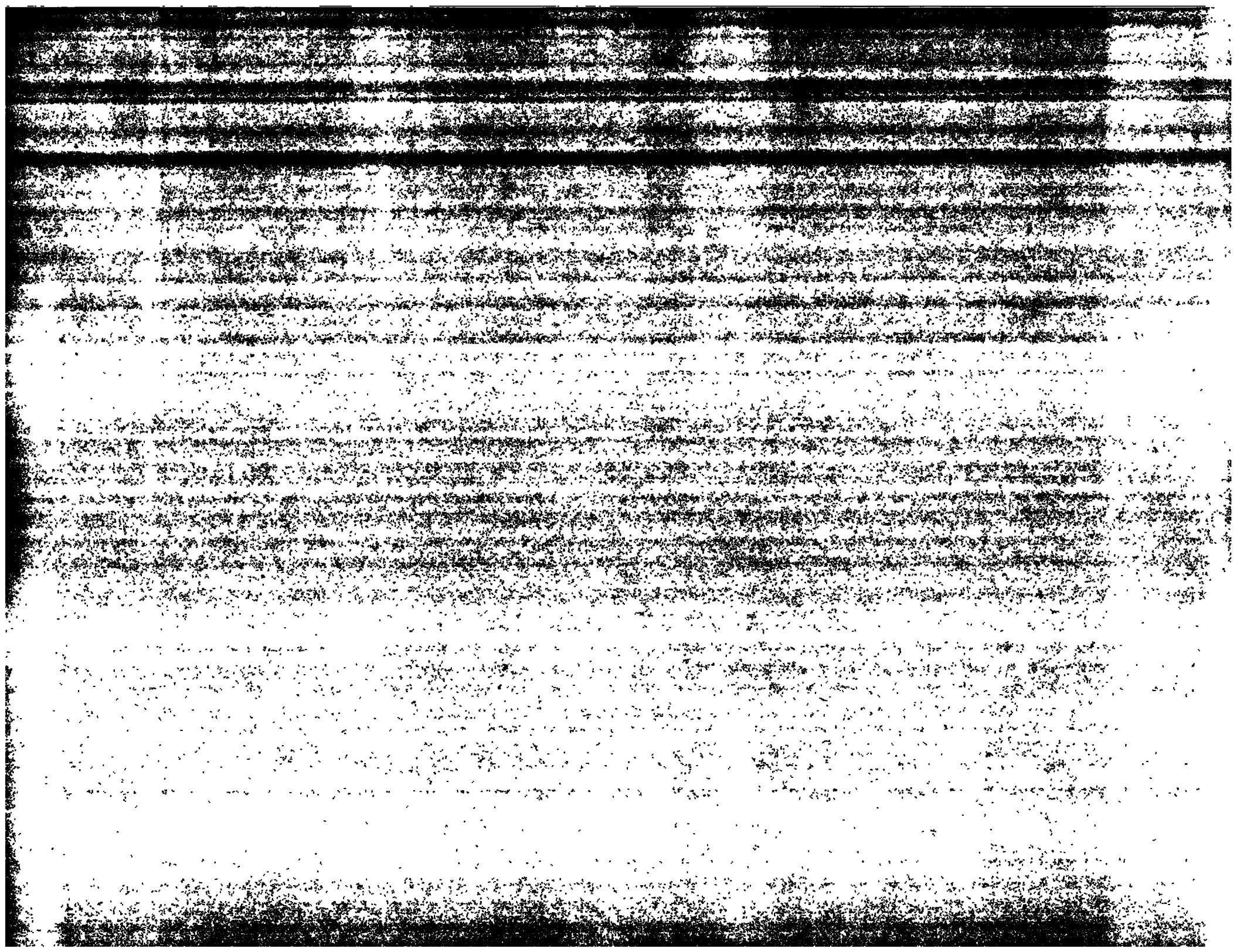
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

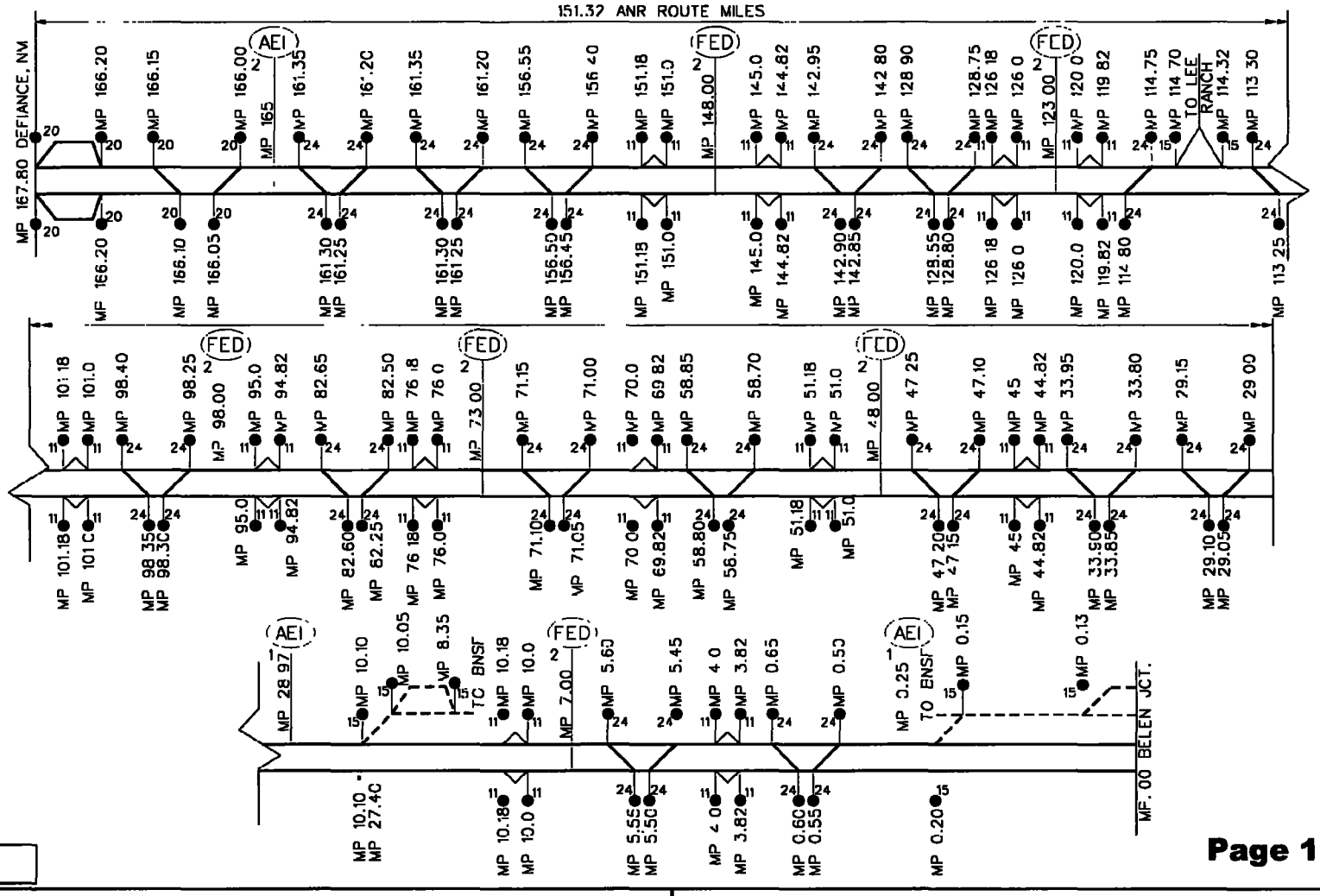
20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-2





NMR

SUBDIVISION: SOUTHWEST

DIVISION: GALLUP

FROM: BELEN JCT. MP: 0.00 DATE: 05/06/10

TO: DEFIANCE, NM MP: 167.80 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

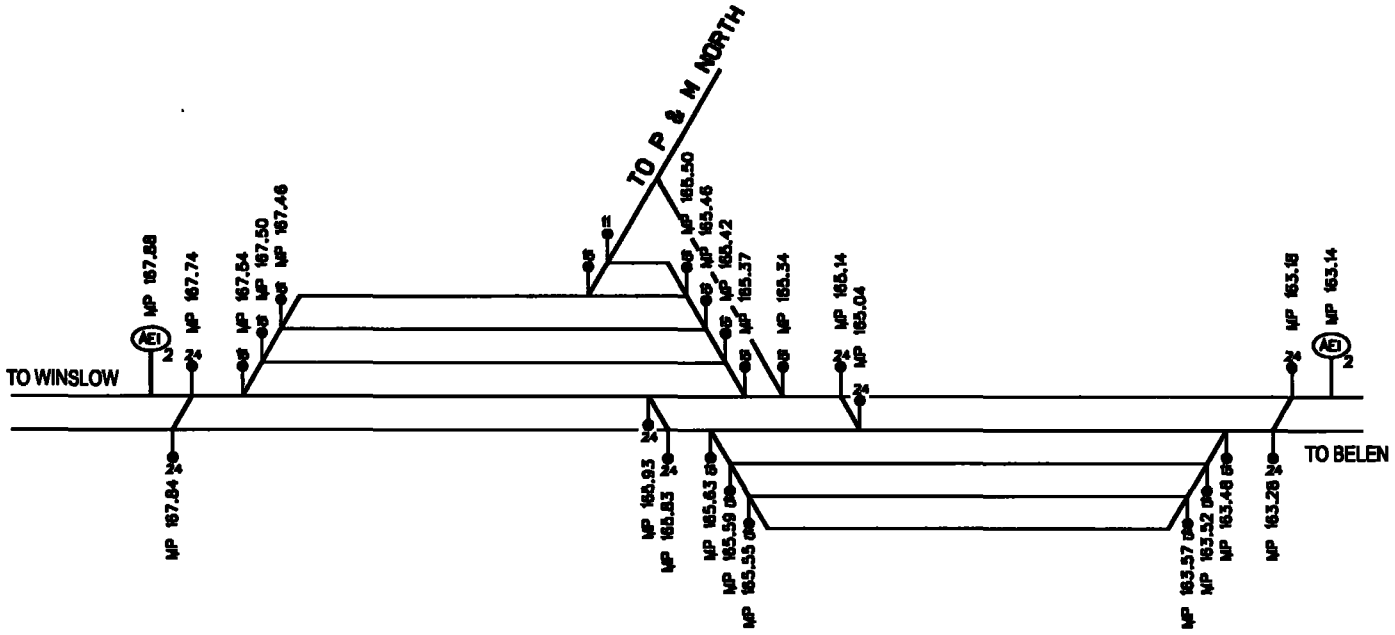
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



DEFIANCE, NM, INTERCHANGE YARD

NMR

SUBDIVISION: GALLUP

DIVISION: SOUTHWESTERN

FROM: MP 163.18 DATE: 04/16/10

TO: MP 167.84 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

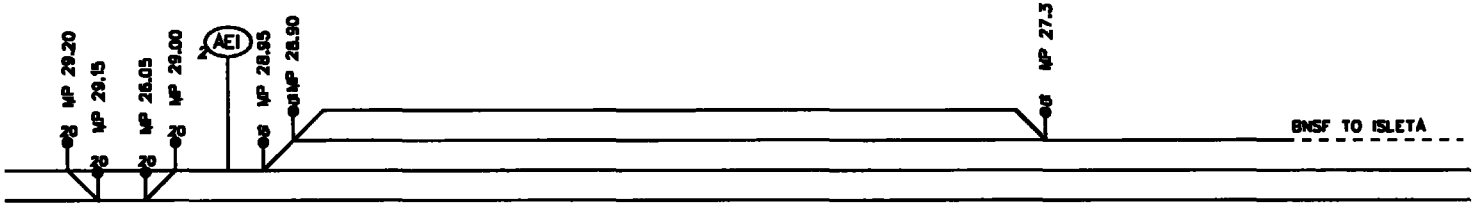
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



DALIES INTERCHANGE YARD

NMR

SUBDIVISION: GALLUP

DIVISION: SOUTHWEST

FROM: MP 27.3 DATE: 05/06/10

TO: MP 28.95 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

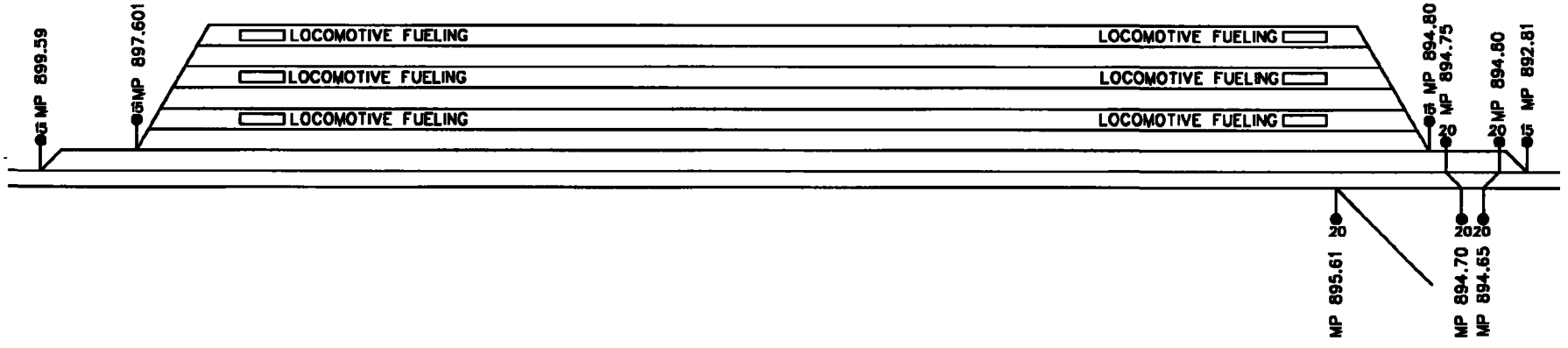
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



BELEN YARD

NMR

SUBDIVISION: **SOUTHWEST**

DIVISION: **GALLUP**

FROM: MP 892.81 DATE: 05/06/10

TO: MP 899059 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

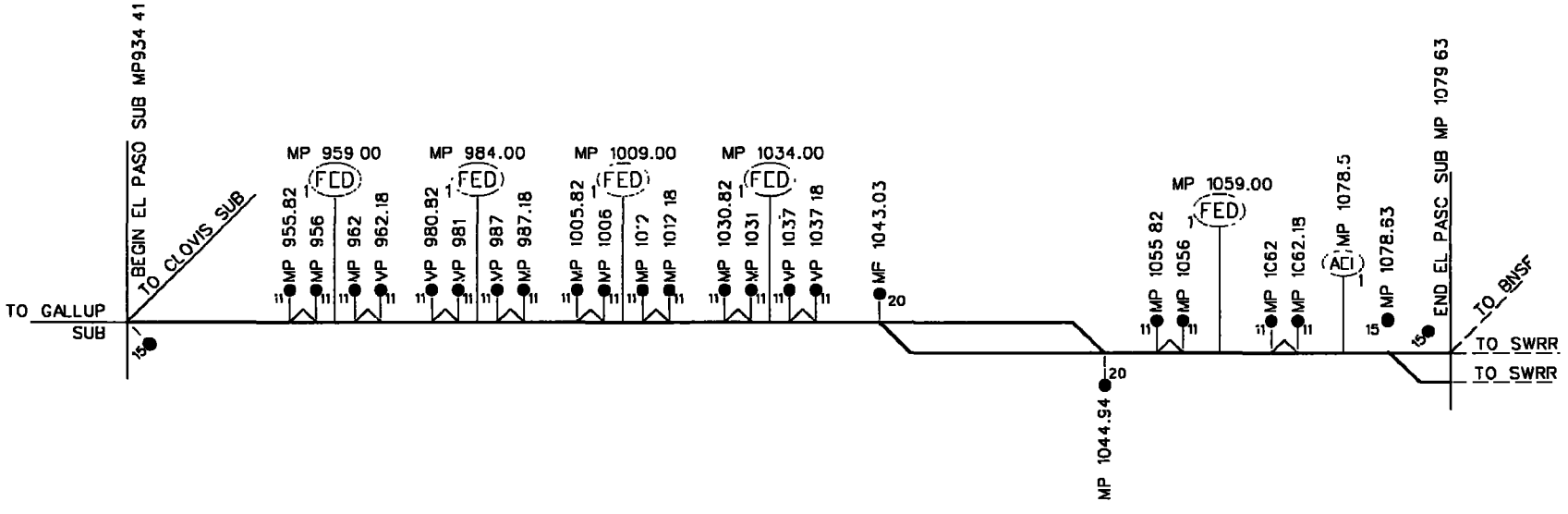
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



NMR

SUBDIVISION: EL PASO

DIVISION: SOUTHWEST

FROM: BELEN, NM MP: 934.41 DATE: 05/06/10

TO: RINCON, NM MP: 1079.63 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DE OR DED - DRAGGING EQIUPMENT DETECTOR
HW - HOT WHEEL DETECTOR

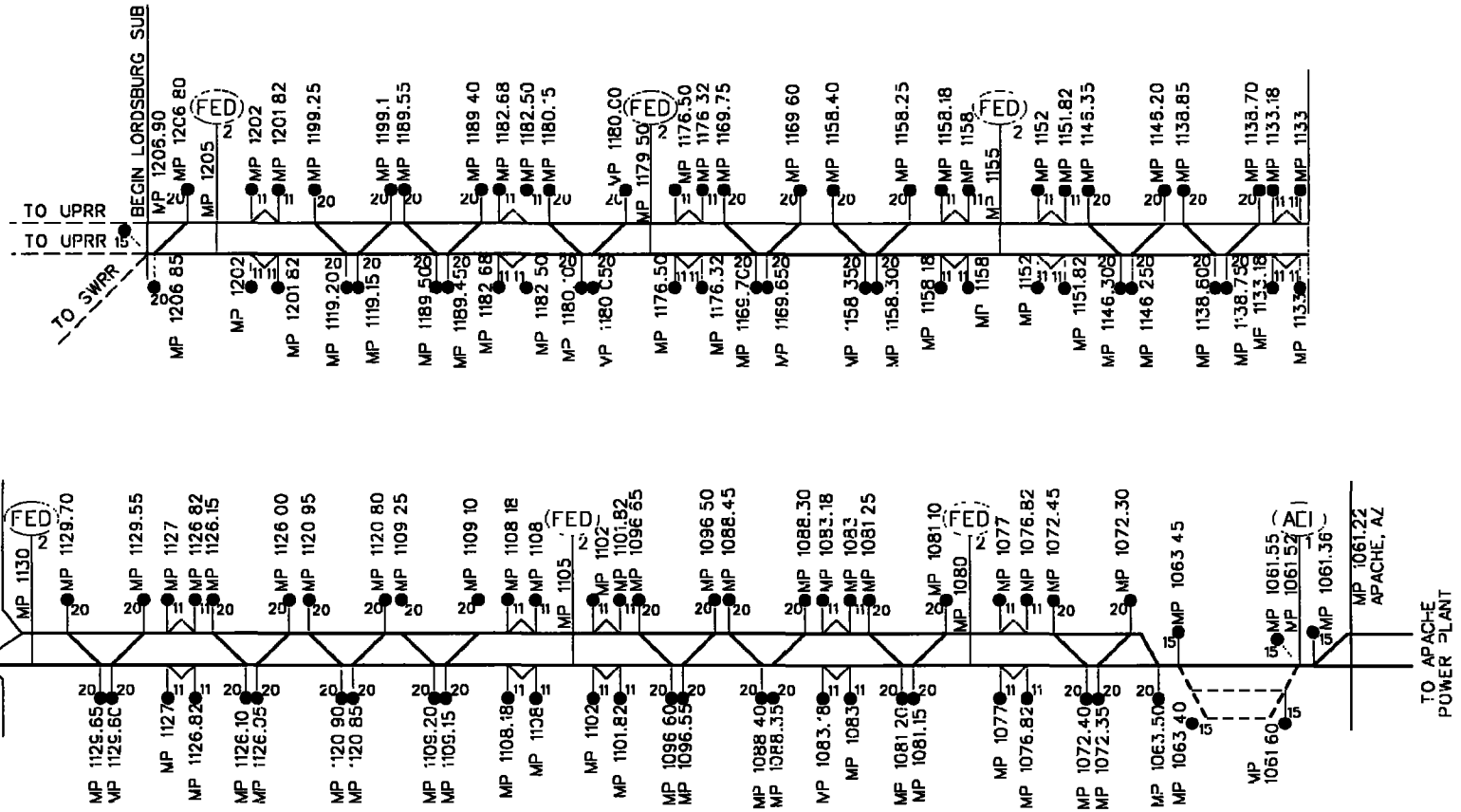
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVFRED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



NMR

SUBDIVISION: LORDSBURG

DIVISION: TUCSON

FROM: DEMING, NM MP: 1206.90 DATE: 05/06/10

TO: APACHE, AZ MP: 1061.40 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# CWR CLASS 1 RELAY

(FED) 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED

HB - HOT BEARING DETECTOR
DF OR DFD - DRAGGING EQUIPMENT DETECTOR
HW - HOT WHEEL DETECTOR

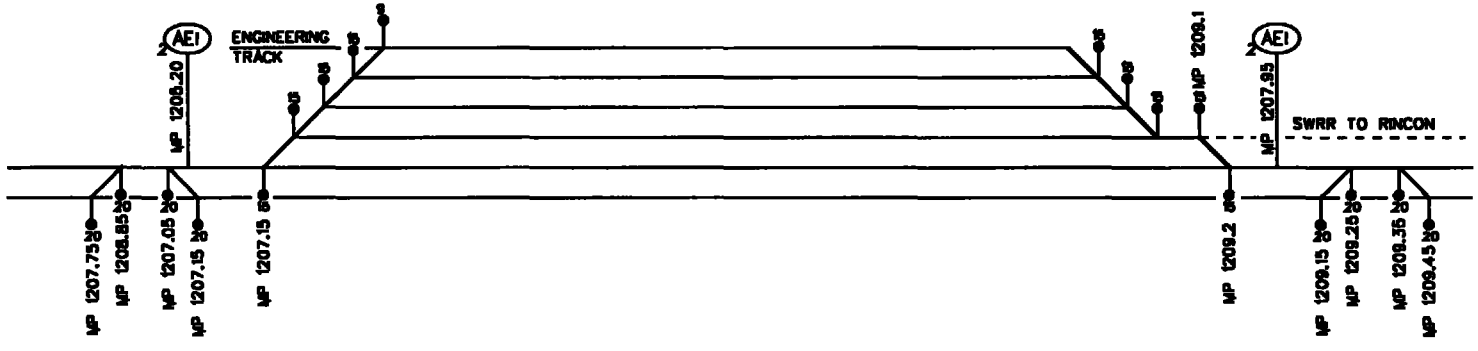
(AEI) 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE*

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY.
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



DEMING INTERCHANGE YARD

NMR

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1204.86 DATE: 05/03/10

TO: MP 1208.28 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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

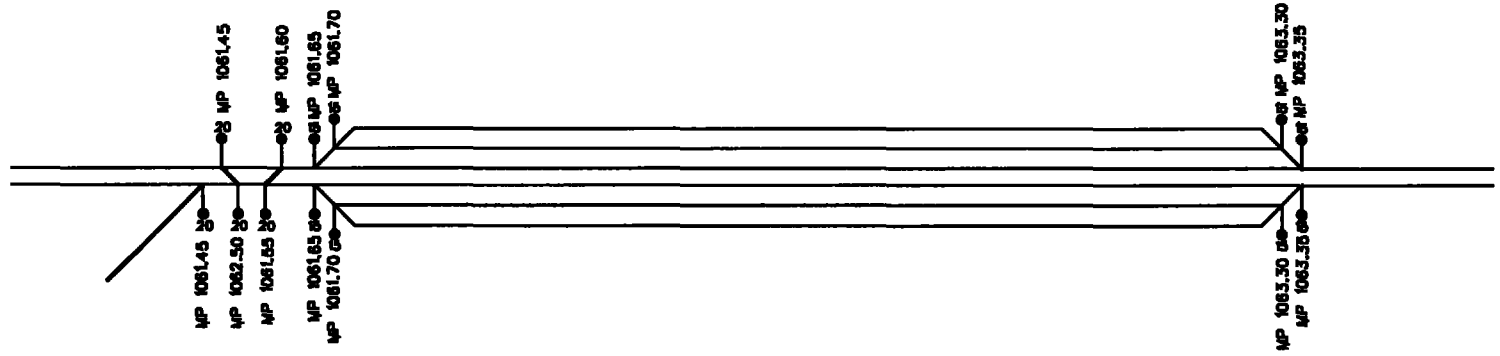
AEI - AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 - TURNOUT TYPE#

#TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

PREPARED BY:
STV/RALPH WHITEHEAD ASSOCIATES

EXHIBIT: III-B-3



COCHISE-APACHE YARD

NMR

SUBDIVISION: LORDSBURG

DIVISION:

FROM: MP 1061.65 DATE: 05/06/10

TO: MP 1063.35 NOT TO SCALE

LEGEND:

- 136# PREMIUM CWR
- 136# STANDARD CWR
- 136# 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
15 - #15 ELECTRIC
15H - #15 HAND-THROWN
11S - #11 SPRING
11 - #11 HAND-THROWN
11E - #11 ELECTRIC

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III.H: Results of SAC Analysis

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