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June 6, 2003



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via Hand Delivery
Hon. Vernon A. Williams
Secretary
Surface Transportation Board
1925 K Street, N.W.
Washington, D.C. 20423

OFFICE OF PROCEEDINGS

Re: *Public Service Company of Colorado d/b/a Xcel Energy v. The Burlington Northern and Santa Fe Railway Company, Docket No. 42057*

JUN 6 2003
Part of
Public Record

Dear Secretary Williams:

Enclosed for filing in the above-captioned matter are the original and 10 copies of the Motion for Leave to File Limited Surrebuttal Evidence of Defendant The Burlington Northern and Santa Fe Railway Company ("BNSF") and an attached Surrebuttal Verified Statement of Karl M. Leopold and Terence J. Monks. Also enclosed are three compact discs containing an electronic version of BNSF's Motion, Surrebuttal Verified Statement and electronic workpapers. These materials contain color documents.

Pursuant to a waiver from the Board's staff, BNSF's electronic version of its Motion and Surrebuttal Verified Statement is being submitted in Word format.

These materials are being filed under seal because they contain Confidential and Highly Confidential Information subject to the Board's January 29, 2001 Protective Order in this proceeding. BNSF is also filing an original and 10 copies of the Public Version of its Motion and Surrebuttal Verified Statement, along with 3 compact discs containing the Public Version in PDF format.

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

Sincerely,

Anthony J. LaRocca

Enclosures

cc: Counsel for Complainant

- 1 -

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BEFORE THE
SURFACE TRANSPORTATION BOARD

PUBLIC SERVICE COMPANY OF
COLORADO D/B/A XCEL ENERGY

Complainant,

v.

THE BURLINGTON NORTHERN AND
SANTA FE RAILWAY COMPANY

Defendant.

Docket No. 42057

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**DEFENDANT'S MOTION FOR LEAVE
TO FILE LIMITED SURREBUTTAL EVIDENCE**

Defendant The Burlington Northern and Santa Fe Railway Company ("BNSF") hereby moves pursuant to 49 CFR §§1104.13(a) and 1117.1 for leave to file limited surrebuttal evidence, contained in the attached verified statement of BNSF's expert witnesses, Messrs. Leopold and Monks. As explained below, the Board should accept BNSF's surrebuttal evidence because (1) it is a limited response to new evidence filed by the Complainant Public Service Company of Colorado d/b/a Xcel Energy ("Xcel") in its May 19, 2003 Rebuttal Evidence, (2) the new evidence filed by Xcel on rebuttal relates to critical assumptions about SARR operations and capacity requirements underlying Xcel's SAC calculations, and (3) BNSF's surrebuttal evidence will create a more complete record and assist the Board in evaluating Xcel's new assumptions made for the first time on rebuttal.¹ These issues are discussed further below.

¹ If the Board does not accept BNSF's surrebuttal evidence, it should strike Xcel's rebuttal string program analysis on grounds that BNSF has not had an opportunity to address changes in the analysis presented for the first time on rebuttal.

I. BACKGROUND

Xcel, like other complainants in recent SAC litigation, based its SAC operating costs and the configuration of its stand-alone railroad on the output of a string program analysis. Xcel Opening Nar. at III-C-11; Xcel Opening Exhs. III-C-1 and 2. Xcel's consultants first identified the SARR traffic that is assumed to move over the SARR during a supposed peak traffic period and then ran that traffic through the string program. The string program generated operating statistics for that traffic, such as locomotive hours, that were then used to develop the operating costs and equipment requirements for the SARR. Xcel also used the string program to determine whether the SARR it designed had sufficient line, siding and yard capacity to handle the SARR traffic. It did this by examining the output of the program for collisions or train meets. Xcel's string program analysis was therefore a critical element in its SAC evidence and it was the primary foundation for major portions of Xcel's SAC costs.

Xcel's string program was developed by Xcel's primary cost consultant, L.E. Peabody & Associates, Inc. The string program has been used by complainants in other SAC litigation and it has been the subject of contention in recent SAC cases. In the *TMPA* case, the Board found that the string program analysis relied upon by TMPA could not be used in the SAC analysis because of certain shortcomings in the underlying program.² The defendants in the pending cases involving eastern coal transportation have urged the Board to reject complainants' string program analyses for similar reasons.³

² *Texas Municipal Power Agency v. The Burlington Northern and Santa Fe Ry. Co.*, STB Docket No. 42056, slip op. at 68 n.112 and 73-74 (served March 24, 2003) ("*TMPA*").

³ See Letter from G. Paul Moates to Hon. Vernon A. Williams, *Carolina Power & Light Co. v. Norfolk Southern Ry Co.*, STB Docket No. 42072, at 3 (filed March 14, 2003).

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In a motion filed February 6, 2003 in this proceeding, BNSF urged the Board summarily to dispose of Xcel's rate reasonableness challenge on grounds that Xcel's opening evidence could not possibly support a finding in Xcel's favor. Motion for Summary Disposition and Stay at 2-4 (filed Feb. 6, 2003). A major focus of BNSF's Motion was that Xcel's opening SAC evidence relied heavily for its SAC calculations on a string program analysis that was fundamentally flawed. BNSF identified several features of the string program that made the program unreliable for the purpose of generating operating statistics and assessing capacity requirements. Among other things, BNSF pointed out that Xcel's string program failed to detect overloaded sidings. Motion at 14-18. In reply to BNSF's Motion, Xcel acknowledged that its string program contained some errors but claimed that it could correct those errors. Reply to Motion for Summary Disposition and Stay at 4 (filed Feb. 26, 2003). On April 4, 2003, the Board denied BNSF's Motion, noting that it has become increasingly "troubled by the submission of incomplete or erroneous evidence on opening" but accepting Xcel's argument that the alleged deficiencies "are better left for an assessment on the merits after development of the full evidentiary record."⁴

In its Reply Evidence, BNSF elaborated upon the string program deficiencies that were described in BNSF's Motion and presented evidence of other flaws in the string program analysis, including an error in the string program's incorporation of grades and curvature data for the SARR route. BNSF Reply Nar. at III.B-20. The grade encountered by a train moving over a particular segment of the SARR has an obvious impact on the speed that the train can attain over that segment, therefore errors in the program's treatment of grades would affect all of the train

⁴ *Public Service Co. of Colorado d/b/a Xcel Energy v. The Burlington Northern and Santa Fe Ry. Co.*, STB Docket No. 42057, at 2 (served Apr. 4, 2003).

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movement assumptions in the string program analysis. BNSF reiterated its position that the Board should reject Xcel's SAC calculations due to errors in Xcel's underlying string program analysis.

On rebuttal, Xcel defended some aspects of its string program analysis, such as the disappearance of trains at mine loading areas, but it also purported to make "two minor adjustments" to the string program in response to BNSF's criticisms. Xcel Rebuttal Nar. at I-31. Specifically, Xcel "[c]orrected input data errors in the program's grade/curve database, thereby certain [sic] problems regarding train speeds and acceleration/deceleration" and it performed certain manual adjustments of trains to "ensure adequate space in sidings and yards." *Id.* at I-32. In addition, Xcel added "30.2 miles of new siding track to resolve certain congestion problems." *Id.*

These supposedly "minor adjustments" produced dramatic changes in the apparent operating characteristics of the SARR trains and in the string program results. According to Xcel, all of the "congestion and delays that occurred in the initial run presented with Xcel's Opening Evidence have been relieved." *Id.* at III-B-36. Moreover, "transit times, on average, declined 28 percent over the transit times presented in Xcel's Opening Evidence." *Id.* at III-B-12. As a result of the major changes in purported transit times, Xcel reduced its line haul locomotive requirements by almost 34%, from 133 to 88. *Id.* at III-D-5, Table III-D-11.

II. BNSF'S LIMITED SURREBUTTAL IS NEEDED TO EVALUATE XCEL'S NEW STRING PROGRAM ANALYSIS

The Board should accept the attached verified statement of Messrs. Leopold and Monks as surrebuttal evidence necessary to evaluate the string program analysis presented by Xcel on rebuttal. The changes Xcel has made in the string program are not transparent and Xcel's

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representations regarding those changes cannot be taken at face value. Xcel claims on rebuttal to have made only “minor adjustments” to fix certain errors in its opening string program analysis of the SARR. If it were true that Xcel made only minor adjustments to its string program analysis, the mere fact that the results of the analysis changed so dramatically would call into question the integrity and reliability of the string program. Huge swings in the average transit time of SARR trains should not turn on “minor” adjustments to grade assumptions or on the addition of a few miles of sidings.

However, as explained by BNSF’s witnesses Messrs. Leopold and Plum in the attached verified statement, the changes Xcel made to its string program analysis on rebuttal were anything but minor. Under the guise of fixing its string program analysis, Xcel actually produced a SARR with fundamentally different operating assumptions, which not coincidentally favored Xcel’s SAC calculations. Moreover, the changes proposed by Xcel on rebuttal contain major errors that distort the results of the analysis. Contrary to its claims, Xcel did not fix its string program analysis on rebuttal but submitted a new analysis that contains additional flaws and confirms the fundamental unreliability of the string program.

Messrs. Leopold and Monks explain in the attached statement that Xcel’s changes to the grade and curvature assumptions underlying the string program analysis were extensive. Xcel expanded from 183 to 654 the number of records contained in the grade file and produced a grade profile for the SARR that differed substantially from the profile used in its opening evidence. *See* Attachment A to the Verified Statement of Messrs. Leopold and Monks (“Leopold/Monks V.S.”). Ironically, and more importantly, while Xcel purported to correct the grade profile with these changes, other changes in the program code caused the string program to treat the majority of the SARR route as having *zero* grade and no curves. As a result, the output

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of the string program reflects an erroneous conclusion that almost 70% of the SARR trains experience *no* grades or curves as they move over the SARR, permitting those trains to move at vastly increased speeds. *See* Table 1 to the Leopold/Monks V.S. This error should have been apparent to Xcel from a cursory review of the string charts prepared by Xcel for its rebuttal statement. *See* Leopold/Monks V.S. at Attachment D.

Xcel's rebuttal string program analysis also purported to address another major flaw that BNSF identified in Xcel's opening string program analysis, namely the failure of the program to identify instances where sidings and yards are overloaded. Xcel Rebuttal Nar. at III-B-32 to 33. The Board specifically identified this aspect of the string program used by complainants in the *TMPA* case as a reason for rejecting its use there. *TMPA*, slip op. at 68 n.112. While Xcel claims that its new string program analysis shows that there are no longer overloaded sidings and yards, Messrs. Leopold and Monks explain that Xcel's rebuttal string program analysis still fails to detect overloaded sidings and yards. Messrs. Leopold and Monks identified 47 instances of overloaded sidings during the two-week period modeled by Xcel on rebuttal and several instances where trains occupy more yard capacity than Xcel assumes to exist. *See* Leopold/Monks V.S. at 19. As in *TMPA*, Xcel's string program analysis does not adequately test critical capacity constraints.

The Board should accept BNSF's surrebuttal evidence analyzing these flaws in Xcel's rebuttal string program analysis. The attached verified statement is limited to the new evidence submitted by Xcel on rebuttal and it focuses exclusively on the new assumptions (changes in grade and sidings) that Xcel made for purposes of its rebuttal analysis. It also relates to issues that profoundly affect the SAC calculations. The new evidence to which BNSF's surrebuttal relates is the foundation of Xcel's calculation of operating costs and its assessment of SARR

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capacity, two major issues in a SAC analysis. Moreover, BNSF's surrebuttal will create a more complete record on which the Board can conduct its SAC analysis. As the Board has already found, the string program used by complainants in recent cases is particularly difficult to use and its reliability is difficult to test.⁵ BNSF's surrebuttal evidence can assist the Board in its evaluation of Xcel's evidence on this complex issue. Under these circumstances, surrebuttal evidence is appropriate.⁶

The Board has made it clear in recent cases that a complainant is not permitted to file new evidence on rebuttal and that new evidence will be struck from the record.⁷ BNSF could therefore have requested that the Board strike Xcel's new string program analysis on grounds that it improperly introduced new SAC assumptions (30% faster transit times clearly constitute new operating parameters) on rebuttal. However, BNSF believes that the more appropriate course here is for the Board to consider the attached surrebuttal evidence because it forcefully confirms the point that BNSF has made in its Motion and its Reply Evidence that Xcel's string program is fundamentally flawed, unreliable and subject to gross manipulation by complainants. Each time that BNSF identifies an error in the program, the supposed fix proposed by the complainant creates a series of new problems. The string program is simply not an appropriate tool for SAC analyses.

⁵ *TMPA*, slip op. at 68 n.112 and 73-74. As explained by Messrs. Leopold and Monks, the string program generates statistics but does not permit the operator to observe the assumed movement of trains through the system unless the string program output is captured through special program codes. See *Leopold/Monks V.S.* at 15-16.

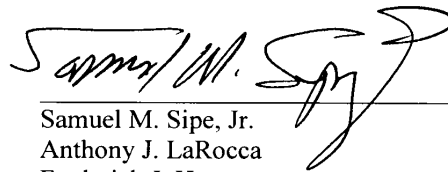
⁶ *Ashley Creek Phosphate Co. v. Chevron Pipe Line Co., et al.*; *Ashley Creek Phosphate Co. v. SF Phosphates Limited Co., et al.*, Nos. 40131 (Sub-No. 1) and 40810, at 3-4 (ICC served Apr. 21, 1995).

⁷ *Duke Energy Corp. v. CSX Transp., Inc.*, STB Docket No. 42070 (served Mar. 25, 2003).

III. CONCLUSION

For the foregoing reasons, BNSF requests that the Board accept the attached Verified Statement of Messrs. Leopold and Monks as limited surrebuttal addressing new evidence filed by Xcel on rebuttal. If the Board does not accept BNSF's surrebuttal evidence, it should strike Xcel's rebuttal string program analysis on grounds that BNSF has not had an opportunity to address changes in the analysis presented for the first time on rebuttal.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Samuel M. Sipe, Jr.", written over a horizontal line.

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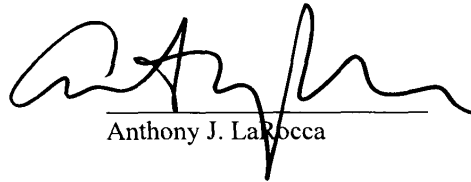
ATTORNEYS FOR THE BURLINGTON
NORTHERN AND SANTA FE RAILWAY
COMPANY

June 6, 2003

CERTIFICATE OF SERVICE

I hereby certify that on June 6, 2003, I caused a copy of the foregoing Defendant's Motion for Leave to File Limited Surrebuttal Evidence and attached Verified Statement of Messrs. Leopold and Monks to be served by hand upon the following counsel for Public Service Company of Colorado d/b/a Xcel Energy:

Thomas W. Wilcox
Michael H. Higgins
David E. Benz
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1920 N Street, NW, Suite 800
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Anthony J. LaRocca

BEFORE THE
SURFACE TRANSPORTATION BOARD

PUBLIC SERVICE COMPANY OF
COLORADO D/B/A XCEL ENERGY

Complainant,

v.

THE BURLINGTON NORTHERN AND
SANTA FE RAILWAY COMPANY

Defendant.

Docket No. 42057

**SURREBUTTAL VERIFIED STATEMENT OF
KARL M. LEOPOLD AND TERENCE J. MONKS**

We are Karl M. Leopold and Terence J. Monks. We have been retained by The Burlington Northern and Santa Fe Railway Company (BNSF) in this proceeding to assist in the evaluation of Xcel's evidence. In this Surrebuttal Verified Statement, we address the continuing presence of fundamental flaws in the string model analysis Xcel presented in its May 19, 2003, Rebuttal Evidence.

In support of a Motion for Summary Disposition and Stay filed by BNSF on February 6, 2003, and in BNSF's April 4, 2003, Reply Evidence, we demonstrated that the first string program analysis submitted by Xcel in this proceeding contained flaws that rendered its output unreliable. On rebuttal, Xcel submitted a new string program analysis that supposedly fixed errors contained in the first presentation. As we describe below, Xcel's new analysis did not fix the errors in its original evidence and, indeed, introduced new errors that confirm the unreliability of the string program for assessing capacity requirements and for generating operating costs upon which costs are based.

I. WITNESS QUALIFICATIONS

Mr. Leopold is a Senior Consultant at FTI Consulting, Inc., with offices at 1201 Eye Street, N.W., Suite 400, Washington, DC 20005. Mr. Leopold holds a Bachelor's Degree in Government and Politics. In 1997, he joined Klick, Kent & Allen, Inc., which was acquired by FTI Consulting, Inc. in 1998. Since that time he has been involved continuously in analyzing accounting, cost, financial and engineering issues associated with railroad operations and pricing. He has conducted numerous stand-alone cost studies, conducted and evaluated railroad contract provisions, and developed computer models to evaluate railroad engineering and operating requirements.

Mr. Monks is a computer programmer and software consultant. His business address is 2450 Freetown Drive, Reston, Virginia 20191. Mr. Monks holds a Bachelor of Arts degree in French and German from the University of Exeter, United Kingdom. He also spent two years in a doctoral program in Computational Linguistics at Birkbeck College, University of London, United Kingdom. Since 1968, Mr. Monks has been employed as a programmer, systems analyst and director of Computer Services and Systems Development for various organizations. He has specialized in computer modeling and simulation, providing studies and software to the National Aeronautics and Space Administration (NASA), the Raytheon Corporation, and the Federal Aviation Administration (FAA). Mr. Monks was a lead designer/programmer for a project sponsored by the FAA to simulate day-to-day air traffic between the West Coast and Hawaii. In addition, Mr. Monks held the titles of Chief, Operational Support and Director, Computer Services for the United States Railway Association. During that time, he oversaw the development and deployment of the Operations Cost Model (OCM), a large-scale simulation of day-to-day operations of the entire Conrail network. Following deployment of the OCM, Mr. Monks spent considerable time refining the model and increasing the throughput and accuracy.

Throughout his professional career, Mr. Monks has had the opportunity to study and use many computer languages and operating systems, including all those in common use today. His work also includes program verification, debugging techniques and error checking in software development.

II. XCEL'S NEW STRING MODEL ANALYSIS IS FLAWED AND UNRELIABLE

On rebuttal, Xcel submitted a new string model analysis of its SARR that purported to demonstrate that many of the problems BNSF had identified with the string model analysis submitted by Xcel on opening had been corrected. Xcel attempted to downplay the significance of the changes it made to the string analysis on rebuttal, asserting that only “two minor adjustments” were made to its analysis: (1) corrections to “input data error in the program’s grade/curve database;” and (2) increased manual adjustment of trains to “ensure adequate space in sidings and yards.” Xcel Rebuttal at I-31 to I-32. In addition, Xcel added “30.2 miles of new siding track to resolve certain congestion problems.” *Id.* According to Xcel, these supposedly “minor” modifications had remarkable results:

The string diagram model was run for this Rebuttal Evidence with the revised facilities and grade and curve file. The results show that the congestion and delays that occurred in the initial run presented with Xcel’s Opening Evidence have been relieved. The output was also checked to verify that no capacity problems in the yards or sidings exist.

Xcel Rebuttal at III-B-36. Moreover, “transit times, on average, declined 28 percent over the transit times presented in Xcel’s Opening Evidence.” *Id.* at III-B-12.

Because “minor” changes could not plausibly enhance performance of the SARR to the extent claimed by Xcel, we sought to determine why transit times had improved to such a degree and whether Xcel had actually addressed the congestion issues, as claimed. The results of our analysis were revealing. First, the changes to the grade and curve data are not minor. In its new

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rebuttal string analysis, Xcel has effectively presented a new SARR that operates over a different grade and curve profile. Second, other changes in the string program that Xcel does not describe in its Rebuttal Narrative cause the string model to fail properly to use the grade and curve data. Third, there continue to be numerous instances of siding and yard overloads in Xcel's newly submitted string analysis.

A. XCEL'S REBUTTAL GRADE AND CURVE DATA DIFFER FROM THOSE SUBMITTED WITH XCEL'S OPENING EVIDENCE

BNSF identified problems with Xcel's opening grade and curve data in BNSF's Reply Evidence. BNSF Reply at III.B-20. On rebuttal, Xcel questions BNSF's analysis, Xcel Rebuttal at III-B-34, but concedes that there are "instances where the data was incomplete or the wrong data for a particular location was used by the string diagram model (due primarily to a formatting error in the database)." *Id.* at III-B-35. The new database that supposedly makes minor necessary corrections is contained in Xcel electronic work paper "grades.dbf."

Comparison of "grades.dbf" to the grade and curve data used by Xcel in opening (an electronic work paper also titled "grades.dbf"), shows that the new file contains 654 records, more than three and a half times as many records as the 183 records submitted on opening. Moreover, as confirmed by the charts included with this Statement as Attachment A, the new grade and curve data presents a different topological profile of the SARR.¹ Simply put, Xcel has submitted data for a different railroad on rebuttal than the railroad it modeled on opening.

¹ For a sample segment of the Valley subdivision totaling approximately 30 miles and a sample segment of the Angora subdivision totaling approximately 20 miles, the charts show how the string program would interpret grade data (*i.e.*, { }) if it were able properly to locate it. As discussed in the next section, the revised string analysis does not, in fact, correctly extract grade and curve data. Confidential and Highly Confidential information contained in this filing is delineated by { }.

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On the present record, neither the Board nor BNSF has a basis to determine whether the new grade and curve data are any more reliable than the old since neither set of data corresponds precisely to the electronic data or track profiles produced by BNSF in discovery. On both opening and rebuttal Xcel adjusted or manipulated BNSF's discovery data in some manner to produce its "grade.dbf" files. Whatever process Xcel employed is completely undocumented. In any case, as described below, Xcel's attempt to introduce new and different data is undermined by the failure of the string program properly to use that grade and curve data (or in fact *any* grade and curve data) for the overwhelming majority of train movements it models.

B. XCEL'S NEW STRING ANALYSIS DOES NOT PROPERLY USE THE NEW GRADE AND CURVE DATA IN ANY CASE

To determine the extent to which the new grade and curve data were responsible for Xcel's reduced transit times, we ran one of Xcel's trains through the string analysis to see what grade and curve values were being used by the program to calculate the train's movement.² The string program itself produces no intermediate grade or curve output showing what variables from the "grades.dbf" file were used during its process. For this reason, we developed additional code to show some of the internal calculations during the acceleration portion of the model, when the values for grade and curve are called upon by the program.³ Without adding this code it would have been impossible to track the activities associated with grade and curve assignments. Indeed, this code serves as a verification of a portion of the process relating to the development of acceleration that is being executed by the model.

² The specific program for Xcel's string analysis is contained in Xcel electronic work paper "pawnee_string.prg."

³ The modified string program is included with this Statement as BNSF electronic work paper "speeder.prg."

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We began with the string program filed by Xcel in rebuttal and added code for the sole purpose of collecting data. Minimal changes were made to the original program in order to capture its internal operation. No algorithms were changed. The additional code does nothing more than record additional output in the form of a database that shows the progress of the model. The changes implemented were as follows:

Line 3:	added a comment to distinguish this program from the original
Line 744:	aliased ROUTE.DBF as ROUTEFILE to allow later references
Lines 783-785:	selected SPEEDS.DBF for output, and deleted all prior records
Line 1274:	added call to dumpdata() function for loaded direction trains
Line 1958:	added call to dumpdata() function for empty direction trains
Line 3429:	added call to dumpdata() function for “R” trains
Lines 4241-4271:	added dumpdata() function

As demonstrated by the programming code reproduced in Attachment B to this Statement, the dumpdata() function does not change any program variables and therefore does not affect the process of the string model. Key values that the string model extracts from the “grades.dbf” file are stored in local variables; the “speeds.dbf” file is selected as the location for captured data output and values are moved into a new record that is appended to the file. The acceleration is calculated { } in the model, which produces a substantial output file.⁴ For this reason, the program was created to extract grade and curve data for only one train at a time.

A sample train, identified by Xcel as { }, was used for our analysis. This train was chosen because it runs from Eagle Butte to Pawnee, covering most of the SARR system. The output of the sample run is included with this Statement as BNSF electronic work paper “speeds.dbf.”⁵ The output data for the sample train moving in the loaded direction shows

⁴ The output file for the single train used as an example was over 16 megabytes.

⁵ An explanation of the fields contained in “speeds.dbf” is contained in Attachment C to this Statement.

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that the grade and curvature for all locations through station sequence 55 (MP 83.1) are zero. In other words, the train is treated by the string program as moving over a perfectly flat, straight track regardless of actual grade or curve, or even the grade and curve data in Xcel's newest version of the "grades.dbf" file.

It is obvious from inspection of the code that instructs the string program to extract grade and curve data that the { }.⁶ Therefore, the string program {

} will assign all loaded trains the same zero values over track through station sequence 55.⁷ The absence of grade and curve constraints allows trains to move over those segments at vastly increased speeds that bear no relationship to real-world conditions.⁸

For the sample train, the string program treats grades and curves as non-existent for the first 83 percent of its journey in the loaded direction. The erroneous treatment of grades and curves has an even larger impact on most trains that start at other mines or leave the SARR at an earlier station. Indeed, more than two-thirds of the trains encounter no grades or curves according to Xcel's string analysis. TABLE 1 below summarizes the percentage of each loaded train's journey during the alleged "peak period" that the string program treats as having zero grade and curve.

⁶ See lines 1234 -1319 of Xcel electronic work paper "pawnee_string.prg" (code segment that calculates acceleration delay for all trains in loaded direction), and lines 1255-1257.

⁷ We ran a second train that travels from the Antelope mine to Pawnee, { }, through the string program to confirm this fact. The results were the same as for the first sample train. See BNSF electronic work paper "speeds2.dbf."

⁸ A similar "zeroing" of grade and curve data occurs in the empty direction.

TABLE 1
Distribution of Trains by Proportion of
Zero Grade and Curvature
Encountered Throughout Journey⁹

Percent of Journey with Zero Grade and Curvature	Count of Trains	Percent of Total Trains
100.0%	363	67.2%
83.1%	32	6.0%
82.0%	28	5.2%
81.9%	26	4.8%
81.6%	10	1.9%
80.6%	24	4.4%
80.4%	38	7.0%
79.1%	2	0.4%
78.9%	17	3.1%
Total Trains	540	100.0%

Even a rudimentary inspection of Xcel's new "grades.dbf" file shows that the zero values used by the string program in its calculations do not correspond to the grade and curve data Xcel claims to be using. Nor, given this problem, is there any reason to believe that the non-zero data used for the other portions of the route is accurate. The string program is apparently failing to find the grade and curve data.¹⁰ The result is an enormous error in Xcel's favor in terms of substantially reduced transit times and capacity requirements.

The error should have been apparent to Xcel. A cursory review of the string charts produced by Xcel in rebuttal, *see* Xcel Rebuttal Exhibit III-C-4, shows inconsistencies in train movements corresponding to this error. Most obvious are the loaded trains (blue lines) traveling

⁹ Source: BNSF electronic work paper "Zero Grade and Curve Data Tables.xls."

¹⁰ Xcel claims in rebuttal that it made no changes to the lookup procedure for grade and curve data in the string program itself. Xcel Rebuttal at III-B-35. This statement appears to be untrue. While examination of the differences between the two versions of the program code showed only 15 changes, some of those changes were to the lookup procedure. Lines 769 and 770 show the modification that was made between the two versions. The modification changed the algorithm for finding the grade and curvature of a given point on the railroad.

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between W. Reno Junction and Pawnee Yard. As shown in Attachment D to this Statement, between W. Reno Junction and milepost 60.9, Xcel's lines depict trains moving throughout the SARR network at a near constant speed with variations only for braking at yards and sidings. After milepost 83.1, however, the slope of the line for each of these trains changes dramatically. The trains are moving much slower for approximately the last 65 miles of their journey where the string model extracts at least some grade and curve data (albeit incorrectly) to calculate train speed. These trains encounter fewer opposing trains in the latter portion of the SARR but travel at slower speeds, presumably because they are constrained by grades and curves.

C. OVERLOADED YARDS AND SIDINGS PERSIST DESPITE XCEL'S MODIFICATIONS

BNSF demonstrated in both its Motion for Summary Disposition and Stay and its Reply evidence that the string program does not adequately test capacity because it fails to identify instances where sidings and yards are overloaded. *See* Motion at 17; BNSF Reply at III.B-17 to B-18. Xcel's claim that its newly submitted string analysis produces a SARR without the capacity problems that plagued its original submission is incorrect.

We tested whether the new string program data produces overloaded sidings and yards using the same procedures reported in BNSF's reply evidence. Again, the material submitted by Xcel reveals overloadings of both types. Our analysis revealed that, during the two week "peak" period, there were 47 instances in which Xcel's data showed more trains on a siding than could fit on that siding.¹¹ Similarly, our analysis reveals that, even if Xcel's proposal that yard capacity can be augmented by allowing two trains to block the main line were accepted, Xcel Rebuttal at III-B-33, the string model continues to allow numerous instances where trains that

¹¹ *See* BNSF electronic work paper "Peak Period Overloading Analysis Rebut v1.xls."

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occupy the yard at Northport significantly exceed its capacity.¹² Xcel continues to misrepresent both that the string program actually tests for these problems and that any problems that may exist have been fixed.

¹² See BNSF electronic work paper “Trains at Northport Rebut.xls.” The “Example” worksheet of this file shows two specific instances in which the string program permitted 12 trains to occupy a yard that Xcel claims will hold up to 7 trains.

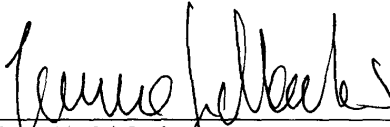
I, Karl M. Leopold, verify under penalty of perjury that the foregoing is true and correct.
Further, I certify that I am qualified and authorized to file this Verified Statement.

Executed on June 4, 2003


Karl M. Leopold

I, Terence J. Monks, verify under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this Verified Statement.

Executed on June 4 2003


Terence J. Monks

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