

**III-F Road Property
Investment**

III. F. ROAD PROPERTY INVESTMENT

On Opening, AEP Texas presented a feasible, least-cost design and road property investment costs for the TNR. On Reply, BNSF largely ignored the Board's precedents and developed an almost completely different set of investment costs based on its own design specifications. Moreover, BNSF has attempted to revisit well-settled issues, such as contingencies. For all of the reasons set forth in this Part, the Board should reject BNSF's grossly inflated investment costs and accept those presented by AEP Texas on Rebuttal, as shown in Table III-F-5 below and Exhibit III-F-14.

TABLE III-F-5				
TNR Road Property Investment Costs				
	<u>Item</u>	<u>AEP Texas Opening</u>	<u>BNSF Reply</u>	<u>AEP Texas Rebuttal</u>
1.	Land	\$ 89.0	\$326.9	\$89.5
2.	Roadbed Preparation	579.7	\$897.2	\$658.1
3.	Bridges	29.7	\$196.3	\$167.5
4.	Culverts	1,079.7	\$34.5	\$26.5
5.	Track Construction	167.5	\$1,039.7	\$1050.5
6.	Signals and Communications	121.9	\$155.3	\$173.3
7.	Buildings and Facilities	32.5	\$69.7	\$59.6
8.	Public Improvements	12.2	\$76.4	\$15.5
9.	Subtotal	\$ 2,112.2	\$2,796.0	\$2240.5
10.	Test Borings and Soil Investigation	1.4		\$2.0
11.	Mobilization	9.4	\$59.3	\$51.6
12.	Engineering	137.6	\$360.1	\$215.1
13.	Contingency	202.3	\$493.8	\$215.1
14.	TOTAL CONSTRUCTION COSTS	\$ 2,462.9	\$3,709.2	\$2724.4

1. Land

On Opening AEP Texas determined that the acquisition cost of the 13,111 acres of right-of-way for the TNR would total \$88.3 million; the 755 acres of easements would total \$49,000; the 273 acres for yards would total \$944,000; and the 61.5 acres for radio tower pad sites would total \$188,001. Total land acquisition costs as set forth by AEP Texas on Opening equaled \$89.5 million. On Reply, BNSF asserts that the TNR's total land acquisition costs are \$326.9 million. As is demonstrated below, BNSF has wrongly attacked AEP Texas' solid methodology while asserting an approach that does not withstand scrutiny.¹

a. BNSF's Approach Leads to a Highly Skewed Result

BNSF's real estate expert, Arnold Tesh, did not perform any independent research when preparing his Reply analysis of the TNR's land acquisition costs. *See* BNSF Reply at III.F-4. Rather, Mr. Tesh relied on AEP Texas' research in reaching a land acquisition estimate. Generally, Mr. Tesh concurred with Thorne, accepting AEP Texas' real estate expert, Mr. Thorne's acreages and division of the TNR's right-of-way ("ROW") into sections for land valuation purposes.² Nevertheless, Mr. Tesh concludes

¹ *See* generally AEP Texas Reb. Exhibit III-F-15 and supporting electronic workpaper files "III_F_1_Denver_Sales.xls," "Methodology_Comparative_Testing.xls," and "TNR_County_Dollars.xls." Exhibit III-F-15 in AEP Texas Witness Thorne's response to BNSF Witness Tesh's testimony.

² Mr. Tesh did slightly modify the yard acreage and easements, though it is unclear from BNSF's evidence why he did so.

that the TNR's land will cost upwards of \$326 million, over \$237 million more than AEP Texas' opening number. BNSF's \$326 million estimate is unsupportable.

Mr. Tesh's approach is fundamentally flawed because it applies a simple average approach in analyzing the data. The problem with the simple average approach is that it attempts to describe a *typical* occurrence. *See* AEP Texas Reb. Exhibit III-F-15 at p. 8. Knowing the average value is only useful if the values that one is measuring tend to cluster around that average. *Id.* While it may have been possible to clean up the raw data and end up with a set of numbers clustered around an average, Mr. Tesh made no attempt to do so. Mr. Tesh's approach also fails to weigh costs by considering the amount of property sold in each transaction. The result is widely varying numbers and a meaningless average.

Feasible alternatives to determining land costs include the weighted average and quartile approaches. Under the weighted average approach, the database is culled for anomalous sales. Items which are clearly too high or too low are either adjusted or removed. Finally, the sum of all sale prices in the list is divided by the sum of all of the land area purchased. *See* AEP Texas Reb. Exhibit III-F-15 at p. 11.

The quartile approach is the method AEP Texas' Witness Thorne utilized on Opening. It is adept at dealing with atypical data points. Under the quartile approach, the data set is reordered and divided into three quartiles. *See* AEP Texas Reb. Workpapers Vol. 2, pp. 00764. The first quartile number is a value such that 25% of the

values of the variable fall below that value. The middle quartile number represents the median. The upper quartile number is a value such that 75% of the values of the variable fall below that value. *Id.* By design, the quartile approach discounts values which fall at the bottom and top of a range, which in all likelihood are anomalous sales.

Another problem with Mr. Tesh's land cost analysis is that he utilized raw data without any modifications to clean up obvious errors. On Opening, Mr. Thorne provided all of his collected data, raw or otherwise. The database utilized by Mr. Tesh on Reply was from AEP Texas' raw data, consisting of all of the comparables collected. Within this database, the data was not cleaned up or edited to account for any errors or anomalies. Nevertheless, it appears that Mr. Tesh utilized the data without modification and performed simple average calculations to develop BNSF's estimate of land acquisition costs. This approach led to a highly flawed result for several reasons. First, the database contained errors which needed to be addressed in order to produce an accurate result. Second, the simple average approach is not appropriate for handling data containing widely varying numbers. As stated above, the simple average approach is only useful if the values one is measuring tend to cluster around the average. Third, failure to account for the amount of land per transaction puts each unit price on equal footing and skews the result.

The land comparables database submitted by AEP Texas Witness Thorne on Opening was originally compiled by extracting the relevant sales from First American, a

vendor that supplies sales data over the Internet. *See* AEP Texas Reb. Exhibit III-F-15 at p. 3. The information in the resulting database was then organized by zoning code and used to develop the cost of the ROW. Mr. Thorne utilized the quartile approach, which by design does not require an entry-by-entry analysis of the data in order to produce an accurate result. This approach is favored in large-scale property acquisitions analyses because of the challenges involved in interpreting large amounts of data. The quartile approach handles anomalies in the data without the need to specifically, alter or extract those items.

Other mathematical approaches may also be used to analyze AEP Texas' database. However, use of other methods increases the need to carefully analyze the data in the database. Frequently, errors emerge in the data, having occurred when the data was initially entered by the maintaining entity or through some error in transmission. *See* AEP Texas Reb. Exhibit III-F-15 at p. 4. The most obvious of the errors are easily fixed by eliminating or modifying those items. In addition, specious and non-arms-length sales should be removed.

b. **BNSF's Criticisms of AEP Texas' Land Evidence Are Unfounded**

On Reply, Witness Tesh offers several unsupported criticisms of AEP Texas' land evidence and cost. For instance, Mr. Tesh criticizes the size of Mr. Thorne's valuation units. *See* BNSF Reply at III.F-4. Given Mr. Tesh's lack of independent knowledge, such criticism is unwarranted. In a typical appraisal, the length of valuation

units (“val sections”) is based on the appraiser’s judgment after physical inspection of the right-of-way. Mr. Thorne inspected much of the TNR ROW; Mr. Tesh did not. *See* BNSF Reply at III.F-4. Mr. Thorne determined through inspection that in the rural areas where the ROW penetrates deserts, mesas, and large expanses of wasteland, land prices are affected by grazing capacities. *See* AEP Texas Reb. Exhibit III-F-15 at p. 2. In such areas, very long val sections are appropriate. However, in the urban areas such as Denver, Colorado Springs, and Pueblo, val sections were shorter based on zoning transitions or a determination (based on inspection) that land use changed. *See* AEP Texas Reb. Exhibit III-F-15 at p. 2. These are the guidelines that Mr. Thorne followed. Without a physical inspection, it would be impossible to make these assessments or to legitimately criticize an appraiser who has.

Mr. Tesh criticizes the dates of Mr. Thorne’s sale comparables. Though the specific criticism is unclear, it should be noted that it is common practice to use sales which bridge the critical date to support pricing opinions. Appraisers have the latitude to go both forward (using historic sales) and backward (using sales after the appraisal date) to develop an opinion. *See* AEP Texas Reb. Exhibit III-F-15 at p. 2.

A further unfounded criticism by Mr. Tesh involves Mr. Thorne’s methodology. BNSF takes issue with the fact that Mr. Thorne did not use the exact same mathematical approach throughout the TNR system. BNSF Reply at III.F-4. However, as the type and amount of data available throughout the system varies, alterations in

mathematical approach are both necessary and prudent. In the areas located in non-disclosure states, sale data was obtained from whatever sources were available, such as appraisers, brokers, and assessors. With such a limited universe of data, prices were developed as best as possible from the information attained. In Colorado, on the other hand, a more sophisticated approach to the right-of-way pricing was appropriate and possible. As Colorado is a disclosure state, more data was available to support the TNR's val section pricing opinions. Simply put, the availability of data in Colorado, combined with the higher priced land located in that state, justified a far greater level of detail than the less expensive rural areas.

Mr. Tesh's application of an assemblage premium to land being acquired to create a rail corridor is likewise inappropriate. It is well established that assemblage premiums are not applied in the SAC setting:

[A]bsent evidence that an assemblage premium was incurred when the existing railroad was constructed, the inclusion of an assemblage premium in the price of the stand-alone railroad would pay for land creates a barrier-to-entry.

Docket No. 42022, *FMC Wyoming Corp. v. Union Pacific R.R.*, (S.T.B. served May 12, 2000) at 114. *See also West Texas Utilities*, 1 S.T.B. at 670-71; *Burlington N. R.R. v. STB*, 114 F.3d at 214. Considering an assemblage premium as a factor in the SAC analysis is clearly inappropriate. While it appears that Mr. Tesh did not include an actual corridor premium (*see* AEP Texas Reb. Exhibit III-F-15 at p. 11), his use of the highly

inappropriate simple average may be an attempt to artificially increase the value to reflect such a premium.

Mr. Tesh further claims that Mr. Thorne failed to conduct a meaningful appraisal that evaluated the characteristics of the ROW along the proposed route and matched those characteristics with comparable sales information. *See* BNSF Reply at III.F-5. This is simply inaccurate. Unlike Mr. Tesh, Mr. Thorne completed a very thorough and accurate analysis of the TNR land acquisition costs. Research was begun by physically inspecting the ROW and surrounding areas. *See* AEP Texas Op. at III-F-8 to 9. Sales were then gathered of properties similar to the ROW. A database of these sales was organized and analyzed to develop the land acquisition cost for the SARR.

c. AEP Texas' Approach is Supported by the Research and Withstands Scrutiny Under Other Methodologies

AEP Texas Witness Thorne inspected the TNR's route and conducted extensive research to develop comparables. His thoroughness is evident by the materials submitted in AEP Texas' Opening evidence. *See* AEP Texas Op. at III-F-2 to 13. As the area in and around Denver elicited the most data and generally has the most valuable land on the entire TNR system, Mr. Thorne took a particularly detailed approach to analyzing this data.

On Reply, Mr. Tesh made only minor validity adjustments to the vast majority of the land for the TNR system. In fact, the difference between BNSF's Reply and AEP Texas' Opening numbers in the non-Denver areas amounts to only \$503,760.

See AEP Texas Reb. Exhibit III-F-15 at p. 1 and AEP Texas Reb. electronic workpaper file “TNR_County_Dollars,” tab “Sans_Denver.” Since the largest discrepancy involves the cost of the land in and around Denver, AEP Texas has focused on this area on Rebuttal.

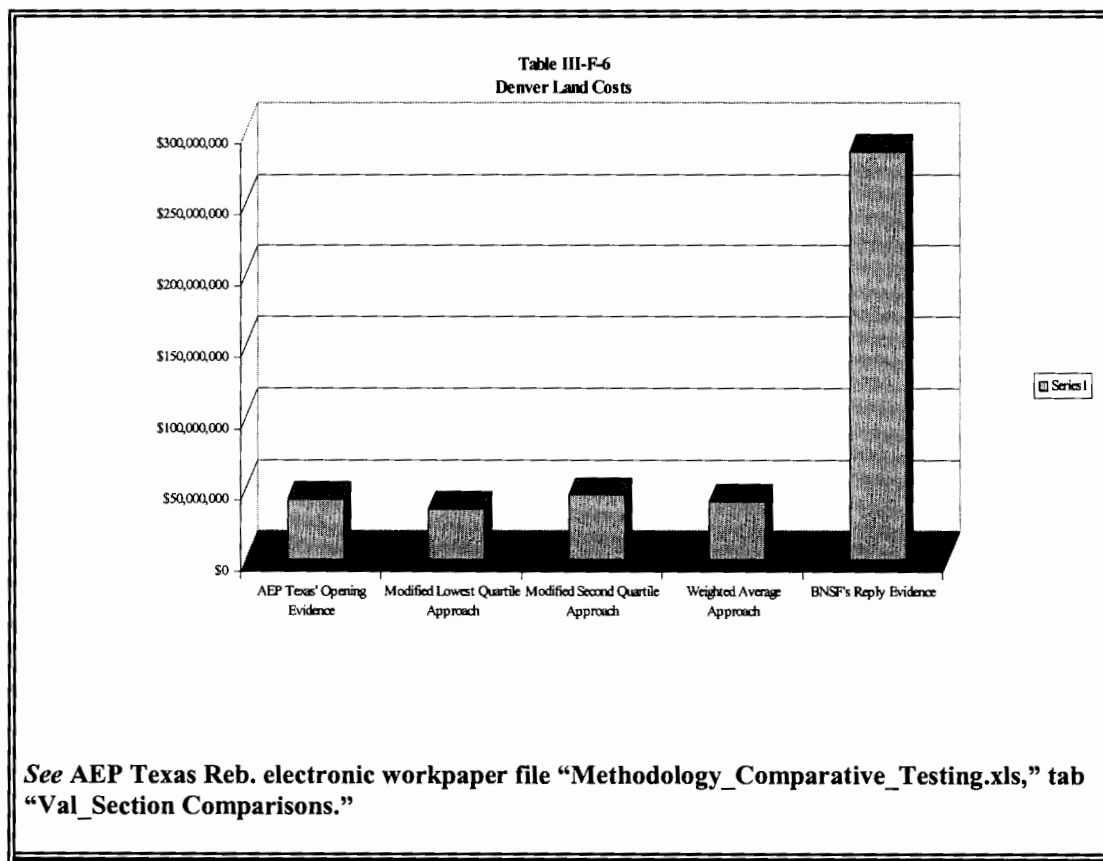
On Opening, AEP Texas used the lower quartile amount taken from the raw land prices consistent with the concept of the lowest cost and most efficient railroad. Even so, the lower quartile results are consistent with several other appropriate approaches to land valuation. On Rebuttal, Mr. Thorne culled the anomalous sales from the Denver data and extracted the first and second quartiles and applied the weighted average approach. Regardless of the approach used, the result was essentially the same as AEP Texas’ Opening number.

First, under the quartile approach, data was divided into three groups containing substantially equal numbers of observations. *See* AEP Texas Reb. Exhibit III-F-15 at p. 9. The first quartile number is the data value a quarter of the way up through the ordered data set; the second quartile number is equal to the median; and the upper quartile number is the data value a quarter of the way down through the ordered data set. *See* AEP Texas Reb. Exhibit III-F-15 at p. 9. Observations were broken into divisions and compared to the total sample. Use of the quartile approach is particularly credible when widely divergent data points are present in a list of samples. The interquartile

distribution is not affected by extremes in the sample. *See* AEP Texas Reb. Exhibit III-F-15 at p. 9 and AEP Texas Reb. Workpapers Vol. 2, p. 00723.

Thorne also applied the weighted average approach to the data. The weighted average approach takes into account the proportional relevance of each component, rather than treating each component equally. *See* AEP Texas Reb. Exhibit III-F-15 at p. 10.

A comparison of the valuation approaches used by Mr. Thorne and Mr. Tesh for the TNR's land in the Denver area is shown in Table III-F-6 below.



As Table III-F-6 demonstrates, BNSF's approach leads to a very skewed result. Even if the Board were to rely on the tried and true weighted average approach instead of AEP Texas' Opening quartile analysis, the result in the Denver area only amounts to \$40,883,160 – not anywhere near BNSF's \$286,318,909. Thus, the cost for the Denver area ranges from a low of \$36,000,835, under the modified lowest quartile approach, to a high of \$45,830,189, under the modified second quartile approach. AEP Texas' opening number of \$42,641,332 falls in the middle of this range along with the weighted average number quoted above. Accordingly, AEP Texas stands by its opening number for land acquisition costs.

2. Roadbed Preparation

Roadbed preparation costs for the TNR include costs for clearing and grubbing, earthwork, water for compaction, retaining walls, rip rap and many other smaller cost items. Roadbed preparation costs were discussed by AEP Texas at pages III-F-13 to 56 of its Opening Narrative and by BNSF at pages III.F-9 to 83 of its Reply.

On Opening, AEP Texas included \$632.4 million for roadbed preparation, including \$29.6 million for culverts and \$20.6 million for yard drainage, paving, lighting and fencing. AEP Texas Op. at III-F-17. BNSF included \$931.9 million, including \$34.7 million for culverts and \$24.0 million for yard drainage, paving, lighting and fencing, or nearly 50% higher than AEP Texas' amount. BNSF Reply at III.F-3, 83. As discussed *infra*, BNSF has significantly overstated roadbed preparation costs by: (1) overstating the

unit costs for earthwork through the selection of costlier equipment and the addition of unnecessary tasks associated with earthmoving; (2) overstating the cost for water for compaction; (3) including costs for unnecessary items such as yard seeding, stripping, undercutting, fine grading and construction lighting; (4) overstating the costs for detour roads during the TNR's construction; and (5) overstating the costs for many other items including land for waste quantities, retaining walls, and yard drainage. Virtually none of BNSF's presentation is based on evidence of construction costs from actual railroad projects or practices. Rather, BNSF's proposed costs are based largely on references to its own "standard" specifications and mere assertions that are either not applicable to the TNR or that refer to unnecessary cost items.

Table III-F-7 below compares AEP Texas' Opening, BNSF's Reply and AEP Texas' Rebuttal investment costs for roadbed preparation for the TNR.

TABLE III-F-7
Comparison of TNR Estimated Roadbed Preparation Investment -
AEP Texas Opening, BNSF Reply and AEP Texas Rebuttal - 3Q00
(\$ in millions)

<u>Item</u> (1)	<u>AEP Texas</u> <u>Opening</u> (2)	<u>BNSF</u> <u>Reply</u> (3)	<u>AEP Texas</u> <u>Rebuttal 1/</u> (4)	<u>BNSF</u> <u>Overstatement 2/</u> (5)
1. Clearing	\$1.48	\$1.30	\$1.49	\$ (0.19)
2. Grubbing	0.84	0.82	0.84	(0.02)
3. Stripping	0.00	3.64	0.00	3.64
4. Undercutting	0.00	34.76	0.00	34.76
5. Earthwork				
a. Line Segments	546.97	737.81	620.74	117.07
b. Yards	3.73	3.79	4.40	(0.61)
6. Amarillo Connection	0.00 <u>3/</u>	1.50	1.50	0.00
7. Alliance Demolition	0.00	0.81	0.00	0.81
8. Construction Lighting	0.00	8.73	0.00	8.73
9. Fine Grading	0.00	19.88	0.00	19.88
10. Lateral Drainage	0.15	0.15	0.15	0.00
11. Yard Drainage, Paving, Lighting and Fencing	20.60	24.00	23.24 <u>4/</u>	0.76
12. Culverts	29.66	34.71	26.48 <u>5/</u>	8.23
13. Retaining Walls	5.10	10.29	5.11	5.18
14. Rip Rap	4.56	4.54	4.56	(0.02)
15. Relocation of Utilities	1.82	2.48	1.81	0.67
16. Topsoil Placement / Seeding	1.49	6.97	1.48	5.49
17. Water for Compaction	10.75	12.73	10.91	1.82
18. Road Surfacing (for detours)	4.45	19.49	4.27	15.22
19. Construction Access Roads/ Staging Areas	0.00	1.70	0.00	1.70
20. Environmental Compliance	0.70	1.60	0.69	0.91
21. Land for Waste Quantities	<u>0.14</u>	<u>0.16</u>	<u>0.15</u>	<u>0.01</u>
22. Total	\$632.44	\$931.86	\$707.82	\$224.04

1/ See AEP Texas Reb. electronic workpaper file "TNR Grading Rebuttal.xls" except where noted.

2/ Column (3) - Column (4)

3/ Costs were included in all applicable areas on Opening.

4/ See AEP Texas Reb. electronic workpaper file "building sites.xls."

5/ See AEP Texas Reb. electronic workpaper file "TNR Culvert.xls."

Each of the components of roadbed preparation detailed in the above table are discussed below.

a. Clearing, Grubbing, Stripping, and Undercutting

i. Clearing and Grubbing

On Opening, AEP Texas included \$1.48 million for clearing the TNR right-of-way. AEP Texas applied two different unit costs for clearing: one unit cost for acres cleared that required grubbing and one unit cost for acres that only required clearing with no grubbing. The acres of clearing and grubbing were developed from the ICC's Engineering Reports and other valuation documents. *See* AEP Texas Op. at III-F-18 to 21.

On Reply, BNSF included \$1.30 million for clearing. BNSF disputed, in part, AEP Texas' quantities and unit costs. The disparity in investment of \$0.18 million is caused by differences in: (1) route miles; (2) additional siding/main track miles; (3) yard track miles; and (4) application of unit costs. Each of these differences is discussed below.

As discussed in Part III-B-2, *supra*, BNSF has understated the TNR's route miles, overstated the TNR's additional track (second main, passing sidings and set out tracks) and understated the TNR's yard track requirements. BNSF also understated its route miles for clearing by failing to include some of the route miles for the Crawford realignment and a portion of the Harrington spur. Finally, BNSF understated the

additional track miles of the TNR for clearing by failing to include its trackage with 25-foot track centers.

BNSF does make one mileage adjustment that AEP Texas has accepted on Rebuttal. On Reply, BNSF included the actual cost for the Amarillo Connection track and removed this 1.05 miles from its calculation of all roadbed preparation cost items. On Rebuttal, AEP Texas has adopted the same approach. This modification results in minor reductions in the calculated costs for clearing, grubbing, earthwork, lateral drainage, retaining walls, rip rap, road surfacing for detours, relocation of utilities, seeding/placing topsoil, environmental compliance and land for waste quantities.

The difference in unit cost application accounts for the majority of the difference in clearing costs. On Opening, AEP Texas used a unit cost of \$4,063.22 per acre (cut and chip medium, trees to 12" in diameter) from the 2000 Means Handbook for acres of clearing that required grubbing. For acres that did not require grubbing, AEP Texas used a clearing unit cost of \$181.65 per acre (clearing with dozer and brush rake, medium brush to 4" diameter). *See* AEP Texas Op. at III-F-20 to 21, Exhibit III-F-5 and electronic workpaper file "TNR GRADING.xls," tab "IIIF Unit Costs." On Reply, BNSF accepted AEP Texas' unit cost for clearing those acres which required grubbing; the minor difference of \$0.43 per acre (\$4,062.79 for BNSF vs. \$4,063.22 for AEP Texas) is caused by the impact of the slightly different route miles on the weighted average location factor. The minor change in route miles used by AEP Texas on Rebuttal results in

agreement with BNSF on the unit cost of \$4,062.79 per acre for clearing for those acres requiring grubbing.

The primary difference in clearing costs is caused by BNSF's rejection of AEP Texas' unit cost of \$181.65 per acre for clearing applied to those acres that do not require grubbing. BNSF claims that AEP Texas' unit cost "does not include any cost for removal and hauling of brush pile for disposal." BNSF Reply at III.F-11. BNSF has not provided any evidence that brush piles need to be removed and hauled away for disposal. The TNR is purchasing a 100-foot right-of-way which is more than adequate to accommodate its tracks. There is no reason why the brush piles generated from the limited clearing of the right-of-way could not be piled along the edge of the right-of-way and allowed to decompose naturally.

BNSF proposes to exclude any clearing cost for the acres that do not require grubbing, claiming that this task is included in its stripping costs. As discussed *infra*, AEP Texas disagrees with BNSF's inclusion of stripping costs.

On Rebuttal, AEP Texas continues to rely on its Opening methodology and unit costs from the 2000 Means Handbook (with a revised location factor adjustment) applied to the slightly increased number of acres (to reflect AEP Texas' modest increase in track miles on Rebuttal), resulting in costs of \$1.49 million for clearing. See Exhibit III-F-16.

ii. Grubbing

On Opening, AEP Texas included \$0.84 million for grubbing. AEP Texas' costs for grubbing were based on quantities developed from the ICC Engineering Reports and other ICC Valuation documents and a unit cost from the 2000 Means Handbook. *See* AEP Texas Op. at III-F-118 to 21 and Op. electronic workpaper file "TNR GRADING.xls," tab "IIIF Unit Costs."

On Reply, BNSF included \$0.82 million for grubbing. BNSF agreed with AEP Texas' quantity calculation methodology and AEP Texas' unit cost (adjusted by the slight difference in the location factor). *See* BNSF Reply at III.F-11.

As the change in route miles results in AEP Texas' unit cost equalling BNSF's unit cost, the difference between AEP Texas' and BNSF's total grubbing cost is caused by the same differences in route and track miles noted in the clearing discussion in the prior section: BNSF's (1) understated route miles; (2) overstated additional track; (3) understated yard track; (4) omission of route miles from the Crawford realignment and a portion of the Harrington spur; and (5) omission of the additional track spaced at 25-foot track centers.

On Rebuttal, AEP Texas has included \$0.84 million for grubbing using the same procedures as on Opening to develop quantities and the revised unit cost based on the revised location factor adjustment. *See* AEP Texas' Reb. electronic workpaper file "TNR Grading Rebuttal.xls," tab "IIIF_16 Othr EW."

iii. Stripping

On Opening, AEP Texas did not include a separate cost for stripping. On Reply, BNSF has included an additional \$3.64 million in earthwork costs to “strip” the top six inches of ground in embankment areas of the TNR route. BNSF’s approach makes several assumptions as to why a separate cost item is warranted, none of which are persuasive.

First, BNSF argues that its current construction standards and AREMA call for stripping. BNSF Reply at III.F-12. However, BNSF implies that the need for stripping is limited to circumstances in which failure to remove the topsoil will create a “weak zone.” *Id.* at III.F-12 and n.6. BNSF has not offered any evidence that the TNR line would be prone to such weak zones. Consequently, BNSF has not demonstrated any need for stripping.

Second, BNSF argues that AEP Texas probably did not include any stripping costs because the ICC Engineering Reports do not contain any separate line item for this activity. *Id.* at III-F.12. At the same time, however, BNSF does not offer any suggestion that the ICC Engineering Reports do not already capture the complete amount of earthmoving or clearing required. In other words, BNSF suggests that perhaps the ICC Engineering Reports are missing an important quantity of earthwork, but it does not demonstrate that point. BNSF did not even suggest that all the unsuitable material was not removed during the excavation process when the lines being replicated by the TNR

were originally constructed. Therefore, the ICC Engineering Report and Orin Line quantities already reflect the removal of unsuitable material.

Third, BNSF argues that all of its projects require stripping. *See* BNSF Reply at III.F-12 to 13. Yet, BNSF also notes that stripping is not included as a separate line item, but is done at the direction of the engineer and compensated for at regular earthwork prices. Thus, BNSF's stripping quantity calculations are erroneous. Moreover, BNSF has assumed that all of the TNR's roadbed will be stripped. Yet, the AREMA specifications cited by BNSF (Reply at III.F-12) only require removal of material "Where designated by the engineer. . . ." *See* BNSF Reply Work paper Vol. IV, p. III.F-0195. BNSF has not provided any evidence of any such designations along the TNR's route. Furthermore, the AREMA specifications state that stripping in areas of fills is confined to areas where the fill height is four feet or less. *Id.* BNSF's stripping quantity calculations are based on all fills; BNSF did not exclude those fills with a fill height greater than four feet. *See* BNSF Reply electronic workpaper file "III F 2 TNR Grading.xls," tab "IIIF_12 EW Cost," Column R. Finally, excavation, by definition, entails removal of earth which includes the top six inches of material. Moreover, an estimated 30% of the excavated material will be wasted (which would include any unsuitable material). Indeed, BNSF even admits this point by noting that "[s]tripping is grading out unsuitable materials. . . ." *See* BNSF Reply at III.F-12 n.7. Therefore, applying an additional cost to these same excavation quantities results in a double count of costs.

Finally, BNSF argues that stripping should be calculated separately because Means has a category for stripping, and, therefore, it is “beyond the scope” of what is provided for in the unit costs associated with other earthwork categories such as common earth. BNSF’s logic leap on this point is unfounded. First, BNSF offers no evidence on what the scope of the other functions is, nor does BNSF suggest that the quantities of earthwork already covered in AEP Texas’ clearing, common earth, loose rock and solid rock excavation quantities are not inclusive of any “stripping” quantities that might be required (which BNSF has not shown are necessary in any event).

BNSF’s stripping arguments are without merit. BNSF has not demonstrated that stripping is needed at any location on the TNR system, nor has BNSF demonstrated that its stripping quantities would not be a double count of the earthmoving and clearing quantities which AEP Texas has included elsewhere. Finally, BNSF has already conceded that the clearing function that AEP Texas specified has the same impact as stripping. AEP Texas has included all the quantities (the top six inches of material), performed all the tasks (removal and wasting of unsuitable material) and applied the relevant costs. BNSF’s inclusion of costs for stripping is, therefore, a straightforward case of double counting investment expense for the TNR.

iv. Undercutting

On Opening, AEP Texas did not include a separate cost for undercutting. On Reply, BNSF included \$34.8 million for undercutting of the TNR’s roadbed Reply at

III.F-13 to 15) – an activity which the Board has repeatedly rejected. *See Duke/NS* at 95; *Carolina* at 82; *Duke/CSXT* at 80. Moreover, BNSF did not even raise undercutting as an issue in the *PSCo/Xcel* case, even though the SARR in that case and the TNR share some common line segments. *PSCo/Xcel* at 15, 89. Still, BNSF argues that five percent of the roadbed needs undercutting (including areas of solid rock), yet it has not offered any specific analysis justifying this activity anywhere on the lines the TNR is replicating, other than a self-serving two-page memo that suggests that five to ten percent of the route might have unsuitable materials. However, that analysis does not include even one example of where this activity would be required. *See BNSF Reply Workpapers Vol. IV*, pp. III.F-0200-01. Rather, BNSF simply performs the mathematical calculation of multiplying its unsupported five percent times the sum of the common, loose rock and solid rock excavation quantities it developed for the TNR. *See BNSF Reply electronic workpaper file “III F 2 TNR Grading.xls,”* tab “IIIF_12 EW Cost,” Cells K59, L59 and M59. In addition, BNSF's memo also states that “it is not uncommon to have a contingency amount to cover undercutting of unsuitable soils during construction.” *See BNSF Reply Workpaper Vol. IV*, p. III.F-0201. AEP Texas has included a sizeable contingency amount in its investment base (as has BNSF). To the extent that any additional undercutting is deemed necessary (over and above any undercutting already reflected in the ICC Engineering Report or Orin Line earthwork quantities), the TNR would draw on its contingency fund. BNSF's inclusion of speculative costs not only

overstates the construction costs of the TNR, it also increases the base investment against which the contingency and engineering additives are applied, causing an even greater overstatement in construction costs.

Not only is BNSF's position unsupported by any analysis, the ICC Engineering Reports and Orin Line documents give no indication that undercutting was required for the lines being replicated by the TNR. If undercutting were necessary, however, it is logical to assume, absent supporting documentation stating otherwise (which the BNSF has not provided), that all excavation quantities, including any undercutting, were captured in the earthwork quantities contained in the ICC Engineering Reports and Orin Line construction documents. In addition, any unsuitable material uncovered during the excavation process would be disposed of as part of the 30 percent waste material.

BNSF's undercutting claims are also inconsistent with its position elsewhere that excavation must be performed with heavier equipment than was provided by AEP Texas because the material is difficult to excavate, indicating that the material is stable and well-suited for a roadbed. Yet, BNSF argues for undercutting on the premise that the material is unsuitable for a roadbed, even going so far as to undercut solid rock.

Simply put, the material encountered during the construction of the TNR will for the most part be sufficiently sound for roadbed construction. In particular, AEP Texas' engineering experts have reviewed the soils maps for the TNR route. *See* AEP

Texas Reb. Electronic workpaper file “soil map.jpg.” The soils taxonomy map of the states of Wyoming, South Dakota, Nebraska, Colorado, Oklahoma and Texas demonstrates the soundness of the potential roadbed.

BNSF’s unsupported assertions with respect to undercutting constitute yet another example of its persistent efforts to artificially raise the TNR’s construction costs. The Board should reject BNSF’s unsupported undercutting costs.

b. Earthwork

**i. Earthwork Quantities for TNR Line
Segments for Which Engineering Reports Exist**

BNSF accepted AEP Texas’ use of the ICC Engineering Reports as the basis for developing the earthwork quantities for most of the TNR line segments. *See* BNSF Reply at III.F-30. However, on Opening, AEP Texas used 15-foot track centers for adjacent main line track on the entire TNR route. BNSF agrees in general with this approach, but it chose to use 25-foot track centers for adjacent main line track in places where it has that track-center spacing today. *See* BNSF Reply at III.F-16. BNSF’s sole reason for this exception is to “provide the same level of service” that it does today. *Id.* BNSF’s argument is unexplained and without merit.

In particular, BNSF offers no explanation as to why its customers are better-served with 25-foot track centers. In fact, AEP Texas submitted a workpaper request asking BNSF to support its assertion that 25-foot track centers were needed to adequately serve the TNR’s customers and BNSF provided no support. *See* AEP Texas

Reb. Workpapers Vol. III, pp. 00801-04. Moreover, the workpapers that BNSF rely on indicate that many of the busiest corridors being replicated by the TNR have 15-foot track centers for adjacent main tracks. *See, e.g.*, BNSF Reply Workpaper Vol. IV, p. III.F-0203, AFE A-97-0330 where a new double track segment at Campbell, WY was set on 15-foot track centers. To be sure, some parts of the BNSF lines the TNR is replicating currently have 25-foot track centers, but that is clearly not a requirement. Otherwise, BNSF would presumably have 25-foot track centers everywhere. As BNSF has not supported the need for 25-foot track centers, AEP Texas continues to use its 15-foot track centers for adjacent main tracks.

ii. Earthwork Quantities for Segments Not Covered by The ICC Engineering Reports

(a) Donkey Creek to South Logan, WY

On Opening, AEP Texas relied on publicly available earthwork data for the BNSF's Orin Line to develop the earthwork requirements for the Donkey Creek to South Logan, WY section of the TNR. AEP Texas used a 28-foot roadbed width between Donkey Creek and Converse Junction, WY, and a 24-foot roadbed width between Converse Junction and South Logan. *See* AEP Texas Op. at III-F-27 to 28 and Op. electronic workpaper file "TNR Grading.xls."

On Reply, BNSF accepted AEP Texas' use of the Orin Line data but took issue with the 24-foot roadbed width between Converse Junction and South Logan. BNSF claimed that the roadbed width needed to be 28 feet because this segment was

actually built with a 28-foot roadbed width and “AEP Texas has not demonstrated that the soils along these lines could support the anticipated traffic volumes on a smaller, 24-foot roadbed. . . .” *See* BNSF Reply at III.F-17. BNSF’s justifications for its 28-foot roadbed width are incorrect for at least two reasons.

First, AEP Texas is not required to build the TNR in the exact same manner as the existing BNSF. AEP Texas has only to construct what is feasible. A 24-foot roadbed has been accepted by the Board in numerous prior proceedings and has, in fact, been accepted in this proceeding by BNSF for a majority of the TNR. BNSF has provided no evidence that a 24-foot roadbed width is insufficient nor has it provided any evidence that the soil conditions necessitate a 28-foot roadbed width. AEP Texas requested the workpapers supporting BNSF’s contention that the “soils along these lines” necessitated a 28-foot roadbed width. BNSF’s only response was that the line was actually built with a 28-foot roadbed width; it provided nothing further. *See* AEP Texas Reb. Workpaper Vol. 3, p. 00803. This response in no way supports BNSF’s contention.

Second, the Converse Junction to South Logan segment is the lightest density segment of the TNR with only 13.5 million net tons in the peak year (2020). *See* AEP Texas Op. electronic workpaper file “SpotMaint.xls,” tab “Density.” Yet, BNSF accepted a 24-foot roadbed width for the TNR segment between Alliance and Northport, NE, which has a density of 59.3 million net tons in the TNR’s peak year, *over four times higher* than the Converse to South Logan density. *Id.* Since BNSF agrees with AEP

Texas that a 24-foot roadbed width is sufficient to handle a density of nearly 60 million net tons, there is no argument that it is insufficient for a segment with a density of less than 25% of that.

In light of the above, AEP Texas continues to use its Opening earthwork quantities for the Converse Junction to South Logan segment of the TNR.

(b) Eagle Butte Jct. to Campbell, WY

On Opening, AEP Texas relied on the publicly available earthwork data for the BNSF's Orin Line to develop the earthwork requirements for the Eagle Butte Jct. to Campbell line of the TNR. AEP Texas used the Orin Line quantity for this segment (adjusted to reflect a 24-foot roadbed width) because BNSF did not provide any earthwork information for this line segment in discovery. *See* AEP Texas Op. at III-F-28 to 29.

On Reply, BNSF stated that there was no need to use the Orin Line quantities for this segment "because the actual build quantities for this line are available from BNSF's records." *See* BNSF Reply at III.F-18. Furthermore, BNSF developed earthwork quantities for this segment based on a 28-foot roadbed width. BNSF's Reply calculations are improper for two reasons.

First, there is no need for the roadbed width to be 28-feet for this segment. In the peak year 2020, this segment has a density of 53.3 million net tons. As this volume is less than that of the Alliance to Northport segment for which the BNSF accepted a 24-

foot roadbed width, discussed *supra*, the 24-foot roadbed width specified by AEP Texas is sufficient.

Second, and more importantly, BNSF should have provided its Eagle Butte records in response to AEP Texas' discovery requests. In particular, Request For Production No. 73 clearly asked for all documents containing earthwork quantities in the states traversed by the TNR. *See* AEP Texas Reb. Workpapers Vol. 5, pp. 00772-74. Notwithstanding the relevance of the request, BNSF raised a temporal objection to the request, but then in its Reply it inexplicably utilized the very same records it refused to provide to AEP Texas. Withholding information in discovery and then relying on it in Reply is unquestionably inappropriate.

In fact, BNSF did the same thing in *PSCo/Xcel*. There, the Board rejected BNSF's use of the Eagle Butte branch construction documents on Reply when the information was not produced in discovery. *Id.* at 92 to 93. The Board should do the same in this case.

AEP Texas also notes that BNSF was well aware of the existence of this document when it responded to AEP Texas' discovery requests. In addition to using it in *PSCo/Xcel*, BNSF also produced it in discovery in the *Otter Tail* proceeding. In *Otter Tail*'s Public Version of its June 13, 2003 Opening Evidence Narrative, at page III-F-18, *Otter Tail* refers to BNSF's production of the Eagle Butte branch earthwork information. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 0776. AEP Texas' first set of document

requests, containing Request For Production No. 73 described above, were served on BNSF on August 26, 2003, over two months after Otter Tail's opening evidence and several months after BNSF produced the information to Otter Tail. Yet, despite this, BNSF failed to provide it to AEP Texas in discovery. Based on this, the Board must reject BNSF's Reply evidence as it did in *PSCo/Xcel* and rely on AEP Texas' evidence.³

(c) Reno to Black Thunder Jct., WY

On Opening, AEP Texas used the Orin Line per-mile quantities (based on a 24-foot roadbed width) for the Reno to Black Thunder Jct., WY segment of the TNR. *See* AEP Texas Op. at III-F-29.

On Reply, BNSF accepted AEP Texas' use of the Orin Line data but took issue with the 24-foot roadbed width. BNSF claimed that the roadbed width needed to be 28 feet because this segment was actually built with a 28-foot roadbed width and AEP Texas had made no demonstration that the soil could support a smaller, 24-foot roadbed. *See* BNSF Reply at III.F-17. BNSF's justification for its 28-foot roadbed width is incorrect.

As noted earlier, AEP Texas is not required to build the TNR in the exact same manner as the existing BNSF. A 24-foot roadbed has been accepted by the Board in numerous prior proceedings and has, in fact, been accepted in this proceeding by BNSF

³ Assuming *arguendo* that the Board decides to rely on BNSF's evidence, it must make the adjustment to the BNSF's earthwork quantities to reflect a 24-foot roadbed width for this line segment.

for a majority of the TNR. BNSF has provided no evidence that a 24-foot roadbed width is insufficient nor has it provided any evidence that the soil conditions necessitate a 28-foot roadbed width on the Reno Branch.

On Rebuttal, AEP Texas continues to use its Opening earthwork quantities for the Reno to Black Thunder Junction segment of the TNR.

**(d) North Wye Tracks for Antelope
and North Rochelle Mines**

On Opening, AEP Texas developed the earthwork requirements for the north wye track at Antelope Mine using Eagle Point engineering software and it used the Orin Line per-mile quantities (based on a 24-foot roadbed width) for the north wye track at North Rochelle Mine. *See* AEP Texas Op. at III-F-29.

On Reply, BNSF states that it accepted AEP Texas' quantities for both of these wye tracks. *See* BNSF Reply at III.F-18. However, a review of BNSF's electronic workpapers reveals that while BNSF did accept AEP Texas' quantities for Antelope, BNSF did not accept AEP Texas' quantities for North Rochelle. Specifically, BNSF used the Orin Line per-mile quantities it calculated based on a 28-foot roadbed width rather than AEP Texas' quantities based on a 24-foot roadbed width. *See* BNSF Reply electronic workpaper file "III F 2 TNR Grading.xls," tab "IIIF_10 CY Grad," cell F42. BNSF has not provided any reason as to why this mine spur must be constructed with a 28-foot roadbed width.

On Rebuttal, AEP Texas continues to use its Opening earthwork quantities for the north wye tracks at North Rochelle and Antelope.

(e) Amarillo Connection

On Opening, AEP Texas' engineering experts designed a direct connection between the Boise City Subdivision and the Red River Valley Subdivision at Amarillo, Texas (similar to a connection constructed by BNSF in 2003). AEP Texas' engineers developed the earthwork quantities for this segment using Eagle Point engineering software. *See* AEP Texas Op. at III-F-30. AEP Texas also included the mileage of this connection in its calculation of the costs for several other roadbed preparation items.

On Reply, BNSF rejected AEP Texas' earthwork calculations for this connection, instead relying on its actual costs of {

} *See* BNSF Reply

Workpapers Vol. IV, pp. III.F-0222-24.

On Rebuttal, AEP Texas accepts BNSF's \$1.5 million cost for the Amarillo connection. Accordingly, AEP Texas has removed the 1.05 miles of track for this connection from the calculations of earthwork, clearing, grubbing, lateral drainage, retaining walls, rip rap, road surfacing for detours, relocation of utilities, topsoil placement/seeding and environmental compliance.

(f) Arapahoe and Harrington Destination Spurs

On Opening, AEP Texas used the per-mile quantities from the adjacent valuation sections for the destination spurs to Arapahoe and Harrington. *See* AEP Texas Op. at III-F-30.

On Reply, BNSF accepted AEP Texas' quantities for the Arapahoe spur and the quantities for 4.26 miles of the 5.17 miles of the Harrington spur. As the TNR serves the Harrington plant from the north rather than from the south as BNSF does, a new 0.91-mile connection must be built to access the existing destination spur track. Rather than use the per-mile quantities for the adjacent valuation section, BNSF calculated the earthwork quantities using US Geological Survey maps. *See* BNSF Reply at III-F-19 to 21.

On Rebuttal, AEP Texas accepts BNSF's earthwork quantity calculations for the new 0.91-mile portion of the Harrington spur.

(g) Crawford Hill Line Change

On Opening, AEP Texas used the ICC Engineering Report quantities for the segment of the TNR traversing Crawford Hill in South Dakota. On Reply, BNSF incorporated earthwork information regarding a line change made in the area of Crawford Hill in the early 1980's to improve the operating efficiency of coal trains originating in the Powder River Basin. *See* BNSF Reply at III.F-21 to 22.

BNSF should have provided this information in response to AEP Texas' discovery requests. However, as the TNR benefits from this line change, including the reduction in mileage discussed in Part III-B-1 *supra*, on Rebuttal AEP Texas has accepted BNSF's earthwork quantities for this line segment. However, for the reasons discussed previously with regard to track centers, AEP Texas has calculated the earthwork quantities for the triple track in this area based on 15-foot track centers.

iii. Yard and Interchange Tracks

On Opening, AEP Texas calculated the yard and interchange track grading requirements based on an assumed average fill height of one foot and either 15-foot or 25-foot track centers depending on the track spacing specified by AEP Texas' operating witness, Mr. Reistrup. *See* AEP Texas Op. at III-F-31 to 33.

On Reply, BNSF accepted AEP Texas' methodology but adjusted the yard track quantities based on the yard track layouts specified by its witnesses. *See* BNSF Reply at III-F-22 to 23. BNSF also included \$0.8 million for the demolition of several buildings at Alliance, NE due to the TNR's "expansion of the Alliance Yard." *See* BNSF Reply at III.F-23.

AEP Texas has already addressed the differences in yard tracks in Part III-B, *supra*. BNSF's inclusion of demolition costs is inappropriate. These costs are a barrier to entry and, as such, should be excluded from the TNR's investment base. Buildings were not demolished to make room for Alliance Yard when it was built by BNSF. To the

contrary, buildings, and entire towns in some cases, were constructed around the railroad and its yards. Consequently, BNSF did not incur costs to demolish buildings and foundations. As BNSF did not incur these costs, the TNR should not be forced to incur them either.

On Rebuttal, AEP Texas has revised the TNR's Las Animas Yard configuration but not the Alliance yard configuration. Therefore, AEP Texas has revised its yard earthwork quantities based on the revisions to the Las Animas Yard configuration. *See* AEP Texas Reb. Exhibit III-B-18.

iv. Total Earthwork Quantities

The parties' total earthwork quantity differences are attributable to the items discussed above and minor differences in track miles. The total quantity differences are shown in Table III-F-8 below:

Table III-F-8
Comparison of Cubic Yards of Earthwork -
BNSF Reply v. AEP Texas Rebuttal

<u>Type</u>	<u>BNSF Reply</u>	<u>AEP Texas Rebuttal</u>	<u>BNSF Reply Over/(Under) AEP Texas Rebuttal</u>
(1)	(2)	(3)	(4)
A. Line Segments			
1. Common	34,605,540	32,539,127	2,066,413
2. Loose Rock	2,297,084	2,271,853	25,231
3. Solid Rock	4,809,494	4,584,204	225,290
4. Borrow	38,073,744	37,444,304	629,440
5. Subtotal	<u>79,785,861</u>	<u>76,839,487</u>	<u>2,946,374</u>
B. Yards			
6. Borrow	312,994	363,924	(50,930)

v. Earthwork Unit Costs

(a) Common Excavation

On Opening, AEP Texas employed a standard package of scrapers (assisted by a bulldozer), rollers and sheepsfoot machines for common excavation. AEP Texas' weighted cost for that activity was \$3.42 per CY. *See* AEP Texas Op. electronic workpaper file "TNR Earthwork Costs.xls," tab "Common Earth." AEP Texas' Opening equipment selections have been accepted in past SAC cases, such as *TMPA* (at 119) and the Eastern rate cases. BNSF offers little evidence to suggest that the Board's previous decisions were incorrectly decided; it merely suggests that a larger scraper would be better than the one proposed by AEP Texas.

(i) Scrapers

Despite the fact that AEP Texas' proposed equipment has been accepted in past cases, BNSF has taken issue with several elements of AEP Texas' proposal. BNSF first claims that the elevated scraper cannot excavate the materials in the TNR's territory and that it is the least versatile of the scrapers listed in Means. *See* BNSF Reply at III.F-30. This is the same argument BNSF recently raised in the *PSCo/Xcel* case, which the Board soundly rejected, and as demonstrated below, BNSF has not presented any additional arguments that warrant a change in the Board's approach.

BNSF's assumption appears to be predicated on the idea that the scraper cannot handle the material without the aid of a bulldozer to push it, stating that a scraper can "work alone" only with loose materials. *See* BNSF Reply at III.F-30. It then hints that the 11 CY scraper does not have a bulldozer assisting it. *Id.* at n.36. BNSF's innuendos aside, AEP Texas' scraper costs clearly include the cost of 25 percent (one-quarter) of a dozer, just as the BNSF's scraper cost does. *See* AEP Texas Op. electronic workpaper file "Const Crews SW67.jpg" and Opening electronic workpaper file "TNR Earthwork Costs.xls," tab "Common Earthwork." As such, even under BNSF's standard, AEP Texas' scraper is adequate to handle more than simply loose materials.

BNSF also suggests that elevating scrapers are traditionally used in smaller site preparation or agricultural applications, and are therefore unsuitable for general grading work (*i.e.*, a scraper is not versatile enough). *Id.* at III.F-31. Instead, BNSF

argues that the “primary choice” of contractors is the twin-engine scraper it selected. *Id.* BNSF’s assertions are without merit, as demonstrated *supra*. While it is true that an elevating scraper, *working alone*, might be somewhat more limited than the twin engine scraper, with the aid of a dozer, the elevating scraper can accomplish the same work as any other scraper due to the increased force. In addition, the Caterpillar web site cited by BNSF clearly states that the elevating scraper can be used for general earthmoving operations. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00832. Moreover, Means inclusion of the elevating scraper with a dozer in the excavating section shows that such activity is contemplated.

(ii) Scraper–Clay

BNSF also claims that 35 percent of the common excavation would involve removing clay at a higher cost than common excavation. BNSF bases this claim on two sentences that suggest its experts plotted the soil types on a map.⁴ However, BNSF has not supplied this map, nor has it indicated the source of its data for the soil types (the USGS maps that the route was allegedly plotted on do not include such soil data). BNSF ‘s witnesses also suggest that they observed certain clay soil types on an inspection trip, but it does not offer any specific percentages or soil samples to support its 35 percent clay assumption. Nor has BNSF suggested that its own projects in this area have required

⁴ BNSF suggests elsewhere that there are heavy clays in this territory. *See, e.g.* BNSF Reply at III.F-31n.38. However, no supporting evidence is present to back up this bald assertion.

additional costs to remove clay in such quantities (or indeed any quantities). In other words, BNSF's soil claims have no support whatsoever. As the Board noted in *PSCo/Xcel*, the proponent of a new or special cost must clearly demonstrate that the SARR would incur the cost, and BNSF has failed to demonstrate that here. *Id.* at 90.

By comparison, AEP Texas is the only party to include any soil-related data. *See* AEP Texas Op. Workpapers Vol. 3, p. 00833. Moreover, AEP Texas has obtained a soils map of the region and plotted the TNR's route on it. It shows that the TNR's route does not have soil types even close to 35 percent clay.

AEP Texas also notes that BNSF's approach increases costs only for clay. It does not, however, reduce costs for parts of the TNR where sand and gravel will be encountered – such costs are more than 15% lower. *See* AEP Texas Op. Workpapers Vol. 21, pp. 10581. As AEP Texas' approach is supported by specific soil data, and consistently assumes common excavation in accordance with the description from the ICC Engineering Reports, AEP Texas' costs are the best evidence of record and should be accepted.

(iii) Compaction

BNSF's final argument in the common excavation section of its Reply is that AEP Texas' use of a combination of a vibratory roller and a sheepsfoot roller for compaction is insufficient, and that sheepsfoot rollers should be used exclusively. BNSF Reply at III.F-40. Evidently, BNSF's engineering experts based this assumption on their

visit to two projects in Colorado and Nebraska where sheepsfoot rollers were used. *See* BNSF Reply at III.F-40. However, it is unclear whether or not that was the only compaction equipment used on either project or even what phase the compaction process was in. Moreover, even under BNSF's view of the soil conditions in the area, which as noted above is incorrect, a sheepsfoot roller alone would not be suitable.

In particular, BNSF's engineering experts have not accounted for the limitations of a sheepsfoot roller, because using it alone would mean the TNR could not reasonably complete all of the compaction tasks required. The Army Field Manual provides a spectrum of compaction for which the sheepsfoot roller can be used. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00833-35. That spectrum ranges from 100 percent clay to a mix between sand and clay. AEP Texas' engineering experts have assumed that the compaction in this territory includes a wide range of soils, including some clay, sand and rock, especially where loose rock and solid rock have been moved. A sheepsfoot roller is not recommended for such activities. *Id.* Moreover, the sheepsfoot roller's design limits its effectiveness on the top two or three inches of a lift, and it is recommended that a vibratory roller finish the compaction. *Id.* Indeed, BNSF seems to recognize the need for a vibratory roller, as it included the costs for this machinery in its grossly-inflated fine grading costs.

By comparison, the vibratory roller that AEP Texas' engineers have included (along with the sheepsfoot roller) can compact soils ranging from part clay and sand, to

100 percent sand, to rocky soils. *Id.* Given these facts, the Board should accept AEP Texas' costs for compaction based on a mix of sheepsfoot and vibratory rollers. *See also PSCo* at 96.

AEP Texas has demonstrated that its Opening common excavation unit costs are feasible and appropriate for the TNR, and therefore, the Board should adopt AEP Texas' cost of \$3.42 per CY. As a final point, AEP Texas notes that its common excavation costs are consistent with those for public construction projects in the TNR territory as shown AEP Texas Opening Narrative, Table III-F-2.

(b) Loose Rock Excavation

(i) AEP Texas' Opening

On Opening, AEP Texas developed loose rock excavation costs of \$5.93 per CY using typical equipment for such work: a combination of a 300 and 200-hp dozer equipped with ripping attachments, a shovel, a hauler and compaction equipment. *See* AEP Texas Op. Exhibit III-F-12 and electronic workpaper file "TNR Earthwork Costs.xls," tab "Loose Rock." Like AEP Texas' common excavation equipment, the equipment proposed for loose rock is typical of that accepted by the Board in recent stand-alone cost rate cases. Moreover, as described *infra*, AEP Texas' costs are quite conservative. BNSF, however, suggests that AEP Texas' Opening costs are over \$5.00 per CY too low. BNSF's claims are meritless and should be rejected.

(ii) Loose Rock Assumptions

AEP Texas developed its Opening costs using a number of assumptions that BNSF acknowledged briefly (BNSF Reply at III.F-35), but then completely ignored in its attempt to increase loose rock costs drastically. First, AEP Texas assumed that the TNR would need to excavate loose rock as defined in the ICC Engineering Reports because the Reports are, after all, the primary source of the quantities that both AEP Texas and BNSF have used. That definition states:

Loose rock shall comprise all detached masses of rock or stone of more than 1 cubic foot and less than 1 cubic yard, and all other rock which can be properly removed by pick and bar and without blasting, although steam shovel or blasting may be resorted to on favorable occasions in order to facilitate the work.

I.C.C. Division of Valuation, *Instructions for Field Work of the Roadway Branch of the Engineering Section*, 110 (1916). The ICC's definition of loose rock assumes that the materials could have been moved by pick and bar. Picks and bars are *hand-held* tools designed to pry rocks loose. AEP Texas' 300 and 200-hp dozers are a quantum leap in capability beyond such tools, and surely more than a match for anything defined as loose rock by the ICC Engineering Reports. Indeed, in the *AEPCO* proceeding, BNSF conceded that modern equipment is far more capable than the equipment available in 1916. *See* Defendant's Reply (Public Version) at III.F-53.

By comparison, BNSF's costs are based on the flawed assumption that the TNR would be required to rip rock at all levels of difficulty, even very hard rock

formations. BNSF took account of its assumption by averaging all the different rock ripping costs and ripping conditions together. Not only is this assumption contrary to the ICC Engineering Report definition, but it skews the loose rock costs far beyond what might be necessary to handle rocks that can be loosened with a pick and bar. In addition, the trap rock that AEP Texas has accounted for is already classified among the very hard rock types that BNSF suggests the TNR will need to rip (*i.e.*, granite and basalt). *See* AEP Texas Reb. Workpapers Vol. 3, p. 00836.

(iii) Ripping Equipment

As discussed above, AEP Texas selected its ripping equipment, a combination of 200-hp and 300-hp dozers, on the assumption that the TNR would be ripping loose rock capable of being removed with a pick and bar. Consequently, AEP Texas selected the bulldozers and assumed ripping of soft shale rock under ideal conditions for the 200-hp dozer and ripping of medium trap rock under ideal conditions for the 300-hp dozer.

BNSF disagrees with AEP Texas' equipment selection for several meritless reasons. First, BNSF claims that AEP Texas has not established that conditions would "consistently be ideal." BNSF Reply at III.F-37. Yet, BNSF has not offered any evidence to suggest that the conditions are adverse, other than to suggest that it is likely that all conditions would be encountered. As BNSF has been involved in any number of construction projects in the TNR territory, it would seem likely that if such "adverse"

conditions existed, it could provide a specific example, but it has not done so. Moreover, the territory involved skirts the eastern side of the Rocky Mountains in Colorado and lies primarily in the Great Plains. (*i.e.*, it is not similar to excavating in the Central Appalachian coal fields).

The final argument raised by BNSF is that the dozers most commonly used in the area are 300-480 HP dozers, and it therefore assumes that the TNR must have such equipment. This is yet another example of an unsupported assertion designed solely to drive up costs.

First, the TNR equipment does include a 300-HP dozer or D8 Caterpillar dozer as BNSF chooses to describe it – although there are any number of other companies that make bulldozers with similar horsepower ratings. Second, as AEP Texas noted in its Opening Evidence and elsewhere in this Rebuttal, construction equipment selections are generally a function of the equipment that the contractor has on hand or can easily rent. Simply showing that larger equipment is often used in the TNR's territory proves nothing about what the TNR needs. Moreover, BNSF never asked, nor did its sources ever describe, what equipment was readily available. In addition, the Caterpillar salesman that BNSF relied on has a vested interest in selling or leasing larger, more expensive equipment.

Another point against BNSF's inclusion of very large dozers is that such dozers might be a more logical choice when a contractor is trying to minimize the amount

of blasting that might be required. Here, AEP Texas has already included a significant amount of funds to blast solid rock, and, therefore, the extremely large equipment is unnecessary.

Finally, AEP Texas notes that its dozers are highly capable ripping machines. Indeed, such equipment can rip granite, basalt, trap rock, and a wide variety of other materials that are considered solid rock under the ICC Engineering Report definition. *See* AEP Texas Reb. Workpapers Vol. 3 p. 00836. As such, AEP Texas' equipment is more than adequate for the task at hand.

(iv) Excavating Equipment

On Opening, AEP Texas included a 3 CY power shovel to excavate the ripped rock. Excavating the loose rock requires a process similar to excavating common earth because the ripping process is designed to make it easier for the excavating equipment to dig out the materials – or pick it up if the rock is loose on the ground. The 3 CY shovel is well-suited for this task as it can work either on a rock face or on the ground. In addition, with its upward-facing bucket, it can excavate and load in one action when handling materials above grade.

Notwithstanding the suitability of the shovel, BNSF raises a number of arguments against AEP Texas' selection of a shovel. First, BNSF suggests that AEP Texas attempted to mislead the Board by including two pictures of shovels that are not exactly the same as the specification Means – although BNSF never suggests that a 3CY

shovel that matched the Means specification exactly would look any different. BNSF's argument suffers from two deficiencies. First, BNSF never suggests that the shovel format is not feasible. Instead, it raises the often-repeated claim that shovels are only meant for quarry work. To be sure, shovels are frequently used in quarrying operations, but the application in this instance is entirely appropriate. In particular, the shovels are being used to move loose rock (*i.e.*, the same materials moved in quarries). Moreover, the shovel format makes it easier to load and dump the rock into trucks because it is configured much like a front end loader, which has an upward facing bucket with scoops and dumps (except the shovel can swivel on its base and the front-end loader must usually turn and dump). And, of course, the shovel is more powerful.

Second, photographs were included on Opening to provide an example of what a shovel looks like. *See* AEP Texas Op. at III-F-38. AEP Texas never contended that the pictures of the shovel (or indeed any piece of equipment) were an exact selection of a particular brand or model. In fact, AEP Texas has argued repeatedly that there are a wide variety of machines available and that the contractor would ultimately pick what would be necessary. However, Means provides the basic cost structure for such equipment regardless of the exact specs.

Moreover, the shovel's general characteristics are very similar to the hydraulic excavator (backhoe) selected by BNSF (except for the direction the shovel faces). The Means Heavy Construction Handbook specifically notes these characteristics

when it states that “Most shovels have the same engine, cab, and undercarriages as a similarly-rated crane or backhoe. Thus, the front arms and bucket can be removed, and a crane boom or backhoe front-mounted in its place.” *See* AEP Texas Reb. Workpapers Vol. 3, p. 00840.

As for the equipment selected by BNSF, a hydraulic backhoe is not as useful for this loading task as the shovel. As noted *supra*, the shovel is setup much like a front end loader (although much more powerful). The shovel can scoop and lift without adjusting the bucket, and can swivel on its base, and then tip the bucket or release its bottom to dump into the truck. The hydraulic excavator, as Means demonstrates through the increased costs, is not optimally efficient for the loading tasks posited by BNSF because the bucket-down orientation requires a greater range of motion to load and dump than does the shovel configuration. Moreover, the Army’s earthwork training materials note that:

Loading trucks with a backhoe is sloppy and somewhat inefficient. The sloppiness is due to material falling off the teeth as the bucket is lifted toward the dumping position. The inefficiency results from the maneuvering necessary to complete a dump within the length of a truck body. It also has a slow digging cycle. The slow cycle is caused by the necessity of pulling the bucket toward the boom before hoisting, to retain the load during the hoist.

AEP Texas Reb. Workpapers Vol. 3, p. 00842. In other words, BNSF’s argument for greater flexibility is not warranted given the extra costs and the limited use of the excavator. Moreover, as BNSF’s approach does not contemplate that the excavator will

be doing anything other than loading the loose rock from a pile, it is inappropriate not to select the least cost, feasible loading equipment, which in this case is the shovel selected by AEP Texas.⁵

(v) Hauling Equipment

The parties agree on the use of a 42 CY off-highway hauler to handle waste and dump excavated materials. Both parties have used the same costs.

(vi) Other Unsupported Costs

Aside from its criticisms of the equipment AEP Texas selected, BNSF has further increased the loose rock costs by adding other equipment and unsupported additives. BNSF's first claim here is that AEP Texas must add 60 percent to its shovel costs for moving heavy soils and 15 percent for loading. BNSF's additives are unsupported and should be rejected.

BNSF claims that a 60 percent additive must be added to the shovel costs because the excavation of loose rock is as difficult as moving heavy soils or clay. BNSF offers no support for this claim, nor does it suggest that Means has any such additive for loose rock. Moreover, the additive BNSF refers to does not assume that the ground being worked has had any treatment before the application of the shovel. In other words, without the benefit of (for example) ripping, heavy soils might require a 60 percent

⁵ AEP Texas notes that BNSF did not even consider a front-end loader, which would also be suitable for this task, and is more than \$1 per CY less expensive than BNSF's excavator, but slightly more expensive than AEP Texas' shovel.

additive. But here, the TNR has already expended a substantial cost to rip the rock for the express purpose of making it easier to excavate and load. BNSF's additive is therefore unsupported and unnecessary. In addition, BNSF's costs do not even assume that AEP Texas' shovel or BNSF's excavator will be doing any "excavating" at all. Rather, under BNSF's plan, the equipment would be loading the material into trucks from a pile. Therefore, it will be no more difficult to move than other piled materials.

BNSF has also added a bulldozer to do nothing but push rock into piles for loading. *See* BNSF Reply at III.F-44. This dozer is totally unnecessary because the shovel is designed to excavate and load at one time. In other words, it does not need the materials to be piled before loading. Moreover, BNSF's suggestion that the shovel's production rate could not be met without such a dozer is not supported in any way. Indeed, given that the shovel cost is based on Means calculations of the shovel's ability to excavate, for which the dozer would be irrelevant since the shovel is doing the work, BNSF's production arguments must be rejected.

Regardless, the ripping process already pushes the ripped materials into piles. In particular, the ripping attachments are attached to the back of a bulldozer. The rock is ripped in layers. *See* U.S. Army Field Manual, AEP Texas Reb. Workpapers Vol. 3, p. 00844. On each pass, the blade of the dozer can move the rock that was ripped on the previous pass, thereby creating the piles for the shovels to load.

As noted above, BNSF has also included a 15 percent additive for loading the material into trucks, which it claims Means “clearly and unconditionally requires.” *See* BNSF Reply at III.F-41. Interestingly, BNSF cites no workpapers in support of its claims. Nevertheless, AEP Texas notes that the Board added this percentage for loading in the *PSCo* case, and must therefore explain why the Board should not follow its previous decision.

BNSF’s statement regarding Means’ clear and unconditional 15 percent additive is incorrect. AEP Texas’ engineering experts contacted Means regarding the application of this additive. Means informed AEP Texas’ experts that the 15 percent additive is only applicable if the excavated material requires additional piling before being loaded into trucks. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00843. If, on the other hand, the material is already being piled before loading into trucks, as the TNR is doing, then the additive does not apply. Consequently, AEP Texas has continued to use its Opening shovel costs, without additives.

AEP Texas notes that under BNSF’s costing scheme, even if additional piling were necessary, BNSF has double counted the cost because it has included both the 15 percent additive associated with piling materials for loading and it has included a dozer to do the same thing. Assuming, *arguendo*, that the Board determines that any piling needs to be done beyond that already being done during the ripping process, it should only add the 15 percent additive, as that is the least cost alternative.

Finally, just as it did with common excavation, BNSF assumed compaction of the loose rock only with sheepsfoot rollers. AEP Texas submits that the sheepsfoot-only compaction is inappropriate for the reasons discussed in the section on common earth excavation costs, *supra*.

(vii) Revisions to Loose Rock Costs

BNSF points out that AEP Texas included a bulldozer to spread waste materials, but it did not include a dozer to spread the embankment. BNSF argued that the dozer would be necessary in both instances. AEP Texas agrees and has added a bulldozer for spreading the embankment in loose rock costs. This revision raises AEP Texas loose rock costs from \$5.93 per CY on Opening to \$6.85 per CY on Rebuttal. *See* AEP Texas Reb. electronic workpaper file “TNR Earthwork Costs Rebuttal.xls,” tab “Loose Rock.”

(c) Solid Rock Excavation

(i) AEP Texas’ Opening

On Opening, AEP Texas developed solid rock excavation costs using the typical approach applied in previous cases and accepted by the Board. *See, e.g., Wisconsin* at 81-82. First, AEP Texas used an average cost from Means for Drilling and Blasting Rock over 1500 CY and Bulk Drilling and Blasting. AEP Texas then added the costs of excavating, loading, hauling, spreading, and compacting blasted rock. All of these

activities were costed at \$10.01 per CY.⁶ As with every other earthwork cost, BNSF disagree with these costs.

(ii) Comparable Rock Excavation Costs

Before delving into the specific criticisms of BNSF's development of solid rock excavation costs, AEP Texas once again notes that its costs developed from Means are *extremely* conservative in comparison to the costs incurred on real world projects. This point is amply illustrated by the road building project near Blackhawk, CO that BNSF uses as a benchmark for a number of the assumptions it used to develop its solid rock excavation costs.

The project near Blackhawk is an 8.5 mile road construction project designed to connect Central City, CO with a major interstate, thereby passing Blackhawk itself – it is known as the Central City Southern Access Road or the Central City Parkway. See www.centralcityhighway.com. This is a privately funded project paid for by the casinos of Central City with the hope that a direct connection to the Interstate will bring more gambling business to their town rather than Blackhawk, which one has to currently drive through in order to reach Central City from the Denver area.

⁶ When averaged with AEP Texas' Opening unit cost for loose rock, AEP Texas' Opening unit cost applied to solid rock was \$7.97 per CY. See AEP Texas Op. electronic workpaper file "TNR GRADING.xls," tab "IIIF Unit Costs." BNSF accepted AEP Texas' averaging of the loose rock and solid rock unit costs. See BNSF Reply at III.F-49.

The project was bid on a design and build basis, therefore there are no specific rock excavation costs. However, there is more than ample information to determine that the rock excavation costs are well below the costs posited by AEP Texas and especially BNSF. Specifically, the total contract value of the project is \$38.5 million. *See AEP Texas Reb. Workpapers Vol. 3, p. 00845.* And, according to Ames Construction, the primary contractor, the project involves the excavation of 5.5 million CY of rock. Therefore, even if the project involved nothing but rock excavation, the maximum price per CY of rock excavation could only be **\$7.00**, well below even AEP Texas' unit cost.

Of course, rock excavation is hardly the only cost in the project. According to Ames Construction, the project also includes construction of two bridges and three concrete box culverts, along with pipe work, MSE retaining walls and asphalt paving. Moreover, according to an article about the progress of the construction, Ames is laying down 150,000 tons of aggregate base for the road, which it is crushing on site. *See AEP Texas Reb. Workpapers Vol. 3, pp. 00845-00846.* Obviously, the costs of the other items would further reduce the total budget for rock excavation, which in turn means that the cost per CY for rock excavation must have been even lower than \$7.00.

Given that the project that BNSF itself favors had far lower costs than those posited by AEP Texas, BNSF's solid rock excavation costs must be summarily rejected.

(iii) Drilling and Blasting

BNSF argues that AEP Texas' drilling and blasting costs should be based solely on the Means cost for Drilling and Blasting Rock Over 1,500 CY. BNSF's position is predicated on the argument that the economies for larger-scale blasting will not be available to the TNR because only 4,116 cubic yards per mile require blasting. *See* BNSF Reply at III.F-45. BNSF's argument is off the mark.

The BNSF's average of 4,116 CY per mile is merely a simple average of the total solid rock quantity for the TNR (4.8 million CY) divided by the 1,168 route miles of the TNR. BNSF then reduced the 4,116 CY per mile by 50 percent to 2,058 CY per mile to reflect the assumption (accepted by BNSF) that only half of the solid rock will require blasting. BNSF's contention that the solid rock is distributed on an even basis along the route of the TNR is unfounded. Nearly two-thirds (66 percent) of the total solid rock encountered on the TNR route (over 3.0 million CY) is located on three line segments (SD/NE Line to Alliance, NE, CO/OK Line to Boise City, OK, and OK/TX Line to Amarillo) which comprise less than 18 percent of the TNR route miles being constructed. On average, this equates to 14,849 CY per mile (or 7,425 per mile assuming 50 percent),⁷ nearly four times the average shown by BNSF. However, even this is misleading because the solid rock is not evenly distributed throughout the line segment, but is instead located

⁷ 3,048,431 CY (Exhibit III-F-19) ÷ 205.29 route miles (Exhibit III-F-17) x 50% = 7,425 CY per mile.

in specific areas. The BNSF's use of an average of 2,058 CY per mile is therefore meaningless. AEP Texas' use of drilling and blasting costs applicable to high volumes is, therefore, appropriate. Moreover, the Board has agreed with AEP Texas' methodology in its four most recent decisions. *See PSCo* at 97 (recognizing that concentrations of blasting make the use of average figures for blasting large quantities appropriate); *Duke/NS* at 95; *Carolina* at 81; and *Duke/CSXT* at 79. Consequently, AEP Texas has continued to use its Opening blasting costs.

(iv) Other Blasted Rock Handling Costs

On Opening, AEP Texas used the Means Handbook cost to "Excavate and Load Blasted Rock, 3 CY power shovel." As the defendant railroads have done in other recent SAC cases, BNSF attempts to argue that the blasted rock cannot be handled at the specific costs provided by Means and selected by AEP Texas. Rather, BNSF suggests two additional costs that it argues the TNR must incur to handle the blasted materials, which are summarized as follows:

1. BNSF includes costs to reblast 30 percent of the rock used in embankment and five percent of the waste rock or "boulders," as BNSF describes it, that are left over from any initial blasting; and
2. BNSF includes the costs of loading ½ CY boulders on to a truck.

BNSF's additional costs are without merit. First, BNSF's additional costs are based on a series of flawed and unsupported assumptions that when debunked obviate the need for the additional costs. These assumptions are taken in turn.

First, BNSF argues that the initial blasting will leave only 40 percent of the blasted material small enough to be reused in embankment without further processing. BNSF's definition of "small enough" is less than 24 inches, which it takes from the WRPI construction specifications.

The problems with BNSF's assumptions are numerous. Initially, AEP Texas notes that BNSF's 40 percent assumption is based on nothing other than its observation of a site in Blackhawk, CO (the Central City Highway project) where blasting was being done. Even then, BNSF does not explain how it reached its 40 percent conclusion from the observations. Moreover, BNSF's observations are meaningless without knowing at least one key factor about the blasting taking place – namely, what specifications the project was using for blasting. BNSF did not suggest that the goal of the blasting on the project was to produce rocks small enough to reuse for fill. Indeed, it may have been the case that the only goal was to blast the rock out of place to then be pushed aside or disposed of on-site.

The other critical flaw in BNSF's assumption is that it assumes that the end result of all blasting is a large quantity of rocks exceeding 24 inches, which BNSF does not define at all (*i.e.*, 24 inches in diameter or 24 cubic inches or 24 inches square?). BNSF offers no support for this claim. Indeed, the references to the WRPI construction specification undermine BNSF's position. In particular, the specification said that all blasted materials should be small enough for earth moving equipment to handle. In other

words, the WRPI specifications contemplated that the materials could, and indeed, had to be blasted in a manner that would permit its easy removal.

AEP Texas also notes that the article about the Central City Highway project, previously mentioned, states that the project “requires an astonishing 150,000 tons of aggregate, all of it already stockpiled and being crushed on site.” This indicates that the material being blasted by Ames is then transported to an on-site crusher where it is reduced in size to aggregate base for the road. The size of material needed before crushing is governed by the size of the crusher and not by the WRPI specifications.

BNSF never makes this link. Instead, it argues that AEP Texas must include additional costs to move large rocks left over from blasting. AEP Texas submits that the WRPI project is evidence that blasting can be performed so that smaller rocks are the typical end result.

AEP Texas also notes that blasting is far from the random exercise that BNSF posits. In fact, blasting is planned with a number of end results in mind, including the size of rocks that are desired and the landing zone for the materials. Variations in the desired end result are achieved, *inter alia*, by placing the charges in different locations, varying the spacing of the charges, and varying the depth of the charges. See AEP Texas Reb. electronic workpaper file “blasting.pdf” (desired fragmentation is obtained by checking the drill pattern, spacing and burden to be blasted).

Finally, AEP Texas' engineering experts conferred with Means regarding its assumptions for handling blasted materials. Means confirmed that its cost assumes that blasting would produce materials small enough to be handled by the 3 CY shovel that AEP Texas used to "excavate and load blasted rock."

Notwithstanding that Means costs for excavating and loading blasted rock clearly apply here, BNSF boldly asserts that all waste rock should be costed using a Means cost of \$12.35 per CY for handling boulders under ½ cubic yard. Strangely, BNSF suggests that one reason why the 3 CY shovel costs is inappropriate is because the pieces of rock will not fit in the bucket even though it is mathematically obvious that a ½ cubic yard rock will fit in a 3 CY shovel with ease. Indeed, the equipment supplied under the Means cost used by BNSF is only a 2.25 CY front end loader. As such, BNSF's claims are without foundation.

BNSF also implies that any larger rocks that exist after blasting must be moved using a Means Handbook unit cost to "Excavate and Load Boulders" – although it only costed the loading of boulders (favoring instead to reblast much of the rock, which is also unnecessary). Again, BNSF's suggestion is improper.

The first problem with BNSF's approach is that it noted a cost for excavating boulders that *have not been blasted*. Obviously, it is considerably more expensive to excavate boulders that are in place rather than rocks that have been blasted. Indeed, this is exactly why the Means Handbook cost for excavating *blasted* rock is much

lower than excavating non-blasted boulders in place. AEP Texas' engineering experts confirmed this point with Means. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00843. Moreover, Means confirmed that its cost for excavating blasted rock assumes that some of the rocks would be quite large – not larger than the 3 CY bucket on the shovel, but still larger than the boulders that the BNSF claims must be moved.

BNSF's boulder loading cost is also inconsistent with the manner in which BNSF handled waste rock. In particular, BNSF assumed that it would reblast 16.7 percent of the waste "boulders" left over from the initial blasting. After that rock is blasted, it is reasonable to assume that, even under BNSF's approach, the materials could be handled using the costs to excavate and load blasted rock with a 3 CY shovel. Yet, BNSF applied the exorbitant boulder moving cost to 100 percent of the wasted rock.

AEP Texas also notes that the BNSF's solid rock excavating costs include the cost to bulldoze ripped materials (presumably into its superfluous piles). This cost is completely unexplained. Moreover, the 3 CY shovel costs assume the cost of excavating and loading. If pushing into piles is performed, there is no need for the shovel to excavate, and therefore, the costs would be lower. In any event, the dozer is unnecessary because the blasting process tends to create piles, as shown in a video that AEP Texas has included in its Rebuttal electronic workpapers. *See* AEP Texas Res. electronic workpaper file "blast.wmv."

(v) Hauling

The parties agree on the use of a 42 CY off-highway hauler to handle waste and dump excavated materials. Both parties have used the same costs.

(vi) Other

BNSF again assumed compaction with only sheepsfoot rollers. AEP Texas submits that sheepsfoot-only compaction is inappropriate for the reasons discussed in the section on common earth excavation costs, *supra*.

The parties agree on the cost to spread the dumped materials. The parties also agree that 50 percent of the materials classified as solid rock can be ripped. Therefore, both parties have used an average of the cost for loose rock and solid rock excavation for all the solid rock quantities.

As BNSF did with loose rock unit costs, BNSF points out that AEP Texas included a bulldozer to spread waste materials, but did not include a dozer to spread the embankment. BNSF argued that the dozer would be necessary in both instances. AEP Texas agrees and has added a bulldozer for spreading the embankment in solid rock costs.

On Rebuttal, AEP Texas has continued to use its Opening solid rock unit cost with the one modification noted above. Specifically, AEP Texas' Rebuttal unit cost for solid rock is \$10.93 per CY. When averaged with AEP Texas' Rebuttal unit cost for loose rock of \$6.85 per CY, AEP Texas' Rebuttal unit cost applied to solid rock is \$8.89

per CY. *See* Rebuttal electronic workpaper “TNR Grading Rebuttal.xls,” tab “IIIF Unit Costs.”

(d) Comparison to BNSF AFE Excavation Costs

The three prior sections contain discussions pertaining to the three types of excavation and their respective costs, all based on the use of the Means Handbook. However, there is another source for excavation costs and that is BNSF AFEs provided in discovery.

The entire purpose of a stand-alone analysis is to estimate the costs that a hypothetical railroad would incur should it enter the market and serve the complainant's traffic. Nowhere in BNSF's Reply is there any discussion of BNSF's actual experience or costs associated with the various excavation equipment types. BNSF's research stops at the equipment level. As shown below, AEP Texas suspects that BNSF avoids presenting any data from its own projects because it fails to support BNSF's high costs as presented in this proceeding.

In addition, BNSF has not provided any documentation showing the types of equipment used on any earthwork project on its system, including four major recent earthwork projects. However, BNSF did provide some AFEs in discovery that contain contract costs for grading, albeit most with no more detail than a total cost and a total quantity. AEP Texas identified ten AFEs covering six states (Wyoming, Colorado, Texas, Kansas, New Mexico and Arizona) in the 1999-2001 time period. Although there was not

enough information to use these earthwork unit costs in lieu of relying on the Means Handbook, the data is sufficient for the comparative purpose for which it is used here.

AEP Texas has prepared a comparison of BNSF's Reply and AEP Texas' Rebuttal average cost per cubic yard of excavation with the average excavation costs from BNSF's AFEs. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00778-00800. The results are quite revealing.

When BNSF's total costs for excavation are divided by the total cubic yards of excavation, BNSF's Reply average unit cost is \$6.64 per cubic yard of excavation. This cost increases to \$8.04 per cubic yard of excavation when including BNSF's costs for stripping, undercutting and fine grading, costs which BNSF considers incidental to the earthwork costs when requesting bids from contractors. AEP Texas' Rebuttal average unit cost is \$4.26 per cubic yard of excavation. The average unit cost for excavation from BNSF's AFEs for grading is \$ { } per cubic yard (arguably including those items classified as incidental to the earthwork costs). The BNSF bid average value is less than { } of the average excavation cost presented by BNSF on Reply, and it is also less than the average excavation cost used by AEP Texas on Rebuttal. Based on this comparison, it is very likely that AEP Texas has overstated the excavation costs for the TNR as opposed to understating them as claimed by BNSF. This comparison also demonstrates the extent to which BNSF's costs are overstated.

(e) Comparison of Excavation Costs to Public Projects

On Opening, AEP Texas included a table that provided actual bid prices for large road projects in the TNR states with quantities in excess of 250,000 cubic yards of *unclassified* excavation, which can include loose rock or solid rock. See AEP Texas Op. at III-F-16. That table, reproduced below, shows that the Means Handbook costs are easily bested.

Table III-F-2					
Weighted Average Cost for Unclassified Excavation					
Projects in 2000 for Quantities over 250,000 CY					
State	Date	Quantity	Unit	Unit Price	Price
CO	04/20/00	348,614	CY	\$3.90	\$1,359,594.60
CO	08/10/00	617,728	CY	\$3.85	\$2,378,252.80
CO	09/28/00	440,100	CY	\$2.60	\$1,144,260.00
TX	06/07/00	294,063	CY	\$1.30	\$382,281.90
NE	01/13/00	499,581	CY	\$1.40	\$699,413.40
NE	01/13/00	685,289	CY	\$0.98	\$671,583.22
NE	01/13/00	289,720	CY	\$2.08	\$602,617.60
NE	02/17/00	278,187	CY	\$1.83	\$509,082.21
NE	04/27/00	1,253,710	CY	\$0.83	\$1,040,579.30
NE	06/29/00	1,026,223	CY	\$0.77	\$790,191.71
NE	06/29/00	1,073,056	CY	\$0.77	\$826,253.12
NE	10/19/00	628,186	CY	\$0.99	\$621,904.14
NE	12/07/00	268,951	CY	\$0.84	\$225,918.84
WY	02/10/00	751,803	CY	\$2.08	\$1,563,750.24
WY	02/10/00	865,967	CY	\$2.74	\$2,372,749.58
WY	04/13/00	298,213	CY	\$1.68	\$500,997.84
WY	04/13/00	260,413	CY	\$1.77	\$460,931.01
WY	05/11/00	816,907	CY	\$4.59	\$3,749,603.13
WY	05/11/00	1,204,622	CY	\$1.15	\$1,385,315.30
SD	NOT AVAILABLE			WTD. AVE.	
OK	NOT SIGNIFICANT			\$1.79	

On Reply, BNSF did not even bother to dispute the above table. Obviously, the above unit costs demonstrate that AEP Texas' excavation unit costs, regardless of specific equipment disputes, are feasible.

(f) Borrow

The parties agree on almost all of the costs associated with borrow.

However, BNSF added a bulldozer to spread the borrow. The addition of this dozer was recently accepted in the *PSCo* case. To minimize disputes, on Rebuttal, AEP Texas has also included a dozer to spread the materials. However, AEP Texas continues to disagree with BNSF's sheepsfoot-only compaction costs for the reasons described, *supra*, and therefore, on Rebuttal, AEP Texas has continued to use its Opening compaction costs.

(g) Fine Grading

BNSF asserts that the TNR would incur a unit cost of \$0.97 per square yard for "fine grading," for a total cost of \$19.88 million. This is yet another unsupported and unwarranted additional cost. Despite previous rulings to the contrary, the Board has recently changed its position and accepted fine grading in the *PSCo/Xcel* case. The reason cited by the Board was that fine grading is typically an element of railroad construction, citing the WRPI specifications, which BNSF has also cited in its Reply evidence in this case.

Simply put, a separate cost for fine grading is unnecessary. In particular, AEP Texas notes that the WRPI construction specifications simply required that ruts,

depressions, or soft spots must be corrected. BNSF never suggests, nor does it demonstrate from its own projects, that a separate cost above the normal grading unit costs was required. Indeed, a review of BNSF's AFEs do not show any specific line items for fine grading. Moreover, the road construction projects submitted by AEP Texas do not include any additional costs for such work.

The Board also accepted BNSF's position in *PSCo/Xcel* because Means has a separate cost category for fine grading. While Means has such a category, it does not mean that it must apply in every instance. In particular, the need for a fine grading crew may be tempered by the equipment already on site. For example, any corrections that might be required in the preparation of the roadbed can easily be handled with the myriad of equipment already included in AEP Texas' costs (*e.g.*, scrapers, dozers and compaction equipment) thereby obviating the need for a fine grading crew. To be sure, a grader is a useful device, but AEP Texas' unit costs are already very conservative, and additional costs are simply not warranted.

Assuming *arguendo* that the Board continues to include fine grading costs, it must reject those costs as developed by BNSF. First, AEP Texas notes that the fine grading crew that the Board accepted in *PSCo/Xcel* was the crew as defined by Means (one motor grader with an operator and labor). Here, without any explanation, BNSF took the fine grading crew included in Means and greatly expanded it to include a water truck with a driver, a steel wheel roller with an operator, a Gradall with an operator, and a

paddle pan (scraper) with an operator. BNSF then also substituted a larger motor grader. These additional costs must be rejected for several reasons.

First, BNSF has not explained why anything beyond the Means fine grading crew is necessary. Second, AEP Texas and BNSF have already included costs for water, scrapers and compacting equipment, and therefore, there is no reason to add them in a second time. Third, to the extent it would be necessary, a motor grader could easily handle any ditch shaping that might be necessary (a grader can generally cut ditches at least three feet deep), and therefore, the Gradall machine is unnecessary. While AEP Texas maintains that separate costs for fine grading are unnecessary, if the Board determines that some fine grading costs are applicable, it should use only the motor grader costs included in the Means grading costs. AEP Texas has included such a calculation in its Rebuttal grading spreadsheet. *See* AEP Texas Reb. electronic workpaper file “TNR Grading Rebuttal.xls,” tab “Fine Grading.”

(h) Summary

On Rebuttal, AEP Texas has included \$625.14 million for earthwork. *See* Exhibit III-F-19.

c. Culverts

On Opening, AEP Texas included \$29.7 million for culverts. On Reply, BNSF included \$34.5 million, which reflects unwarranted additional costs. On Rebuttal,

AEP Texas has continued to use its basic Opening culvert installation approach with several costs modifications noted below.

i. Calculation Errors

BNSF notes that AEP Texas made significant calculations that caused overstatement of AEP Texas costs. First, AEP Texas inadvertently included the costs for RCB culverts twice. Second, AEP Texas added an unnecessary extra 15 feet when adjusting culverts to reflect additions to the existing BNSF track infrastructure. AEP Texas has corrected these errors on Rebuttal.

ii. Culvert Inventory

BNSF argues that AEP Texas did not include 481 culverts that are required on the lines being replicated by the TNR. Upon further review, AEP Texas agrees that 476 of the 481 culverts listed by BNSF are required, but BNSF has also included additional culverts that did not appear on its inventory list and should therefore be excluded. As to the culverts AEP Texas is accepting, these include the culverts on the Orin, Pikes Peak, and Boise City Subdivisions.

AEP Texas disagrees with the inclusion of any other culverts as they did not appear on the BNSF's inventory list. BNSF argues that AEP Texas' approach is unfair because AEP Texas used the track charts for lateral drainage quantities, and so it should use the track charts for culverts as well. BNSF's argument is without merit because AEP Texas had no choice but to use the track charts for lateral drainage quantities because

BNSF did not produce any lateral drainage information in discovery. Moreover, AEP Texas' reliance on BNSF's inventory sheet is entirely appropriate as ostensibly it is BNSF's official record of culverts that it uses for important accounting requirements. Moreover, AEP Texas' engineering experts should not be required to expend the time and expense to verify the veracity of such a list. Consequently, AEP Texas has continued to exclude any culverts that do not appear on BNSF's culvert list.

BNSF also added 44 approach culverts. Three of these approach culverts were included in BNSF's inventory. As BNSF notes, AEP Texas mistakenly assumed that these were standard culverts, and, thus, the culverts were needlessly lengthened to go under tracks that the culverts do not actually cross. BNSF used the length as shown on its inventory list, and AEP Texas has done the same on Rebuttal. As for the other 41 approach culverts, AEP Texas objects to their inclusion because they did not appear on the inventory list provided in discovery.

BNSF also argued that AEP Texas reduced the pipe openings, thereby reducing the potential waterflow. BNSF has misconstrued AEP Texas' pipe sizes and placement. In particular, BNSF did not observe that in some instances AEP Texas replaced one box culvert with two or more circular pipes to meet the necessary area requirements. In other words, it was more economical to use different culvert types in some cases. However, AEP Texas did discover that in three instances, it had in fact

reduced the overall area of the pipes. That error has been corrected on Rebuttal. *See* AEP Texas Reb. electronic workpaper file “TNRR Culverts.xls.”

iii. Culvert Installation

AEP Texas’ approach to culvert installation is discussed in detail in its Opening narrative at pages III-F-47 to 48. BNSF does not agree with AEP Texas’ methodology, and argues for additional costs for both RCB and CMP installation. BNSF’s costs are unfounded for each culvert type, and should be rejected for the reasons discussed below.

BNSF’s principal cost increase stems from its use of a separate culvert crew to perform the necessary excavation, backfill and compaction for the culvert installation. BNSF offers no specific support for this extra cost with respect to excavation, and in support of the extra costs for backfill and compaction, it implies that AREMA recognizes the need for such costs, even though the area all around the culvert is already being graded. But, BNSF glosses over a critical element: AREMA specifically notes that the “backfilling requirements apply where the reinforced concrete box culvert is to be constructed by open cut.” *See* AREMA Standards Chapter 8, Part 16, Concrete Box Culverts, Section 16.7.6 Backfilling, included in AEP Texas Reb. Workpapers Vol. 3, p. 00856. AEP Texas’ approach does not assume open cutting (excavating an already filled area), and thus, the additional crew costs are inapplicable.

In addition, because the TNR plan does not require backfilling of an open cut area, there is no need to create a trapezoidal section as BNSF has proposed. Therefore, no change in the overall quantity of compaction is required. In other words, the soil will be compacted as the embankment for the surrounding railroad is created. This eliminates the duplication of work and higher construction cost that BNSF created by using an open cut.

Similarly, AEP Texas continues to use its one-foot clearance to accommodate compaction equipment, as opposed to the two feet BNSF suggests. Again, if the area was open cut, as BNSF's proposes, then a width of 24 inches would be required. But, the TNR is not planning an open cut. Rather, fill and compaction will occur as the embankment is created. Moreover, TNR's proposed compaction can be achieved with its general grading crew because a 24 inch vibratory roller can overlap the 12 inch compaction area as proposed by TNR. Therefore, TNR has not changed the amount of compaction required.

BNSF also argued that AEP Texas should extend the excavation depth to 22 inches and the bedding depth to 12 inches. AEP Texas agrees with this modification, and has adjusted its culvert spreadsheets accordingly.

iv. Unit Costs

BNSF has also raised several arguments related to unit costs for culvert.

AEP Texas has accepted some of BNSF's proposals, but continues to use its Opening unit costs in other respects, as discussed below.

To minimize disputes, on Rebuttal AEP Texas has accepted BNSF's costs for the actual installation of the culverts (as opposed to excavation costs, etc.). AEP Texas has also accepted BNSF's transportation additives, as well as BNSF's unit cost for excavation, although as described above, AEP Texas continues to use its Opening excavation quantities on Rebuttal.

BNSF has added bituminous coated pipes. However, AEP Texas' photographs of the replicated BNSF lines show that the existing culverts do not meet this specification. *See* AEP Texas Op. electronic workpapers files "AEP Texas North - Pikes Peak 10-27-03.pdf" (Way Point 16); "AEP Texas North Boise City 10-28.pdf" (Way Point 66); "AEP Texas North Red River Valley.pdf" (Way Point BT5,BT22 [3 photos]); and "AEP Texas North Red River Valley 2.pdf" (Way Point BW 34). The existing culverts are galvanized, and uncoated. Thus, BNSF selected the higher priced pipe even though it does not use this type of culvert in its own construction. Moreover, BNSF has provided no rationale as to why bituminous coated pipe is necessary. The Board recently rejected such pipe in *Duke/CSXT* at 82; *Carolina* at 84; and *Duke/NS* at 97.

Finally, BNSF argues that AEP Texas misapplied the Means index to the RCB and CMP culverts. As AEP Texas has accepted BNSF's RCB costs, the Means index issue is irrelevant. And as to other items, AEP Texas accepts BNSF's indexing approach, which actually results in a decrease in costs.

d. Lateral Drainage

Both AEP Texas and BNSF included \$0.15 million in investment costs for lateral drainage. Although not addressed in BNSF's Reply narrative, BNSF accepted AEP Texas' methodology and unit costs. The minor difference in costs is due to (1) a slight difference in the location factor (caused by the difference in route miles) and (2) BNSF's exclusion of 0.91 miles of the Harrington spur from its lateral drainage quantity calculation. On Rebuttal, AEP continues to include \$0.15 million for investment in lateral drainage.

e. Other

i. Sideslopes

BNSF accepted AEP Texas' specification of 1.5:1 sideslopes.

ii. Ditches

On Opening, AEP Texas included trapezoidal drainage ditches two feet wide and two feet deep. This specification was accepted by the Board in both *Wisconsin* and *PPL Montana*. See *Wisconsin* at 82-83; *PPL Montana* at 19.

BNSF has accepted AEP Texas' ditch specification, but not without first engaging in gratuitous criticism thereof. In particular, BNSF argues that the TNR must have ditches with a minimum bottom width of three feet based on AREMA specifications or else the TNR roadbed will require an inordinate amount of maintenance due to water damage. *See* BNSF Reply at III.F-66 to 67.

BNSF's claim is unfounded. First, AREMA specifications are merely guidelines, not requirements. Second, these guidelines are not location-specific and can certainly be adjusted based on actual needs. Third, BNSF did not submit any evidence demonstrating that it adheres to the specification it proposes. In fact, BNSF does not adhere to this specification. AEP Texas' engineering witnesses' field trip identified numerous locations where BNSF's side ditches do not meet its own design specifications (but do meet AEP Texas' design specifications in terms of width). *See* AEP Texas Op. electronic workpaper files "AEP TEXAS NORTH BOISE CITY 10-28.pdf" Waypoints 62, 63, 74; "AEP TEXAS NORTH BOISE CITY 10-27.pdf" Waypoints M3, M4, M8, M25; "AEP TEXAS NORTH BOISE CITY 10-29.pdf" Waypoint 81; "AEP TEXAS NORTH-LA JUNTA 10-28-03.pdf" Waypoint 57.

In short, BNSF has no justification whatsoever for its suggestion of increased maintenance costs due to this alleged design deficiency. AEP Texas' design is no different than what exists on BNSF's lines today, and BNSF has not presented any evidence showing that its own roadbed is routinely damaged as a result of inadequate

drainage ditch sizes. This is yet another example of BNSF's attempt to require the TNR either to be constructed to higher standards than BNSF's existing rail lines, or to incur needless additional costs.

iii. Retaining Walls

On Opening, AEP Texas included \$5.1 million for retaining wall investment for the TNR. AEP Texas' costs were based on quantity information from the ICC Engineering Reports and unit costs from the Means Handbook. *See* AEP Texas Op. at III-F-50 and Op. electronic workpaper file "TNR GRADING.xls," tab "IIIF_5 Othr EW."

On Reply, BNSF included \$10.3 million for retaining walls. BNSF accepted AEP Texas' base use of the quantity information from the ICC Engineering Reports and the use of gabion baskets, but it made one, albeit major, quantity adjustment and one cost adjustment. *See* BNSF Reply at III.F-67 to 69 and electronic workpaper file "III F 2 TNR Grading.xls," tab "IIIF_5 Othr EW." These adjustments are discussed below.

As to the quantity adjustment, BNSF arbitrarily increased the retaining wall quantities by 100 percent to allegedly account for the TNR's wider roadbed compared to the roadbed width of the replicated BNSF lines as originally constructed, as well as additional retaining walls built since the original construction. *See* BNSF Reply at III.F-67 to 68. AEP Texas does not agree with BNSF's adjustment to the retaining wall quantities.

First, BNSF has provided no evidence detailing the construction of any new retaining walls. Second, BNSF has assumed that, at *every* retaining wall location, the topography is such that the surrounding earth side wall is always going upward (in a cut) or downward (in a fill) as one moves out from the center of the roadbed. This is simply not the case. BNSF's drawings of these circumstances in its Reply Workpapers have no basis in reality.

In particular, the side retaining walls do not always increase; they may actually decrease or they may stay the same. The only way to know for certain what impact the wider roadbed would have on the retaining wall is to look at each and every retaining wall location and ascertain the surrounding topography. If the topography is sloping upward away from the roadbed, a wider roadbed would result in a taller retaining wall in a cut and a shorter retaining wall for a fill. However, if the topography is sloping downward away from the roadbed, the opposite would occur (*i.e.*, a wider roadbed would result in a shorter retaining wall in a cut and a higher retaining wall in a fill). Finally, if the topography is flat, widening the roadbed would have no impact on the height of the retaining wall. BNSF provides no evidence that it reviewed all existing retaining wall locations and determined that in every instance the retaining wall would need to be enlarged, and such a result is illogical.

In addition, BNSF assumes that the wider roadbed extends equally on each side of the track centerline. BNSF has provided no support for this assumption, either. If

there is a location where a retaining wall is necessary, it is possible that the entire amount of the widened roadbed could be accommodated on the side where the retaining wall is not required, meaning that no adjustment in size is necessary.

Again, BNSF has made unsupported assumptions that result in unwarranted cost increases. Given that there are several scenarios where the retaining wall quantities could be decreased as well as increased, and BNSF has relied only on unsupported assumptions, AEP Texas submits that BNSF's 100 percent adjustment to retaining wall quantities is erroneous and should be rejected.

BNSF also increased retaining wall costs by adding trenching costs for the installation of the gabions. Apparently, BNSF believes that the gabions will be installed after the grading process, whereas AEP Texas would install them as part of the grading process. As the costs for excavation are already included, no additional costs are necessary. *See, e.g., Duke/CSXT* at 81 (rejecting additional costs for installing items after the grading process is completed because such materials could have been installed during the roadbed preparation stage).

On Rebuttal, AEP Texas has continued to include retaining wall costs of \$5.1 million.

iv. Rip Rap

On Opening, AEP Texas included \$4.56 million in investment costs for rip rap. On Reply, BNSF states that it accepted AEP Texas' rip rap costs but it increased the

costs to \$4.54 million. The minor difference in costs is due to (1) the difference in route miles; (2) a slight difference in the location factor (caused by the difference in route miles); and (3) BNSF's exclusion of 0.91 miles of the Harrington spur and 6.61 miles for the Crawford Hill re-route from its rip rap quantity calculation. On Rebuttal, AEP Texas continues to include \$4.56 million for investment in rip rap.

v. Relocating and Protecting Utilities

On Opening, AEP Texas included \$1.82 million for the relocation of utilities on the line segments that replicate BNSF's recently-constructed lines. BNSF generally accepts AEP Texas' approach, but adds additional costs to relocate utilities on 55 miles of track where it claims it has made capacity improvements and 71 miles where AEP Texas has built more track than BNSF currently has in place. BNSF's revisions push its cost to \$2.48 million. BNSF's approach is contrary to stand-alone principles and should be rejected for the reasons described below.

It is undisputed that the stand-alone railroad does not face any barriers to entry that the incumbent railroad did not face when it *originally* built the lines being replicated. In addition, the Board has long held that changes made to the incumbents' infrastructure over the years are not relevant to the entry-barrier analysis. *See West Texas Utilities*, 1 S.T.B. at 669 n.68. Consequently, the Board as well as the defendants in SAC cases have repeatedly accepted that a larger roadbed is permissible, different bridge types are appropriate, and (until now in the case of BNSF) that the number of tracks may vary

from what the current or original railroad has or had. Indeed, the Board has even accepted that open cuts may be used in lieu of tunnels where this would be more economical – over the objections of the defendant railroads that argued that such cuts must be considered “new” and therefore subject to environmental permitting, etc. *See, e.g., Duke/CSXT* at 108 (environmental permitting costs rejected by the Board related, *inter alia*, to open cuts for “daylighted” tunnels).

AEP Texas’ development of its stand-alone railroad is no different than the SARRs in all the other SAC cases that have preceded this one. In accordance with those precedents, AEP Texas added the costs for utility relocation, environmental mitigation, and similar costs where BNSF incurred such costs when a replicated line was *originally* built, and omitted such costs otherwise. The additional locations that BNSF has included are unwarranted and unsupported by stand-alone theory and must be rejected as BNSF did not face such barriers when the lines were originally constructed.

Not only is BNSF’s argument unsupported by stand-alone theory, it is unsupported in fact. BNSF’s claim that it incurred utility relocation costs for 55 miles of capacity improvements is unsupported save for a single AFE, pertaining to 0.52 miles in Texas to extend a siding, where utility relocation costs were incurred. However, it is not clear even if this AFE supports BNSF’s position. *See* BNSF Reply electronic workpaper file “AFE A990454.pdf.” The 55 miles of additional (passing) track added by the BNSF, and the 71 miles of additional track added by the TNR, would not require additional

right-of-way to be purchased and, in fact, BNSF did not make that claim. As such, if there were any utilities to be relocated, they would have been relocated when the right-of-way was first purchased. This means that no utility relocation would be necessary for capacity improvements located on the original right-of-way. It is possible that, when the siding in Texas was extended, BNSF had to buy the land for this extension, but there is no way of determining this from BNSF's AFE.

AEP Texas also reviewed the AFEs provided by BNSF in discovery and found several AFEs pertaining to capacity enhancements which did not include costs for utility relocation. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00806-00831.

BNSF's inclusion of utility relocation costs for these "capacity improvements" is a new item never before included in a SARR's road property investment costs. It is in contradiction to stand-alone cost theory, and BNSF's inclusion of these costs is not supported by any credible evidence.

vi. Seeding/Topsoil Placement

On Opening, AEP Texas included \$1.49 million for seeding/topsoil placement. In particular, AEP Texas included costs for this item at locations indicated on the ICC Engineering Reports where BNSF incurred such costs on rail lines built within the last 40 years. AEP Texas' costs were based on information from the testimony of Jerry R. Masters concerning the costs of topsoil and seeding placement on the Orin Line construction project. *See* AEP Texas Op. at III-F-52 to 53 and Exhibit III-F-13.

On Reply, BNSF included \$3.54 million for topsoil placement and a separate cost of \$3.42 million for seeding, for a total of \$6.96 million. BNSF agrees, in part, with the methodology used by AEP Texas to develop quantities for topsoil, but adds quantities for “capacity enhancements.” BNSF also disagrees with the unit cost used by AEP Texas. The final difference between BNSF and AEP Texas is caused by BNSF's inclusion of separate costs for seeding. *See* BNSF Reply at III.F-71 to 73. These issues are discussed below.

First, BNSF has included costs for topsoil placement and seeding in the areas where it argued that additional utility relocation costs were necessary (*i.e.*, areas where BNSF has made capacity enhancements over the years or where AEP Texas built more track than BNSF has now). For the reasons discussed in the utility relocation section, *supra*, BNSF’s costs are a barrier to entry and must be rejected. Moreover, BNSF has not argued or demonstrated in any way that topsoil placement and seeding are actually needed in any of the locations where BNSF added such costs, and the costs must also be rejected for that reason. In fact, the one AFE cited by BNSF to support its inclusion of capacity enhancements with regard to utility relocation costs does not include any costs for seeding/topsoil placement.

BNSF maintains that the Orin Line unit cost used by AEP Texas does not include seeding and that it is inappropriate to index the 1978 unit cost to 2000 for use in this proceeding. BNSF claims that there was a separate contract for seeding of the Orin

Line yet BNSF did not produce any documentation supporting its claim. This issue was decided in *Wisconsin* where the Board determined that the topsoil placement cost for the Orin Line included seeding costs (the position also taken by UP in that case). See *Wisconsin* at 85, n. 159. BNSF's position was rejected in *TMPA*, where the Board held that it was improper to include seeding costs separately when they were already included in the cost used by the complainant, and in *PSCo/Xcel* where the Board stated that BNSF's claim was unsupported by any evidence. See *TMPA* at 121-22 and *PSCo/Xcel* at 100. As the Orin Line cost was accepted by the Board in these decisions, and presumably indexed to the proper time period in each proceeding, AEP Texas' reliance on it in this proceeding is appropriate.

BNSF further maintains that AEP Texas' failure to include costs for topsoil placement and seeding for the entire AEP Texas right-of-way significantly increases the TNR's maintenance costs by requiring continuous slope restabilization and increasing the need for ditch cleaning and ballast cleaning. BNSF's position is again off-target. AEP Texas included the costs for embankment protection based on what BNSF (and its predecessor railroads) incurred when these lines were originally built. This is consistent with stand-alone theory and with the Board's ruling in *TMPA* and *PSCo/Xcel*. See *TMPA* at 121-22; *PSCo/Xcel* at 100. Furthermore, BNSF fails to consider the likely possibility that natural growth along the embankment precluded erosion and other problems from affecting BNSF's predecessors when these lines were originally built. In fact, the Board

has previously found that seeding is a barrier to entry whenever natural growth occurs. *See APS*, 2 S.T.B. at 408; *FMC* at 120. Just because the TNR does not incur a separate cost does not mean that the embankment is not protected. Therefore, BNSF's inclusion of additional maintenance costs is unnecessary.

On Rebuttal, AEP Texas continues to rely on its Opening evidence methodology and unit cost application, consistent with *Wisconsin*, *TMPA* and *PSCo/Xcel*. Investment for topsoil placement and seeding for the TNR equals \$1.48 million. See Exhibit III-F-20.

vii. Water for Compaction

On Opening, AEP Texas included \$10.75 million for water for compaction. The quantity of water required per cubic yard was obtained from specifications and cost documents from BNSF's Orin Line project. The cost per gallon of water of \$0.009 was from a Wyoming DOT bid. *See* AEP Texas Op. at III-F-53 to 54 and Exhibit III-F-13.

On Reply, BNSF included \$12.73 million for this item. BNSF accepts AEP Texas' quantity of water per cubic yard of earthwork, but it disagrees with the unit cost. BNSF argues that the unit cost used by AEP Texas includes the cost for transporting and spreading the water, but not the cost of the water itself. Therefore, BNSF included additional costs for water from the Means Handbook. *See* BNSF Reply at III.F-75 to 76.

As noted above, AEP Texas used a unit cost of \$0.009 per gallon for water for compaction. The Means Handbook contains three different costs for water for

compaction depending on the length of the haul. When converted to a cost per gallon of water, the total costs including the water, transportation and application (and overhead and profit) range from \$0.005 to \$0.008 per gallon, all of which are lower than the \$0.009 used by AEP Texas. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00861. BNSF's addition of \$0.001 per gallon for water costs using the Means Handbook results in an unnecessary increase of the unit cost for water for compaction. AEP Texas also notes that BNSF accepted and used the unit cost of \$0.009 per gallon for water for compaction in the public version of its Reply evidence in the *Otter Tail* rate-reasonableness proceeding. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00866.

On Rebuttal, AEP Texas has continued to rely on its Opening unit cost of \$0.009 per gallon which, as shown above, is an overstatement. Total water for compaction costs for the TNR equal \$10.91 million. *See* AEP Texas Reb. Exhibit III-F-20.

viii. Surfacing for Roads

On Opening, AEP Texas included \$4.45 million for surfacing of detour roads. AEP Texas included these costs for recently constructed lines such as the Orin and Campbell Subdivisions. AEP Texas did not include these costs on the older lines it is replicating, as BNSF did not incur such costs which means that these inclusions would represent a barrier to entry. *See* AEP Texas Op. at III-F-54 to 55 and electronic workpaper file "TNR GRADING.xls," tabs "IIIF_13 Othr Cost" and "Public Road Detours." This methodology is consistent with prior Board decisions. *See FMC* at 120; *Wisconsin* at 85;

PPL Montana at 20; *TMPA* at 122-23; *Duke/NS* at 100; *Carolina* at 86; *Duke/CSXT* at 84; *PSCo/Xcel* at 101.

On Reply, BNSF included \$19.49 million for this cost item. BNSF agrees with AEP Texas' units costs and the application of such costs to the newer lines, but it raises three arguments against AEP Texas' position. *See* BNSF Reply at III.F-76 to 78. The first criticism is that AEP Texas should have included costs for road detours on the Reno Subdivision as it is also a relatively new BNSF line segment. AEP Texas agrees, and it has made this correction on Rebuttal. In addition, while comparing BNSF's Reply count of crossings to AEP Texas' Opening count, AEP Texas discovered that it had overstated the number of public crossings by five. Specifically, AEP Texas overstated the number of public crossings by one on the Donkey Creek to South Logan (Orin Subdivision) segment and by four on the Las Animas to Amarillo (Boise City Subdivision) segment. This overstatement has been corrected on Rebuttal.

Second, BNSF has included a count of crossings on the so-called "capacity enhancements" made by BNSF in the last ten years and by AEP Texas in designing the TNR. As discussed in the section on utility relocation costs, *supra*, these additional tracks should be treated in the same manner as the main-line tracks they are adjacent to (*i.e.*, if the crossing costs for the main track are not applicable because the original railroad construction pre-dates the road, then there should be no crossing costs for these additional

tracks). Furthermore, BNSF provided no evidence that it actually incurred any crossing costs for these “capacity enhancements.”

Third, BNSF argues that the costs for road detours should extend to all other lines because the ICC Engineering Reports show that BNSF’s predecessors might have paid for road crossings on such lines. *See* BNSF Reply at III.F-76 to 77. BNSF’s assumptions are unfounded and should be rejected. In particular, as AEP Texas discusses in full in Part III-F-8, *infra*, the ICC Engineering Reports are not definitive as to who paid for a particular crossing, and therefore it is not reasonable to assume that any detour costs were borne by BNSF. Furthermore, BNSF does not even suggest, nor is it the case, that the ICC Engineering Reports show any costs for road detours, and BNSF has not presented any specific evidence of such costs. Finally, as the railroad predates most of the roads in this area, it is unlikely that any road damage was incurred when the lines were originally constructed.

On Rebuttal, AEP Texas continues to rely on its Opening count of crossings, as modified to include the crossings on the Reno Branch and correct the overstatement discussed above, applied to its Opening unit cost. Total investment for road surfacing for detours equals \$4.27 million.

ix. Construction Site Access Roads

On Opening, AEP Texas did not include any access roads as the vast majority of the route is easily accessible via public roads. However, the BNSF has

included costs for certain bridge construction sites and railheads (selected by BNSF not AEP Texas) that it argues are inaccessible. BNSF Reply at III.F-79. On Opening AEP Texas cited only a few rail heads for material delivery in order to obtain shipping prices, the TNR would certainly use many of the rail connections and road connections for accessing its right-of-way. There are 26 rail crossings of the residual BNSF⁸ and other rail carriers throughout the TNR's route. They include from north to south:

- BNSF - Gillette, WY
- BNSF - Orin, WY
- DME - Crawford, NE
- BNSF - Alliance, NE
- BNSF and UP - Northport, NE
- BNSF - Bridgeport, NE
- UP - Sidney, NE
- Up - Sterling, CO
- NKCR - Sterling, CO
- BNSF - Brush, CO
- BNSF - Denver, CO
- UP (Denver Pacific) - Denver, CO
- UP (Kansas Pacific) - Denver, CO
- Denver Intermountain Railroad - Denver, CO
- Denver Rock Island Railroad - Denver, CO
- Rock & Rail Railroad/UP - Pueblo, CO
- C&W RR - Pueblo, CO
- BNSF - La Junta, CO
- BNSF - Las Animas, CO
- Cimerron Valley Railroad - Springfield, CO
- Cimerron Valley Railroad - Boise City, OK
- UP - Stratford, TX
- Texas Northwestern Railroad - Etter, TX
- BNSF and UP - Amarillo, TX

⁸ As discussed at pp. III-F-118 to 119, *infra*, SAC theory permits a SARR to use the lines of the residual incumbent for transportation of materials because those lines exist (for SAC purposes) up to the time when the SARR commences operations.

BNSF - Quanah, TX
BNSF - Oklaunion, TX.

The above list only includes rail connections. There are also many roads available. *See* AEP Texas Op. electronic workpaper file “AEP TEXAS NORTH ROUTE.est.” As such, AEP Texas has not added BNSF’s proposed costs to its Rebuttal

x. Environmental Compliance

On Opening, AEP Texas developed environmental compliance costs of \$0.70 million based the environmental compliance costs accepted by the Board in *FMC*. AEP Texas applied these costs to the newly-constructed lines of the TNR. *See* AEP Texas Op. at III-F-55 to 56 and Op. Exhibit III-F-13.

On Reply, BNSF included \$1.60 million for environmental compliance. BNSF accepts AEP Texas’ unit cost development, and the application of those costs to the newly constructed portions of the lines the TNR is replicating. However, BNSF has added environmental mitigation costs to the same “capacity enhancement” locations and for the same reasons that it added additional utility relocation costs. For the reasons discussed *supra*, the additional locations that BNSF has included are unwarranted and unsupported by stand-alone theory, and must be rejected as BNSF did not face such barriers when these line segments were originally constructed. Furthermore, BNSF did not provide any evidence that it incurred any environmental compliance for any of these so-called “capacity enhancements.” AEP Texas reviewed several AFEs for track construction

provided by BNSF in discovery and did not see any costs for environmental compliance.

See AEP Texas Reb. Workpapers Vol. 3, pp. 00806-00831.

On Rebuttal, AEP Texas continues to rely on its Opening methodology and unit cost to calculate environmental costs of \$0.69 million for the TNR.

xi. Land for Waste Excavation

On Opening, AEP Texas assumed that 30 percent of the excavated quantities would be wasted, and it included \$0.14 million for land for waste quantities. AEP Texas' calculation was based on an assumed depth of 15 feet (24,200 CY per acre), resulting in the need for 470.9 acres, and a land cost of \$300 per acre. *See* AEP Texas Op. electronic workpaper file "TNR GRADING.xls," tab "IIIF_13Othr Cst."

On Reply, BNSF included \$0.16 million for land for waste quantities. BNSF accepted AEP Texas' methodology and land cost. The difference in investment is caused solely by the difference in earthwork quantities, which has been addressed *supra*.

On Rebuttal, AEP Texas has included \$0.15 million for land for waste quantities which reflects the slight increase in earthwork quantities from opening. *See* AEP Texas Reb. Exhibit III-F-20.

xii. Yard Site Preparation

On Opening, AEP Texas included \$20.6 million for yard site preparation, including surfacing, drainage, lighting and fencing for both the Alliance and Las Animas

Yards. While BNSF generally accepts AEP Texas' costs and approach, it has taken issue with several items.

First, BNSF moved the Las Animas Yard to Amarillo, applied the same unit costs to Amarillo, and adjusted for the additional track that BNSF added. As noted in Part III-B, *supra*, AEP Texas is not moving the TNR's Las Animas Yard to Amarillo.

However, it has added two additional tracks at Las Animas, and therefore it has adjusted its costs for that yard accordingly.

Second, BNSF argues that AEP Texas should pave the inspection roadways. This cost is totally unnecessary. As BNSF acknowledged, AEP Texas already included gravel inspection roads, which are more than sufficient (indeed many yards have no inspections roads at all). *See* AEP Texas Op. electronic work paper file "AEP TEXAS NORTH-PUEBLO 10-29-03.pdf" (Way Point 88); "AEP TEXAS NORTH-PIKES PEAK10-27-03.pdf" (Way Point 29); "AEP TEXAS NORTH BRUSH 10-28.pdf." (Way Point 049); "AEP TEXAS NORTH BRUSH 10-27.pdf" (Way Point 6). Moreover, BNSF claims that paving is necessary to limit dust and provide an adequate surface for inspections. BNSF has not provided any evidence that a gravel road will create any dust problems, nor has it offered any rationale as to why a gravel inspection road is not a suitable surface from which to perform inspections. Finally, BNSF has not even argued that such roads in its own yards are paved. As such, BNSF's paved inspection roads should be rejected.

Third, BNSF argues that the drainage system length per track should be 4,245 LF rather than 3,945 LF used by AEP Texas on Opening because the additional length is required to cover the entire length of each track. The difference in length is 300 feet. That is the distance from the end of track to the first catch basin for each end of track as shown on the sketch provided in AEP Texas Opening electronic workpaper file “Building Sites.xls,” tab “yard drainage and lights.” The spacing shown between catch basins is 300 feet. AEP has allowed drainage to flow no more than 150 feet in any direction before it drains to a catch basin. Therefore, a 150-foot allowance has been made at both ends of each track.

Fourth, BNSF increased the cost of AEP Texas’ yard fence by switching to “industrial fencing” versus the “residential” fencing used by AEP Texas on Opening. The principal differences between the fences selected by the parties is that the “industrial” fencing includes barbed wire. The only other difference is a slight difference in gage (9 gage versus 11 gage). AEP Texas engineering experts viewed most of the BNSF’s yards on the route being replicated by the TNR. Many of the yards had little or no fence at all, let alone barbed wire fences. As AEP Texas provides more fencing than BNSF itself uses, AEP Texas has continued to use its fencing type and quantity.

Finally, BNSF agrees with AEP Texas’ selection of light fixtures for the yards, but it has added costs for items such as bollards, foundations and brackets for the pole and light assemblies. AEP Texas agrees that these additional costs are necessary with

one exception, and it has added them to its unit costs on Rebuttal. The one exception is BNSF's addition of bollards around the base of the light poles. BNSF's own field trip photos show that BNSF does use bollards around its light fixture in the Alliance Yard. Consequently, AEP Texas has excluded them on Rebuttal.

xiii. Construction Lighting

Apparently as an after-thought, and with virtually no explanation, BNSF has added over \$8.7 million for construction lighting during the winter months. BNSF's sole explanation is that the lighting will be required to meet the TNR's "aggressive" construction schedule during the winter months where it opines that daylight only lasts a little over eight hours. BNSF's additional costs involve several factual and operational assumptions that are flawed.

First, BNSF argues that daylight only last a little over eight hours during the winter months, and therefore, lighting will be required. Putting aside the question of whether more than eight hours of work is required, BNSF's statement about the light availability is incorrect. The U.S. Naval Observatory sunrise/sunset calculator shows that on December 21, 2004, the shortest day of the year, the time between sunrise and sunset at Denver, CO (approximately the mid-point in latitude for the TNR system) is 9 hours and 21 minutes. *See* AEP Texas Reb. electronic workpaper file "daylight.xls." More importantly, the time between the beginning and end of civil twilight (where the sun illuminates brightly enough for outdoor activities without the aid of lights) is 10 hours and

22 minutes. *Id.* By February 1, the time between sunrise and sunset extends to 10 hours and 12 minutes, and the time between the beginning and end of civil twilight extends to 11 hours and 9 minutes. *Id.* So even on the shortest day of the year, there is more than enough time for the construction crews to do their work. Indeed, even BNSF's construction management costs assume only 10 hours per day of supervision. Thus, BNSF's cost for construction lighting are unsupported.

BNSF's inclusion of construction lighting costs should also be rejected because this type of cost, should it in fact become necessary, is precisely the type of cost that the contingency funds are intended to cover – unexpected and unknown costs. BNSF's addition of costs based purely on unsupported speculation is improper and erroneously increases the construction costs of the TNR. BNSF's inclusion of speculative costs not only overstates the construction costs of the TNR, it also increases the base investment against which the contingency and engineering additives are applied, causing an even greater overstatement in construction costs.

3. Track Construction

BNSF attempts to inflate track construction costs by requiring AEP Texas to meet standards that BNSF itself does not follow. BNSF also suggests that there are a number of inconsistencies, omissions and errors that will raise the costs of constructing the TNR. BNSF Reply at III.F-86. Many of these added costs are overstated, and several of

the components BNSF suggests are required are unnecessary for a least-cost, most-efficient carrier.

BNSF also attempts to attack AEP Texas' cost quotations by stating that AEP Texas obtained a collection of very low costs by extracting individual unit costs from quotes from numerous scattered suppliers, BNSF's own data, and the R.S. Means Handbook. BNSF Reply at III.F-87. In numerous stand-alone cost cases, the Board has accepted costs from all three of these reliable methods of cost estimating. BNSF has not shown why such costing tools should be ignored in the present case. Indeed, as a least-cost, most-efficient carrier, the TNR should attempt to find the most economic method of constructing its rail line. As a result, AEP Texas stands by all three methods of costing used in its Opening evidence.

Further, BNSF notes errors in location factors and historical indexing. BNSF argues that the application of R.S. Means location factors to non-Means costs (such as where the unit cost was developed from a supplier's quote or BNSF's price list) is inappropriate because BNSF costs and suppliers quotes are not generic costs which do not take into consideration geographical location of a supplier. BNSF Reply at III.F-87. In addition, BNSF argues that AEP Texas' experts inappropriately averaged the historical factor and the location factor. BNSF Reply at III.F-88. AEP Texas has corrected these errors on Rebuttal.

BNSF also attempts to drive up costs by adding additional transportation expenses to various TNR construction railheads. BNSF Reply at III.F-88. BNSF also argues that additional railheads are necessary to meet the construction schedule. BNSF Reply at III.F-89. As discussed below, AEP Texas takes issue with the excessive transportation additives that BNSF has used.

AEP Texas also notes that most of the differences in track-related quantities stem from the parties' differing track and yard configurations. AEP Texas uses the track miles and configurations discussed in Part III-B, *supra*. See AEP Texas Reb. electronic workpaper files "Total Rail and Type Miles.xls," "Track Miles Total.xls," and "yardcomputations.xls."

AEP Texas discusses the specific areas of disagreement in detail below.

a. Geotextiles

BNSF criticizes the degree to which AEP Texas utilizes geotextile fabric in its construction of the TNR. Yet, BNSF provides little support for its own placement of geotextiles. BNSF attempts to justify its excessive use of geotextiles simply by stating in its testimony that "BNSF standardized construction specifications required that geotextiles be placed between the subgrade and the subballast." BNSF Reply at III.F-90. BNSF cites a rail construction-specification workpaper as evidence of this requirement. The specification in this workpaper does not state that geotextiles *shall* be used, but only that the geotextile fabric "shall be placed . . . in the manner and locations *shown on the*

plans, or as directed by the Engineer.” BNSF Reply Workpapers Vol. IV, p. III.F-0477 (emphasis added). Geotextiles are shown on BNSF’s plans, and in fact, AEP Texas has obtained a set of standard drawings produced by BNSF and used in a class conducted by the Institute of Railroad Engineering. The drawings show no geotextiles in either the standard track details or the standard turnout details. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00869-73. BNSF also fails to follow its own standards by including geotextile fabric for the TNR’s crossing diamonds; in the typical illustration provided by BNSF for crossing diamonds, there is no reference by the engineers to geotextile use. *See* BNSF Reply Workpapers Vol. IV, p. III.F-0477.

AEP Texas’ engineering experts used the AREMA guidelines to determine proper placement of geotextiles on the TNR. AREMA defines the use of geotextiles as:

10.1.1.1 Application Uses

The use of geotextile is dependant upon traffic, environmental and/or subgrade conditions.

10.1.1.2 Application Locations

An engineering analysis of existing or proposed conditions, including subgrade classification using the “Unified Soil Classification” should determine if a geotextile is required.

AEP Texas Reb. Workpapers Vol. 3, p. 00874. The United States Army specifications for constructing military tracks define the use of geotextiles as being “*sometimes* used under the track to provide for filtration and/or separation of ballast and subgrade or ballast and subballast, drainage functions.” AEP Texas Reb. Workpapers Vol. 3, p. 00875 (emphasis added). Both the AREMA and the United States Army Standards affirm that

geotextiles are utilized only in situations requiring special needs. As a result, AEP Texas' experts have utilized geotextile fabric only in areas where its engineering experts determined that such special needs exist.

i. Specifications

BNSF states that AEP Texas properly used geotextile fabrics for turnouts and at-grade crossings, but failed to include geotextile fabric for rail diamonds and grade crossings, which BNSF constructed with different materials than those utilized by AEP Texas. BNSF Reply at III.F-90. While AEP Texas agrees that geotextiles must be added to rail crossings, geotextile costs are already included in the grade crossing costs utilized by AEP Texas as discussed below.

(a) Geotextiles Under Turnouts

BNSF and AEP Texas both placed geotextile fabric under the turnouts, but BNSF argues that AEP Texas should extend the geotextile fabric to encompass the entire switch structure including the transition ties, which would add an additional 272 square feet of geotextiles ahead of each turnout. BNSF Reply at III.F-91. AEP Texas does not accept the use of geotextile in these areas and, in fact, has rejected the use of transition ties adjacent to turnouts. Moreover, the detailed layouts provided by BNSF fail to mention the use of geotextile fabric beneath the transition ties. *See* BNSF Reply Workpapers Vol. IV, pp. III.F-0493-95. In addition, the use of geotextiles beneath the

transition ties is unnecessary as AEP Texas' design does not call for any transitions between track segments that would require transition ties.

In addition, BNSF notes that the amount of geotextile fabric used for turnouts that AEP Texas calculated in its workpapers differs from that included in its geotextile totals. BNSF Reply at III.F-92. BNSF corrected this amount, and AEP Texas agrees with its adjustment.

BNSF further increases the geotextile fabric because it argues that AEP Texas' totals include only the geotextile for the overlap and does not include fabric for the entire turnout plus the overlap. BNSF Reply at III.F-92. BNSF corrected this amount, and AEP Texas agrees with this adjustment as well.

(b) Geotextiles Under Road Crossings

AEP Texas has not included any additional costs for geotextile beneath road crossings, because the cost for geotextiles is included in the unit cost for road crossings. *See* AEP Texas Op. Workpapers Vol. 22, pp. 11658-84. BNSF accepts AEP Texas' road crossing unit costs, when using the same type of crossing as AEP Texas. However, BNSF has added geotextiles to the variety of other road crossing types (*e.g.*, gravel) it has used in its restatement of the TNR's construction costs. BNSF's additional road crossings types are superfluous. AEP Texas simplified the construction of road crossings by constructing only two types of crossings – asphalt and concrete. These crossings are suitable replacements for the existing crossing types. Moreover, these crossings have

proven to be the most reliable and most capable of withstanding the wear and tear that usually occurs at road crossings. Concrete and asphalt are superior materials to gravel, wood timbers and planks, and unconsolidated material. The use of a variety of types of crossings is another attempt by BNSF to complicate construction and inflate costs.

(c) Geotextiles Under Rail Crossings

As discussed above, BNSF has added the costs of geotextile fabric to all rail crossings. AEP Texas agrees with this and has added the costs of geotextiles for rail crossings.

ii. Unit Cost

BNSF agrees with the unit cost for materials, but uses the RS Means cost for labor, including Overhead and Profit and Installation. BNSF Reply at III.F-94. BNSF states that the Windgate quote does not include geotextile placement as an itemized cost. *Id.* AEP Texas accepts the BNSF's unit price for geotextiles which includes the Overhead and Profit costs.

b. Ballast and Subballast

i. Specifications

The parties agree on the composition and the general depths of the ballast and subballast. AEP Texas used eight inches of subballast and 12 inches of ballast in its mainline track and passing sidings. This practice is consistent with a number of prior decisions, including *PSCo/Xcel*. *Id.* at 102.

BNSF, however, argues that the TNR needs additional ballast under curves between one and three degrees. BNSF Reply at III.F-95. BNSF cites a table and a formula from AREMA as the evidence that the same amount of ballast is required for a one degree curve as for a five degree curve. *See* BNSF Reply Workpapers, Vol. IV, pp. III.F-0487-88. BNSF's witnesses fail to realize that the table that they cited shows the calculated elevation needed to achieve equilibrium. Equilibrium can be defined in railroad terms as "A condition in which all influences acting upon it are canceled by others, resulting in a stable balanced, or unchanging system." AEP Texas Reb. Workpapers Vol. 3, p. 00877. This definition refers to the rail car as it passes around a curve. Super-elevation established in a curve acts as a balancing or stabilizing force against the influence of centrifugal forces, thus bringing the rail car into equilibrium.

The FRA allows railroads to design and build curved track with an unbalanced tolerance of up to four inches below equilibrium. AEP Texas Reb. Workpapers Vol. 3, p. 00878. This means that a track designed for exact equilibrium (such as the AREMA chart used by BNSF) may be built with less super-elevation by up to four inches, should the governing railroad chose to do so. For example, a train operated over a one degree curve at 100 miles per hour would require seven inches of super-elevation to reach equilibrium. The same curve can be designed and built with only three inches of super-elevation, using four inches of unbalance as allowed by the FRA. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00878. The cars will exert more pressure on the

inside of the rail of a curve if it is unbalanced than it will on the outside rail. Allowing unbalance simply means that the weight will not be evenly distributed to both rails, and the FRA guidelines recognize that the rail can support this level of unbalance.

The AREMA equilibrium chart shows that the one degree curve at 60 miles per hour would require 2.52 inches of super elevation. When the four inches unbalance design that is allowed by the FRA is applied, a one degree curve can be operated at 66 miles per hour before any super-elevation is needed. AEP Texas Reb. Workpapers Vol. 3, p. 00878. As the maximum train speed on the TNR is 60 mph, AEP Texas has not added any additional ballast for curves between one and three degrees.

BNSF also takes issue with AEP Texas' determination that subballast is unnecessary in the TNR's yards. BNSF Reply at III.F-95. AEP Texas used 10 inches of ballast and 12 inches of yard fill, instead of using additional subballast. The yard tracks thus are set on 22 inches of ballast and compacted subbase. Because of the very low speeds associated with the yards, AEP Texas did not incorporate any dynamic loading into the subgrade bearing pressure calculations. AEP Texas Op. Workpapers Vol. 21, pp. 10724-37. As discussed below, AEP Texas' exclusion of subballast is appropriate.

First, BNSF argues that the fill for the yards would be unsuitable when applied as subballast. AREMA describes subballast as follows:

Material most commonly available for use as subballast are those aggregates ordinarily specified and used in construction for highway bases and subbases. These include crushed stone, natural or crushed gravels, natural or manufactured sands,

crushed slag, or a homogenous mixture of these materials.
Other natural or on site materials conforming to proper engineering standards and specifications as may be defined by individual railway companies may be used.

AEP Texas Reb. Workpapers Vol. 3, p. 00879 (emphasis added); AEP Texas Op. Workpapers Vol. 21, p. 10756.

As the fill material used by AEP Texas would be subject to approval by its engineering staff, it is reasonable to assume that the materials would be suitable for use as subballast. Moreover, the Board has accepted AEP Texas' approach in prior SAC rate cases. *See, e.g., Duke/CSXT* at 87.

The issue of subballast/ballast in yards is apparently not as critical as BNSF would like the Board to believe. BNSF itself has yards where common earth and fouled ballast support the track structure. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00880-84. Again, BNSF is attempting to require the TNR to meet specifications that its own real-world yards do not meet. Consequently, AEP Texas has not added subballast to the TNR's yards.

ii. Material Availability Along the TNR

BNSF generally accepts AEP Texas' sources for ballast and subballast along the TNR, and it accepts the general methodology used to determine a transportation additive for ballast. BNSF Reply at III.F-98. However, BNSF alters the transportation costs for ballast and subballast to conform with its changes to the railheads and track construction schedule. *Id.*

AEP Texas has accepted and corrected the transportation distance from Granite Canyon to Sterling, as provided by BNSF. However, AEP Texas does not agree that additional railheads are necessary for ballast distribution. First, BNSF provide no support for its additional railheads. In particular, BNSF agrees that Northport is a sufficient delivery location for ballast, but places another railhead at Alliance which is only 35 miles north of Northport without any support as to why an additional nearly railhead is necessary. As a result, AEP Texas has not included the cost for transportation of ballast from Guernsey to Alliance.

iii. Ballast and Subballast Quantities

As noted above, BNSF accepts AEP Texas' general methodology for determining ballast and subballast quantities. BNSF Reply at III.F-99. AEP Texas used eight inches of subballast and 12 inches of ballast in its mainline track and passing sidings. BNSF again takes issue with the calculation for ballast and subballast for curves between one and three degrees. BNSF Reply at III.F-99. BNSF argues that these curves need the same amount of ballast as five-degree curves. BNSF Reply at III.F-100. As discussed above, additional ballast for these curves is unnecessary and no additional ballast is added for these curves.

BNSF also points out that AEP Texas failed to account for ballast and subballast quantities for the 21 miles of TNR branch and spur tracks. BNSF Reply at III.F-100. AEP Texas agrees with this and has corrected this omission on Rebuttal.

iv. Unit Costs

(a) Ballast

While BNSF's consultants generally accept AEP Texas' method for computing the unit price for ballast, they have made some unwarranted adjustments to the unit cost. Again, BNSF's consultants claim that the railhead that BNSF added will increase transportation costs. BNSF Reply at III.F-100. Because of the additional railhead, BNSF has changed the transportation additive in the unit cost for ballast. BNSF Reply at III.F-101. As discussed above, AEP Texas has altered the transportation distance from Granite Canyon to Sterling, but has not included costs for additional railheads.

BNSF's consultants correct two errors in AEP Texas' calculation of the ballast unit cost. BNSF Reply at III.F-101. First, BNSF states that AEP Texas routed the ballast shipment on a railroad that no longer exists, and therefore they have corrected the transportation additive to show transportation over longer distances. *Id.* AEP Texas agrees that the railroad no longer exists from Granite Canyon to Sterling and has corrected this on Rebuttal.

Next, BNSF notes that AEP Texas claimed to use the Davis quarry costs supplied by BNSF in discovery, but then used a different number when calculating unit costs. BNSF Reply at III.F-101. AEP Texas has corrected this error.

(b) Subballast

BNSF criticizes AEP Texas' use of the subballast number from BNSF's own AFE, which it produced in discovery. BNSF Reply at III.F-102. BNSF provides no argument or rationale why this cost is somehow inappropriate or incorrect, other than to say that the cost is not representative. The Board has accepted unit costs obtained from AFEs in past SAC cases. *See, e.g., TMPA* at 140.

BNSF instead refers to a quote of \$3.75 per ton from Guernsey Stone as an indicator that AEP Texas' cost per ton is too low. However, BNSF fails to refer to the quote on the previous workpaper page showing \$2.50 per ton from The Aggregate Source. AEP Texas Op. Workpapers Vol. 21, p. 10748. The quote from Guernsey stone was likely to be higher because less volume was involved – 100 tons, a minuscule amount in comparison to the actual tonnage required by AEP Texas. Because the AFE is a reliable source for obtaining costing information, AEP Texas stands by its material cost as the best evidence of record.

BNSF also alters the unit cost for subballast by adding additional costs for transportation. BNSF Reply at III.F-102. BNSF finds fault with AEP Texas' use of the dump train rental fee as the entire transportation cost. *Id.* Further, BNSF argues that the rental fee is too low. AEP Texas agrees with BNSF's transportation addition, with the exception of the cost from Guernsey to Alliance, as BNSF has accepted the unit cost for this subballast.

c. Ties

i. Tie Specifications

BNSF accepts AEP Texas' use of and specifications for wood crossties and for the spacing of the ties, BNSF Reply at III.F-103. However, BNSF noted an inconsistency between AEP Texas' narrative and its workpaper that determined the tie costs. BNSF Reply at III.F-104. AEP Texas stated on Opening that it would use grade five ties for branch lines, but included only grade three ties in its workpaper. AEP Texas has changed the costs to include the costs of grade five ties for branch lines. AEP Texas has also changed the quantity of the grade three ties which were incorrectly used on Opening.

ii. Tie Quantities

BNSF generally accepted AEP Texas' tie quantities but substituted grade five ties for the grade three ties for the branch lines. BNSF Reply at III.F-104. AEP Texas agrees with this change and has changed the quantities to reflect the substitutions. Further, BNSF alters the quantity amount to incorporate BNSF's changes to the TNR's configuration. BNSF Reply at III.F-104. AEP Texas has accepted some changes to the configuration and route miles as indicated in Part III-B, and has altered its tie quantities based on those changes, as well.

iii. Unit Costs

BNSF states that AEP Texas used RS Means to determine the tie unit costs but failed to add ten percent for Overhead and Profit costs. BNSF Reply at III.F-105.

AEP Texas used RS Means to determine the cost for grade five ties. AEP Texas did not include Overhead and Profits because Windgate included it in its quote for tie installation – thus the contractor has already received its O&P share. *See* AEP Texas Op.

Workpapers Vol. 21, p. 10738. Thus, BNSF approach results in a double count of costs.

BNSF notes that grade three ties are not currently produced in Denver and therefore has changed the cost for delivery to reflect transportation costs from Galesburg, IL. AEP Texas accepts the fact that the grade three ties are not currently produced in the Denver plant, and instead will come from Galesburg. AEP Texas accepted the cost from Galesburg, which included delivery. The quote from Windgate includes transportation for all materials on the job site. AEP Texas Op. Workpapers Vol. 21, pp. 10738 to 40. Further, the shipping costs are taken as an average over the TNR's lines, with some of the locations being closer to the supplier and some being farther.

iv. Transition Ties

BNSF argues that no transition ties were used on the TNR. BNSF Reply at III.F-108. BNSF has included transition ties for installation before the switch points at each turnout and has constructed the crossings entirely with transition ties.

AEP Texas has not included transition ties ahead of the switch points. They are not recommended by AREMA, and are not used by all railroads as a construction standard. AEP Texas Reb. Workpapers Vol. 3, pp. 00886-89.

BNSF does indicate the use of transition ties ahead of turnouts on its typical turnout drawings, yet BNSF does not always apply them to actual construction. AEP Texas Reb. Workpapers Vol. 3, p. 00890.

BNSF also attempts to support its use of transition ties by showing that BNSF currently uses these ties on the approach to open deck bridges. BNSF Reply Workpapers Vol. IV, p. III.F-0496. The TNR has no open deck bridges, why the TNR should be constructed using transition ties. AEP Texas is using ballasted deck bridges, which provide the same basic surface as the track leading to the bridge. Therefore, there is no transition that requires larger, more expensive transition ties.

BNSF has also used transition ties for all of the TNR's grade crossings. AEP Texas has provided quotes which already include the crossties for construction of the crossing. BNSF has accepted these quotes, but later attempts to double count the ties for this section by adding in the costs for transition ties to the cost for grade crossings which already include 10 foot long ties, which were recommended by the manufacturer. AEP Texas Op. Workpapers Vol. 22, p. 11670. As such, AEP Texas has not included transition ties on Rebuttal.

d. Track (Rail)

i. Mainline

(a) Specifications

BNSF generally agrees with AEP Texas' specifications for rail. BNSF, however, noted that AEP Texas did not place 136-pound premium rail in the Orin Subdivision between Donkey Creek and South Logan Donkey Creek, as it had indicated it would in its Narrative. BNSF Reply at III.F-108. After reviewing AEP Texas' Opening Evidence, it is obvious that the 125.4 track miles of this segment were properly included in the total calculations for rail. *See* AEP Texas Reb. electronic workpaper files "Total Rail and Type Miles.xls" and "Track Miles Total.xls." The entire mainline track for the Orin subdivision is included as premium rail. When the total premium rail of the two parties is compared, the difference is less than six miles, so it is impossible that such a large section was overlooked.

(b) Quantities

BNSF notes that on Opening AEP Texas doubled its rail material costs, due to an improper equation in its workpapers. BNSF remedied the mistake and AEP Texas agrees with this approach. BNSF has also altered the quantities because of its configuration changes. AEP Texas has accepted some of these changes and as a result has included additional track for the changes it has made in Part III-B.

(c) Unit Costs

BNSF takes issue with the quote from Pohl Corporation for rail costs. BNSF argues that the quote is not a final quote because it is a phone record, and the record indicates that Pohl Corporation will fax a quote at a later date. BNSF Reply at III.F-109. Instead, BNSF developed its own unit costs based on dollar amounts found in BNSF's AFEs. In the interest of saving time and resources, AEP Texas accepts BNSF's unit costs, but disagrees with the transportation additive (*see* BNSF Reply at III.F-109).

BNSF argues that the distance calculated for transportation is inappropriate because AEP Texas is shipping the rail from the sales office in Houston instead of the facility in Pennsylvania. The transportation from Pennsylvania is no longer relevant since AEP Texas accepted BNSF's unit costs for rail. BNSF, however, shows mileage from Pueblo to Gillette as 1,869 miles, when in reality the route mileage should only be 585 miles. Defendant also shows Pueblo to La Junta as 170.6 miles, when it should be 63 miles. AEP Texas Reb. Workpapers Vol. 3, pp. 00892-94. As discussed below, AEP Texas disagrees with BNSF's transportation additives and has not incorporated the additional mileage proposed by BNSF.

ii. Branch and Destination Spurs

BNSF states that AEP Texas claimed to use 136-pound rail on branch and destination spurs and 136 pound premium rail for curves greater than three degrees in its Opening Narrative but actually used 115-pound rail in its calculations. BNSF Reply at

III.F-110. This is partially correct. AEP Texas included the branch lines as 136 pound rail, however, AEP Texas did improperly use 115 pound rail on the mine spurs. The mistake results in a 4.38 mile difference, not a 21 mile difference. This error has been corrected on rebuttal.

BNSF added a staging track to the Campbell Subdivision branch line and has increased the amount of track based on this change. BNSF Reply at III.F-111. On Rebuttal AEP Texas has imported the additions to the TNR configuration described in Part III-B, *supra*.

Additionally, BNSF has added the labor costs associated with laying the track for TNR branch and spur lines, which AEP Texas had inadvertently excluded. BNSF Reply at III.F-111. AEP Texas agrees that this cost should be included.

iii. Yard and Setout Tracks

(a) Yard Tracks

BNSF has altered the yard rail quantity to reflect the changes it made to the TNR yards. BNSF Reply at III.F-113. For the reasons discussed in Part III-B, *supra* and Part III-F-7-b, *infra*, AEP Texas has not altered its yard rail quantity, with the exception of the yard configuration changes described in Part III-B, *supra*.

(b) Set out Tracks

BNSF asserts that the TNR's set-out tracks are too short accommodate the dual purpose of holding bad-order cars and MOW equipment. BNSF Reply at III.F-113.

BNSF has added an additional 1,400 feet to each set-out track in order to accommodate maintenance and work-train equipment. BNSF Reply at III.F-113. As described at pp. III-B-32 to 34, *supra*, AEP Texas' experts have determined that there is no need to enlarge every set-out track so that it can hold a complete work train. Instead, they have lengthened two set-out tracks to 2,000 feet, one at MP 533 on the Black Hills Subdivision and one at MP 431 on the Butte Subdivision.

BNSF notes that AEP Texas has stated that it would provide 600 feet of clearance for the other set-out tracks, but failed to do so. AEP Texas has added 260 feet to each set-out track to allow for sufficient clearance. *See* pp. III-B-32 to 33, *supra*.

(c) Interchange Tracks

BNSF added additional crossover tracks at Oklaunion and Amarillo. *See* BNSF Reply at III.F-114. AEP Texas agrees that an additional cross-over track is necessary at Oklaunion (*see* p. III-B-31, *supra*) and has added it to its Rebuttal costs.

iv. Crossing Diamonds

BNSF notes that AEP Texas did not include crossing diamonds on the TNR. BNSF included four crossing diamonds where the line crosses the pre-existing Union Pacific rail lines. BNSF Reply at III.F-114. AEP Texas agrees and has included these costs.

e. **Field Welds/Compromise Joints**

BNSF agrees with the unit cost per weld kit, but argues that the cost used was a 2002 cost, instead of a 2003 cost. BNSF Reply at III.F-116. However, both the 2002 cost and the 2003 costs for a field weld was { }. *See* AEP Texas Op. Workpapers Vol. 21, pp 10780-785. As the TNR is a least-cost carrier, AEP Texas used the 2003 cost and indexed it.

AEP Texas' engineering experts used a compromise weld to join 115-pound and 136-pound rail. BNSF argues that a compromise joint configuration must be used instead. BNSF argues that the transition from 115-pound to 136-pound rail is too large to accommodate a compromise weld. BNSF Reply at III.F-116. Although the unit cost for the compromise joints is slightly lower than that of the compromise welds, AEP Texas stands behind its original choice of compromise welds due to the high maintenance issues involved with the compromise joints.

The design of the compromise joints gives them a natural tendency to crack and break at the transition location. Welds, on the other hand, do not suffer from this shortcoming. BNSF claims that compromise welds cannot be used to join the two rail sections specified. There is no basis for this claim. In fact, the bid that BNSF used for its compromise joint weld price also contained prices for compromise welds that joined 141-pound rail to 112 and 115-pound rail. *See* AEP Texas Op. Workpapers Vol. 21, p. 10800.

AEP Texas has included a list of standard welds produced by Orgo-Thermit, Inc. showing that 115-pound to 136-pound compromise welds are not only possible, but are a standard production weld regularly used in the industry. AEP Texas Reb. Workpapers Vol. 3, pp. 00895-96.

BNSF also disputes the number of welds required at each FED location. BNSF insists that a total of eight welds are required. While BNSF is technically correct, its statement is somewhat misleading. In fact, four welds are needed to install the FED and then two welds at each end of each of the set-out track is required, which totals eight welds. AEP Texas already included the welds at each end of the set-out track. Thus, BNSF is double counting the set-out track welds.

f. Insulated Joints

Insulated Joints are discussed in Section III-F-6, Signals and Communications.

g. Switches (Turnouts)

i. Turnout Specifications

The parties agree on the turnout specifications. BNSF Reply at III.F-117.

ii. Quantities

BNSF has changed the quantity for turnouts because of changes it made to the TNR's configuration. BNSF Reply at III.F-117. AEP Texas does not agree with all of

these changes to the configuration, and as a result, is altering its quantities based only on the changes described in Part III-B, *supra*.

iii. Unit Costs

The parties agree on the unit costs. BNSF Reply at III.F-118.

iv. Additional Turnout Components

The parties agree on the unit and installation costs for switch heaters.

BNSF, however, argues that the switch heaters must be integrated into the signal system. BNSF Reply at III.F-118. This is unnecessary. The switch heaters are independent of the main signal system and have a built-in snow detector. *See* AEP Texas Op. Workpapers Vol. 21, p. 10807. Therefore, they do not need to be integrated into the overall signal system.

BNSF accepts AEP Texas' cost for propane tanks.

v. Switch Stands

BNSF agrees with AEP Texas' power switch stand unit costs. BNSF argues that high target switch stands must be used for No. 10 turnouts outside the TNR yards, in order to ensure proper visibility. BNSF Reply at III.F-118 to 119. BNSF supports this contention by referring to a number of workpapers. *See* BNSF Reply Workpapers Vol. IV, pp. III.F-0511-14. These workpapers, however, only provide drawings of switch stands and components. BNSF makes no reference to any BNSF standards regarding high or low target stands, nor do they show that BNSF typically uses these stands. Moreover,

BNSF claims are contradicted by photographs in AEP Texas' workpapers that show low target switch stands in the areas where BNSF claims high target switch stands are used. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00898-902. Therefore, AEP Texas continues to use low target switch stands.

BNSF is correct that AEP Texas failed to include the cost for the switch target and mast. AEP Texas has corrected this in its rebuttal costs.

BNSF accepts AEP Texas' unit cost for the power, low and high target switch stands, but it makes an adjustment for transportation costs to reflect additional railheads. BNSF Reply at III.F-119. As AEP Texas has explained, *supra*, additional railheads are unnecessary, and as a result, AEP Texas rejects any adjustment to transportation costs to account for them.

h. Other Track Materials (OTM)

i. Rail Lubricators

The parties agree on the unit costs and the installation costs used by AEP Texas on Opening. BNSF takes issue with the placement and quantities of the lubricators. BNSF Reply at III.F-120 to 122.

AEP Texas engineering experts followed the manufacturer's "rule of thumb" for placement of rail lubricators. As a result, they placed the lubricators every three miles on curves four degrees and over. Despite AEP Texas' use of the manufacturer's instructions as a guide, BNSF insists that rail lubricators must be used at

each curve over three degrees. BNSF never states that AEP Texas' method will not work, but merely that BNSF places rail lubricators on each curve over three degrees.

Following the recommendations of the supplier is a completely acceptable criterion for determining the placement of the lubricators. BNSF points to a segment of track on the Butte Subdivision (between Mileposts 410 at 415) which BNSF claims contains lubricators on all curves over three degrees. Yet, a review of the track charts just a mile or two further, MP 416 to MP 417, shows two back-to-back curves of three degrees with no lubricators. AEP Texas Reb. Workpapers Vol. 3, p. 00904. Again, BNSF attempts to require AEP Texas to construct the TNR to a higher standards than the lines being replicated. Consequently, AEP Texas continues to place its lubricators three miles apart, or on curves greater than four degrees.

BNSF also argues that a 3.75 degree curve is almost the same as a four degree curve, and, therefore should be lubricated. BNSF Reply at III.F-120 to 121. This simplistic argument is clearly intended to further increase the quantity of lubricators and therefore the cost of constructing the TNR system. There is simply no basis to alter this standard. AEP Texas continues to place additional lubricators only on curves of four degrees or more.

BNSF accepts the material and labor costs for the rail lubricators, but makes transportation adjustments. These transportation adjustments are unnecessary as

transportation charges were included in the quote. AEP Texas does not believe any additional charges are necessary.

ii. Ties Plates, Clips, Spikes and Anchors

(a) Specifications

AEP Texas' experts have used two spikes per plate or four spikes per tie, and show photographs where BNSF has used the same spiking pattern. BNSF argues that it generally uses at least three spikes per plate, and therefore AEP Texas should follow the same standards. However, BNSF's own evidence refers to pictures taken by BNSF's consultants that show two spikes per plate on the Boise City Subdivision and two spikes per plate on the Angora Subdivision. AEP Texas Reb. Workpapers Vol. 3, pp. 00905-907.

As a SARR, the TNR is not required to construct its track exactly as BNSF has done. The TNR simply must meet minimum standards and accepted practice. AEP Texas has followed the AREMA standards which state that the minimum spiking pattern is two spikes per plate. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00908. Further, the FRA requires that the rail be fastened by a system of components which effectively maintains gauge. The use of two spikes per plate to hold the rail in place has been and is an effective rail fastening system, and BNSF has not shown otherwise.

BNSF agrees with the specifications for box anchors that AEP Texas listed in its Narrative. BNSF Reply at III.F-123. AEP Texas' Opening evidence indicates that

is has installed anchors on every fifth tie in yards and set outs. However, its Opening quantity applied anchors on every other tie. AEP Texas has corrected this error on Rebuttal and applied anchors to every fifth tie.

BNSF argues that AEP Texas did not install anchors on every tie for 200 feet on each side of crossings. However, AEP Texas included these anchors in the overall cost of the crossing installation. *See* AEP Texas Op. Workpapers Vol. 22, p. 11660-79. Therefore, AEP Texas has not adjusted the quantity of anchors for the crossings.

(b) Unit Costs

BNSF generally agrees with the materials costs, but has made adjustments to the transportation costs for everything except anchors and tie plates. BNSF Reply at III.F-123. As discussed above, BNSF has not shown that the additional transportation cost is necessary, and, therefore, AEP Texas has not included any additional transportation costs in its unit-costs calculations.

iii. Derails and Wheel Stops

The parties agree with the costs and specifications for derails and wheel stops. BNSF Reply at III.F-124.

i. Materials Transportation

i. Off-line Transportation

BNSF argues that AEP Texas did not include sufficient off-line transportation costs. BNSF Reply at III.F-125. Where AEP Texas has used bids, the

contractor has included the off-line transportation costs in the bid. AEP Texas added transportation costs to the quotes it obtained from RS Means. In some instances, AEP Texas obtained a cost for transportation from a third party.

BNSF claims that proper off-line transportation costs cannot be adequately determined because AEP Texas did not disclose the locations of its 11 railheads. In determining the transportation costs, AEP Texas has used the cost of transporting materials the average distance necessary to deliver them to the railheads. Admittedly, some of the actual delivery points are further away, and some of them are closer. Therefore, AEP Texas' experts did not believe that it was necessary to indicate the exact locations of each of the 11 railheads.

Realistically, AEP Texas cannot ask a supplier to quote ten or more delivery locations for each cost estimate, particularly in light of the fact that the project is a hypothetical one that will never be constructed. If AEP Texas, experts required the companies from whom it obtains quotes to go through the tedious process of quoting delivery prices for numerous locations, this might ultimately deter those companies from providing quotations.

The quotes received by AEP Texas are adequate for providing an estimate of the transportation costs related to the materials needed for the TNR project. The costs used on Opening are representative of the average transportation costs for all of the

railheads, and to further expand on those costs is both unnecessary and too burdensome to be practicable.

BNSF argues that the off-line transportation costs are inconsistent because some materials were delivered to one railhead and others to multiple railheads, and that because of this inconsistency the costs are insufficiently supported. BNSF Reply at III.F-125 to 126. As discussed above, AEP Texas provided a conservative estimate of transportation costs when more precise information was not available. Because the costs of transportation were based on shipment to the average location on the TNR, AEP Texas has used an appropriate cost for this item.

BNSF further attempts to undermine AEP Texas' transportation costs by arguing that the BNSF lines being replicated by the TNR cannot be used to determine off-SARR transportation costs, because under stand-alone cost theory, the replicated BNSF lines will no longer exist. BNSF Reply at III.F-130. This is a departure from how the Board has handled transportation charges in all prior SAC rate cases. Moreover, BNSF's statement oversimplifies stand-alone cost theory. While it is true that AEP Texas is not required to ensure that sufficient space is required to fit both the incumbent's railroad lines and the TNR physically, other aspects of stand-alone theory suggest that the incumbent's replicated lines continue to exist – particularly where, as here, the SARR is not carrying 100% of the traffic with the incumbent moves over these lines. In addition, prior to the date of commencement of operations on the newly-constructed TNR lines, the

traffic for which it replaces the incumbent must continue to move over the lines being replicated. Otherwise, power plant would run short of coal, etc.

BNSF fails to recognize that the TNR is a hypothetical economic model. Despite the fact that much of the analysis in TNR cases mirrors reality, this economic model allows for certain changes such as the absence of barriers to entry, and unlimited availability of resources. BNSF's new approach is a departure from SAC theory as developed in the *Coal Rate Guidelines* and subsequent ICC and STB decisions. It is simply another attempt by BNSF to require captive shippers (who by definition do not have transportation options to the incumbent) to pay higher rates by jacking-up stand-alone costs.

In any event, the point is irrelevant in this case, as there are far more rail transportation possibilities than those used by BNSF. In particular, the TNR route connects with the residual BNSF or other rail carriers at twenty locations. Thus, suppliers can deliver materials to many different points along the TNR route. These delivery points include: (1) the BNSF at South Logan, WY; (2) the BNSF at Gillette, WY; (3) the DME at Crawford, NE; (4) BNSF at Alliance, NE; (5) BNSF and UP at Northport, NE; (6) BNSF and UP at Sidney, NE; (7) the NKCR and UP at Sterling, CO; (8) BNSF at Brush, CO; (9) UP and BNSF at Denver, CO; (10) UP at Colorado Springs, Co; (11) UP at Pueblo, CO; (12) BNSF at La Junta, CO; (13) BNSF at Las Animas, CO; (14) the Cimmerron Valley Railroad at Springfield, CO; (15) the Cimmerron Valley Railroad at

Boise City, OK; (16) UP at Stratford, TX; (17) the Texas Northwestern Railroad at Etter, TX; (18) the BNSF and UP lines at Amarillo, TX; (19) BNSF at Quanah, OK; and (20) BNSF at Oklaunion. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00909-911.

Moreover, UP can operate between Denver and Pueblo via its own trackage and under trackage rights agreements with BNSF. As there are more than enough points along the TNR to deliver materials, there is simply no need to increase transportation costs to ship materials in the inefficient manner proposed by BNSF.

ii. On-Line Transportation

The parties agree on the on-line transportation costs. BNSF Reply at III.F-131.

j. Track Labor and Equipment

AEP Texas' experts use a quote from Windgate Construction for the costs of complete track installation for the entire TNR system. BNSF accepts AEP Texas' unit costs for track labor and equipment, but BNSF adjusted the costs using Means, which AEP Texas accepts.⁹ BNSF Reply at III.F-131. BNSF applies the adjusted cost to its own final track count. BNSF Reply at III.F-132. AEP Texas has not accepted all of BNSF's changes to the configuration of the TNR, therefore, AEP Texas has therefore applied the adjusted costs to its own final configuration, as described in Part III-B, *supra*.

⁹ AEP Texas discovered too late in the production of this Rebuttal that it had not properly revised its spreadsheets to reflect BNSF's revised unit costs, which represent a savings of approximately \$12 million.

BNSF notes that AEP Texas has failed to include 21 miles of branch and spur tracks in certain track construction costs. BNSF Reply at III.F-132. AEP Texas has corrected this oversight on Rebuttal.

BNSF has added the costs for subballast in yards. BNSF Reply at III.F-132. As discussed above, subballast is not necessary in the TNR's yards because of the use of the additional fill. As a result, AEP Texas has not included the cost for installation of subballast in yards.

4. Tunnels

AEP Texas did not include the costs for any tunnels on Opening. However, AEP Texas engineering experts did note an item described as a tunnel on the Spanish Peaks Subdivision track charts (the spur which leads to the Comanche Plant). Nevertheless, it did not include any costs for this item because the track charts were not specific as to length or purpose, and the tunnel did not appear on the inventory lists provided by BNSF in discovery.

On Reply, BNSF has substantiated the details for this tunnel, and assigned a cost of \$218,528 to it. AEP Texas has accepted BNSF's costs on Rebuttal. For convenience, AEP Texas included the costs in its Rebuttal electronic workpaper file "TNRR Culverts.xls."

5. Bridges

On Opening, AEP Texas used a series of BNSF-provided bridge costs and designs to develop standard costs for bridge components including abutments cost, individual pier cost and a cost per linear foot for each bridge on the TNR's system. From that point, AEP Texas' engineering witnesses reviewed the particular characteristics, such as height, of each bridge to determine if any additional modifications to the bridge designs were necessary.

On Reply, BNSF generally accepts the approach that AEP Texas posited on Opening, but it suggests several design and inventory modifications to AEP Texas' Opening costs. Each of these disagreements is addressed below.

a. Bridge Inventory

BNSF argues that AEP Texas omitted a number of bridges on Opening. *See* BNSF Reply at III.F-134 to 135. AEP Texas omitted some bridges for several reasons. The first is that a number of the bridges did not appear on the bridge inventory list, but they were apparently omitted because they were part of the joint trackage tangle between Denver and Pueblo. Others were omitted because it appeared that the railroad had predated the roads they cross. In any event, AEP Texas has accepted BNSF's revised inventory, with one minor exception.

AEP Texas' sole exception to the inventory list is BNSF's addition of a 314-foot bridge over the South Platte River on the Arapahoe Spur near Denver . Apparently,

BNSF could not find the actual length of the bridge in its inventory list or track charts. BNSF Reply at III.F-135. BNSF's engineering witnesses therefore decided to replicate a 314-foot structure on the Brush Subdivision where the TNR also crosses the South Platte River. *Id.* BNSF's bridge length is incorrect. AEP Texas' engineering experts reviewed the bridge inventory list and found the bridge, which is located on the Denver Subdivision and identified as Bridge 2.43 on Line Segment 483. *See* AEP Texas Reb. electronic workpaper file "TNR Bridge List.xls," tab "Bridge Costs," row 477. That bridge is only 181 feet long. AEP Texas has substituted the 181 feet for the 314 feet used by BNSF. Otherwise, AEP Texas agrees with BNSF's revised inventory.¹⁰

b. Bridge Design

BNSF generally accepts the bridge designs proposed by AEP Texas – particularly the modifications that AEP Texas made to existing bridges. BNSF Reply at III.F-139. However, BNSF argues that a number of the modifications proposed by AEP Texas were applied in an inconsistent manner, and BNSF attempted to correct this deficiency. *Id.* at III.F-139 to 140. BNSF also argues that AEP Texas' replacement of certain steel bridges with concrete deck bridges required adjustments to the bridge length to maintain water flow. *Id.* AEP Texas disagrees with BNSF's modifications for the reasons set forth below.

¹⁰ BNSF's spreadsheet does not properly list this bridge and the spreadsheet fails to count it. Thus, BNSF's bridge count is stated as 474 even though there are 475 bridges on the spreadsheet.

BNSF's first criticism is that AEP Texas' bridge span modifications, while reasonable, were not applied consistently. *Id.* at III.F-139. AEP Texas concedes that its Opening evidence on this point is somewhat contradictory because it failed to describe the instances where it did not apply its general span adjustment methodology, thereby muddying the waters.

In fact, on Opening, AEP Texas' engineering experts were reluctant to adjust the span lengths and the number of spans out of concern that BNSF would object to such modifications, which it has in some respects. The observation made in the BNSF Reply Narrative that "AEP Texas did not make any span adjustments to any bridges on the Campbell, Black Hills, Angora and Butte Subdivisions" indicates AEP Texas' general restraint in changing bridge designs. *Id.* at III.F-139. For these subdivisions, where the bridges have been redesigned in recent years, the span lengths and number of spans are at least reasonable if not optimal. However, on the older subdivisions, many bridges are timber spans and use timber pilings. Due to the strength limitations of timber, the spans are very short, with closely spaced piers, typical of an old timber trestle. From an engineering and efficiency stand point, it is inadvisable (and extremely expensive) to construct a pre-cast concrete span, steel pile bridge to the same configuration as a timber trestle. Thus, AEP Texas' experts adjusted the spans where the current design and span length were inapposite to provide sound and efficient construction of concrete deck bridges.

BNSF also lengthened 13 bridges by seven percent where AEP Texas' standard design of concrete girders below the track surface replaced thru-span (structural members along side the track surface) steel bridge designs, arguing that the concrete design reduces water flow under the bridge, and therefore the bridges must be adjusted to accommodate the reduced flow. BNSF Reply at III.F-142. BNSF's design revisions are without merit and should be rejected. BNSF has not demonstrated in any instance that the new design would actually reduce water flow. For example, on one bridge that BNSF proposes lengthening, a crossing over the Arkansas River at MP 590.31 on the Pueblo Subdivision, the top of the track is well above the bottom of the structure. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00924-25 A concrete structure would not necessarily have any less clearance than the thru-span steel structure – as exemplified by the photo of the concrete bridge next to the thru-span railroad bridge. In other words, BNSF's argument that the concrete structure would always provide less clearance is unfounded.

Likewise, BNSF's assertions that larger pillars would restrict flow is not necessarily true either. The same photos show that the steel bridge supports and concrete bridge supports are very similar in size and displacement. Moreover, the concrete structure appears to have fewer supports, thereby increasing waterflow.

AEP Texas notes that in some instances, the length of a bridge is far greater than the width of a creek, even at flood stage. The length of the bridge is based on the length of opening it must cross. For example, one of BNSF's 13 bridges crosses Bennet

Canyon in South Dakota (MP 484.36 on the Butte Subdivision). *See* AEP Texas Reb. electronic workpaper file “TNR Bridge List.xls,” tab “Bridge Costs,” row 74. The 98-foot span is needed to cross the canyon. BNSF has not suggested that there is so much as a creek at the bottom of this canyon.

AEP Texas also notes that a review of the other 11 bridges that BNSF proposes to lengthen shows that some of the bridges do not even cross water barriers, and therefore the need to lengthen the bridge is unfounded. *Id.* at rows 221 and 485. In particular, at milepost MP 74.43 on the Angora subdivision, the bridge crosses a road and a Union Pacific rail line.

Six other bridges lengthened by BNSF’s experts only cross creeks (four are clearly labeled as such and two others do not include the word creek in their description), and yet they range from 61 to 231 feet. *Id.* at rows 90, 171, 226, 244, 432, and 442. Such lengths are not typical of creeks. Indeed even most rivers are not so wide. Moreover, two of the bridges are taller than 24 feet, which suggests that the bridge height was needed to span the gap rather than accommodate water flow.

The bridge at MP 586.42 on the Pueblo Subdivision crosses something simply described as “water.” *Id.* at row 244. Likewise, the bridge at MP 102.50 crosses “dry.” *Id.* at row 221. Without more information from BNSF, there is no justification for lengthening these bridges.

Only three of the bridges actually cross rivers. *Id.* at rows 229, 242, and 283.

The bridge at MP 590.31 has already been addressed. For the crossing over the Arkansas River at MP 120.44 in Pueblo, CO, the bridge is listed as being 30 feet tall and 427 feet long. Assuming *arguendo* that BNSF's assumption is correct, and the concrete bridge proposed by AEP Texas will be five feet shorter, the water level would still have to rise 25 feet before the lower chord of the bridge will affect the water flow area. BNSF has not suggested that a 100-year flood would impact the bridge at all, and AEP Texas' engineering experts determined that a 427-foot wide and 25-foot tall wall of water is an extremely unlikely scenario.

The last bridge at issue is located at MP 533.70 on the La Junta Subdivision. *Id.* at row 283. This bridge is 15 feet tall and 741 feet long, and according to the inventory list, it crosses the Purgatory River. However, AEP Texas' engineering experts have further researched this crossing and determined that it no longer crosses the Purgatory. Apparently, a dam was built down river and this bridge now crosses a bay of the John Martin Reservoir. *See* AEP Texas Reb. Workpapers Vol. 3, p. 00926. The flow area requirements of a river crossing do not apply to a reservoir. As such, there is no need to lengthen the bridge.

It was incumbent on BNSF to justify its increased bridge lengths on case-by-case basis, which it has failed to do. Consequently, the Board should reject BNSF's modification of the 13 bridges. AEP Texas has not revised its bridge designs.

c. Bridge Costs

On Opening, AEP Texas developed its baseline bridge costs using an average of the costs for 21 bridges provided by BNSF in discovery. *See* AEP Texas Op. at III-F-68 to 74. While BNSF agrees that these costs are appropriate for bridges with spans less than 50 feet, it disagrees with AEP Texas' approach for spans greater than 50 feet, and it has developed a second algorithm for determining costs for those bridges. *See* BNSF Reply at III.F-144 to 147.

AEP Texas submits that BNSF's approach is unwarranted. In particular, BNSF ignores that many bridges smaller than the average bridge are also being built at a cost disadvantage to AEP Texas, and thus, to separate out some larger bridges as requiring higher costs benefits BNSF's position and thus is inappropriate. Moreover, AEP Texas already made additional allowances for larger bridges on Opening through its individual bridge review process. Therefore, BNSF's alternative methodology is not needed. In addition, careful review of AEP Texas' Opening cost formula demonstrates that it was sufficiently generous to cover some of the miscellaneous items BNSF claims AEP Texas omitted.

i. Model Bridge Cost Differences

On Reply, BNSF's engineering consultants separated the data for the three longest bridges of the 21 model bridges AEP Texas used on Opening, and it used that data

to create a different average cost of components for bridge spans greater than 50 feet. BNSF Reply at III.F-144 to 145. BNSF's approach is flawed and should be rejected.

First, AEP Texas notes that the average individual span length for the 21 model bridges is 26.8 feet and the average individual span length for the entire TNR bridge inventory is 34.2 feet. *See* AEP Texas Reb. electronic workpaper file "TNR Bridge List.xls," tab "Bridge Costs," cell R480, and "Model Bridge Costs.xls," cell N27. The differences between the two averages is very small; thus AEP Texas' Opening costs are not unfairly skewed such that a second algorithm is needed.

Second, BNSF's use of only three bridges to create an average is not a statistically significant sample – especially since the three bridges are essentially the same design, built by one contractor. *See* AEP Texas Op. Workpapers Vol. 21, pp. 10916-10925. AEP Texas' engineering experts did not have access to the drawings for these bridges in preparing the opening evidence on bridge design/costs; drawings for only one of the bridges were provided by BNSF in Reply rather than in discovery. In any event, AEP Texas' engineering experts have reviewed the design and have concluded that all three bridges have their steel pilings encased in concrete, a somewhat unusual feature that the TNR did not intend to duplicate in its design. For these reasons, a sample based solely on those bridges is not valid. *See* BNSF Reply Workpapers Vol. V, pp. 0596-608.

This encasement feature, referred to as C.I.P. collars in the bid tabulations, was mistakenly treated by AEP Texas' engineering experts on Opening as being cast in

place pile caps because the drawings for these bridges were not provided in discovery.

BNSF points out that “AEP Texas incorrectly used concrete collar costs in determining the pile costs for abutments and piers, therefore overstating the total cost for these two items.”

See BNSF Reply at III.F-146. In fact, AEP Texas incorrectly used the collar costs to estimate the cost of cast in place pile caps and abutments.

BNSF also argues that AEP Texas’ experts omitted wing walls, bearing pads, expansion joints, deck plates, washers and brackets, and deck waterproofing from their bridge cost formula. *Id.* at III.F-146. BNSF’s argument is incorrect.

AEP Texas’ analysis of the three longer bridge costs assumed that wing walls were cast in place and included in the C.I.P. (cast in place) quantities. While BNSF has shown this not to be the case, it has also acknowledged that AEP Texas costs for abutments was overstated because of this very error. *Id.* at III.F-146. Thus, AEP Texas’ abutment costs for its bridges already included wing walls, as well as slope paving. As AEP Texas’ experts have continued to use their cast in place design on Rebuttal, no additional additives for wing walls or slope paving are necessary.

The other items listed by BNSF (bearing pads, expansion joints, deck plates, washers and brackets, and deck waterproofing) are minor cost items, which are effectively covered by AEP Texas’ generous application of costs for other components, as shown in the following list:

1. The cost per linear foot of span material was taken from a very large bridge over the South Canadian River, the longest individual span

length for this bridge was 102'-6" according to the Jennison paper cited in AEP Texas' Opening evidence at Page III-F-71. While the cost would certainly be lower for most of the bridges, AEP Texas engineers applied this cost/ft to all bridges. A line item in the bid tabulation for this bridge also listed the transportation cost for this span material. That cost, which involved transporting 102'-6" long concrete girders, converted to cost per linear foot, was generously applied to all bridges, some where the longest component might be only 30' long.

2. Handrail costs, also taken from the South Canadian River bid tabs, are higher than necessary in two respects. Handrails and walkways need only be installed on one side of the track, not both. Further, the guardrail could be made far more economically, using posts and guy wires rather than welded pipe handrails.
3. The costs of pile and abutment caps were again based on very large bridges rather than the average sized bridge.
4. When adding cast in place concrete deck to the large span bridges, the deck was applied to the entire length of the bridge. Very often the entry and exit spans are shorter than the major spans and are constructed with box beams which do not require the additional cast in place deck.
5. Whenever an item was hard to quantify, or data was lacking to provide an accurate average cost, above average costs were always generously applied by the AEP Texas' engineers.

Given the above, all of the constants contained in the bridge formula presented in Opening are sufficiently generous to account for the miscellaneous components such as hardware not specifically mentioned on Opening.

BNSF has also added an additional cost for concrete collars on spans of 50 feet or more. *See* BNSF Reply at III.F-147. This additional cost is unnecessary. As

discussed *supra*, encasing the steel pilings in concrete is a somewhat unusual feature that the TNR neither needs nor intends.

ii. Bridge Unit Costs

On Opening, AEP Texas developed the bulk of its bridge unit costs from materials provided by BNSF in discovery; some costs were developed from Means. BNSF generally accepts AEP Texas' unit costs with a few exceptions discussed below.

(a) Pile Cap Costs

As discussed *supra*, AEP Texas applied the cost for cast in place concrete collar cost to determine the pile cap costs for piers and abutments. AEP Texas continues to use its Opening costs to avoid unnecessary changes on Rebuttal. BNSF is not prejudiced by this approach, as its pile costs are actually lower than AEP Texas' costs. In fact, BNSF's precast components add up to \$10,450.10 per pair of abutments (one bridge), (*see*, BNSF Reply electronic workpaper file "III F 5 Bridges.xls," tab "Bridge Costs," cell H44 and H46), versus the \$20,368 per pair of abutments used by AEP Texas on Opening and Rebuttal (*see* AEP Texas Op. Workpapers Vol. 21, p. 10958).

(b) Pile Material Costs

On Opening, AEP Texas, used the Means cost for W14x89 piles. BNSF accepts this cost, but increased it to reflect overhead and profit. *See* BNSF Reply at III.F-148. Notwithstanding BNSF's general agreement as to AEP Texas' unit costs, AEP Texas has revised its pile costs on Rebuttal as discussed *infra*.

The cost data provided by BNSF in discovery does not separate abutment pile costs from column pile costs, so some method of allocating pile costs between the two had to be devised. AEP Texas' engineering witnesses explained their approach in their workpapers. *See* AEP Texas Opening Workpapers Vol. 21, p. 10957. In particular, they assumed that one pier has twice as many piles as an abutment because the abutment supports half as much bridge area. BNSF's experts argue that the relationship is closer to one to one. *See* BNSF Reply at III.F-146. For smaller bridges, BNSF's observation is correct, because a minimum number of piles are always used no matter what the load is on a particular bridge. But on larger bridges, piers can have more than double the amount of piles supporting them than the abutments do. This is particularly common when the first and last spans are shorter than the middle spans. For example, on Bridge No. 453.2 (North) five piles are used for each abutment and 20 piles are used for each pier. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00922-23. In any event, BNSF's argument is something of a red herring. Regardless of which method is used, the total impact on cost is minimal because the pile costs not attributed to the abutment cost are attributed to the column cost instead. The total length of pile material and labor to install the piles are listed in the contract documents for the 21 model bridges and are not in dispute. What is at issue is what percentage of those pile costs is for abutments and what percentage is for piers. Since all bridges have abutments and most bridges also have columns, the effect on the total bridge inventory cost is minimal.

BNSF also attempts to greatly inflate the amount of *pier* cap material required. In particular, BNSF doubled the size of *pier* caps for all spans greater than 50 feet. *See* BNSF Reply at III.F-148. For the bridges with individual spans equal to or greater than 50 feet, BNSF also doubled the pier cap costs it used in its shorter bridge equation. *See* BNSF Reply at III.F-148. BNSF's approach is flawed because AEP Texas used the average span size for the entire TNR inventory in its original cost formula. Thus, if a higher than average cost is to be used for the longer span bridges, a lower than average cost should be used for shorter bridges, but BNSF did not provide for this. Such a blatant manipulation of the costs must be rejected.

On Reply, BNSF included a quote from Hanson-Wilson for a variety of bridge items. *See* BNSF Reply Workpapers Vol. V, pp. 0647, also included in AEP Texas Reb. Workpapers Vol. 5, p. 00921. BNSF also used this quote to determine its costs for precast pile costs. However, without explanation, BNSF conveniently ignored Hanson-Wilson's specific quote for pile material, which is mere a \$18.00 per linear foot – \$7.19 per linear foot less than the Means cost posited by BNSF. AEP Texas has attempted to use BNSF's own costs where it is logical to do so and because AEP Texas is entitled to use the least-cost feasible approach, it has revised its pile material unit cost to reflect the Hanson-Wilson quote.

BNSF also accepted AEP Texas' costs for pre-cast beam material. *See* BNSF Reply at III.F-148.

iii. Other Unit Costs

BNSF also added unit costs for wing walls, bearing pads, miscellaneous hardware, and deck expansion joints. *Id.* at 149. AEP Texas has already addressed those items *supra*, and for the reasons discussed, AEP Texas has not included any additional costs for these items on Rebuttal.

AEP Texas notes several flaws in BNSF's unit cost development for these other items. In particular, AEP Texas' cost per linear foot was based on average costs from BNSF plus additional items not included in the BNSF materials, such as the pre-cast span members, transportation and handrails. The additional costs for those items was obtained from the Jennison paper describing the construction of BNSF Bridge No. 412.1 over the South Canadian River and the bid tabulation sheet for that bridge. That bridge had eight very large spans of 102' - 6" each. Despite this, AEP Texas conservatively used the cost per linear foot of span material based on this bridge (\$840.00 per linear foot), which is extremely generous when applied to smaller bridges. *See* AEP Texas Op. Workpapers Vol. 23, pp. 10960-61. Notwithstanding this very conservative approach, BNSF added miscellaneous costs such as hardware, bearing pads, signs, joint filler, and water proofing all of which are legitimate items, but of minor cost significance. Moreover, despite using two different bridge formulas, BNSF experts have applied the \$840.00 per linear foot cost to even the short bridges. *See* BNSF Reply electronic workpaper file "III F 5 Bridges.xls," tab "Bridge Costs," cell J48.

BNSF's approach is unfounded in light of its own workpapers. For example, an e-mail from Dick Stephen of Hanson-Wilson, Inc. to Cassie Gouger, BNSF's bridge witness, contains a quote for a 33-foot span box beam of \$6,192.00 each. *See* BNSF Reply Workpapers Vol. V, p. III.F-0647 or AEP Texas Reb. Workpapers Vol. 3, p.00921. A bridge is two box beams wide. Thus, the cost is \$375.27 per linear foot for span material rather than the \$840.00 per linear foot used by AEP Texas. As the average individual span length for the entire inventory is 34 feet long, the \$375.27 per linear foot cost could be applied for the entire inventory. At the very least it could be used for the shorter bridges, which results in a massive cost savings, even if BNSF's miscellaneous costs were to be added back into the equation.

iv. Transportation Costs

BNSF's added \$3.78 million on Reply for transportation of pre-cast wing walls and pier caps to bridges "over natural barriers," "bridges over roads," and "bridges over other railroads." *See* BNSF Reply at III.F-150 to 151. As AEP Texas is using cast in place costs, no transportation for these items has been added to AEP Texas' Rebuttal costs.

Transportation costs for the pre-cast span material was included in the AEP Texas' formula base on the transportation costs for Bridge 412.1 over the South Canadian River and the bid tabulation sheet for that bridge. BNSF substituted an average haul of 478 miles for the 139-mile haul included in that quote with based on a claim that this represents an average of the hauls from four bridge fabricators. *See* BNSF Reply at III.F-

151. But in fact, BNSF's approach appears to assume hauls from all fabricators to all locations thereby resulting in absurdly long hauls to locations that would naturally be served by a closer fabricator. *See* BNSF Reply Workpapers Vol. V, pp. 0651-65.

For example, BNSF includes a haul from Albuquerque, New Mexico to Gillette, Wyoming. *Id.* at 0676. It is totally irrational and contrary to SAC principles to include a 1476-mile haul when, by BNSF's own admission, there is a precast plant in Denver which is 450 miles closer to Gillette than Albuquerque. Moreover, the route selected by BNSF is also nonsensical because it goes via Wichita, Kansas. As AEP Texas demonstrated in Part III-F-3, *supra*, the transportation options for the TNR are far more varied than BNSF assumed. For example, the shipment could move via the residual BNSF from Albuquerque via Belen and Pueblo, and then via the UP to Denver, Sterling, and onto Gillette. And that of course assumes (incorrectly) that the spans need to be moved that far in the first place.

BNSF also severely limits the possible number of fabricators. In fact, a review of the Precast Concrete Institute ("PCI") website shows that 37 precast plants, 29 with certifications (B2, B3 or B4) for making precast bridge components are located near the TNR route. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00927-00932.

BNSF ignores that the delivery costs for the 139 mile haul are already quite expensive owing to the enormous 102-foot length of the spans. In other words, smaller spans are less expensive to move, and can be moved greater distances at the same cost.

Finally, the 478-mile average haul used by BNSF is not explained anywhere in its Reply materials. Thus, AEP Texas could not determine how it was derived. AEP Texas attempted to average all of the hauls listed in BNSF's workpapers noted *supra*, but the average of those hauls does not equal 478 miles. Thus, BNSF's average is apparently groundless.

AEP Texas has, accordingly, continued to use its 139 mile haul cost from Opening.

v. Accounting for Unique Bridge Characteristics

BNSF also criticizes the individual bridge review performed by AEP Texas' engineering experts. In particular, BNSF argues that AEP Texas' experts should have added water-proofing costs and AEP Texas should have added additional costs to all bridges over 23 feet in height, rather than the 30 feet adopted by AEP Texas. *See* BNSF Reply at III.F-151 to 153.

With respect to waterproofing costs, BNSF's third attempt to include this cost is still inapplicable for the reasons described *supra*. As for the height adjustment factor, on Opening AEP Texas applied the factor to the pier and abutment costs to compensate for increased costs for bridges greater than 30 feet tall. AEP Texas selection of 30 feet was based on a graph plotting cost versus height for columns and abutments, which it included in its Model Bridge Cost spreadsheet presented on Opening and

Rebuttal. *See* AEP Texas Reb. electronic workpaper file “Model Bridge Costs.xls,” rows 32-98.

The explanation of the formula is in AEP Texas’ Opening workpapers. *See* AEP Texas Op. Workpapers Vol. 21, p. 10965. AEP Texas’ engineering experts’ analysis of the data showed that there was no distinct trend in the data they had that warranted application of any additives below 30 feet. Moreover, AEP Texas’ engineers determined that since most of the pile material is below ground, typically from 50 to 70 feet deep, a small variation above ground would not be significant in the overall dimensions of the substructure for the average bridges utilized in its formula.

Of course, a correction factor is necessary for higher bridges. AEP Texas’ cut-off point selection necessarily focused on the bridges included in its average bridge formula, and the tallest bridge in that group was 23 feet, thus making the formula applicable to bridges of that height at a minimum – as one would expect that the substructure would be roughly comparable on bridges 24 or 25 feet high as well. AEP Texas began using the additive at 30 feet.

Without presenting any data, BNSF applies the same correction to all bridges higher than 23 feet. *See* BNSF Reply at III.F-154. BNSF does not suggest even one instance where a bridge between 24 and 30 feet high would require something above the average that both parties otherwise used. Thus, on Rebuttal, AEP Texas has continued to apply its additive to bridges 30 feet and higher.

vi. Indexing

BNSF misconstrues the indexing approach used by AEP Texas on Opening. All of AEP Texas Opening bridge unit costs, except for piles, were derived from BNSF materials and costs for projects in 2003 in rural Texas. The only cost that involved Means was piles. Thus, it was necessary to adjust the bid-based costs from rural Texas 2003 to a 2000 national cost. AEP Texas used the Means general construction index for that purpose. The costs were then indexed by zip code in year 2000 dollars. *See* AEP Texas Op. Workpapers Vol. 21, pp. 10970-10977.

To be sure, AEP Texas should have used 2000 costs for the one Means item, but all the other costs still needed adjustment. In any event, AEP Texas has replaced its pile cost from Means with one from BNSF thus eliminating that problem.

On Rebuttal, AEP Texas again started with all 2003 rural Texas costs, and adjusted them using a zip code location factor because, unlike a continuous rail line which covers many miles, bridges are at single locations and the zip codes are known. Thus, the zip code approach provides a more specific index, which is appropriate. Consequently, AEP Texas has not revised its indexing methodology on Rebuttal.

The parties' respective bridge costs and linear feet are illustrated in the Table III-F-9 below.

Table III-F-9
Comparison of Bridge Quantities and Costs

	AEP Texas Opening			BNSF Reply			AEP Texas Rebuttal		
	Cost	Quan.	LF	Cost	Quan.	LF	Cost	Quan	LF
Natural Barriers	\$161,155,821	456	54,875	\$185,748,051	475	56,332	\$159,274,411	475	56,120
Highway	\$6,339,695	19	2,337	\$10,546,166	25	3,256	\$ 8,257,852	25	3,242
Total	\$167,495,516	475	57,252	\$196,294,217	500	59,588	\$167,532,263	500	59,362

6. Signals and Communications

a. Signals

BNSF has increased AEP Texas' signals costs by \$27 million by making unnecessary additions to AEP Texas' signal costs and by overstating costs for a number of components. BNSF Reply at III.F-156. BNSF argues that AEP Texas' experts made calculation errors, failed to include a number of items, and provided "inappropriate costs" for certain items. BNSF Reply at III.F-156. Many of these criticisms are unjustified and add unnecessary costs to the TNR's signals system.

i. Centralized Traffic Control

Increases in the cost of the Centralized Traffic Control ("CTC") System constitute most of the difference in the Signals costs between the two parties. AEP Texas' Rebuttal CTC system for the TNR is laid out in AEP Rebuttal Workpapers Vol 3, pp.

00934-53. BNSF attempts to drive up costs by using over-priced power drops and double-counting certain items. AEP Texas discusses each item in detail below.

(a) Control Points

BNSF points out that AEP Texas erred in installing single face signals at power switches for sidings, because AEP Texas already included the costs for the single face signals as a part of the EOS control unit. BNSF Reply at III.F-158. AEP Texas agrees that this was an oversight and has altered its Rebuttal costs to show this change.

BNSF also notes that AEP Texas did not include switch circuit controllers at the non-powered switches on the main tracks. BNSF Reply at III.F-158. Although BNSF provides an incorrect workpaper citation and FRA Rule 236.60 does not cover this matter, AEP Texas agrees that switch circuit controllers are required and has included them in its Rebuttal restatement of costs.

However, AEP Texas takes issue with BNSF's costs for the switch circuit controllers. In its narrative, BNSF arrives at a cost of \$9,000 per switch circuit controller, plus installation. AEP Texas' engineering experts accept the \$9,000 materials unit cost but believe the cost of power drops and installation to be excessive. The power drops which BNSF used are simply not economically efficient. The costs for these drops is high because the drops are too far away from the power supply. AEP Texas has used solar charging units in these instances. These units can be installed for less than \$2,000, and provide a much more efficient method of recharging the batteries for the switch circuit

controllers. *See* AEP Texas Op. Workpapers Vol. 21, p. 11027. In addition, the time that BNSF suggests is necessary to install the system is unreasonably long. This is a less complicated installation than a wayside signal. Therefore, AEP Texas' experts have assigned five days for the installation of this system. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00959-62. AEP Texas has restated the costs accordingly in its Rebuttal electronic workpaper file "III-F-6 CTC System & Signals.xls."

BNSF states that AEP Texas failed to install bungalows at intermediate signals. BNSF Reply at III.F-159. This has been corrected and bungalows have been added for the intermediate signals.

Mistakenly, BNSF argues that AEP Texas did not install the necessary EOS signals at wye switches. BNSF Reply at III.F-159. AEP Texas did install powered switches, as required, on the inside switches of the spur tracks going in and out of the mines. *See* AEP Texas Op. Workpapers Vol. 21, pp. 10979-11024.

AEP Texas determined its unit costs for control points by using bids from Alstom Transportation, Safetran and L & W Industries, and BNSF agrees with the unit costs for the control point equipment, the bungalows, and the batteries. BNSF Reply at III.F-159. The parties disagree regarding a number of other unit costs related to the signal system, as discussed below.

(b) Control Point Installation

BNSF notes that AEP Texas failed to include overhead and profit costs for the installation of control points. BNSF Reply at III.F-160. AEP Texas agrees that the costs should be added. AEP Texas has adjusted its labor costs to include overhead and profit in accordance with RS Means.

Further, BNSF notes that AEP Texas developed a labor cost for installation of the bungalows, but failed to include the cost in its control point costs. BNSF Reply at III.F-160. AEP Texas agrees and has included this cost in its control point costs on rebuttal.

(c) Control Point Batteries

AEP Texas' experts intended to use 24-volt batteries for switch machines and 12-volt batteries for the signals (AEP Texas Workpapers Vol. 21, pp. 11036 - 11037), but instead used only 24-volt batteries. In addition, AEP Texas used only 12-volt chargers. BNSF has altered these costs to be consistent with AEP Texas' workpapers. BNSF Reply at III.F-161. AEP Texas has adjusted its costs to reflect these changes. *See* AEP Texas Reb. electronic workpaper file "III F 6 CTC System and Signals," tab "individual cost calcs."

(d) Cables

BNSF states that AEP Texas failed to include cable for wiring bungalows to components. AEP Texas has included a "Miscellaneous" factor of 10% of material and

labor costs in the costs of the CTC system items specifically to cover costs such as the cable and connects. There is no need to double count these items.

(e) Control Point Protection

BNSF attacks AEP Texas' costs for hot air blowers simply by stating that the cost is too low to include materials and installation of cables. BNSF Reply at III.F-161. BNSF fails to show that AEP Texas' evidence on this matter is unreliable. In fact, in AEP Texas Opening electronic workpaper file "III F Total, cell B109," AEP Texas describes "Install Switch Heater" as a separate item. This item was bid by Windgate Construction. Their quote appears in AEP Texas Op. Workpapers Vol. 21, p. 10739, Item 14. The quote clearly states the costs for "Installation of switch heater – hot air blower." Therefore, AEP Texas' costs should be used.

AEP Texas uses propane driven generators to provide backup power. BNSF argues that AEP Texas failed to include the additional overhead and profit costs from RS Means, which BNSF added to AEP Texas' costs estimates from Interstate Power Systems. BNSF Reply at III.F-162 to 163. BNSF is incorrect. AEP Texas did include this cost in its Opening electronic workpaper "CTC System & Signals.xls," tab "Individual Cost Calculations," where it was incorporated into the final costs. There is no need to double count this item.

(f) Switch Layout (Switch Stands)

BNSF states that AEP Texas included a quantity for switch stands in its final cost spreadsheet but did not include any costs for switch stands. BNSF Reply at III.F-163. AEP Texas has addressed switch stands in part III-F-3-g-(5), *supra*, and sees no reason to double count the costs for these stands in this section as well.

ii. Power to Signals

AEP Texas powers its signals by either overhead power drops or by solar panels in more remote areas. AEP Texas conservatively used the same cost for solar panels as it did for overhead drops, even though solar panels are significantly less expensive than overhead drops. *See* AEP Texas Op. at III-F-76. BNSF argues that there are no grounds for assuming that the solar panels cost less than a power drop. BNSF Reply at III.F-163. This is simply untrue. To support its costs, AEP Texas refers to its Opening Workpaper Vol. 21, p. 11027, which is a telephone quote that states that a 24 volt system would cost \$1,257 and a 12 volt system will cost \$929. As AEP Texas' costs are supported, and BNSF has not shown that this quote is inaccurate, AEP Texas' costs should be used.

BNSF further suggests that AEP Texas' costs for an overhead power drop are unsupported. BNSF Reply at III.F-163. On Reply, BNSF states that the average costs of a power drop for crossing signals is \$1,937.71, yet BNSF's average costs for a power drop for switch machines is \$6,966.57. *See* BNSF Reply electronic work paper file "III F

6 CTC System and Signals,” tab “Power Drops” at cells L144 and L141. These costs are higher because the power drops are further from the power source. AEP has used the average costs for the power drop near roads, and it has used solar power for the drops which are far from existing power lines. This enables the TNR to avoid running long overhead power lines to remote locations.

AEP Texas’ cost for power drops is further supported by a bid used by the New York and Pennsylvania Railroad, LLC. This bid shows power drop costs under \$2,000. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00954-58.

BNSF applies the cost of the power drop to each control point, because it argues that solar power panels can only provide enough power for the signals themselves. BNSF Reply at III.F-164. This is not the case. Powered switch stands can be purchased to run on solar power. *See* AEP Texas Op. Workpapers Vol. 21, p. 11026. AEP Texas obtained a quote for a model 1500 Solar Powered Switch Stand. These are 24 volt switch stands that run with the 24 volt battery with solar panels. *See* AEP Texas Op. Workpapers Vol. 21, p. 11027. There is no need to use high-cost power lines to remote power control points.

iii. Dispatch Center

The parties agree on the costs for the TNR’s Dispatch Center at Alliance, NE. BNSF Reply at III.F-165.

iv. Detectors

BNSF agrees with the number of failed equipment detectors (“FEDs”) that AEP Texas has included on Opening, but takes issue with the unit costs for the detectors. In particular, BNSF argues that AC service costs are insufficient as AC service covers only metered service from within 200 feet of the point of installation. BNSF therefore adds the cost of power drops to the detectors. BNSF Reply at III.F-165 to 166. As discussed above, the average cost for power drops near the power source is \$1,937.71, and AEP Texas has used this cost for drops near the power sources. For those that are farther from the source, AEP Texas has used solar power. Once again, AEP Texas does not agree that a least-cost, most-efficient carrier would spend over three times that amount for a power drop, when a less expensive and feasible option (solar power) is available.

v. Crossing Signals

AEP Texas included the costs for crossing signals on line segments where roads pre-date the BNSF lines being replicated, because BNSF is the junior tenant and would be responsible for the entire cost of installing crossing devices. AEP Texas has excluded the costs of crossings on all other line segments where BNSF (or its predecessor) was not the junior tenant. BNSF alleges that because it has upgraded the crossing devices over the years, AEP Texas should pay for the costs of these additional devices as well. BNSF has included the costs for upgrading these devices on half of the crossings on the TNR line segments where BNSF was not the junior tenant. BNSF Reply at III.F-166.

BNSF's costs are unsupported and inconsistent with the Board's past decisions. BNSF has not provided any proof that the signals were upgraded or that BNSF paid for those upgrades. In fact, under the FHWA Section 130, federal funds are provided for all or most of the cost for upgrading crossing signals. *See* AEP Reb. Workpapers Vol. 3, pp. 00963-64. Moreover, BNSF has not offered any explanation for its application of such costs to 50 percent of the signals. Finally, the Board has rejected similar arguments in the past. *See APS* at 411 (“[W]e include sunk costs such as grade crossings only when the incumbent carrier has actually incurred the costs.”).

vi. Summary

As a result of the changes described above, AEP Texas has included \$118.8 million for signals costs on Rebuttal.

b. Communications System

On Opening, AEP Texas included \$10.8 million for the TNR's microwave communications system. *See* AEP Texas Op. at III-F-79 to 88. The microwave system is based on a 6 GHz microwave backbone network spanning 41 sites along the TNR route and an 800 MHz Land Mobile Radio (“LMR”) system that provides communication access via mobile and portable radios. The costs for the TNR microwave system were based upon publicly available unit cost information from the State of Colorado Department of Transportation (“CDOT”) and various suppliers. *See* AEP Texas Op. Workpapers Vol. 22, pp. 11066-11475 and electronic workpaper file “TNR Radio System Cost Model.xls.”

On Reply, BNSF included \$17.2 million for the TNR's communications system-\$15.4 million for the microwave system and \$1.8 million for other communications investment (radios). *See* BNSF Reply electronic work paper file "III F 6 Radio System Cost Model.xls."

i. Microwave System

BNSF accepted the basic parameters of AEP Texas' microwave communications system but identified six areas where it either disagreed with AEP Texas' specifications or costs: (1) antenna cables; (2) tower steel; (3) ground grid; (4) communications shed; (5) microwave base station; and (6) dehydration equipment. *See* BNSF Reply at III.F-167 to 174. Each of these areas is discussed below.

(a) Antenna Cable

BNSF objected to the types of cable AEP Texas specified for the connection of the microwave base station to the antenna and for the LMR radio system, stating that they will result in unacceptable signal loss. On Rebuttal, AEP Texas accepts BNSF's cable substitutions.

(b) Tower Steel

BNSF's Reply Narrative discussion of tower steel (at pages III.F-170 to 171) focuses on the reliability of the microwave communications system and the need for four antennas rather than two on each tower, *i.e.*, a backup set of antennas. AEP Texas agrees that having a backup set of antennas would result in virtually 100% system reliability, and

it has included the additional antennas on Rebuttal. Two cost items which BNSF does not discuss, however, are its increase of the tower steel costs by \$10,000 per tower, from \$25,050 to \$35,050, and a corresponding increase in the freight costs per tower from \$2,500 to \$3,498. BNSF has provided no support for the \$10,000 increase and has made no claim that AEP Texas' microwave tower is incapable of supporting two additional antennas. Therefore, AEP Texas has not increased its tower steel costs.

(c) Ground Grid

On Opening, AEP Texas included ground rods for each microwave tower and communications shed. On Reply, BNSF included a ground grid consisting of seventeen ground rods and connecting wire. Based on a review of BNSF's workpapers, AEP Texas agrees that the ground grid proposed by BNSF will result in a more reliable system and has, therefore, accepted BNSF's ground grid on Rebuttal.

(d) Communications Shed

On Opening, AEP Texas included an estimated \$20,000 for earlier communications shed based on its witness' experience. On Reply, BNSF included \$ { } for each communications shed based on BNSF invoices from 2003 that were not produced to AEP Texas in discovery. Despite this fact, AEP Texas has used BNSF's communications shed cost on Rebuttal.

(e) Microwave Base Station

On Opening, AEP Texas included one microwave base station per microwave site based on discussions with the manufacturer as to the capabilities of the unit selected. On Reply, BNSF claimed that, based on discussions with the manufacturer, the unit selected by AEP Texas is not capable of repeating a signal for further transmission along the microwave backbone. Based on additional discussions with the manufacturer, AEP Texas agrees with BNSF and, on Rebuttal, has provided two microwave base stations at each microwave site along the TNR with the exception of the towers at each end of the TNR where further transmission is unnecessary.

(f) Dehydration Equipment

On Opening, AEP Texas inadvertently excluded the costs for dehydration and pressurization equipment. AEP Texas has used BNSF's costs for this equipment on Rebuttal.

ii. Other Communications Investment Cost

On Opening, AEP Texas included an annual cost of \$32,000 for 653 hand-held radios in its operating cost calculations. Radios were provided to all trainmen, Managers of Train Operations and Locomotive Operations, Assistant Managers of Train Operations and various MOW personnel. *See* AEP Texas Op. (Second Errata) electronic workpaper file "TNR_OP_EXP.xls." The cost for each radio was \$49 per year based on

an original cost of \$240 amortized over eight years. See AEP Texas Op. electronic workpaper file “TNR Materials and Supplies.xls,” tab “Radios.”

On Reply, BNSF included \$1.8 million in investment for 412 hand-held radios provided to MOW and mechanical personnel plus 648 mobile radios for MOW, train crew, operating managers and mechanical personnel. BNSF used 2002 investment costs of \$1,003 for the portable radios and \$2,264 for the mobile radios indexed to 2000. See BNSF Reply Workpapers Vol. V, pp. III.F-0777-79 and electronic work paper file “III F 6 Radio System Cost Model.xls.”

There are four areas of difference between BNSF and AEP Texas with regard to radio costs - (a) type of radios provided; (b) number of radios; (c) radio unit costs; and (d) classification of costs. Each of these issues is discussed below.

(a) Type of Radios Provided

On Opening, AEP Texas relied exclusively on portable hand-held radios. On Reply, BNSF took exception to this and provided a mixture of portable hand-held and mounted mobile radios.

BNSF provided mobile radios for each train crew member stating that they were necessary so that the T&E personnel could stay in touch with the dispatcher. The hand-held radios provided by AEP Texas were not for the trainmen to contact the dispatcher, but were provided for them to remain in contact with each other while on different parts of the train and on the ground near the train. The locomotives leased by the

TNR include the radios used to communicate with the dispatcher. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00966-68. Because BNSF accepted AEP Texas' locomotive lease costs (as discussed in Part III-D-2, *supra*), and the locomotives leased by the TNR (under the BNSF plan as well as the AEP Texas plan) are already equipped with mobile radios, it is totally unnecessary to provide trainmen with mobile radios – much less each and every trainman. If the locomotives did not have radios (which they do), the most that would need to be provided is a radio in each locomotive, not one for each trainman. Moreover, it is functionally illogical to provide a mobile radio on a per-person basis because the radios are meant to be mounted in a vehicle – they are not portable. Thus, handing one out to each person in a two person road crew is pointless.

BNSF also provided 108 operating managers with mobile radios while AEP Texas provided its 39 operating managers with hand-held radios. AEP Texas agrees with BNSF that there may be a need at times for a more powerful radio, but AEP Texas does not know of any reason why *each* operating manager requires a mobile radio and BNSF' provides non. On Rebuttal, in addition to the hand-held radios provided on Opening, AEP Texas has added the cost to install 147 mobile radios in the vehicles used by the operating managers and MOW personnel. No additional mobile radios are required

AEP Texas has increased its handheld radios for road crews by 70 radios, to conform to the number of road crew employees used on Rebuttal. In addition, AEP Texas

agrees with BNSF that equipment inspectors should have hand held radios. AEP Texas has included an additional 108 radios for the equipment inspectors.

Finally, BNSF provided a mixture of mobile and hand-held radios to its MOW personnel while AEP Texas provided only hand-held radios. On Rebuttal, AEP Texas continues to provide hand-held radios to its MOW personnel as mentioned above, but it has also added mobile radios to all hi-rail vehicles used by the TNR's MOW personnel.

(b) Number of Radios

As noted above, on Reply, BNSF provided 412 hand held radios and 648 mobile radios. In addition to the disagreement as to what type of radio should be provided, BNSF has overstated the number of radios required by overstating its personnel counts for operating managers, equipment inspectors and MOW personnel. See Parts III-D-2 and III-D-4, *supra*. On Rebuttal, AEP Texas has provided a total of 653 hand-held radios and 147 mobile radios, not including the radios *included* in the locomotive which are covered by the equipment leases. See AEP Texas Reb. electronic workpaper file "TNR Radio System Cost Model Rebuttal.xls," tab "Radios."

(c) Radio Unit Costs

On Opening, although it only provided hand-held radios, AEP Texas did include unit costs for mobile radios as well. See AEP Texas Op. Workpaper Vol. 18., pp. 9006-9009 and electronic workpaper file "TNR Materials and Supplies.xls," tab "Radios."

On Reply, BNSF rejected AEP Texas' radio unit costs and instead relied on BNSF radio costs included in its workpapers. See BNSF Reply at III.F-174. BNSF claims that AEP Texas' radio unit costs are inadequate because "the equipment did not provide the functionality needed for railroad communications." However, BNSF did not provide any support for this statement. In addition, BNSF did not provide any specifications for its radios, other than the model numbers.

AEP Texas' experts obtained the specifications for the BNSF radios and compared them to the radios specified by AEP Texas on Opening. This comparison showed that the radios specified by AEP Texas were comparable to those specified by BNSF, particularly in power (watts). See AEP Texas Reb. Workpaper Vol. 3, pp. 00969-79.

On Rebuttal, AEP Texas has continued to rely on the radio costs it submitted on Opening.

(d) Classification of Costs

As noted previously, on Opening, AEP Texas included radio costs in the TNR's operating expenses. On Reply, BNSF included radio costs in its communications investment. On Rebuttal, AEP Texas accepts this change and includes the monies for radios in the TNR's communications investment.

(e) Summary

On Rebuttal, AEP Texas has included 831 hand held radios and 147 mobile radios at a total investment cost of \$ 0.26 million. *See* AEP Texas Reb. electronic work paperfile “TNR Radio Cost System Rebuttal.xls.”

iii. Summary

With the modifications described above, on Rebuttal AEP Texas has included \$14.97 million in investment for the TNR’s microwave communications system and \$0.26 million in investment for radios. Thus, total Rebuttal communications cost is \$15.23 million.

7. Buildings and Facilities

a. Headquarters Building

On Opening, AEP Texas provided \$1.6 million for its headquarters building. This building included the necessary space and facilities for the staffing AEP Texas proposed on Opening, as well as ancillary facilities and related costs for items such as parking lots.

BNSF’s lengthy Reply evidence on this subject suggests a myriad of problems from both a space design and cost perspective. AEP Texas address these issues below.

i. Costs Per Square Foot

Putting aside the merits of BNSF's extended discussion of the proper calculation of costs per square foot, including additives such as fire sprinklers, and for the sake of minimizing disputes, AEP Texas has elected to use the BNSF's spreadsheet "III F 7 Buildings," "Headquarters" as baseline for the square-foot cost. From there, AEP Texas simply inserted its own square-foot quantities. *Id.* at cell M38 (total building square footage). Using this approach, AEP Texas effectively accepts the unit costs for building additives and appurtenances advanced by BNSF, but not BNSF's proposed square footage. The result is a cost of \$92.14 or \$0.64 per square foot more than AEP Texas utilized in Opening.

Consequently, the only dispute remaining between the parties is the size of the building, which is discussed below.

ii. Size of the Headquarters Building

BNSF argues that the room sizes proposed by AEP Texas on Opening are too small and should be adjusted upward. In particular, BNSF argues that: (1) the executive office should grow from 180 square feet to 250-300 square feet; (2) regular offices should expand from 100 square feet to 120; (3) cubicles should grow from 68 square feet to 100 square feet and (4) restrooms should be enlarged an additional 22 square feet. BNSF also argues that AEP Texas excluded a lunch room and a data processing room. The building size difference between the parties is also attributable to the different

sizes of their proposed headquarters staffs. As demonstrated below, BNSF's space-related arguments with respect to the building needed to accommodate AEP Texas' headquarters staff are without merit and should be rejected.

AEP Texas' Opening office space sizes are reasonable. In particular, BNSF argues that AREMA recommends the office sizes specified by BNSF. AEP Texas does not dispute the AREMA sizes, but instead notes that its sizes are feasible and supported by recognized sources. In particular, AEP Texas based its office sizes on standards developed by the American Institute of Architects, a body obviously qualified to make such design recommendations. *See* AEP Texas Reb. Workpapers Vol. 3, pp. 00981-82. Moreover, AEP Texas has included an extra 20 percent to its total square footage to accommodate design variations and extra areas such as hallways. As such, AEP Texas has shown that its basic office designs are feasible, and has continued to use them on Rebuttal.

As for bathroom privacy screens, the 20 percent additive proposed by AEP Texas more than covers the additional square footage proposed by BNSF. In any event, the restrooms AEP Texas' engineers designed do have privacy screens at the urinals and toilet partitions. *See* AEP Texas Op. Workpapers Vol. 22, p. 11485. Moreover, the urinals have partition/screens between them and the sink. Thus, there is no need to expand the sizes of the bathrooms specified by AEP Texas.

BNSF also suggests that AEP Texas did not include a lunch room, and it proposed a 1,300 square foot facility. In fact, AEP Texas did include a lunch room on

Opening. Crew Work Area 1 is designed to be a lunch room, and it can accommodate 12 to 16 people at a time.

Finally, BNSF proposed a 2,000 square foot data center to house computers, plotters, printers, storage and staff offices. This additional space is unwarranted. First, AEP Texas has already included office space for every staff member, including the IT department. Second, AEP Texas included five different 300 square foot clerical areas that can accommodate computers – more than enough for the limited centralized computer equipment proposed by AEP Texas. Indeed, AEP Texas' IT witness, Mr. Kruzich, specified on Opening that a room 15x20 (300 square feet) would be all that is required for the IT infrastructure. AEP Texas Op. III-D-64. As AEP Texas has five such rooms, an additional data processing center is not required. In light of the above, AEP Texas has continued to use its Opening building size on Rebuttal.

Finally, BNSF has added additional light fixtures and related unit costs to the parking lot facilities. AEP Texas agrees with the revisions to the lighting unit cost. However, it disagrees that more light fixtures are necessary. The two 400-watt bulb fixtures selected by AEP Texas (the same used in the yards) can cover 29,760 square feet each. The four fixtures proposed by AEP Texas on Opening, therefore, cover 119,040 square feet. As the parking lot is only 61,200 square feet, no additional light poles are necessary.

b. Fueling Facilities

i. Alliance Yard Facility

On Opening, AEP included over \$7.8 million in investment for fueling facilities at the TNR's Alliance Yard. The costs for fuel cranes and gravity towers were derived from a quote from the Hanson-Wilson Company – the same company that BNSF has used to install fueling equipment. Additional equipment costs, such as storage tanks, were developed from Means and other sources. The fueling facilities were also sized to handle the number of trains/locomotives and amount of fuel that the TNR would need.

The TNR's basic design assumed that locomotives would be fueled at Alliance in the empty direction on separate yard tracks. The locomotives would not be connected to a train at that point, as arriving empty trains would have their power cut off and freshly fueled and serviced locomotives would be added.

BNSF takes issues with AEP Texas' approach. As demonstrated below, BNSF's criticisms are marred by inaccuracies that undermine its points.

BNSF's initial criticism is that AEP Texas did not produce a full scale design of the Alliance fueling facility. However, the shipper's primary obligation in SAC rate cases is to develop accurate costs for the various facilities to be constructed, a full scale design is not a requirement. AEP Texas costs were developed from a variety of sources, and designs were developed where necessary, such as the containment areas for the storage tanks, and estimates were used for groups of items, where they were available.

Moreover, the primary cost quote used by AEP Texas is from Hanson-Wilson, the same company that built BNSF's Belen, New Mexico, fueling facility. Nevertheless, BNSF attempts to belittle the quote received from Hansen-Wilson suggesting that it is a mere "email." BNSF relies on just such email quotes for parts of its bridge costs – yet, somehow, it is not enough when AEP Texas uses a similar quote. Obviously, BNSF's double standard should not be tolerated.

BNSF's criticisms also reveal a lack of knowledge with respect to the operational aspects of AEP Texas' fueling plan. For example, BNSF states that "there does not appear to be any operational basis for the eight fueling platforms as proposed by AEP Texas. This arrangement suggests that AEP Texas intends to bring the two locomotives from the head end of each empty coal train directly to a fueling rack." Of course, that is exactly what AEP Texas is proposing. Mr. Reistrup's operating plan calls for all locomotives on northbound (empty) coal trains (including the DP unit) to be removed from each train at Alliance for fueling and servicing and fresh locomotives to be added to each train prior to departure for the PRB mines. BNSF's unfounded criticism seems to indicate that it agrees that AEP Texas' configuration is appropriate for fueling the trains in the manner proposed by Mr. Reistrup.

BNSF also criticizes AEP Texas' estimate of the capacity of the Alliance fueling facility. In particular, BNSF states that the system is over designed: "Although the AEP Texas' locomotive count is only 368 locomotives, it inexplicably asserts that the

Alliance fueling facility theoretically can fuel 1,152 locomotives every 24 hours” and then argues that such numbers are unrealistic. However, AEP Texas’ statement that 1152 locomotives could be serviced at Alliance in a 24 hour period was made only to explain the theoretical capacity of the platform layout and infrastructure. It was not meant as a statement of how many locomotives per day would actually be fueled at Alliance. Indeed, on the peak day of the peak year, the Alliance facility will only fuel 147 locomotives, which is far below the maximum capacity of the facility.

Unfortunately, BNSF appears to have mistakenly assumed that 1152 locomotives would actually be fueled in Alliance in one day because it engages in a considerable dissertation as to how the facility could not really handle 1152 locomotives, without regard to the actual peak locomotive quantity.

As noted above, on the peak day operation 49 trains with 147 locomotives will be fueled at Alliance. Of course, all other days would have less volume, but the design requirements were based on the operations plan for train make up and departure based on this number with plenty of margin for contingencies and worst-case scenarios. As an example, on a peak day the facility would have to handle a locomotive for fueling and servicing every 91 minutes, on average. This is plenty of time to fuel and turn the power using even BNSF’s low pump rate of 400 gpm. The average consist can be fueled (pump time) in just over six minutes. See AEP Texas Reb. electronic workpaper file “Fueling Info.xls.”

In that electronic workpaper, AEP Texas has documented by train the specific fueling requirements for a peak day. As the spreadsheet demonstrates, these volumes are substantially less than BNSF suggests; *see* BNSF Reply at III.F-189 wherein it claims that an SD70MAC locomotive would likely have only 900 gallons left in the tank upon arriving at Alliance (assuming it came from Las Animas and was not an interchange train). Even if BNSF were correct, AEP Texas' peak day plan still leaves another 84 minutes per locomotive for locomotive servicing, fuel set up and hostling. Most days would be lighter and even more time is available for these activities. Spread over 8 platforms, and with the proposed operational servicing and building of consists, the Alliance fueling facility is more than adequate to meet any operational challenge for the TNR's traffic group.

ii. Las Animas Fueling

On Reply, BNSF suggests that it is not practical to fuel locomotives at Las Animas by tanker truck, but it offers no specific reasoning. In any event, BNSF proposed a yard in Amarillo rather than Las Animas and it included a mainline fueling facility for that yard with two 750,000 gallon tanks. BNSF proposes to fuel locomotives on all trains moving in both locations at Amarillo. As shown in Part III-B-3, *supra*, AEP Texas' Witness Reistrup retains Las Animas as the location for the TNR's southerly yard and locomotives are fueled in the loaded (southbound) direction only.

AEP Texas has reviewed the fueling requirement for Las Animas, which consist of only 19 trains requiring an average of 1426 gallons each on the peak day. AEP Texas analysis assumes a peak fuel burn rate of 3.24 gallons per diesel unit mile. Thus, on the peak day, the Las Animas facility will pump 81,259 gallons with each consist taking on 4,277 gallons, or less than one full fuel tank of an SD70MAC at 4,900 gallons. Although pump time is longer out of a tanker truck, taking on average just under ten minutes, this does not pose an operational or servicing time constraint as the loaded trains will layover here for five hours according to the TNR's operating plan.

Despite the feasibility of fueling from tankers, AEP Texas has decided to adopt BNSF's proposal for fueling the head end power at Las Animas using permanent fuel racks rather than tanker trucks. Thus, on Rebuttal AEP Texas has placed a permanent fueling facility at Las Animas for the head end power (DP units would still be fueled by tanker truck). In order to make this change without adding improper rebuttal evidence to the case, for this purpose only, AEP Texas uses the costs provided by BNSF for the fueling facility at its proposed Amarillo Yard.

However, the Las Animas yard will require a significantly smaller facility than Amarillo because it will not fuel merchandise trains, and coal trains will be fueled in only one direction rather than in both directions as proposed by BNSF. Thus, the Las Animas Yard requires only fueling platforms serving four tracks, rather than the four platforms serving eight tracks that proposed by BNSF for Amarillo. Therefore, AEP

Texas has accepted one-half the \$14.2 million cost proposed by BNSF for the Amarillo fueling facility, or \$7.1 Million.

iii. Basic Cost Elements

On Reply, BNSF argues that AEP omitted a variety of facilities such as pumps and storage tanks for items for such as journal oil. As noted above, AEP Texas relied on a quote from Hanson-Wilson Company for the fuel rack portion of the system. That quote included:

- Reinforced concrete fueling platform
- Pipe trenches
- Piping
- Diesel fuel dispensing
- Lube oil dispensing
- Compressor oil dispensing
- Water and treatment
- Lighting
- Power controls
- Track, direct fixed to the platform
- “Everything needed for a Full Service Platform, including associated support structures and equipment”

See AEP Texas Op. Workpapers Vol. 22, p. 11599. Moreover, close review of this quote shows that the costs associated with the fueling facilities include all costs related to ancillary functions for locomotive servicing. In other words, the Hanson-Wilson quote was meant to be a turnkey solution that covers everything the TNR will need.

While the Hanson-Wilson quote does not cover “fuel storage/supply pumping costs” within the fueling platform costs, these costs, as BNSF noted, are covered separately in AEP Texas Op. electronic workpaper file “Bldest2.xls.” In addition to the

unit costs quoted by Hansen-Wilson, AEP Texas' engineering experts also provided a 2,000,000 gallon storage tank for fuel, underground fuel piping to the loading racks and other related costs, which BNSF agrees with but split into two 1,000,000 gallon tank in case one tank needs to be shut down. This is unnecessary because one tank can simply have a backup pump.

BNSF further argues that the Hanson-Wilson quote is not applicable because “[t]he fueling platform arrangement described by Hanson-Wilson incorporates significant cost savings to be realized from using common pipe headers to distribute fuel and maintenance fluids to dispensing stations serving two tracks.” AEP Texas' engineering experts were aware of this issue on Opening. Recognizing this, AEP Texas used the cost for a double rack and applied it to the single racks – intentionally overstating the fuel rack costs in order to avoid criticism for adjusting the cost for single racks.

BNSF also states that the pipe fitting used by AEP Texas will not work with the fueling design, and that a four inch pipe from the storage facility to the fuel platform is too small. AEP Texas agrees with both of these statements, and it has revised its Rebuttal costs accordingly.

AEP Texas' engineering experts find no particular fault with BNSF's design for the Alliance fueling facility, except one. BNSF's costs includes a multitude of items (e.g., journal oil storage tank, pumps, piping containment, waste oil tanks, pumps, piping, containment, air compressor, oil storage tanks, toilet chemical tank, piping, radiator water

storage and piping, sanitary sewer dumps on service (fuel pad) track) that AEP Texas submits are already covered by the Hanson-Wilson quote. As such, AEP Texas believes that BNSF's Alliance fueling facility cost is overstated by at least 49 percent.

Finally, AEP Texas accepts the additional costs proposed by BNSF for helper fueling facilities.

Thus on Rebuttal, AEP Texas' revised cost for the Alliance fueling facility is \$7.8 million. Coupled with the addition of \$7.1 million for the fueling facility at in Las Animas, AEP Texas' grand total for the TNR's fueling facilities is \$14.9 million.

c. Locomotive Shop

On Opening, AEP Texas provided for a 118,000 square foot locomotive repair facility that includes six tracks and all major equipment necessary for a contractor to maintain and repair the TNR's locomotives in the shop. BNSF accepts the building size proposed AEP Texas, but in almost every other respect, BNSF quarrels with the costs proposed by AEP Texas. *See* BNSF Reply at III.F-199.

BNSF has presented a litany of objections with respect to the structural elements of the building, ranging from the thickness of the floors to theoretical weight bearing elements of the floor. While AEP Texas believes that the basic elements of its locomotive shop are sufficient, it recognizes that in some respects (*e.g.*, electrical service) its plan maybe insufficient. To minimize disputes, between the parties, AEP Texas has adopted BNSF's locomotive shop spreadsheet as the basis for its Rebuttal costs. This

spreadsheet covers all the items that BNSF takes issue with including shop floors, drop pits, cranes, etc. *See* BNSF Reply III.F-201 to 211. However, AEP Texas has made several modifications consistent with its Opening evidence as discussed below.

First, AEP Texas has continued to use its building size because it was accepted by BNSF. Second, AEP Texas removed certain equipment supplied by BNSF because such equipment will be provided by the contractor. In particular, AEP Texas presented a resources agreement between Omnitrax and the Union Pacific that specifies what equipment the railroad must provide for the shop. As AEP Texas' Witness Ellison was responsible for that contract with UP during his time with Omnitrax, he can say with certainty that all other equipment was the responsibility of the contractor. BNSF never disputes this point. Rather, BNSF sidesteps it and argues that the repair equipment in the Omnitrax agreement is not applicable, and from there it adds additional equipment. BNSF's repair equipment arguments are flawed as explained below.

In particular, BNSF argues that the tools covered by the OmniTRAX agreement apply only to GP40-2 and GP38-2 locomotives, but it then concedes that the tools are rather generic and could be used to service "any locomotive." Obviously, AEP Texas disagrees that the maintenance tools selected are for locomotive types not used by the TNR. In particular, EMD tooling for 567, 645 and 710 model engines are, as BNSF itself notes, rather generic items, unlike tooling that might be used for General Electric locomotives. The fact that the tooling referenced in the Omnitrax materials happens to

reference different models of EMD locomotives than those used by the TNR is not valid as the TNR's locomotives fall into the 567, 645, and 710 engine types. The major tooling differences between these models are generally the size of the parts and the size of the socket used on the tooling. The SD70MAC, for example, utilizes the EMD 710 engine type which is a refinement of the 645 and the earlier 567 engines. All are nearly identical in layout, form and function as far as tooling is concerned.

In light of the above, AEP Texas has excluded the additional equipment added by BNSF on Reply. *See* BNSF Reply at III.F-213 to 214 for a list of the equipment it added.

AEP Texas also objects to BNSF's paving of the area surrounding the locomotive shop. AEP Texas notes that numerous photos taken by AEP Texas engineering experts show several areas of the BNSF Denver and Pueblo yards that are mere dirt and cinders, without even a defined gravel drive. Thus, heavy equipment stored in the yard area outside the repair shop can be placed on wood blocks as can several of the other large replacement locomotive parts. Therefore AEP Texas has retained its Opening site construction costs near the locomotive shop.

The only other point of disagreement between the parties is the locomotive wash house. On Opening, AEP Texas provided a single-track wash rack, which BNSF objects to on Reply from both a size and design perspective. BNSF's revisions to AEP Texas' wash house are unnecessary as described below.

First, BNSF argues that the wash house should have two track lest it become a bottleneck to the movement of locomotives into the shop. This argument is easily dispatched. Hanson-Wilson has recently built a single-track wash house in Barstow, California, which, according to its website, can handle an average of 100 locomotives a day. *See* www.hansonwilson.com/projects/barstow.asp. Consequently, AEP Texas has continued to use a single-track design on Rebuttal.

BNSF also complains that AEP Texas' wash house does not provide sufficient clearances for personnel to move about. As BNSF's cost per square foot is lower than AEP Texas', and to minimize disputes, AEP Texas has used BNSF's cost per square foot but applied it to its Opening square footage.

With the above revisions, AEP Texas has included \$15.55 million on Rebuttal for its locomotive repair and wash house facilities.

d. Crew Change Facilities, Yard Office and MOW Buildings

On Opening, AEP Texas provided other buildings to cover crew-change points, yard offices and MOW buildings. Unfortunately, some of the details of AEP Texas' plan were not well explained. Consequently, BNSF has raised a variety of arguments against AEP Texas' buildings. However, as AEP Texas demonstrates below, its Opening facilities were adequate and it has continued to use those costs on Rebuttal.

BNSF's first six points against AEP Texas revolve around which buildings were specified for which points on the TNR system. *See* BNSF Reply at III.F-221 to 222.

For clarification, AEP provided buildings at each location as follows:

1. Donkey Creek – 2 large buildings and 1 medium – capacity 260
2. Alliance – 1 large and 1 medium – capacity 162 persons
3. Englewood – 1 medium building – capacity 60 persons
4. Las Animas – 1 medium building – capacity 60 persons
5. Amarillo – 1 medium building – capacity 60 persons
6. Oklaunion – 1 small building – capacity 32 persons.

AEP Texas' building specifications were based on the following crew personnel disbursements: Donkey Creek 240, Alliance 162, Englewood 56, Las Animas 54, Amarillo 60, and Oklaunion 32. On Rebuttal, AEP Texas has added seven more crew members at Donkey Creek, but the facilities there are still adequately sized as they can accommodate 260. As such, AEP Texas has not changed its building allotments on Rebuttal.

BNSF also argues that AEP Texas did not calculate the cost per square foot in accordance with the Speed Space costs that AEP Texas utilized on Opening. *See* Reply at III.F-222 to 223. AEP Texas agrees that its Opening square foot cost of \$69.00 was erroneous because it included in its average square foot cost the lump sum per building cost of the setup. AEP has corrected the square foot cost by removing the setup cost and averaging only the building square foot cost for a revised cost of \$66.70. AEP then

applied the setup cost of \$2,150 into the site development cost by multiplying the \$2,150 by the number of each type of crew change and MOW building.

BNSF also argues that only the medium and small crew change building could utilize the Speed Space products because the large crew building exceeds 1,200 square feet, which it argues is beyond the recommended Speed Space size. AEP Texas disagrees with BNSF's assessment. The Speed Space web site states that "We are space solving experts and we can supply modular buildings to meet every need." *See* http://www.comstruc.com/forkliftable_buildings.htm. The website further notes that the modules can be added to or subtracted from, and even made into double story offices. *Id.* One example listed on that same page is a 1,360 square-foot building. *Id.* As AEP Texas' large crew building is feasible, AEP Texas has continued to use its Opening sizes and its revised Opening costs.

BNSF also argues that modular space of the type proposed by AEP Texas is not durable enough to withstand the rigors of railroad employees, and so must be replaced every ten years. AEP Texas disagrees. In particular, AEP Texas notes that the exteriors of the buildings have a 20-year guarantee. *See* AEP Texas Op. Workpapers Vol. 22, p. 11496. Moreover, the Speed Space buildings are backed by an "unconditional, no nonsense guarantee." *See* http://www.comstruc.com/forkliftable_buildings.htm.

The Speed Space buildings are a durable, affordable choice for the TNR's line buildings. *See* AEP Texas Opening Workpapers Vol. 22, p. 11494, which shows a

number of different suggested uses for this type of building, including “railroad line buildings.”

As for MOW buildings, BNSF used totally different sized buildings because of its vastly overstated MOW staffing and equipment. As AEP Texas has continued to use its Opening MOW staffing on Rebuttal, it has not adjusted the size of its buildings. BNSF also argues against the use of a modular building for the MOW crews on the same basis noted above. *See* BNSF Reply at III.F-226. As AEP Texas has shown such building are feasible, it has continued to use them on Rebuttal.

BNSF’s further argues that the garage space provided by AEP Texas must be air conditioned. *Id.* AEP Texas disagrees. In particular, AEP Texas notes that the garage space it provides is considerably more generous than what BNSF itself utilizes on its own lines. AEP Texas’ engineering experts’ photos show that some MOW buildings have no garage at all – forcing the personnel to work directly in the open. *See* AEP Texas Op. electronic workpaper files “AEP TEXAS NORTH ANGORA 10-28.pdf,” p. 63 and “AEP TEXAS NORTH BRUSH 10-27.pdf,” pp. 38-39. AEP Texas has, therefore, continued to use its Opening garage design.

Finally, BNSF added a variety of small tools to the facility. *See* BNSF Reply at III.F-226. AEP Texas objects to the inclusion of these tools because AEP Texas has already included a 35 percent allowance in the MOW personnel budget for small tools to be used by the crews.

Consequently, AEP Texas has continued to use its revised Opening costs for MOW buildings.

e. Waste Water Treatment

On Opening, AEP Texas included \$0.6 million for waste water treatment facilities, including three 5,000-gallon facilities and a 400-gallon facility at each small and medium crew change building. BNSF accepts AEP Texas use of the 400-gallon facilities. *See* BNSF Reply at III.F-229. However, BNSF's has developed its own costs for the 5,000-gallon facilities, arguing that it is unsure whether AEP Texas' cost quotes are sufficient.

AEP Texas' 5,000-gallon facility costs are sufficient to handle the daily flow. In particular, its facility includes a blown air aeration plant (not simply a gravity oil-water separator as BNSF suggests) capable of separating the emulsions created when soaps and petroleum based products are combined (as BNSF's dissolved air flotation system does). *See* AEP Texas Op. Workpapers Vol. 22, p. 11595. That facility can handle 5,000 gallons per day, which is 3,000 gallons more than AEP Texas' projected usage. *See* AEP Texas Op. Workpapers Vol. 22, p. 11595. As to the capabilities of the oil/water separator and related equipment from the Tenco-Hydro quote, the workpapers show a rating of 450 gallons per minute for that equipment. *Id.* at p. 11590.

BNSF also argues, for the same reasons that it did with respect to yard fencing, that AEP Texas should have included more expensive barbed wire around the

treatment facility. For the same reasons that AEP Texas presented in its yard fencing rebuttal, it has continued to use its Opening fencing costs.

Finally, BNSF suggests that AEP Texas did not properly index the costs. AEP Texas has reviewed the relevant spreadsheet, and its total unit costs were in fact indexed. Consequently, AEP Texas has continued to use its Opening costs.

AEP Texas notes that BNSF's costs are also overstated because it bases its costs on a facility built by the Union Pacific, the Hinkle Locomotive Maintenance and Fueling Facility. This facility, according to UP's website, is the only UP facility designed as a "zero discharge" facility for sanitary and industrial waste streams. *See* <http://www.uprr.com/aboutup/history/hinkle/>. As AEP Texas has not suggested a zero discharge facility, basing the facility costs on such a plant is inappropriate.

f. Yard Air and Yard Lighting

AEP Texas has addressed yard site costs in Part III-F-2, *supra*.

g. Car Repair Shop

AEP Texas did not include the cost of a car repair shop in its Opening costs because the terms of the full-service lease for cars requires the contractor to perform all work. AEP Texas Op. at III-D-6. On Reply, the BNSF argues that while the contractor may perform the work, AEP must provide the facility. BNSF Reply at III.F-218 to 219. BNSF is incorrect in its assumption. In particular, the rail car leases state that the lessor is responsible for the repair of the cars and that such repairs will take place at a car shop

designated by the lessor, and in one instance state specifically that it will be a private car shop. *See* AEP Texas Op. Workpapers Vol. 18, pp. 08937-08946. Consequently, AEP has not included any car shop facilities on Rebuttal. AEP Texas notes that the Board has recently accepted the thrust of AEP Texas argument in *PSCo/Xcel*. *Id.* at 113.

8. Public Improvements

a. Fences

On Opening, AEP Texas based the amount of fencing needed for the TNR's right-of-way on its engineering experts' inspection of the lines being replicated. The Board approved this method in *PPL Montana*. *Id.* at 28. BNSF has accepted AEP Texas' fencing percentages for the Orin line segments, but disagrees with the 25% figure that AEP Texas used for the remaining portions of the right-of-way. BNSF's experts inspected the BNSF's line being replicated and came up with their own estimate on the percentage of fencing along the right of way. BNSF Reply at III.F-231. BNSF's estimate includes all fencing located along the lines, even that which was constructed by adjacent landowners.

AEP Texas experts Brian Bastow, Daniel Swanson and Douglas Ellison viewed and photographed the entire line for the purposes of determining the amount of fencing along the right of way. These experts concluded that only 25% of the line had been fenced by the railroad. While other areas were also fenced, the experts concluded that this fencing had been placed by the property owners, not the railroad.

AEP Texas' experts conclusions were based on their observation that the fencing along the line varies widely in style and type, which suggests that the landowner, not BNSF, constructed the fence. Yet, BNSF argues that "BNSF provides various types of fence depending on the use of adjacent land and the landowners' preferences." *See* BNSF Reply at III.F-232. BNSF's statement strains credibility.

AEP Texas' experts have dealt with Class I railroads for many years, and with BNSF in particular, and have never witnessed a Class I railroad contact an adjacent landowner to determine what type of fence would be most appropriate. Indeed, such an act would be nearly impossible considering the sheer number of different property owners that railroads of that size would have to contact. One would expect that such efforts would produce a considerable amount of paper work that BNSF could rely on to support its position, but it has not provided any.

In addition, BNSF has not provided any records of any construction costs for the fencing, nor has it provided any proof that it even maintains this fencing – even though AEP Texas requested such information in discovery. BNSF Reply at III.F-232.

If BNSF has installed the fences, common sense would dictate that it would build a standard fence that designed to stop the transfer of livestock from one property to another. Instead, there is a variety of fencing types along the right of way.

Further, much of the fencing along the right-of-way is not of a type traditionally used by railroads, but is instead a type of fence that is used by farmers, such

as simple strung, barbed wire fencing. This type of fencing generally requires repairs on a regular basis. BNSF, however, has not shown that it has incurred any costs associated with repairing this fencing, or any fencing along the line.

Finally, at many property lines, the fences turn and run perpendicular to the right of way. Obviously, the railroad has no reason to build a fence beyond its right of way. As a result, AEP Texas' experts concluded that these fences were not constructed by BNSF, and did not include them in their fencing percentages.

BNSF argues that the AEP Texas' experts' trip to examine the line should be given little credit because "there is no formal report of documentation of the trip in AEP Texas' workpapers." BNSF Reply at III.F-232. This is simply not the case. AEP Texas' witnesses documented their trip with a multitude of photographs of the lines being replicated which it provided on Opening. This visual evidence is more than adequate.

BNSF has added the costs of cattle guards, because cattle guards are included in the ICC Engineering Reports. BNSF also prorated the number of cattle guards from the ICC Engineering Reports. BNSF Reply at III.F-233 to 234. These reports do not accurately reflect initial cost that the railroad incurred because the Reports reflect replacement cost and not the cost originally incurred by the railroad, if any such cost was even incurred. Consequently, AEP Texas has not included any additional cattle guards.

BNSF also states that snow fences are required, and includes 1,328 LF of snow fence on the Orin Subdivision and 43,569 LF for other lines from the ICC Engineering Reports. BNSF Reply at III.F-234. AEP Texas' engineering witnesses' observations of the other lines shows that BNSF's 43,569 feet of snow fences does not exist. While, the ICC Engineering Report may show such quantities, virtually no snow fences exist on these line today. Indeed, AEP Texas' experts visited the lines during the winter and did not see *any* snow fence used along the right of way during their inspections. Further, none of the pictures that AEP Texas' experts took along the right of way show any snow fence, and BNSF never argues that there is in fact any snow fence along the line. BNSF did not provide one photograph of a snow fence along these lines. As a result, AEP Texas has not included any costs for snow fences in its Rebuttal restatement.

AEP Texas used 2002 and 2003 right-of-way fence costs from the BNSF AFEs produced in discovery. From these numbers AEP Texas derived an average unit cost per linear foot. BNSF agrees that costs for gates, panels and brace panels were correctly included in the costs of the fence. However, BNSF then argues that additional gate costs should be added to the cost of fences. BNSF Reply at III.F-233. AEP Texas disagrees with BNSF that additional gate costs should be added to the cost of fences. The average costs established is reasonable, and even BNSF agrees that this includes gates,

panels and brace panels. BNSF has not shown that additional gates are necessary and therefore AEP Texas did not alter its unit costs.

BNSF further alters the unit costs by stating that AEP Texas did not average some of the higher costs for BNSF's AFEs. BNSF Reply at III.F-233 to 234. AEP Texas is a least-cost most efficient carrier, and therefore is able to use the lowest cost provider of services and goods. As a result, there is no requirement that AEP Texas should use an average of all the AFEs. BNSF has shown no reason why the unit cost would not be feasible or why AEP Texas would be unable to receive the same services for the unit cost that BNSF paid.

AEP Texas stands by its original ROW fencing quantities and costs and has made no changes on Rebuttal.

b. Roadway Signs

i. Types and Quantities

On Opening, AEP Texas included a standard set of signs that have been accepted by the Board in recent SAC rate cases. These signs include milepost, whistle post, and certain advance warning and crossing signs. BNSF takes issue with the placement of the signs and argues that additional signs are necessary. BNSF Reply at III.F-235. With one exception, for the reasons discussed below, AEP Texas has not altered its sign quantities.

BNSF argues that the TNR is required to have speed restriction, advance warning, and crossing signs, which AEP Texas has not included in its costs because such information is normally included in timetables. BNSF Reply at III.F-236. AEP Texas' decision to operate using timetables is consistent with the Board's decision in *PPL Montana*, where it held that "yard limit, reduce speed and resume speed signs would not be required when appropriate instructions are included in operating timetables." *Id.* at 28. As indicated on Opening, the TNR operates under the NORAC Operating Rules, which govern the TNR crews' required preparation. BNSF argues that NORAC does not have anything to do with requirements for signs. BNSF Reply at III.F-236. These rules indicate that crews must know the various conditions, speeds, and other factors before setting out, and therefore additional signs are not required.

BNSF argues that the TNR should operate under the General Code adopted by Western carriers. BNSF tries to support this argument by stating that all railroads in some territories operated under similar operating rules. The TNR is a stand-alone railroad with no other railroad operating on its lines. Further, the FRA requires only that a railroad operate under approved operating rules. Therefore, the TNR has the right to choose any operating rules determined to be the most effective and plausible for its situation. In fact, the FRA allows any railroad to create its own operating rules as long as the FRA approves such rules. Therefore, the rules that govern the TNR are adequate and

follow the guidelines set by the FRA. Considering that the TNR operates lawfully under the NORAC rules, AEP Texas decision to exclude certain signs is reasonable.

BNSF points out that “AEP Texas states that it did not include advance warning signs, but it nonetheless included costs for these signs at crossings.” BNSF Reply at III.F-235. AEP Texas notes this error and has removed the costs for these signs at crossings.

BNSF states that 49 C.F.R. § 218.35 mandates the use of yard limit signs in addition to the notification in the timetables. BNSF Reply at III.F-236. AEP Texas agrees with this, and has placed six yard limits signs pursuant to BNSF’s calculations.

BNSF also discusses the “1-800 ” signs required at all crossings by the FRA. These costs are included in the crossing costs and should not be double counted here.

The BNSF further attempts to inflate costs by arguing that flanger signs are necessary in heavy snowfall areas. BNSF Reply at III.F-237. In their field study, AEP Texas witnesses Brian Bastow, Dan Swanson and Douglas Ellison traveled all of the BNSF lines being replicated (including those areas that receive heavy snow) and did not see any flanger signs along the right of way. Indeed, no flanger signs can be seen in any of these photographs taken by these experts. As such, AEP Texas did not include flanger signs in its costs.

BNSF also attempts to increase costs by adding warning signs on bridges to keep people from entering these structures. Again, AEP Texas' experts reviewed their photographs and found that not all BNSF bridges have such signs. Moreover, the FRA does not require these signs.

ii. Unit Costs

BNSF agrees with AEP Texas' unit costs but adds overhead and profit to installation costs. *See* BNSF Reply at III.F-237 to 238. AEP Texas agrees with this addition.

c. Crossings

i. At-Grade Crossings

The BNSF argues that the ICC Engineering Reports show that BNSF contributed to the cost of all road crossings, even where the railroad pre-dated the road. BNSF Reply at III.F-238. Indeed, BNSF claims that the ICC Engineering Reports show that 296 crossings were built, and in addition there were quantities of materials under Account #15 for crossings that it claims equal another 1,501 crossings. For the reasons discussed below, AEP Texas has excluded the costs for at-grade crossings on all portions of the TNR route except the Orin, Campbell and Boise City Subdivisions.

AEP Texas' experts have reviewed BNSF's crossing data, and disagrees with BNSF's determination that the data proves that BNSF paid for the crossings it added. In particular, the ICC Engineering Reports were prepared more than 30 years after most

of the railroad was constructed. During that period significant development took place throughout the West, which resulted in the construction of new roads. And of course, cars and trucks were not even available when most of the lines being replicated were built. Other than the ICC Engineering Reports, which are based on replacement costs and not who originally paid for a crossing, BNSF has produced no evidence that it has paid for the construction of any of the road crossings. Since BNSF cannot show that BNSF paid for the other crossings, and these crossings were built after the railroad was in place, the general rule that the later entrant pays for the improvement should be followed. *See TMPA* at 134; *Wisconsin* at 92; *West Texas Utilities*, 1 S.T.B. at 672, 709. Thus, AEP Texas has only built the crossings on the subdivisions listed above.

In addition to BNSF's failure to show that it paid for the crossings at issue, BNSF cost estimate suffers from methodological problems. Specifically, the ICC Engineering Reports did not identify the number of crossings in some valuation sections. To get around this problem, BNSF estimated how many crossings were built in each valuation section by analyzing the underlying crossing material quantities in account #15 for each valuation section. From there BNSF applied a percentage of the crossing materials to TNR that corresponds to the BNSF then (1) determined the number of crossings that can be built from these materials, and (2) assigned a certain percentage of crossings for the TNR by using a ratio of the TNR's route miles versus the total route miles in the valuation section.

Assuming *arguendo* that Board agrees with the BNSF that the ICC Engineering Reports are a reliable source of carrier-paid cost for a crossing, this estimation method is simply too unreliable to determine which crossings BNSF paid for in the past – in part because BNSF’s method does not definitively place the crossings on the lines being replicated by the TNR. Moreover, BNSF fails to cite any evidence showing that the quantity of materials that it calculated would create 1,501 crossings on the TNR system. Instead, BNSF simply relies upon the experience of its consultant Gouger, who “summarized the information in the ICC Reports and determined that there was sufficient material for the equivalent of 1,501 crossings.” BNSF Reply at III.F-239. To require AEP Texas to pay for crossings based on such flimsy evidence is totally inappropriate.

On Opening, AEP Texas used a combination of asphalt and rubber crossings for at grade crossings. This is a long-lived, durable crossing material that railroads have been using successfully for many years. BNSF alleges that asphalt is not a proper material for high density crossings because it needs continual replacement. BNSF Reply at III.F-239, and argues that a number of different crossing materials should be used. Most of these crossings are concrete. Concrete crossings cost in excess of \$500 per foot more than the asphalt/rubber crossings selected by AEP Texas.

As the TNR is a least-cost railroad, it can select the materials it will use for grade crossings so long as its selection is feasible. It is not required to replicate the exact materials used by BNSF. In this case, AEP has elected to use asphalt and rubber

crossings. This type of crossing material is commonly used railroads today, and is of sufficient quality to hold up to normal traffic loadings. The crossing consists of two rubber rail sections, one on either side of each rail with the inside rail section including a flangeway for the railway wheels, firmly attached with clamps to the rails surrounded by a full depth asphalt layer, generally equal or better than the roadway to which it is connected. This type of crossing is commonly used for asphalt, concrete and even gravel roads.

BNSF's approach, by comparison, is overly complicated and in many cases the crossing material selected is inferior to that proposed by AEP Texas. In particular, BNSF used gravel crossings in many places, and inexplicably those crossings were more expensive than those installed by AEP Texas. Obviously an asphalt crossing is more desirable than mere gravel.

On Opening, AEP Texas provided for flashing crossing lights without gates. BNSF has included gates. AEP Texas agrees the gates are necessary, and it has used BNSF's unit costs on Rebuttal.

ii. Highway Overpasses

The TNR is not required to build any highway bridges that the existing railroad did not build, as this would constitute a barrier to entry. Most of the replicated BNSF lines were constructed prior to most of the existing highway overpasses. When the

highways are the junior tenant, the Board assumes that the railroad did not pay for these costs. *See TMPA* at 134; *Wisconsin* at 92; *West Texas Utilities*, 1 S.T.B. at 672, 709.

BNSF generally accepts AEP Texas' approach, but it has made several modifications. First, BNSF notes that AEP Texas omitted a number of overpasses on the more recently constructed subdivisions (*e.g.*, the Orin and Campbell Subdivision). AEP Texas has corrected these omission on Rebuttal. BNSF also adds overpasses where the TNR has built more capacity than the BNSF currently has in place. This is the same rationale that BNSF employed to argue increased costs for items such as utility relocation. AEP Texas submits that BNSF's reasoning is flawed, as discussed *supra*.

On the older line segments, the ICC Engineering Reports, according to BNSF, list seven other overpasses. In some instances, the reports specified what percentage of the overpass was paid for by the carrier and others they did not. When the ICC Engineering Reports did not specify the carriers' share, BNSF used 10 percent. AEP Texas has added those overpasses where a specific percentage was listed. For the remaining overpasses, AEP Texas has not included any costs because BNSF did not show that it paid for the overpass. In addition, if the Reports lacked a specific percentage, they cannot be relied upon because they only determine replacement costs and not who bore the original cost.

AEP Texas Rebuttal costs are shown in detail in “crossings to be built.xls.”¹¹

9. Mobilization

On Opening, AEP Texas applied a one percent mobilization additive to various cost categories where labor and equipment is required, and where that category was not otherwise covered by a bid. AEP Texas’ rationale for its approach was simple and consistent with industry practice, namely: (1) bids that do not include “mobilization” as a specific bid item are assumed to include (2) mobilization because one does not pay contractors more than is required by their bid; and (2) mobilization is not added to “materials only” costs because normally the purchaser is already paying to have the materials delivered.

Conversely, BNSF’s mobilization costs were applied to all its costs (excluding land), and without regard to the appropriateness of such additions. BNSF even added mobilization costs for the track construction crews despite AEP Texas’ quote that clearly indicates that mobilization and demobilization are included. In other words, BNSF’s blanket approach substantially overstates mobilization costs.

a. Mobilization Costs Only Apply to Labor and Equipment

As noted above, mobilization costs are only applied to labor and equipment costs. Indeed, BNSF’s Reply recognizes this limitation (*i.e.*, “mobilization costs would be

¹¹ AEP Texas discovered too late in the production of this Rebuttal that it had not properly added the additional overpasses at a cost of approximately \$17 million.

incurred for all staff and all equipment involved in constructing the project”). *Id.* at III.F-249. Nevertheless, BNSF applies the costs to all materials as well. Adding mobilization costs to materials that already include a delivery cost results in an unnecessary double count of costs, which the Board should reject.

b. Mobilization Only Applies Where No Bids Have Been Received

It is well settled in the construction industry that mobilization only applies to labor and equipment components where such costs have not yet been bid out. This is true because the engineer’s estimate (the last stage of cost development prior to bids) typically includes mobilization as an element of an RFP. Contractors are expected to place bids specifically on the basis of the RFP, and that bid is expected to include all costs that will form the basis of the contract. Therefore when a bid is received, mobilization costs become an integral part of the bid cost and no additional mobilization fees are necessary. Many of the state highway departments note in their standard specifications that where mobilization is not included as a bid item, the contractor is expected to include it in his unit prices.

In this case, AEP Texas has received a bid on one of the single biggest equipment and labor mobilization costs, installation of track. As the Windgate quote specifically includes mobilization and demobilization, AEP Texas did not apply any mobilization additive for those tasks. AEP Texas also received a bid for the installation of crossings, and it excluded mobilization accordingly. For all other labor and equipment

activities, such as grading, bridges, buildings, signals, communications, and fueling facilities, AEP Texas included mobilization in accordance with standard estimating practices.

BNSF attacks the definitiveness of AEP Texas' construction bids, but its arguments are without merit. The bids included are accurate and valuable sources from which to derive the TNR's costs. AEP Texas has consulted with reputable contractors to develop the cited costs for some of the most costly aspects of the TNR construction project. And contrary to BNSF's suggestion, AEP Texas has, in fact, applied a mobilization factor to all Means-based estimates (such as grading). Indeed, AEP Texas is only relying on two bids, one for track installation and one for crossings, and both of those bids clearly cover mobilization. As such, AEP Texas has been conservative by limiting its exclusion of mobilization costs to only those areas where mobilization has been covered specifically.

c. Mobilization Percentage

On Opening, AEP Texas utilized a one percent mobilization additive on the items listed in its mobilization spreadsheet. *See* AEP Texas Op. electronic workpaper file "mobilization.xls." By contrast, BNSF has used 2.4 percent, but it has not explained its percentage breakdown, other than to note that it believes the performance bond costs should be either 0.67 percent or 1.05 percent depending on the activity and that mobilization and demobilization should be split evenly. *See* BNSF Reply at III.F-252 to

253. Assuming that the performance bond costs were as low as possible, 0.67 percent, the remaining mobilization and demobilization percentage would be 1.73 percent ($2.4 - 0.67 = 1.73$). Following BNSF's approach, the mobilization and demobilization costs should be split, and therefore each activity is accorded, at most, 0.865 percent. In other words, despite BNSF's protests to the contrary, a one percent mobilization factor is reasonable by its own standard. And as AEP Texas does not agree that demobilization or performance bond costs are appropriate here, it has continued to use its Opening one percent mobilization factor.

d. Demobilization is Unwarranted

While the Board has accepted demobilization costs in recent cases, AEP Texas submits that the Board's adoption of such costs is in error, and the Board should reverse its previous holdings on this issue. In particular, demobilization is simply not a regular feature in major projects, such as road construction. For example, a review of the public road construction bids submitted on Opening shows that none of the projects included a demobilization additive. Likewise, BNSF's own AFEs do not include any such costs. AEP Texas' evidence is the best evidence of record in this case, and the Board should therefore reject any demobilization costs.

e. Performance Bonds are Not Required

The BNSF also points out that AEP Texas did not include performance bonds in its costs. *See* BNSF Reply at III.F-210. Notwithstanding references to performance bonds in recent cases such as *CPL/NS*, performance bonds are either required or not at the pleasure of the project's owner. Other than citing the WRPI specifications, a non-BNSF project, BNSF has not demonstrated that it incurred costs for performance bonds when the lines were originally built, and therefore the TNR should not incur such costs either.

Assuming, *arguendo*, that the Board agrees with BNSF that performance bonds should be included, the costs should only apply to the same labor and equipment categories to which mobilization applies, as discussed above. Indeed, the Surety Information Office, an arm of the surety industry, defines a performance bond as a device that "protect[s] the owner from financial loss should the contractor fail to perform the contract in accordance with its terms and conditions." *See* AEP Texas Reb. Workpapers Vol. 3, p. 0090. As such, BNSF's application of performance bond costs to materials costs is inapplicable.

10. Engineering

On Opening, AEP Texas used a 6.8 percent engineering additive. *See* AEP Texas Op. at III-F-111. On Reply, BNSF used 10.5 percent, plus an additional \$100 million in costs for surveys, construction stakeout, geotechnical investigation, and

materials testing, resulting a total engineering additive of 14.6 percent. *See* BNSF Reply at III.F-277. BNSF's figures represent an unnecessary inflation of costs, the addition of unnecessary categories of costs, and a faulty interpretation of engineering cost source material. Moreover, BNSF's costs are inconsistent with the Board's recent decision in *PSCo/Xcel*. In addition, they far exceed the costs posited by BNSF in *TMPA*, where the scope of the SARR was similar to the TNR.

a. AEP Texas' Adoption of PSCo/Xcel Engineering Additive

In *PSCo/Xcel*, the Board advised that, in that case and future cases, a 10 percent estimate for all engineering cost components will be used. To comply with that decision, AEP Texas has used the 10 percent additive on Rebuttal.

b. BNSF Overstates the Engineering Additives

While AEP Texas believes that the Board's *PSCo/Xcel* decision settles the matter of engineering fees, out of an abundance of caution AEP Texas nevertheless addresses the problems with BNSF's proposed engineering additives.

i. Basic Engineering Fees

BNSF uses a basic engineering fee percentage of 5.7 percent based on the argument that the TNR project is of "above average" complexity. The Board has rejected this assertion on several occasions, most recently in *PSCo/Xcel* where it noted that "construction of a railroad, while a massive undertaking, is not 'above average' in complexity." *Id.* at 118. BNSF recognizes this point (Reply at III.F-265), but it argues

that more than simply track is being built. While this is true, the vast majority of the costs are for track construction, and BNSF has not demonstrated that all the other costs are worthy of a higher percentage. And even if they were, it would be inappropriate to place a higher percentage on the overall cost of the project as a result. Finally, BNSF never suggests that its own projects incur fees so high. As such, the 5 percent fee for basic engineering services utilized by AEP Texas on Opening is more appropriate – even though that has been vitiated by AEP Texas’ adoption of the Board’s overall 10 percent additive.

ii. BNSF’s Duplicative Study Phase

BNSF added an additional 0.5 percent for what it calls “planning studies.” It argues that is common practice to have such studies and that such a plan would be required to select that route. BNSF arguments are flawed. First, the route of the TNR is not at issue here and additional planning would not be required. More importantly, the “study and report” phase is the first step in basic engineering as listed in ASCE’s 1981 Manual 45, which both parties used. Indeed, Manual 45 narrative specifically mentions the that the “Study and Report Phase” includes the “determination of project scope and economic and technical evaluation of feasible alternatives.” *See* AEP Texas Op. electronic workpaper file “SW28.jpg.” BNSF’s inclusion of an additional cost, when that cost is already covered by the engineering percentage is an unnecessary double count that the Board should reject.

iii. BNSF has Double Counted Surveys

The BNSF also added a flat fee of \$5.7 million for surveys of the TNR route, implying that the engineering additives do not include location and design surveys. The Manual 45 narrative specifically mentions the preliminary work as the “Study and Report Phase” which includes “determination of project scope and economic and technical evaluation of feasible alternatives.” *See See AEP Texas Op. electronic workpaper file “SW29.jpg.”* The costs for location and design surveys are included in this Study and Report phase. In support of this, it should be noted that the USRD engineering agreement, which is used throughout the country, states in Section A 4 that “the ENGINEER will perform the necessary design surveys, accomplish the detailed design of the project, prepare construction drawings. . . .” *See See AEP Texas Op. electronic workpaper file “SW16.jpg.”*

Finally, AEP Texas notes that in *PSCo/Xcel* the Board rejected additional costs for surveys, presented by both parties, when it adopted the 10 percent additive. *Id.* at 117, Table D-15. As the there is no need for this additional \$5.7 million under any circumstances, the Board should not vary from its *PSCo/Xcel* decision.

c. Construction Management

BNSF has included an additional \$106.2 million for construction management by appying an additive of 4.3 percent. As AEP Texas noted on Opening, it believes that the Board had erred in recent cases by recognizing that construction

management was included in the shipper's basic engineering costs, but nevertheless adding to that percentage. However, AEP Texas' adoption of the Board's 10 percent additive from *PSCo/Xcel* more than covers BNSF's construction management additive, and therefore, AEP Texas will rest on the 10 percent overall engineering additive. In fact, when BNSF's percentage-based engineering additives are adjusted to eliminate the double count of surveys and planning studies, BNSF's engineering additives are reduced to 9.3 percent.

d. Resident Inspection

On Opening, AEP Texas provided 1.8% for resident inspection. BNSF discarded the resident inspection proposal by AEP Texas (despite the ample support that AEP Texas provided on Opening) and responded by including individual costs for construction stakeout, construction management, and materials testing, which it implies replace or duplicate resident inspection.

i. Construction Management

As noted above, BNSF's construction management figures are overstated, but nevertheless irrelevant if the Board uses its 10 percent overall engineering additive. However, AEP Texas notes that its resident inspection figure did not include construction management because AEP Texas included it as part of its basic engineering fees.

As for the two other items proposed by BNSF, construction stakeout and materials testing, for which BNSF developed flat costs of \$26.3 million and \$49.0 million

respectively, these costs are without merit and must be rejected for the reasons described below.

ii. Construction Stakeout

BNSF has included a list of 14 construction stakeout activities and assigned those activities a total cost of \$26.3 million. A separate cost for construction stakeout is inappropriate for several reasons. First, AEP Texas' resident inspectors are the field construction inspection corps. Part of their job is ensuring the proper alignment of the railroad. The above mentioned RUS engineering agreement (USRD form RD-1942-19) in Section A, paragraph 12 states "The ENGINEER will establish baselines for locating the work together with a suitable number of bench marks adjacent to the work as shown in the contract documents." *See* AEP Texas Op. electronic workpaper file "SW28.jpg." This is under the Engineering Services portion of the agreement. The construction contractors are required to protect the control that has been provided by the engineer and all construction work to be completed uses the survey control and bench marks for reference.

More importantly, the requirements for construction stakeout or layout are generally included within the construction contract. The standard specifications used within the engineering community and throughout the country are published by several different groups. EASYSPEC is promulgated by Bni®Building News of Anaheim, CA. Under Section 02310 Grading, Part 1, section 1.01 paragraph A the specification states "In accordance with pertinent provisions of this section, excavate, backfill, compact and grade

the site to the elevations *shown on the Drawings* and as needed to meet the requirements of the construction shown in the Contract Documents.” (emphasis added) *See* AEP Texas Reb. Workpapers Vol. 3, pp. 1019-21

In the McGraw Hill *Construction Specifications Portable Handbook* written by Fred A. Stitt, under Division 2 Sitework, Part 3.2 Grading and Excavation, paragraph A. states “Grade and excavate to lines, grades and elevations *as shown in the Drawings*.” (emphasis added). *See* Rebuttal Workpapers Vol. 3, pp. 00847-47.

Moreover, during the design phase, the design engineers provide control and benchmark data for the general contractors. After that point, it is the contractor’s responsibility to perform the actual construction layout. In a project with massive cuts and fills, it is impossible to provide design layout that would carry through to the end of a project. As cuts and fills are made, construction survey layout has to be continuously updated. Since this is the job of the construction contractor, it would therefore be included within the construction contract. Indeed, AEP Texas’ point is supported by industry practice. For example, one surveyor noted in a magazine article that “more than 90% of his firm’s contracts are directly with contractors who include the cost of the surveying in their bids and their contract prices.” *See* AEP Texas Reb. Workpapers Vol. 3, pp. 100994.

Incidentally, the control and benchmark data provided during the design phase of the contract by the engineer is included in his fee, as shown in the USRD Engineering Agreement, Section A4 as described above.

Another problem with BNSF's addition of \$26.3 million for construction stakeout is that it is totally unsupported by any specific evidence that BNSF incurs additional costs above those paid to the contractors for such activities. Indeed, a review of the AFEs provided by BNSF did not include one instance of a construction stakeout line item. Moreover, BNSF's own contracts indicate that such work is the responsibility of the contractor. *See* AEP Texas Reb. electronic workpaper file "BNSF contractor.pdf." Likewise, the public project bids that AEP Texas submitted on Opening and Rebuttal do not include separate costs for construction stakeout.

Another reason why additional construction stakeout costs (*i.e.*, surveying as the construction moves and placing stakes in the ground) are not necessary is that traditional construction stakeout as posited by BNSF is rapidly being supplanted by new technologies. In particular, Global Positioning Systems ("GPS") are used during the design phase to map the proper coordinates, and that information is fed into systems used by the contractor to guide the construction equipment, thereby largely eliminating the need for traditional stakeouts. For example, the U.S. Army notes that it uses GPS systems for "stakeout" purposes. *See* AEP Texas Reb. Workpapers Vol. 3, p. 01006. *Grading and Excavation Contractor* magazine touts the many benefits of GPS technology:

GPS allows surveying and mapping calculations to be conducted by one person, freeing other crew members for other work, and eliminates inaccuracy from lost or unintentionally moved stakes. With GPS, surveyors can log and direct topographical, detail, stake-out, boundary, and local

control data to the home base within minutes and can concurrently receive information on their progress.

GPS eliminates the need for constant surveying and mapping updates on the job site because the GPS data, in conjunction with computer-aided drafting (CAD) and geographic information system (GIS) technology, can keep track of a project's progress. These combinations can also be effective in initial project study and evaluation. Project progress can be assessed and monitored throughout the construction process. Mapping the location of environmental obstacles on construction areas provides necessary information for decision-makers about environmental issues for a specific project. Precision in these early stages of a project can help ensure accuracy throughout the construction process.

The same article also notes that:

In grading operations, the installation of centimeter-accuracy guidance on-board earthmoving equipment lets the operator visualize the position of the cut-and-fill surfaces in relation to the project design. GPS provides better control and continuous monitoring capabilities, reducing the amount of time that expensive machines stand idle or the possibility of having to move material more than once.

Moreover, as to the accuracy of using such systems, the article notes that:

"Grading before GPS involved a lot of surveying and staking," Hoselton explains. "As a grader got closer and closer to the correct grade, there had to be grade checkers pulling off and showing the operators when they were getting close. And a smaller contractor doesn't even have this luxury."

According to Hoselton, smaller contractors without grade checkers would be forced to use operators who perform their own grade-checking functions. "GPS for a small contractor would allow elimination of all the tools and work involved for the operator. All those tools are incorporated in the SiteVision equipment. The operator never has to leave the machine to

determine whether he's getting close or has achieved the grade he needs."

SiteVision GPS is an earthmoving grade-control system that allows operators to "see" design surfaces, grades, and alignments from inside the cab. Machine position versus site plan is displayed on a color monitor mounted inside the cab in front of the operator, providing quick location of embankments and pad corners. Light bars mounted in the operator's field of view guide operators to cut or fill along alignments. Road alignments and cul-de-sacs are located and defined with minimal assistance from grade setters or stakes.

See AEP Texas Res. Workpapers Vol. 3, pp. 01008-18.

By placing the site plan in the cab, SiteVision GPS enables operators to bring the site up to consistent and accurate grade that makes finishing faster, more efficient, and more predictable. Machine operators find SiteVision GPS very easy to learn and use because it is simple and intuitive.

"At the beginning of the shift, the foreman transfers the project data from the engineer's CAD files to a SiteVision unit that is on a V6 Cat dozer," Hoselton describes. "These data are only in 2D, so all contour lines are set at zero. Fortunately, we can remedy this problem by calibrating the elevation data from our survey tools. This gives us a 3D image of the control points on the job we're working on. All of these data are put into the SiteVision unit on a PC card, then the work begins."

In actual operation, the display in front of the operator shows a map with the machine position on it, while the light bars indicate how much the left and right corners of the cutting edge should be moved relative to the design alignment. With a single key press, the operator can switch between the plan-view map and the blade-orientation display. The blade-orientation display shows a picture of the blade position relative to the planned design shown.

“It’s almost like a combination of grading and connecting the dots,” notes Hoselton. “The SiteVision always shows the operator where he’s at as well as how close he is to where he needs to be on alignment.”

Simply put, \$26.3 million for traditional construction stakeout is unwarranted and should be rejected. And even assuming *arguendo*, that the Board agrees that an additional cost might be required, it should subsume it in its already conservative engineering additive of 10 percent.

iii. Material Testing During Construction

BNSF has also added \$49.0 million for verification and monitoring of the quality of construction materials. *See* BNSF Reply at III.F-277. Again, BNSF’s experts are artificially raising costs. Standard procedure is for the construction contractor to be responsible for the material testing at the job site, and for any vendors to provide certifications that their materials meet the railroad’s requirements. BNSF readily acknowledges this point in its Reply at III.F-276, but argues that these costs are in addition to the fees paid to a contractor for the work or materials it provides. BNSF’s position is unsupported, contrary to industry practice, and should be rejected.

First, no additional fees are usually associated with testing the work of a contractor or vendor because the contractor or vendor is usually obligated by its contract to provide its service or material in accordance with specifications determined by the railroad. For example, if a railroad orders ballast, it normally specifies the specific type and grade. The vendor is then obligated to provide such ballast, and it would be required

to provide a certification with its delivery that certifies that the material has been tested or inspected and that it complies with all the requirements of the contract. AEP Texas has included several examples of such contracts and certifications in its Rebuttal Workpapers. *See* AEP Texas Reb. electronic workpaper file “certs.pdf.”

Finally, AEP Texas notes that BNSF never claims that it incurs such additional costs in its projects. In fact, a review of BNSF’s AFEs showed only one instance where any materials testing was listed as a separate cost. In other words, any materials testing was already subsumed in the vendor or contractor costs, or such costs were not necessary. Either way, BNSF’s additional costs of \$49.0 million are unsupported and should be rejected.

e. Test Borings and Soils Investigation (Geotechnical)

On Opening, AEP included \$1.3 million for test boring and soil investigation for tests to be conducted at each bridge location. BNSF has responded by greatly expanding subsurface investigations, and, of course, the associated costs rose as well to \$19.8 million. *See* BNSF Reply at III.F-277.

BNSF has expanded its investigation to cut slopes, embankment material, and culverts. *See* BNSF Reply at III.F-268. The TNR has no need to commission test borings and geotechnical investigations for cut slopes, embankment material, and culverts. The data available through the States Soil Conservation offices and the geological survey data is of sufficient quality to preclude spending the extra resources on test borings in

these areas. In addition, there are a sufficient number of test borings, spread out over the project area, to provide the needed information to verify the geological and soil information.

Furthermore, the terrain in the SARR states is generally much less severe than in the East, for example, and therefore borings beyond those sites where complicated footings or large bodies of water are present will not be needed. Moreover, very detailed soils mapping and geologic data are available, eliminating the need for additional test borings and soil investigations. For example, the USDA Soil Conservation Service produces a county for every county in the SARR states. In addition, for Colorado, the Association for Engineering Geologists, in cooperation with the Colorado Geological Survey, produces a book entitled "Engineering Geology in Colorado." The TNR will utilize the test boring program set forth in AEP Texas' Opening evidence in conjunction with other readily available data in order to construct its lines, and has no need for the additional testing proposed by BNSF.

Testing borings are also not needed for culverts because they are generally installed at ground level in a stream bed or along a drainage line. Minimal if any excavation is required for culvert installation (as they are installed during the grading process) and the loads resulting from the culverts are no greater than those resulting from the construction of the railroad's roadbed.

Regarding the depth of the test borings, BNSF has argued that AEP Texas will be required to bore to a depth of 55' for each boring. In reviewing the soils maps for the SARR states in the areas where the railroad will be constructed, it has been determined that a large percentage of the right-of-way is on a thin layer of soil that overlays rock. *See* AEP Texas Reb. electronic workpaper file "soil layers.pdf." Rather than calculating the depth to rock at every location where a boring is to be drilled, a conservative average depth of soil was developed that allowed AEP to come up with an average depth of drilling for the test borings. Many of the borings will only be 5' or 10' before rock is encountered and some will find rock at or near the surface. As no piles will be driven at these locations, and the abutments for bridges will be constructed directly on the rock subgrade, deep borings will not be required.

In other areas where the surface soils are deeper, the borings can be carried to whatever depth is necessary. AEP Texas maintains that it has provided sufficient funding for the test borings and that the prices quoted are the best available for its project. Even assuming *arguendo* that a greater depth would be required, the costs for the deeper borings would only add about \$500,000 to AEP Texas' Opening cost of \$1.2 million (*i.e.*, AEP Texas' linear foot costs would expand from 20 feet to 55 feet – using AEP Texas' linear foot cost of \$9.00 per foot it increases by about \$500,000).

Of course, BNSF does not agree with AEP Texas' unit cost either, and it argues that the test boring quote used by AEP Texas for an industrial park site in northwest

Pennsylvania is not consistent with the terrain issues that would be encountered for the TNR. The fact is that the terrain in northwestern Pennsylvania is as rugged or more rugged than that along the TNR's route. The industrial park site for which the quote was prepared was an undeveloped, wooded, hilly site and therefore provides a complicated enough terrain to support the applicability of the quote to the TNR region. *See* AEP Texas Reb. electronic workpaper file "Clarion Topo.jpg" for a map of the Pennsylvania site. BNSF also suggests that the site was "easy" to access, but AEP Texas' quote includes a \$175 per boring for mobilization, which would imply it was not that simple to move the equipment into position.

AEP Texas also notes that BNSF never suggests that the costs from AEP Texas' quote are too low or in any way incomplete. Indeed, AEP Texas' quote includes all the items necessary for this work, including borings, testing, mobilization and related materials. All of which are consistent with BNSF's approach, and, therefore, AEP Texas' costs are feasible on their face. As such, AEP Texas stands by its Opening costs.

Finally, AEP Texas notes that the minor cost of subsurface investigation is properly rolled into the Board's 10 percent overall engineering fee, as it is an integral part of the engineering process.

f. Summary

BNSF's attempt to raise the engineering fees considerably higher than those accepted in other rate cases is unwarranted and unsupported. Moreover, the Board's

decision in *PSCo/Xcel* to adopt a 10 percent overall engineering fee for all SAC rate cases is reasonable in light of the Board's other decisions in this area – even though AEP Texas believes that the additive is on the high side. As such, AEP Texas urges the Board to reject any engineering additive greater than 10 percent.

11. Contingencies

On Opening, AEP Texas used a 10 percent contingency factor, which the Board has consistently applied in a long line of cases stretching back many years. *See PSCo/Xcel* at 118; *TMPA* at 158; *WTU* at 710; *APS* at 402. This is the same factor that BNSF itself, has repeatedly supported. *See, e.g., TMPA* at 158. Now, not satisfied that a shipper agrees with such a contingency, BNSF seeks to double the contingency factor to an incredible 20 percent. BNSF's latest salvo must be rejected for the reasons outlined below, and because BNSF is attempting to relitigate one of the most well settled points in STB caselaw.

As a preliminary matter, contingency factors are added to estimated costs for construction projects to take account of unknowns that can raise the costs for reasons beyond the control of the entity planning the project. The principal kinds of events that can cause cost overruns are shortages of labor and materials, and problems in obtaining required governmental permits. These problems do not exist with respect to a SARR due to the principles of barrier-less entry and unlimited availability of resources needed for the project. *See Coal Rate Guidelines*, 1 I.C.C.2d at 528-29; *PSCo/Xcel/Xcel* at 10-11.

BNSF nonetheless asserts that a 20 percent contingency factor is justified because the construction cost estimates for the TNR “reflect those of a project in the conceptual planning phase” and some engineering and design authorities support contingency factors of at least 20 percent for projects at this phase. *Id.* at III.F-279.

a. Stage of Construction

BNSF hinges the bulk of its contingency arguments on the assumption that the current state of the TNR’s design is in the “rudimentary planning stages,” and, therefore, a higher contingency should apply. BNSF’s arguments further turn on a Federal Transit Administration (“FTA”) chart that depicts how contingencies might be applied depending on the development process.

Specifically, BNSF argues that AEP Texas does not have enough information yet even to be considered, under the FTA chart, in the “preliminary” stages of development, where a 10-20 percent contingency would be appropriate, let alone in the “definitive” stage where a 5 to 15 percent contingency would apply. BNSF’s assertions are incorrect for the reasons explained below.

First, BNSF misreads the FTA chart. It notes on several occasions that 25 percent of the “detailed” plans are required to meet the preliminary stage requirements. But the FTA chart clearly states that 25 percent of the “preliminary design report” should be completed. This is hardly the equivalent of the detailed plans that an engineer might develop once a plan has funding. Moreover, the goal of the FTA is to reach a point at

which the project could be bid out, not completed. As such, BNSF's characterization of the design stage implies far more detail than is required to meet the FTA specification.

Moreover, BNSF's characterization is inconsistent with its own practices. For example, BNSF produced a number of AFEs in discovery. Even a cursory review of these documents shows that BNSF's development of specific costs and plans is very limited at the stage in which it seeks financial approval from its senior management. Indeed, the AFEs often included language that reveals the "sketchy" nature of the engineering, such as "{

}" See AEP Texas Reb. Workpapers Vol. 3, p. 01028. That same AFE notes that the materials list "{

}" *Id.* In other words, a hyper-detailed development of the project is not necessarily required to make an estimation. Yet, that same project included only a five percent contingency.

In fact, most of BNSF's {

} See AEP Texas
Reb. electronic workpaper file "BNSF AFE contingencies.xls."

AEP Texas further notes that BNSF has not provided any evidence that it develops detailed drawings of the kind it argues AEP Texas needs when it enters the AFE

process. Indeed, even BNSF's signed contracts are limited in detail. For example, BNSF provided a construction contract for bridge and related work that it entered into with Ames Construction. That contract notes that the bid form, which is attached, is only approximate and that the contractor's bid assumes that the contractor has done the necessary due diligence to determine if it can build the structures at the price laid out in the contract. A review of the bid form that is attached, reveals that little detail about the bridge work has been provided. As such, BNSF's suggestion that AEP Texas should incur a much a higher contingency than BNSF itself assumes at a similar, or even lesser, stage of development is unwarranted and should be rejected.

An even more apt example as to the stage of construction and the appropriate contingency to apply is the DM&E's construction documents. *See Finance Docket No. 33407, Dakota, Minnesota & Eastern Railroad Corporation – In Campbell, Converse, Niobrara, and Weston Counties, Wyoming, Custer, Fall River, Jackson, and Pennington Counties, South Dakota, and Blue Earth, Nicollet, and Steele Counties, Minnesota – Application for Construction and Operation Authority.* In the verified statement of Anthony Daniels, the engineer retained by the DM&E to develop its construction cost estimates, he describes the current state of engineering when the costs for the DM&E project were submitted to the Board. *See AEP Texas Reb. Workpapers Vol. 3, p. 01061.* In particular, for the newly constructed segments of the DM&E, Mr. Daniels applied a combined engineering and contingency fee of 18.5 percent (or an average of 9.25

percent for each factor). *Id.* at p. 01064. According to Mr. Daniels, his firm, Parsons Brinckerhoff, had developed the alignment and performed some basic onsite work, but according to his statement the quantities were ultimately developed using:

field surveys, analysis of USGS quadrangle topographical maps, and input from DM&E, and using unit prices based on our experience with past projects, current vendor and contractor quotations and recent DM&E experience.

Id. at p. 01061. In other words, the DM&E cost estimate is based on a similar level of detail as AEP Texas. To be sure, the DM&E costs may have had more detail in some respects or another (it is difficult to tell from Mr. Daniels statement), but it is doubtful that it had the level of detail that AEP Texas has in some areas, such as earthwork quantities. In any event, the DM&E documents demonstrate that railroad projects at a similar stage of development do not require 20 percent contingency factors.

As for the TNR project's current stage of development, according to the FTA chart, the information availability required in order to be considered in the preliminary stage includes "40-scale alignment, facility descriptions, sketches, study reports, cross sections, profiles, elevations, geotechnical data, staging plans, schedule, and definition of temporary work." AEP Texas has met virtually all of above criteria. For example, AEP Texas has complete descriptions of all of its facilities, basic layouts of the buildings, cross sections, profiles and elevations of all track types, geotechnical data from a variety of sources, general staging plans and a construction schedule. The only piece of information that AEP Texas engineering experts did not provide specifically is a 40-scale

alignment. However, AEP Texas does have track charts and it has GPS positioning of much of the line from its engineering experts' field trips. Moreover, AEP Texas included a Microsoft Streets and Trips electronic map on Opening that maps the route, and it can be zoomed to a scale of 1" = 250'.

Moreover, AEP Texas has some components for which its current state of information is much further advanced than that required to meet the definition of preliminary stage. For example, AEP Texas has very specific plans for signal placement, track placement, turnout placement, and set-out track placement.

The second factor in determining the stage of planning, according to the FTA chart, is the estimating methods being used. In this area, because costs are so important to these cases, AEP Texas is easily within the preliminary design stage, and indeed in many instances is in the "definitive" or "detailed" phase as described by the FTA.

The estimating measures require:

Preliminary	Quantity development of major commodities, pricing by database, manuals, quotes, bid results, or experience which may be adjusted for the conditions of the specific package. Rough estimates or allowances developed for immeasurable items.
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Definitive	Takeoff of quantities from plans, representative pricing by database, manuals, quotes, bid results, or experience adjusted for the conditions of the specific package. Crewed approach to labor and equipment, percent approach to general conditions, overhead and profit, contingency, and escalation. Some allowances carried for immeasurable items.
Detailed (Engineer's Estimate)	Detailed takeoff of all measurable items, detailed review of specifications, detailed pricing including price quotes, crewed approach to labor and equipment, detailed estimate of general conditions, overhead & profit, and escalation. Consideration of construction schedule, work restrictions, shift requirements, and risk.

AEP Texas easily meets or exceeds the preliminary design stage estimates as it has, at a minimum, based all of its costs on recognized databases, manuals, or quotes. Indeed, AEP Texas has not even used its engineering witnesses considerable experience as a pricing guide. Moreover, AEP Texas has estimates of many items at a level far beyond the preliminary design stage. For example, AEP Texas has detailed grading quantities that meet the FTA chart's highest specifications "Detailed (Engineer's Estimate)" (*i.e.*, the lowest contingency of 5 percent). Likewise for many expensive items, such as track construction, AEP Texas has specific written quotes that match the "Detailed" estimate requirement as well. In addition, AEP Texas also has all the quantities and costs determined for bridges and culverts.

As far as cost estimates for items such as grading, track materials, signals, communications, public improvements, and buildings, AEP Texas has estimates that meet or exceed the “preliminary design phase” because it either has quotes from vendors or it used recognized estimating tools, such as Means. It even goes well beyond the level of DM&E information by having exact grading quantities. Of course, the BNSF attempts to belittle the quotes used by AEP Texas, suggesting that phone quotes or faxes are too “sketchy.” However, the quotes are consistent with the FTA standard, which even allows bids from other projects to be used.

Lastly, AEP Texas submits that BNSF’s Reply evidence is manifest with examples of the great level of detail already available regarding the design of the TNR. Perhaps no example is more telling than BNSF’s criticism of AEP Texas’ design for the TNR headquarters building where BNSF noted that AEP Texas’ design for the restrooms is inadequate because it did not include an additional 22 square feet for privacy screens at the entrance doors. *See* BNSF Reply at III.F-179-80.

In light of the above, at a minimum, AEP Texas’ current development of the TNR costs and designs meet the preliminary standard, and therefore a contingency percent of 10 to 20 percent is applicable under the FTA chart, but because AEP Texas’ design and costs exceed the preliminary standard on a number of the most costly items, the 10 percent figure, at most, should apply. Thus, even under BNSF’s preferred standards, the Board should continue to apply to its 10 percent contingency factor.

b. BNSF's Reliance on Other Projects is Misleading

BNSF also attempts to support its proposed 20 percent contingency factor by presenting evidence from its Witness William Rennie concerning “real-world experience with large construction projects.” *See* BNSF Reply at III.F-284 to 285 and Exhibit III.F-4, pp. 12-18. Mr. Rennie cites a study of 258 worldwide transportation projects, of which he analyzed a subset of 58 rail projects, and notes that the average cost overrun from the original cost estimates for these rail infrastructure projects was nearly 45% and only one in four of these projects were completed within 20% of planned cost. *See* BNSF Exhibit III.F-4 at pp. 12-13. Mr. Rennie also cites a U.S. DOT study of urban rail transit construction costs which determined that, on average, rail transit projects required over 60% longer to construct than originally estimated. *Id.* at 13-14.

The study of worldwide rail infrastructure projects cited by Mr. Rennie is set forth in BNSF's Reply Workpapers at Vol. VI, pp. III.F-1617 to 1633. The study does not identify the specific projects that were analyzed or the countries that they were in, so it is impossible to determine the extent to which they were comparable to the TNR construction project. Nor is it possible to determine the extent to which the projects were subject to environmental restrictions and governmental-permitting issues, that would be considered barriers to entry for SAC purposes. (Mr. Rennie himself acknowledged that such factors may have contributed to the cost increases for these projects; *see* BNSF Exhibit III.F-4 at p.12).

The author of the study acknowledges that many of the projects that were analyzed involved public funding, and that this probably created an incentive to underestimate costs during the early phases of these projects.¹² The same incentive does not exist with respect to privately-funded projects such as the TNR project. In any event, the lack of any information as to the specific rail projects involved in the study cited by Mr. Rennie makes it impossible to compare them with the TNR project.

The urban mass transit projects involved in the U.S. DOT study cited by Mr. Rennie are not comparable to the TNR project – regardless of whether they are “heavy rail projects” or “light rail” projects. Such projects involve public funding at the local, state and federal level, which requires an extended application/permitting process involving numerous stakeholders. In addition, mass transit projects usually are located in

¹² See BNSF Reply Workpapers Vol. VI, pp. III.F-1624-25 where the author states:

Economic explanations conceive of cost underestimations in terms of economic rationality. Two types of economic justification exist; one explains in terms of economic self-interest, the other in terms of the public interest. As regards self-interest. . . transit capital investment projects in the U.S. compete for discretionary grants from a limited federal budget each year. This creates an incentive for cities to make their projects look better, or else some other city may get the money.

As regards the public interest, project promoters and fore-casters may deliberately underestimate costs in order to provide public officials with an incentive to cut costs and thereby save the public’s money.

large urban/suburban areas where environmental issues are much more complex than for a freight rail freight construction project such as the TNR, which is located primarily in the sparsely-populated Great Plains region. The environmental permitting process for rail mass transit projects is extremely complex and time-consuming, which often causes such projects to fall behind schedule and incur cost overruns. The environmental impact statements required of these project alone can consume two or more years in their preparation and approval. The TNR construction project, on the other hand, is not subject to either public funding or environmental permitting, which constitutes a barrier to entry for a SARR.

The Alameda Corridor project, discussed at pp. 16-17 of Mr. Rennicke's Exhibit III.F-4, is not comparable to the TNR project for similar reasons. The Alameda Corridor project involved public funding, and was situated in an urbanized area of the Los Angeles Basin. It involved elimination of 200 rail/highway grade crossings (many by means of grade separations) along a 20-mile corridor, as well as rebuilding and widening a highway that paralleled the corridor, all while under traffic. *See* BNSF Reply Workpapers Vol.VI, p. III.F-1651 to 52. Despite the relatively short length of the Alameda Corridor project, it was considerably more complex than the TNR construction project.

The only privately-funded U.S. freight rail construction projects cited by Mr. Rennicke to support his proposed 20 percent contingency factor are two projects in

the Powder River Basin. The first project is the PRB “Joint Line” construction project undertaken by Burlington Northern, Inc. (“BN”) and Chicago and North Western Transportation Company (“CNW,” now part of the Union Pacific) in the late 1970s. The second project involved a plan by CNW to construct a new line to extend its service to additional mines not served by the Joint Line.

Mr. Rennie states as follows with respect to the Joint Line project:

For example, in the Powder River Basin, a joint-line track line was started based on a 1974 construction cost estimate of \$152 million (indexed to 2000); by 1979, based on a partially completed project the estimate was increased to \$257 million (indexed to 2000) and the completion date was extended by 3 years. Although the projected scope in 1979 was slightly different than envisioned in 1974, the fact still remains that costs on this large, heavy haul infrastructure construction project, which was similar to the proposed TNR in many characteristics and considerations, surpassed the initial cost estimate by nearly 70% and doubled the original time estimate.

BNSF Reply Exhibit III.F-4 at p. 15.

AEP Texas asked Richard H. McDonald, a rail engineering and operations expert who has had direct experience with Powder River Basin rail construction projects including the Joint Line project, to review Mr. Rennie’s testimony and provide the Board with additional information concerning the Joint Line and related PRB rail construction projects.

Mr. McDonald is uniquely qualified to provide testimony on these projects. He was employed by CNW for 20 years in various managerial positions involving

engineering and operations. From 1981 to 1984 he was Vice President-Western Railroad Properties, Inc. (“WRPI”)¹³ and in that position was responsible for all facets of CNW’s project to obtain access to the PRB by (1) acquiring a one-half interest in the Joint Line and (2) constructing 107 miles of new railroad lines and associated facilities (the “WRPI line”) necessary to enable CNW to access the Joint Line and transport unit coal trains out of the PRB. Mr. McDonald continued to have responsibility for CNW’s operations on the WRPI lines thereafter as Vice President-Operating Administration and Vice President-Transportation. Mr. McDonald’s complete statement of qualifications is set forth at pp. IV-3 to 5, *infra*.

As a preliminary matter, Mr. McDonald has reviewed Mr. Rennie’s statements of qualifications in part IV of BNSF’s Reply Narrative and in Reply Exhibits III.D-4 and III.F-4, and notes that Mr. Rennie has neither an engineering background nor railroad engineering experience. He apparently does have some background in rail operations, although he does not describe his operating experience in any detail. Mr. Rennie’s lack of any engineering qualifications or experience is evident from the misstatements concerning the Joint Line and WRPI projects in BNSF Reply Exhibit III.F-4.

The PRB Joint Line project was initiated by the filing of a joint application to the Interstate Commerce Commission (“ICC”) in early February of 1974 in Finance

¹³ WRPI was a wholly-owned subsidiary of CNW created for the purpose of owning CNW’s one-half interest in the Joint Line as well as constructing and operating the other new lines connecting with the Joint Line. WRPI ceased to exist as a separate entity in 1996, following the merger of CNW and WRPI into UP.

Docket No. 27579, *Burlington Northern Inc. and Chicago and North Western Transportation Company—Construction and Operation—Between Gillette and Douglas, in Campbell and Converse Counties, Wyoming*. The application involved construction of 112.5 miles of new rail line, of which the southerly 103.5 miles (between Coal Creek Jct. and Shawnee Jct./Fisher, WY) were to be jointly owned and operated by BN and CNW. In the Return to Questionnaire accompanying the application, BN and CNW estimated that the total construction cost for the new line would be approximately \$50 million (in 1994 dollars), and that construction would start in October 1974 and be completed “in 1976 or 1977” (*i.e.*, a three-year construction period). *See* BNSF Reply Workpapers Vol. IV , p. III.F-1640 and 1642.

Mr. Rennie’s statements that the Joint Line construction period was extended from three to six years and that the construction-cost estimate increased by 70% (in 2000 constant dollars) are highly misleading. First, construction of the Joint Line did not begin in 1974, as originally planned, due to regulatory and other delays. Construction could not begin until the ICC approved the application in Finance Docket No. 27579; that did not occur until 1976. *See Burlington Northern, Inc. – Construction and Oper.*, 348 I.C.C. 388 (1976). BN, acting on its own, started construction in 1976, notwithstanding pending court appeals from the ICC’s decision (CNW was unwilling to participate in funding of the construction while the appeals were pending).

The first 28.8 miles of the new line, extending south from Belle Ayr Jct. to Reno, as well as grading of the right-of-way south of that point, were completed in 1977. However, notwithstanding denial of the court appeals in 1977, there was then a hiatus for nearly two years due to environmental problems (bald eagles were nesting their young along the already-graded right-of-way). Construction (track laying) resumed on May 1, 1979 and was completed by BN in early November of the same year without financial participation by CNW (which had been unable to obtain financing for its one-half share of the costs). BN began operating trains over the Joint Line in early November of 1979.¹⁴ Thus the actual construction time period was less than the three years initially estimated – not six years as Mr. Rennicke asserts.

With respect to the alleged increases in the cost of constructing the Joint Line, in its July 1979 application to the ICC for authority to construct the WRPI lines between Shawnee Jct., WY and a connection with the UP at Joyce, NE,¹⁵ CNW indicated

¹⁴ See ICC Finance Docket No. 29066F, *Application of Chicago and North Western Transportation Company for Approval of the Terms of Construction, Ownership and Operations of a Line of Railroad Presently Under Construction in Campbell and Convers Counties, Wyoming*, Decision served November 30, 1979, at 4. A copy of this decision is included in AEP Texas Reb. Workpapers at Vol. 3 pp. 01065-72. Mr. McDonald recalls that the new line was placed in service by BN (alone) on November 6, 1979. The Joint Line continued to be owned and operated exclusively by BNSF until 1984, when construction of the WRPI line was completed and CNW (which by then had acquired a one-half interest in the Joint Line) commenced operating coal trains out of the PRB.

¹⁵ Finance Docket No. 28934 *et al.*, *Chicago and North Western Transportation Company Construction and Operation of a Line of Railroad in Niobrara and Goshen*
(continued...)

that the total construction cost was estimated to be \$104.6 million in current dollars. However, this included interest on CNW's one-half share of the construction funds advanced by BN since the start of construction in 1976. In addition, by 1979 the Joint Line included 15 miles of additional main track/passing sidings that were not reflected in the original 1974 cost estimate.¹⁶

In short, Mr. Rennicke's statements to the effect that the Joint Line construction cost "surpassed the initial cost estimate by nearly 70% and doubled the original time estimate" (BNSF Reply Exhibit III.F-4 at p. 15) are highly misleading.

Mr. McDonald also notes that Mr. Rennicke failed to mention CNW's project to construct the WRPI line, which was comparable in scope to the Joint Line construction project. The WRPI project involved the construction of 107 miles of new heavy-haul rail line between Shawnee Jct., WY and a connection with UP at Joyce, NE, to enable CNW and UP to transport coal from mines served by the Joint Line. The project was formally initiated by CNW's 1979 filing of the application for construction authority in Finance Docket No. 28934. Final ICC approval of the project was granted in January

¹⁵(...continued)

Counties, Wyoming and in Sioux and Scotts Bluff Counties, Nebraska, Application filed June 13, 1979. The ICC's docket sheet for CNW's application in Finance Docket No. 28934 together with excerpted pages from the application itself are included BNSF's workpapers at BNSF Reply Workpapers Vol. IV, pp. III.F-1644 to 1649.

¹⁶ In 1982, CNW calculated the actual cost of constructing the portion of the Joint Line to be jointly owned and operated, including improvements, at \$90.3 million in current dollars, and this number was accepted by the ICC. *See* Decision in ICC Finance Docket No. 29066 served October 22, 1982, Appendix B at 2.

of 1980. See *Chicago & N.W. Transp. Co.—Construction*, 363 I.C.C. 906 (1981), *aff'd sub-nom. Mobil Oil Corp v. I.C.C.*, 685 F.2d 624 (1982). However, the start of construction of the WRPI line was delayed until 1983 due to judicial review proceedings, the need to complete financing arrangements, and a dispute between BN and CNW as to whether CNW had forfeited its interest in the Joint Line because of payment delays (that dispute was resolved in 1983).

The story of construction of the WRPI line is not one that fits Mr. Rennicke's thesis of delay and cost overruns. The WRPI construction project, which (to use Mr. Rennicke's words) was also a "large, heavy haul infrastructure construction project, which was similar to the TNR in many characteristics and considerations," was completed *ahead* of schedule and *under* budget.

In its 1979 application for authority to construct and operate the WRPI line CNW estimated the total construction cost at \$240 million. The final construction-cost estimate, prepared in early 1983, was \$140 million and included a 10 percent contingency factor. The construction contracts called for completion of the project within 24 months of the actual start of construction. Construction of the WRPI line began in June 1983 (although some preliminary engineering work had already been performed, pending resolution of the legal matters described above). Construction was completed to the extent that rail operations over the WRPI line could begin in mid-August of 1984 – or only 14 months after construction began. The actual construction cost, including all

phases of design, construction management and quality assurance services, land acquisition, and construction of subgrade, bridges, other drainage structures, track (including 15 miles of second main track), a microwave communications system and a CTC traffic control/signal system, was \$122 million. Thus, construction of the WRPI line was completed ahead of schedule by 10 months and under budget by 13 percent.

Additionally, Mr. McDonald notes that the WRPI project was constructed in territory where freezing ground conditions and inclement weather can be an issue during the months of December through March – potentially playing havoc with construction schedules for roadbed, bridges and track structure. This is not as large an issue for the TNR project, since over 75 percent of its route is located in territory where adverse winter weather is not likely to be a significant problem. Construction scheduling and cost estimation thus should be even more reliable for the TNR project than for the WRPI project.

The only other PRB construction project referred to by Mr. Rennie involved the proposed 10.7-mile extension of WRPI's lines in 1986 ("WRPI extension"). Mr. Rennie discusses this project in a brief paragraph on page 40 of BNSF Exhibit III.F-4. Mr. McDonald's review of Mr. Rennie's statements concerning this project indicates that they, too, are misleading.

The WRPI extension involved an effort by CNW to extend its PRB coal transportation service north from the original northerly terminus of the Joint Line at Coal

Creek Jct. to Caballo Jct., WY, thereby enabling CNW to serve four additional PRB coal mines (Cordero, Caballo Rojo, Belle Ayr and Caballo) that could not be reached via the original Joint Line and thus were served only by BN. In early 1985, CNW approached BN about extending the jointly owned and operated portion of the Orin Subdivision (*i.e.*, the Joint Line) another ten miles north for this purpose. BN refused to agree to this. At the urging of the owners of these four mines and various utility coal customers, CNW then filed an application with the ICC for authority to construct a separate 10.7-mile line parallel to the solely-owned BNSF Orin Subdivision main line that would connect the northerly terminus of the Joint Line at Coal Creek Jct. with the spurs to each of these mines. The ICC approved CNW/WRPI's application to construct the new extension in early 1986.¹⁷

Mr. Rennicke refers to an appendix to CNW/WRPI's application to construct the WRPI extension containing a preliminary construction cost estimate for the extension (prepared by the same Mr. McDonald who is sponsoring this portion of AEP Texas' Rebuttal evidence) in the total amount of approximately \$41 million. *See* BNSF Reply Workpapers Vol. VI, p. III.F-1731. Mr. Rennicke avers that this estimate

¹⁷ ICC Finance Docket No. 30700 *et al.*, *Chicago and North Western Transportation Company and Western Railroad Properties, Incorporated— Construction and Operation—In Campbell County, WY* (ICC served January 15, 1986) (included in AEP Texas Reb. Workpapers Vol. 3, pp. 01073-01095).

represented \$3.8 million per track-mile in 1986 dollars,¹⁸ or almost \$6 million per track-mile in 2000 dollars which is an increase of 75% over AEP Texas' projected cost per track-mile for the TNR. *See* BNSF Reply Exhibit III.F-4 at p. 40.

Mr. McDonald was directly involved in the planning for the WRPI extension and notes that it was an unusually complex and expensive project due to the topography involved and the need to reach the four additional mines without disturbing BN's existing operations on the Orin Subdivision. The WRPI extension project included an interlocking at Coal Creek Junction and a new bridge over Coal Creek. The main line was designed to extend northeasterly (on the east side of BN's Orin Subdivision main line) into mountainous terrain, requiring grading that was much more extensive than for the Joint Line itself. Four spurs were designed to extend in a westerly direction from the WRPI extension main line and tie into the existing mine loop tracks. Each of these four spurs had to cross the Orin Subdivision main line by means of expensive overhead bridges because all four of the mines to be served were located on the west side of the Orin Sub. These crossings required expensive grade separations in order to avoid disrupting BN's operations extending north to Donkey Creek as well as to and from these mines.

¹⁸ This number is overstated because Mr. Rennie divided the estimated construction cost for the WRPI extension by its route miles (10.7) rather than by its track miles. The WRPI extension was actually designed with 16.4 miles of track, including a three-mile passing siding and spurs from the main line to each of the four mines. Thus the estimated cost per track mile was \$2.5 million, not the \$3.8 million claimed by Mr. Rennie.

The design/configuration for the WRPI extension thus was extremely unorthodox, and much more expensive than normal railroad construction. However, it was the only feasible way for CNW to reach the four additional mines independently without interfering with BN's operations. It was not comparable in the least to the TNR construction project.

The WRPI extension was never built. Instead, after CNW received construction authority from the ICC, it was able to negotiate a "buy-in" agreement with BN under which the jointly owned and operated portion of the Orin Subdivision was extended 10 miles north to Caballo Jct. and CNW obtained access to the existing leads to the four additional mines it desired to serve. Mr. McDonald recalls that the negotiated cost of the buy-in was { }.

* * * *

In summary, BNSF's comparisons with other construction projects are unpersuasive. BNSF has failed to demonstrate that a contingency factor in excess of the standard 10 percent factor used by the Board in all other recent SAC rate cases is warranted.

c. BNSF's Contingencies Only
Assume Greater Costs and Complications

As a last point, AEP Texas notes that BNSF's lengthy contingencies discussion always assumes that AEP Texas could never meet its construction schedule and that the costs for the TNR are sure to grow exponentially. AEP Texas submits that the

BNSF's position is hopelessly one-sided, and that other factors could easily support a contingency factor more like 5 percent than the 20 percent supported by BNSF.

As noted above, the WRPI construction project was completed 10 months ahead of schedule and 13 percent under budget. Likewise, the DM&E cost estimate, discussed above, notes that the estimate is conservative and that substantial cost savings, especially in grading, might be realized. Indeed, a review of the public road projects described in AEP Texas Opening and Rebuttal workpapers, shows that the engineer estimates, used to judge the bids, are almost always higher than the contractor bids. This is especially the case for grading.

For example, on a recent project near Denver, the winning bidder, Ames Construction, beat the engineers estimate by 19 percent. *See* Rebuttal Workpapers Vol. 3, pp. 01096. But in earthwork of unclassified excavation (the second largest cost item after paving), the Ames Construction bid was less than half the engineers' estimate. And as noted *supra*, the earthwork unit costs proposed by AEP Texas are consistently higher than those found on other large scale road projects. In other words, a 10 percent contingency is more than enough given the possible savings on earthwork alone.

Finally, as to BNSF's suggestion that the TNR project is somehow unique or unparalleled, AEP Texas notes that nothing the TNR is building is at all unique or unparalleled. Railroad track is railroad track, a locomotive shop is a locomotive shop, etc. Thus, the pitfalls for the TNR are well within reasonable limits. Moreover, the biggest

potential problems for most large construction projects, lack of resources and project opposition, are not issues under stand-alone principles.

AEP Texas also notes that some truly unique and unparalleled construction projects have been conceived and built in far less time than that proposed by AEP Texas. For example, the Empire State Building was built in less than 14 months (January 22, 1930 (start of excavation) and April 11, 1931 (end of construction – although the ceremonial opening did not occur until May 1, when President Hoover switch on the lights from the White House), and the plans for the building were announced only a few months before the start of construction, August 29, 1929. Moreover, the building opened ahead of schedule and under budget.

In light of the above, the Board should apply a 10 percent contingency factor.

12. Other

a. Construction Schedule

Even though BNSF accepts the TNR's construction schedule, it nevertheless complains bitterly about the schedule, arguing that in the real world it could never be achieved, and that as a result the Board should use a higher contingency factor. As explained above, a higher factor is unwarranted. Moreover, the time allocated for construction is ample, especially since the TNR does not need to endure any unexpected delays from permitting or resource shortages.

AEP Texas also notes that its construction schedule is consistent with the Board's decisions in prior rate cases. In particular, the Board stated in *West Texas Utilities*, "our SAC analysis assumes the labor, material, and machinery would be available in sufficient quantity at current market prices to construct WTRR in the minimum time dictated by technological feasibility." *Id.*, 1 S.T.B. at 672. There is no controversy regarding the technological feasibility of the TNR construction schedule, and therefore the Board should not deviate from it or impose any unnecessary additives elsewhere.

i. Failure to Identify Necessary Activities

BNSF has criticized the AEP Texas' schedule for lack of specificity. While, it is impressive that BNSF went to the trouble of identifying "more than 95 discrete and linked activities" just for the Prairie Dog Fork Bridge. This level of scheduling is not normally done by the engineer for a project such as this, it is done by the contractor who will construct the bridge and submitted to the engineer for approval. At this stage in the design process, it is only necessary to identify the general tasks and associate a time line with it. BNSF then goes on to suggest that the project should really take 42 - 48 months and not the 30 months proposed by AEP Texas. AEP Texas strongly disagrees.

In this day and age of construction managers and design-build types of project development, it is easier to meet this schedule of 30 months than it was even 20 years ago. And with no barriers to entry and unlimited resources, the TNR can stage as

many crews per contractor as will be necessary to see that the work gets done within the established project schedule.

ii. Failure to Properly Sequence Tasks

BNSF also criticizes AEP Texas for overlapping tasks. For example, BNSF suggests that the TNR cannot establish alignment, grades and right of way simultaneously. This is hardly extraordinary, many projects are being done today with design proceeding while right-of-way is being procured.

iii. Failure to Propose Reasonable Durations for Individual Activities

BNSF argues that AEP Texas is too optimistic in some of its time estimates. For example, BNSF suggest that the actual field work of surveying cannot be accomplished in 90 days. *See* BNSF Reply at III.F-293. Especially with today's technology, it is quite easy to accomplish the work in the allocated time. With the new GPS accuracies, the entire project can be flown in several days, control can be established using GPS technology and plans can be produced almost immediately. Surveyors can then break up the project into small sections and each complete their work in several weeks to a month's time. For example, on a recent project, AEP Texas' engineering expert, Mr. Stone, hired a surveyor who covered a proposed five-mile railroad line route in one day with a GPS system, from which he produced two-foot contour maps covering 500 feet width in addition to the five miles in length. Thus, there is no reason why a complete set of plans could not be available in the 90 day time period.

iv. Failure to Account for Key Construction Realities

BNSF also suggests that AEP Texas has not adequately explained two potential problems, rail handling and turning equipment. For example, BNSF now suggests that the 100 foot right-of-way that has been used by AEP Texas does not provide enough room for construction equipment to turn around and will thereby “undercut the productivity of the machines.” *See* BNSF Reply at III.F-294. BNSF does not say which equipment is so hampered. This is the same argument BNSF raised in its Supplemental Reply in the *AEPCO* case, where it argued that the hauler selected by AEPCO could not turn around in the 100-foot right of way. AEPCO thoroughly discredited this preposterous claim in its Supplemental Rebuttal, and AEP Texas therefore incorporates that evidence by reference. *See* AEPCO’s Supplemental Rebuttal (Public Version), filed April 2, 2004, at III-F-48 to 49.

As for handling the strands of rail, AEP Texas has documented *supra*, the extensive number of interchange locations from which it can receive materials. As for the laying of track, it is done just like any other railroad project. The first load of track will be delivered to the railheads and unloaded. It will be used to construct the first sections of track along the new railroad. Then, as the line is extended, the rail trains will be pulled on to the new sections of track, and as each 1440-foot piece of rail is installed the load will move up to discharge the next piece of rail. Moreover, this activity is included in the

quote of the track installation contractor who has experience in installing new welded rail on new railroad track.

v. Failure to Make Allowance For Expected Delays

BNSF also suggests that AEP Texas has not allowed for various unexpected delays. The most important possible delay, scope changes, is not applicable here because the project is not going to change in scope along the way. All the other problems, are as BNSF's states, unquantifiable. Moreover, other delays, such as weather related issues and equipment malfunctions, are remedied by adding additional equipment and manpower as needed.

vi. Monte Carlo Risk Analysis

While a Monte Carlo risk analysis sounds very authoritative, it is largely an exercise in judgment in deciding the inputs. Moreover, Mr. Rennie's analysis is hardly unbiased. Indeed a review of the materials suggests that Mr. Rennie applied his "probability distribution" in a manner that would result in a "virtually zero" probability that the schedule would be met. The result of this, BNSF says is that "financial communities would dismiss the entire project." *Id.* at III.F-296. Of course, there is no actual risk of this because the TNR has unlimited access to capital.

Mr. Rennie's analysis also ignores the multitude of projects with a greater level of complexity than this one, such as the Empire State Building, that were constructed in a shorter period of time than AEP Texas has proposed. Building a railroad, mostly

through open country, is not particularly difficult, and there are singular engineering challenges to overcome for the TNR. In other words, this has been done before and especially with today's technology it can be done again.

Finally, AEP Texas suggests that an aggressive construction schedule will encourage investment, not discourage it, by keeping inflationary costs down and achieving an operating income in as short a time as possible.