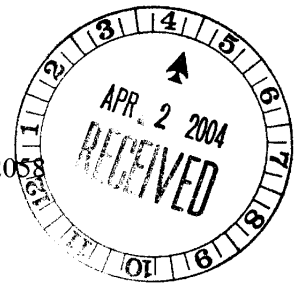
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BEFORE THE
SURFACE TRANSPORTATION BOARD

ARIZONA ELECTRIC POWER COOPERATIVE, INC.,	)	
Complainant,	)	
v.	)	Docket No. 42058
THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY and UNION PACIFIC RAILROAD COMPANY,	)	
Defendants.	)	



COMPLAINANT ARIZONA ELECTRIC POWER COOPERATIVE, INC.'S SUPPLEMENTAL REBUTTAL EVIDENCE

NARRATIVE

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Dated: April 2, 2004

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I. Counsel's Argument and
Summary of Evidence

BEFORE THE
SURFACE TRANSPORTATION BOARD

ARIZONA ELECTRIC POWER COOPERATIVE, INC.,	)	
Complainant,	)	
v.	)	Docket No. 42058
THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY and UNION PACIFIC RAILROAD COMPANY,	)	
Defendants.	)	

I. COUNSEL'S ARGUMENT AND SUMMARY OF THE EVIDENCE

Complainant Arizona Electric Power Cooperative, Inc. ("AEPCO"), hereby submits its Supplemental Rebuttal Evidence and Argument ("Supplemental Rebuttal" or "Supp. Reb.") in accordance with the Board's order in this proceeding served November 19, 2003 (the "November 2003 Order"). AEPCO's Supplemental Rebuttal responds to the Supplemental Reply Evidence and Argument ("Supplemental Reply" or "Supp. Reply") that Defendants The Burlington Northern and Santa Fe Railway Company ("BNSF") and Union Pacific Railroad Company ("UP") (jointly, "BNSF/UP" or "Defendants") jointly submitted on January 26, 2004.

A. PREFACE

AEPCO continues to believe that the November 2003 Decision was issued in error and that all stand-alone cost ("SAC") issues should have been resolved in AEPCO's favor on the basis of the parties' original Opening, Reply, and Rebuttal Evidence. As AEPCO has explained previously, including the response to the November 2003 Decision that AEPCO submitted on November 26, 2004, Defendants should not have been given an opportunity to submit additional Reply Evidence and Argument at all. Moreover, any such submission should have been limited to matters that Defendants could not have reasonably addressed in their original Reply Evidence submitted May 27, 2003.

The Board premised its ruling in the November 2003 Decision that Defendants should be allowed to submit additional evidence on two matters, the alleged uncertainty as to the traffic group for AEPCO's stand-alone railroad ("SARR"), the Apache, Cochise & Eastern Railway ("ACE"), and the ACE's use of trackage rights between Vaughn, NM and El Paso, TX. Based on Defendants' Supplemental Reply, neither matter supports the introduction of much, if any, additional evidence.

As AEPCO has previously explained, the disputed revenue adjustment related only to the volume of revenue-bearing traffic that the ACE handles and not its design or operation. In other words, the ACE sought to handle the same trains in number and length over the same system, with or without any revenue adjustment. Moreover, at

the technical conference that the Board convened in response to AEPCO's request on December 18, 2003, the parties jointly stipulated to the limited revenue adjustment that AEPCO presented in its original Rebuttal Evidence. Consequently, the revenue adjustment should not provide any sort of premise for the Defendants to have submitted additional evidence.

Any uncertainty over the Vaughn-El Paso trackage rights also does not support the introduction of Supplemental Reply evidence on a broad range of issues. As AEPCO noted in its November 26, 2003 response to the November 2003 Decision, the Board had previously ruled favorably on AEPCO's use of trackage rights of one Defendant over the other for purposes of the SAC challenge to joint rates in the August 2002 Decision, and the November 2003 Decision itself found that AEPCO could elect to utilize trackage rights for the Vaughn-El Paso segment. While the November 2003 Decision allowed Defendants the opportunity to contest the level of that trackage rights fee, Defendants have effectively eschewed that opportunity, as confirmed by the fact that their calculated annual trackage rights payment is actually lower than that which AEPCO presented in its original Rebuttal.[1]

Accordingly, the range of Defendants' Supplemental Reply should have been quite narrow (assuming that it was appropriate for any additional evidence to be

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[1] See line 2 of Table III.D.10-1 of Supp. Reply at III.D-157 (showing that BNSF/UP claim $1.3 million in trackage rights expense for 2001 versus the $1.7 million claimed by AEPCO).

submitted at all). However, the actual scope of Defendants' submission is broad by any measure and consists almost entirely of matters that could have been, and in a number of areas, such as BNSF's local operations at Belen, NM, and AEPCO's string diagram analysis, actually were addressed in Defendants' original Reply filings. Defendants have thus sought to avail themselves of a second bite at the apple.[2] While AEPCO's Supplemental Rebuttal submission responds to the vast array of contentions submitted by Defendants, AEPCO's response should not be viewed as a waiver of AEPCO's position regarding the appropriate scope of the limited set of matters that should have been addressed in Defendants' Supplemental Reply and the error in the November 2003 Decision itself.

B. AEPCO'S SAC APPROACH IS CONCEPTUALLY SOUND AND VERY CONSERVATIVE

Defendants assert that AEPCO's SAC case-in-chief continues to be fundamentally flawed because of its use of trackage rights on the Vaughn-El Paso segment and its reliance on exempt movements for the vast majority of the SARR traffic. Supp. Reply at I-4 to 8. Both contentions are devoid of merit. In these as well as all

[2] While Defendants repeatedly claim that time constraints limited the scope of their Supplemental Reply (see, e.g., Supp. Reply at I-3), they, in fact, had almost a year to respond to AEPCO's Opening Evidence. Moreover, their filing must be considered substantial by any reasonable measure, particularly considering the limited volume of AEPCO's shipments (essentially a maximum of 1.5 million tons a year).

other respects, AEPCO's approach to its SARR is conceptually sound as well as very conservative.

Defendants' contentions regarding the trackage rights are largely the same as those in Defendants' Motion to Dismiss on Reopening that they filed on January 26, 2004, simultaneously with their Supplemental Reply, and have already been addressed in the Reply to that motion that AEPCO filed on February 17, 2004. As explained in AEPCO's Reply and also in AEPCO's Supp. Reb. at III-B-1 to 9, infra, Defendants' contentions are entirely defective.

First, Defendants' efforts to convert the ACE's trackage rights payment into miles of single-track line makes no attempt to take into account the other traffic that utilizes the line. Second, Defendants' claim that they cannot possibly calculate an appropriate trackage rights fee for the segment is belied by the fact that they presented such a calculation in the UP/SP merger proceeding for purposes of defending a voluntary trackage rights fee nearly identical to that used by AEPCO for the Vaughn-El Paso segment. Third, Defendants' claim that they utilized the 9.05 mills-per-GTM fee (the higher of the two figures that was calculated in the UP/SP merger proceeding) is simply incorrect because, as discussed at III-B-5 to 8 infra, Defendants used the same trackage rights fee as AEPCO.

Accordingly, Defendants' assertions concerning the trackage rights fee cannot possibly be credited, and the appropriate treatment is to use AEPCO's previous

figure. Moreover, AEPCO continues to believe that use of the 3.2 mills fee is appropriate because (a) UP voluntarily agreed to that fee, thus indicating that it considers the fee to provide adequate compensation, and (b) failure to allow the ACE to utilize that fee would amount to an impermissible entry barrier.

Defendants' further attacks on the supposed implausibility of the ACE's reliance on exempt cross-over traffic for the bulk of its revenues are equally groundless. While the traffic may be largely exempt and competitive, that hardly establishes that the traffic is unprofitable or undesirable, as explained in Part III-A of AEPCO's Supplemental Rebuttal. In particular, UP has committed to spending $1 billion over three years to expand its infrastructure to handle intermodal traffic, as discussed at III-A-14 to 15, infra. UP surely would not be making such an investment to capture additional intermodal traffic unless UP believed the traffic to be desirable. Defendants' own actions thus demonstrate that the traffic is profitable.

Defendants' Supplemental Reply also seeks to attack AEPCO's revenue divisions for the ACE's non-coal cross-over traffic by claiming that the residual incumbents are entitled to cost-based enhancements for their divisions, which otherwise will presumably reflect the modified straight mileage prorate ("MSP") method the Board recently adopted in the Eastern rate cases.[3] As shown in Part III-A infra, Defendants'

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[3] Defendants cite STB Docket No. 42069, Duke Energy Corp. v. Norfolk Southern Ry. Co. (STB served Nov. 6, 2003) ("Duke v. NS"), and STB Docket No. 42072, Carolina Power & Light v. Norfolk Southern Ry. Co. (STB served Dec. 23, 2003)

efforts are entirely deficient. Defendants have generally sought to overstate terminal and related costs while understating the line-haul costs, all with the intent of claiming massive mileage blocks, as much as five times in excess of the 100-mile blocks normally allowed under the MSP method. Defendants have further sought to alter the MSP method outright by manipulating the treatment of switching costs in the line-haul component. Defendants' calculations are generally unfounded and demonstrably erroneous. Defendants have failed to show that they are entitled to any enhancement to the divisions calculated under the normal MSP methodology.[4]

Notwithstanding Defendants' criticisms, AEPCO's SARR is entirely sound conceptually and represents an entirely proper application of established SAC principles to AEPCO's particular situation, as explained below and throughout AEPCO's evidentiary submissions. Indeed, the conception and execution of AEPCO's SARR is very conservative in a number of important respects.

AEPCO's origins and destination for the issue traffic are located along high-density lines of the incumbents that are used primarily to handle non-coal traffic,

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("Carolina"). Since Defendants submitted their Supplemental Reply, the Board also issued a decision in STB Docket No. 42070, Duke Energy Corp. v. CSX Transportation, Inc. (STB served Feb. 4, 2004) ("Duke v. CSXT"), as well as a corrected decision in Duke v. NS (served Feb. 3, 2004).

[4] As explained in Part III-A, AEPCO also believes that the Board's focus on cost, rather than commercial, considerations for determining divisions is inconsistent with stand-alone theory since it imposes a burden on the SARR that real-world railroads do not confront.

and AEPCO's SARR configuration soundly replicates the configuration of those high-density lines and carries largely the same traffic in much the same (trainload) manner of operation. While AEPCO reroutes the issue traffic and a small amount of additional coal traffic over more densely-utilized lines (via Vaughn-El Paso rather than Belen-Deming, NM), such rerouting over a longer, higher-density route is specifically permitted under both the Coal Rate Guidelines and the August 2002 Decision.

AEPCO's incorporation of the cross-over traffic is entirely logical, as that is the traffic that passes over the lines that serve AEPCO's origins and destinations. While Defendants criticize AEPCO for including only the line-haul and not the terminal portions of such movements, AEPCO had no choice. The December 2001 Order and August 2002 Order precluded AEPCO from including facilities in its SARR system that the SARR did not use to handle the issue traffic. Having successfully argued that AEPCO should be precluded from including such unnecessary segments in its system on the grounds of cross-subsidy, Defendants should be deemed precluded from criticizing AEPCO for not having included such segments in the system of its SARR. Alternatively, if AEPCO's SARR were forced, or merely permitted, to include the intermodal terminals, then it should also be allowed to include the Powder River Basin segments as well (or instead). Defendants cannot be allowed to have it both ways.

AEPCO's volume assumptions are also quite conservative. Specifically, as explained in Part III-A infra, AEPCO capped its coal and non-coal volumes at the base

year (2001) level, notwithstanding clear internal projections from the Defendants indicating that they are likely to experience massive growth in their traffic, particularly the intermodal segment. AEPCO's analysis foregoes this growth in the interests of certainty and conservatism.

AEPCO's operating assumptions are also very conservative. Specifically, AEPCO's analysis assumes that the ACE will continue to handle the same trains as BNSF and UP handled in 2001 (except for the local freight and Amtrak trains that AEPCO excludes from its traffic group), using much the same technology (e.g., track components, locomotives, traffic control/communications systems, etc.) as BNSF and UP employed in 2001, throughout the DCF period. Moreover, AEPCO's SARR largely duplicates the track facilities of the incumbents, albeit with some capacity enhancements to the incumbents' present systems, as noted infra.[5]

Accordingly, AEPCO's SARR, because its configuration and traffic so closely resemble that of the incumbents, and because it foregoes massive volume and revenue growth that is projected to occur, is among the most conservative SARRs ever presented in a rate case. It is thus inherently plausible, and there can be no question as to its operational and commercial feasibility.

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[5] AEPCO had proposed to use steel tie technology. However, in the interests of narrowing the areas of dispute, AEPCO's Supplemental Rebuttal accepts Defendants' proposed use of wood ties, as explained in Part III-F infra.

C. AEPCO'S SARR IS OPERATIONALLY SUPERIOR COMPARED TO THE INCUMBENTS' OPERATIONS

Defendants argue at Supp. Reply I-8 to 9 and III.C-14 to 15 that because the ACE so closely recreates the incumbents in terms of facilities, traffic, and operations, it is unrealistic to expect the SARR to achieve any operational advantages, and thus the AEPCO's operating data should reflect nothing superior to what Defendants achieve in the real world. Such assertions are not consistent with the facts.

First, AEPCO's SARR eliminates what even Defendants concede is a significant amount of local traffic -- approximately two trains per day -- on the BNSF segment between Defiance and Vaughn, NM, including the switching activities that occur at Belen and other locations. While Defendants choose to ignore it, AEPCO's SARR also eliminates two daily local trains on the UP segment between El Paso and Cochise, AZ. AEPCO's SARR also eliminates the daily Amtrak trains between Defiance and Dalies, NM (one train a day in each direction over the 142.7-mile segment) on the replicated BNSF main line, and the three Amtrak trains a week in each direction (total of six trains a week) on the full UP segment between El Paso and Cochise. The rerouted coal traffic constitutes significantly less traffic (only one loaded coal train every other day in the 2001 peak period) than the eliminated local freight traffic and the Amtrak traffic, which enjoys the highest operating priority and thus presents the greatest conflict with other

operations.[6] On this basis alone, the ACE should achieve significantly more fluid operations than the real-world incumbents, as trains will not be subject to delays for local switching activities (particularly at Belen) or to allow passing by Amtrak trains.

AEPCO has also made some enhancements to the ACE's track capacity relative to that of the incumbents. The improvements made on Opening included nearly tripling the length of one passing siding on the Gallup Subdivision, adding double crossovers at locations on the Gallup and Clovis Subdivisions, and adding an additional connection on the Clovis Subdivision, all on the replicated BNSF main line. These changes serve to eliminate the vestiges of the directional-running mode utilized on the BNSF segment before the installation of CTC was completed and to increase capacity. AEPCO Op. at III-B-9 to 10. Additionally, AEPCO's Supplemental Rebuttal accepts Defendants' proposed addition of 1.17 miles of second main track at Abo Canyon on the Clovis Subdivision to enhance capacity east of Belen.[7]

The ACE will also achieve additional efficiencies by customizing its train support operations such as inspection, fueling, and crew changes, to focus on through

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[6] On the return moves, the empty coal trains (of which there were only two during the eight-day peak period, as contrasted with just four coal trains in the loaded direction east of Belen) will be sufficiently light in weight to achieve speeds that should not cause them to delay other trains. Also, the ACE's reroutes pertain to only the Belen-Vaughn and El Paso-Deming segments since the current routing utilizes the Defiance-Belen and Cochise-Deming segments.

[7] During the ACE's eight-day peak period in 2001, only four loaded rerouted coal trains could possibly use this segment, which is otherwise available to facilitate the movement of other traffic.

trains and to eliminate local trains as well as Amtrak traffic. The ACE should also experience additional efficiencies because it will begin with all-new track and facilities, and the program maintenance that is part of the DCF model assures that the ACE will replace its assets systematically. Additionally, as a least-cost, most-efficient provider, the ACE will not suffer from the crew shortages that have recently plagued UP's operations in the Southwest.

Nor will the ACE allow AEPCO's coal trains to sit unattended for hours at AEPCO's Apache power plant and the Deming interchange, as has been UP's routine practice (as confirmed by the analysis of the cycle times in the variable cost evidence that the parties previously submitted). Instead, the issue and other rerouted coal traffic, which is not time-sensitive in any event, will receive service (measured by train transit times) that is superior to that provided by Defendants via Belen and Deming. Even if the service to AEPCO's Apache plant at Cochise were materially slower, the deficiency could be readily redressed by a modest increase in the number of coal railcars. While the additional railcar cost should be absorbed by the SARR as part of its overall cost of service, AEPCO would be willing to absorb this cost itself in exchange for significant rate reductions, as discussed in Part III-C-4 infra.

In light of all of these changes, it is inherently implausible for Defendants to assert that the ACE will not experience any improvement in average transit times relative to those of the Defendants. When system capacity is enhanced through selective

upgrades, system traffic volume is reduced by eliminating disruptive local traffic and switching and highest-priority Amtrak trains, and operations are tailored for expediting the remaining through train movements, improvements in operating speeds and transit times are inevitable. As Defendants have chosen not to introduce any direct evidence concerning the effect of the ACE's changes, AEPCO's estimates of the improvement in transit times must necessarily be accepted. See III-C-27 to 30, infra.

D. DEFENDANTS' OTHER CRITICISMS ARE MISPLACED

In the remainder of Part I, Defendants present (in some cases repeat) brief (or not so brief) criticisms of and/or comments on various aspects of AEPCO's SAC analysis, including (1) traffic assumptions, (2) revenue divisions, (3) track and yard configuration, (4) operating statistics and operating costs, and (5) design and construction costs, and conclude by presenting (6) a summary DCF analysis. Supp. Reply at I-10 to 26.[8] AEPCO responds in summary fashion to Defendants' statements as follows.

1. Traffic Assumptions

Defendants largely agree with AEPCO's traffic assumptions, as indeed they should in light of the inherent conservatism of AEPCO's assumption that neither coal nor non-coal volumes will exceed the peak-year (2001) levels. Defendants also note that they

[8] There is considerable repetitiveness in Defendants' summary, as well as their following evidentiary presentation. AEPCO has sought to make its Supplemental Rebuttal responsive to Defendants' contentions, and so a degree of repetitiveness is inevitable in AEPCO's submission.

have joined in the stipulation to use the limited revenue adjustment that AEPCO presented in its original Rebuttal.

Defendants' only criticisms relate to divisions (a matter that Defendants address both earlier and later in their Part I), AEPCO's supposed use of an outdated DRI-WEFA forecast, AEPCO's supposed misinterpretation of a UP internal non-coal revenue forecast, AEPCO's supposed improper inclusion of a small coal movement, and a supposed error in AEPCO's coal volume forecast. Supp. Reply at I-10 to 11. With very limited exception, the Defendants' criticisms are misplaced.

Regarding divisions, Defendants' analysis ignores and/or distorts key characteristics of the traffic and is otherwise substantively unsupported, conceptually flawed, and analytically deficient and should thus be rejected in its entirety. Even assuming that Defendants have met their threshold burden, their analysis improperly equates full terminal costs with variable line-haul costs, and overstates terminal and switching costs and understates line-haul costs for intermodal traffic. Their analysis of manifest and automotive divisions relies on a calculation that is not relevant to their intended purpose, and their analysis also entails distorted alterations of MSP's treatment of line-haul costs. Even if Defendants' analysis were somehow deemed minimally acceptable, the largest division enhancements that can possibly be awarded are far less than Defendants claim.

With respect to inflation, AEPCO used the most recent DRI-WEFA forecast to which it had access at the time. AEPCO does not object to updating the inflation forecast, but, as explained in Part III-G infra, other inputs, including particularly the cost of capital, must be updated as well to preserve the synchronicity of the underlying inputs, to prevent the SARR from facing a real cost of capital higher than of the Defendants, and to otherwise avoid imposing an entry barrier upon the SARR and conferring a premium return on the Defendants.

AEPCO applied UP's internal non-coal revenue forecasts in a consistent manner. In contrast, Defendants seek to apply UP's forecasts inconsistently and to make various "corrections" and adjustments in a selective manner that considers various factors only when they result in revenue decreases, but ignores similar or even the same factors when they result in offsetting revenue increases. Under the circumstances, AEPCO's calculations (with a modest correction for UP "Q" trains) represent the appropriate approach.

Despite Defendants' claim, AEPCO's SARR does not alter how the Defendants handle the small coal volume at issue during the portion of the Rillito movement on the SARR's lines (apart from an internal reroute that Defendants accept). There is thus no basis for excluding the movement. AEPCO does accept Defendants' exclusion of an unbuilt generating unit from the traffic group, but the unit has only a minor and transient effect on volume.

In short, Defendants' contentions regarding AEPCO's traffic and revenue assumptions are either erroneous or do not result in significant change to AEPCO's prior calculation of the ACE's revenues.

2. Divisions

Based on recent decisions in the Eastern coal rate cases, Defendants claim not only that MSP should supplant MMP, but also that the residual incumbents should receive enhanced divisions on their terminal and other non-line-haul costs beyond the 100-mile terminal credit normally conferred under MSP. Defendants also seek to manipulate the manner in which line-haul costs related to switching are applied under MSP. Supp. Reply at I-11 to 15.

AEPCO is willing to accept the switch to MSP, although AEPCO does not believe that the change is necessary in this particular instance because AEPCO's SARR configuration does not reflect any external rerouting or any other elements that could suggest any effort to manipulate mileage blocks. However, as noted supra and explained in detail in Part III-A infra, Defendants have not shown that they are entitled to any enhancement to the standard MSP divisions. Defendants were certainly in a position to make a very thorough showing as to their relative terminal and switching costs, but they have failed to do so. Their assertions with respect to intermodal traffic are devoid of factual support and analytically deficient, and their underlying assertions are rife with internal inconsistencies and deviate from the characteristics of the ACE's traffic. Their

analysis of manifest and automotive traffic lacks sufficient factual breadth for the expansive adjustment they seek and distorts the nature of the cost analysis that AEPCO presented in its original Rebuttal Evidence through Witness Whitehurst. Moreover, their analysis of the I&I switching costs for the manifest and automotive traffic rests on distortions of established costing principles, the characteristics of the sample movements, and the MSP method itself. Defendants have thus failed to show that they are entitled to any enhancement on their divisions.

3. The SARR's Track and Yard Configuration

Defendants note that they have accepted, with modest exceptions, AEPCO's proposed track and yard configuration for the ACE. Supp. Reply at I-15 to 16. Defendants can scarcely object because AEPCO's track configuration largely duplicates the incumbents' existing configuration. Indeed, AEPCO installed some capacity enhancements to the existing infrastructure, even though AEPCO's SARR handles less traffic, i.e., AEPCO excludes the Amtrak and local freight traffic noted supra.

Nonetheless, Defendants do propose some additions supposedly in order to handle the rerouted coal traffic and to facilitate the yard operations. While these additions are unnecessary, they are also generally relatively inexpensive, and AEPCO has accepted some, but not all, of the changes in order to minimize dispute, as explained in Part III-B infra.

4. SARR Operating Statistics and Operating Costs

There is no issue as to the SARR's basic feasibility since its configuration is closely based on that of incumbents and since the SARR seeks to handle almost the same trains with the same locomotive consists and crewing. However, Defendants do take issue with AEPCO's calculations of the SARR's operating statistics and the related operating costs, as explained further in Parts III-C and D infra.

a. Operating Statistics

Defendants' position with respect to operating statistics, which drive many of the service units for the operating expenses, is that, as noted supra, AEPCO cannot achieve any significant improvements on the incumbents and AEPCO's computerized string model analysis is thus inherently faulty to the extent it shows otherwise. Defendants claims are unfounded. Defendants have failed to identify any specific, significant flaws in AEPCO's string program or anlysis. Apart from minor input errors that are both easily remedied and of no consequence (particularly as some simply involve conservative assumptions), what Defendants claim are flaws are simply ways in which the ACE's operation follows the real-world BNSF/UP operations for the trains comprising its traffic group. See Part III-C-3 infra.

In particular, Defendants' Supplemental Reply presented nine criticisms of the string model results as presented by AEPCO on Opening. As AEPCO demonstrates in detail at III-C-7 to 25, infra, Defendants' criticisms for the most part are meritless. In

the few instances where a criticism had merit (e.g., the number and type of locomotives per train and the train weights used in the model), AEPCO corrected the model (and its inputs, including one additional main track capacity enhancement proposed by Defendants on the replicated portion of BNSF's Clovis Subdivision) to eliminate the asserted problem.

One of Defendants' criticisms of the string model involves what the defendants in several recent rate cases have referred to as the "disappearing" train problem at the mine origins for the ACE's coal trains. However, all that is involved is a modeling assumption regarding what happens when the SARR returns an empty coal train earlier than did the incumbents during the 2001 peak week, as explained in detail at III-C-22 to 25, infra. The practical adjustment in the real world would be to cycle the coal trains continuously, which would reduce the number of trainsets in operation and thus reduce congestion. However, such adjustments entail external modifications and are thus properly beyond the scope of the peak-week modeling exercise. In any event, coal trains form a very small part of the ACE's traffic group, and even if the matter amounted to a flaw, it would be of no consequence to the overall results.

Defendants' assertions regarding AEPCO's failure to model "random failures" are of even less substance. While Defendants have noted a number of mechanical failures or similar events (primarily involving the signal system on the replicated BNSF main line), Defendants have not shown whether or the extent to which

any of these events resulted in any delay of any train. See III-C-15 to 17 and III-D-95 to 107, infra. Defendants have not documented any specific delay, and a number of their so-called failures (a malfunctioning failed-equipment detector, for example) are unlikely to result in any significant delay. Defendants' observation that things do not always work smoothly in the real world is simply not sufficient to demonstrate any error in AEPCO's analysis. Moreover, the ACE (because it has superior facilities and handles less traffic) has at least the same capability as the Defendants to recover from any such disruption.

AEPCO's revised string model results are presented in its Supplemental Rebuttal electronic workpapers for Part III-C. The corrected results actually indicate some decreases in transit times compared with AEPCO's Opening string modeling, and very minor increases in a few of the operating statistics generated by the model and used in the DCF model to calculate the SARR's annual operating expenses. The evidence in this case warrants the Board's acceptance of the string model results particularly since Defendants neither (1) performed any overall modeling of the ACE's operations of their own, (2) presented an operating plan for the ACE, or (3) challenged the operating-plan inputs developed by AEPCO's expert rail operations witness.

On a more general level, Defendants' position is effectively that the ACE cannot achieve any transit time improvements compared to the incumbents, notwithstanding the fact that (a) the ACE handles less traffic with upgraded facilities, (b) the ACE is relieved of handling highest-priority Amtrak trains and disruptive local freight

trains, and (c) the ACE's facilities and operations are designed from the outset to handle only complete trains and not be burdened by also supporting local switching. Under these circumstances, Defendants' claim that the SARR will not achieve any improvements is inherently implausible. As Defendants have submitted neither an operating plan nor any modeling of the SARR's overall operations of their own, AEPCO's analysis constitutes the best (and only) evidence of record and must be accepted.

b. Other Operating Costs

Defendants also challenge some of AEPCO's other operating cost calculations. Supp. Reply at I-18 to 21. Here, AEPCO responds to the matters raised in Defendants' summary, but these matters are treated at length in Part III-D, infra.

In particular, Defendants challenge the calculations for the ACE's locomotive fuel costs on the basis of both consumption rates and unit rates. Defendants' challenge to the consumption rates is premised on a defective premise. Specifically, Defendants assume that the ACE's trains will not only fail to achieve any transit time improvements over Defendants' operations, but will nonetheless operate in a manner -- moving at maximum throttle setting for long periods and then sitting completely idle -- that maximizes fuel consumption. Defendants seek to avoid operating in this manner in this real world (BNSF's operating rules explicitly instruct its personnel not to operate their trains this way), Defendants make no showing that they actually operate their trains this way, and such operations are plainly inappropriate for a least-cost, most-efficient

carrier. There is thus no possible basis on which Defendants' fuel consumption analysis can possibly be accepted, particularly as Defendants did not submit any modeling of the SARR's actual operations or a fuel study based on their own existing operations.[9]

Defendants also assert that the ACE's cost of fuel at the Vaughn terminal would be significantly higher than the BNSF system average because Vaughn, unlike Belen, is not presently served by a petroleum products (diesel fuel) pipeline. However, such a pipeline is located only 30 miles away and the ACE's demand for diesel fuel at Vaughn would be much more than sufficient to induce a build-out to that location at a minimal cost, as explained at III-B-21 to 29, infra. AEPCO's use of the BNSF system average fuel cost is thus very conservative, as the combination of the pipeline and nearby refineries would likely enable the ACE to obtain fuel at considerably less than the BNSF system average rate at both Vaughn and El Paso (the sites of its fueling facilities).[10] Also, the assertion that equivalent fuel delivery service would not be available to the ACE at Vaughn constitutes an impermissible entry barrier (especially as it was undoubtedly BNSF's demand at Belen that caused the existing pipeline to be built to that point in the

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[9] Defendants do rely on UP's train performance simulator ("TPS"), but the TPS fuel consumption calculations merely reflect Defendants' assumed train movement characteristics, which were selected to maximize fuel consumption. The TPS simulates the operation of only one train at a time, and has no capability to simulate system operations. In other words, Defendants simply assumed the conclusions they wanted to reach and used the TPS to measures the consequences of their assumptions.

[10] For example, the ACE (unlike Defendants) would not need to purchase any of its fuel in California, where energy prices tend to be high relative to the nation as a whole.

first place). Defendants' additional efforts to hold the SARR liable for switching activities that the residual incumbent would supposedly conduct at Belen are improper as a matter of SAC theory because the traffic associated with those activities is not encompassed within the ACE's traffic group and/or those activities could just as easily be conducted elsewhere.

Defendants attempt to inflate the ACE's expenses for operating (including mechanical) and G&A personnel by reference to their own real-world staffing levels and "benchmark" comparisons with other "peer" railroads (for G&A expenses). In Part III-D-3 infra, AEPCO demonstrates that its experts' "bottom-up" approach to staffing is far more indicative of what a least-cost yet feasible SARR such as the ACC can achieve than the incumbents' approach, which is grounded on unionized personnel and the need to manage a far-flung operation involving many different types of commodities, several different types of train operations, the need for substantial yard switching, etc.

With respect to G&A and information technology ("IT") expenses, AEPCO's bottom-up approach is well-supported by experienced rail operations, management and IT experts.[11] Defendants, on the other hand, presented no evidence on either G&A or IT expenses by a witness with railroad experience in these areas. See III-

[11] Indeed, AEPCO's principal G&A witness, Fred Yocum, helped develop the G&A staffing in the Duke/NS and Duke/CSXT cases, in which the Board accepted the complainant's proposed staffing levels because they "are based on the experience of former senior-level railroad employees, [and] are reasonable and supported." See Duke/NS at 73; Duke/CSXT at 59.

D-62 to 63, infra. Moreover, Defendants' comparisons with other real-world "peer" railroads are meaningless because of the enormous differences between their operations and those of the ACE. When AEPCO's proposed G&A expenses are compared with those of other stand-alone railroads as approved by the Board in recent SAC rate cases, the validity of AEPCO's staffing proposal is confirmed. See III-D-58, infra.

Defendants also seek vast increases in the ACE's maintenance-of-way ("MOW") costs as developed by AEPCO. Defendants' analysis ignores the SAC principle, reflected in AEPCO's approach, that the MOW would be undertaken by a least-cost, efficient competitor unburdened by many of the encumbrances that confront existing large Class I railroads such as labor agreements, merger protective conditions, and outdated equipment and facilities. Nowhere do Defendants demonstrate that AEPCO's approach is in any way infeasible. Instead, Defendants' analysis rests entirely on the "principle" that the ACE's MOW plan and costs should replicate those of the Defendants in terms of staffing and equipment needs and associated costs.

Defendants thus ignore key characteristics of the ACE's system and how they differ from those of the incumbents such as the ACE's lack of feeder lines, local switching operations, and tunnels, and the fact that the ACE's traffic consists entirely of through train movements, with a very limited number of yards, no local switching (beyond bad-ordered cars), uniform track densities, and an alignment that generally tracks

that of major interstate and other highways. These factors all serve to reduce the ACE's MOW costs, yet they are never noted in Defendants' 100 pages of MOW narrative.

Defendants' MOW projection instead rests on rampant inefficiencies, grossly overstated personnel requirements, and inflated equipment costs, all founded entirely on a "that's not the way we do it" premise. Defendants' analysis, on its face, is simply not consistent with the SAC principles adopted in the Coal Rate Guidelines. The standard is not whether the incumbents' real-world approach to MOW is feasible, but rather whether an efficient SARR can achieve a feasible MOW plan at significantly less expense. AEPCO's engineering and MOW experts demonstrate that it can in Part III-D-4, infra.

Ironically, Defendants' own real-world experience undermines their assertions. Specifically, Defendants' data shows that UP satisfies its MOW staffing requirements with one employee per { } route miles, as contrasted with BNSF's ratio of one employee per { } route miles. Merely applying the UP benchmark reduces the ACE's staffing needs by approximately { }%.[12]

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[12] Defendants also double-count the labor costs for maintaining equipment used in spot MOW. Defendants claim { } for this item based on BNSF data, but { }. Defendants' calculation of equipment costs for program maintenance work reflects a similar double-count.

While AEPCO has made some adjustments to its MOW calculations based on Defendants' criticisms where they have some specific support, Defendants' basic approach is not consistent with SAC standards and must, therefore, be rejected.

5. SARR Road Property Investment

Defendants also allege that AEPCO has understated the cost to design and construct the ACE. The reality is that AEPCO's Opening estimate is, with very limited exceptions, entirely reasonable, and Defendants seek to burden the ACE with costs that are demonstrably higher than they need to be and with construction activities that are unneeded.

In what has become a familiar refrain in SAC rate cases, Defendants claim that the equipment that the shipper specified for earthwork activities is unrealistic. However, use of the equipment that AEPCO specified for the earthwork is well-established and more than sufficient to meet the construction schedule, especially considering that the SARR is not burdened by limitations on available resources. See III-F- 32 to 58, infra.

Defendants' criticism as to track construction focuses largely on the proposed use of steel ties. The tie and fastening criticism is now mooted by AEPCO's decision to accept the use of wood ties and Defendants' unit costs in order to narrow the range of controversy. Defendants' criticisms of AEPCO's unit costs for track construction are contradicted by the very evidence they seek to rely upon.

Defendants criticisms regarding bridges are largely computational and unit cost-related. AEPCO has corrected the computational errors, and it has shown that Defendants' unit costs are, in many instances, overstated. AEPCO and the Defendants otherwise agree on bridge designs and inventory.

Defendants' arguments that AEPCO's signals and communications facilities are inadequate and unsafe are unfounded. As AEPCO demonstrates infra, its Opening presentation provided for a feasible and safe network that would meet the needs of the SARR. AEPCO did, however, adjust its costs to account for certain items that it omitted on Opening.

Defendants' criticisms with respect to mobilization, engineering and contingencies rehash the usual conflicts on these issues. AEPCO continues to believe that stand-alone cost theory does not require demobilization or performance bonds, and so it has not included those costs. Moreover, AEPCO's mobilization costs did not include mobilization for track labor because the bid for track labor that AEPCO obtained already included mobilization. In contrast, Defendants, who also used AEPCO's bid as the basis for track labor costs, added $9.4 million in unneeded mobilization for this function.

AEPCO also presented a reasonable and well-supported fee for engineering services that encompasses all of the major functions required to build the SARR, including preliminary surveys and construction management. On the other hand, Defendants have proposed a fee of more than 14 percent (including over $24 million for

unnecessary materials testing), despite the substantial evidence that the SARR's territory is among the easiest places in the United States to build a railroad.

AEPCO also proposed a contingency factor of 8 percent. While AEPCO recognizes that the Board regularly applies a 10 percent contingency factor, AEPCO submits that a lower contingency is also feasible for the same reasons a lower engineering fee is appropriate in this territory.

Defendants' criticisms of AEPCO's presentation of the ACE's construction costs are thus generally misplaced. In those rare instances where Defendants' criticisms have some validity, AEPCO has made appropriate adjustments in its Supplemental Rebuttal restatement of road property investment costs. See Part III-F, infra.

E. ADDITIONAL DCF ISSUES

While Defendants ignore them in their summary, their Supplemental Reply raises two additional issues regarding the DCF analysis.

The first, which Defendants address in Part III-G, relates to whether the adjustment of future operating expenses should reflect productivity growth. While Defendants naturally contend that the DCF should rely exclusively on the RCAF-U, AEPCO strongly disagrees. Unlike the SARRs in other cases, the ACE operates largely as an overhead carrier, replacing almost in toto two segments of the Defendants' main lines, and the ACE does so using largely the same technology and very similar facilities as the incumbents. The productivity improvements that Defendants experience both on

and off (especially under a cost-based approach to divisions) those segments should flow through to the SARR. Additionally, the incumbents' assets are overall not massively older than the SARR's assets. Moreover, the SARR will avoid many of the negative developments that will limit Class I productivity gains. Use of the RCAF-A to adjust the SARR's expenses is thus appropriate and even conservative.

The other DCF matter, which AEPCO also addresses in Part III-G, pertains to the cost of capital. In seeking to use a more recent and lower inflation forecast for the SARR in conjunction with an older and greater cost of capital, Defendants seek to saddle the ACE with a higher real and nominal cost of capital than confronts the incumbents. The disparity amounts to an impermissible entry barrier that results in an unjustified premium for the Defendants and/or the type of cross-subsidy that SAC seeks to eliminate.

The minimal solution, which is consistent with the Board's past approach and thus presented in AEPCO's base case, is to update the cost of the SARR's 2002 cost of equity to reflect the 2002 railroad industry cost of equity and to include the 2002 equity cost in the multi-year average cost of equity for future years. The more appropriate approach, presented in AEPCO's alternate case, is to use the 2001 industry average cost of capital (cost of equity, cost of debt, and capital structure weighting) for the SARR's cost of capital in 2001 and the 2002 industry average cost of capital for the SARR's cost of capital in 2002 and beyond (subject to possible updating after the Board issues its 2003 cost of capital decision).

F. THE SAC ANALYSIS SHOWS SIGNIFICANT SAVINGS

Defendants' Table I-1 purports to show that the ACE fails to recoup its costs in every year of the DCF model. However, Defendants' results are dependent on all the unfounded allegations and errors noted above, including understatement of revenues, exclusion of operational efficiencies, and overstatement of design, construction, and operating costs. When these errors are accounted for, the SARR's DCF results under AEPCO's base case (Supp. Reb. Exhibit III-H-6) show significant savings throughout all years of the DCF model as follows:

Table I-3
Summary of ACE Base Case DCF Results
(All $ Figures in Millions)

Year	ACE Revenue	ACE Cost	Overpayment	Percentage Reduction
1Q01	$ 121.5	$ 84.9	$ 36.6	30.1%
1Q02	121.6	83.2	38.4	31.6
1Q03	121.9	81.8	40.1	32.9
2003	487.6	333.6	154.0	31.6
2004	489.6	339.9	149.7	30.6
2005	495.8	341.9	153.9	31.0
2010	532.5	357.1	175.4	32.9
2015	555.5	377.9	177.6	32.0
2020	580.8	400.8	180.0	31.0

The results under AEPCO's alternate case (Supp. Reb. Exhibit III-H-7) are as follows:

Table I-4 Summary of ACE Alternate Case DCF Results (All $ Figures in Millions)				
Year	ACE Revenue	ACE Cost	Overpayment	Percentage Reduction
1Q01	$121.5	$82.9	$38.6	31.8%
1Q02	121.6	81.1	40.5	33.3
1Q03	121.9	79.7	42.2	34.6
2003	487.6	325.2	162.4	33.3
2004	489.6	331.1	158.5	32.4
2005	495.8	333.0	162.8	32.8
2010	532.5	347.2	185.3	34.8
2015	555.5	366.9	188.6	34.0
2020	580.8	388.5	192.3	33.1

The above calculations assume application of the Board's standard percentage reduction methodology. AEPCO notes that in a number of recent rate cases, shippers have sought modification of the percentage reduction method because the carriers have "gamed" the methodology by setting their common carrier rates artificially high. See the Eastern rate cases and the March 18, 2004 oral argument in Docket No. 42057, Public Service Company of Colorado d/b/a/ Xcel Energy v. The Burlington Northern and Santa Fe Railway Company.

AEPCO has not alleged any such gaming here. {

} Moreover, all indications are that AEPCO's relief will be governed entirely, or almost entirely, by the jurisdictional threshold and not the SAC constraint.

Nonetheless, to the extent that AEPCO's rate relief were to be determined under the SAC constraint, strong grounds would exist for enhancing the relief that would normally be available under the percentage reduction method. Defendants have noted that most of the traffic handled by the ACE is cross-over traffic that is exempt from regulation, and Defendants have claimed that the traffic is extremely competitive. To the extent the traffic already benefits from competitive forces, its entitlement to share in SAC savings is very attenuated since SAC analysis represents a surrogate for competition. Instead, the issue and other coal traffic will continue to subsidize the exempt traffic and/or the Defendants would continue to receive far more compensation for handling the traffic group than would be required by a least-cost, most-efficient carrier free.

Even without sharing in the percentage reduction, the exempt traffic would still benefit from the ACE's substantial improvement in transit times across its route relative to the Defendants. While coal can be and is typically stockpiled and is thus among the least time-sensitive commodities handled by railroads, the exempt traffic is viewed by the railroads as being very time-sensitive, as manifested in its high priority status. The ACE's faster service would thus be of substantial value to such shippers.

Since the exempt traffic would receive valuable non-monetary or hedonic improvement, it would be especially appropriate to allocate an additional share of the monetary relief to the ACE's coal shippers. Since coal represents a modest (less than 10%) portion of the ACE's total revenues, enhancing coal's share of the SAC savings would result in little reduction to the relief theoretically available to the exempt traffic. Moreover, the exempt traffic, according to Defendants, moves at rates that are generally only slightly (if that) above variable costs, and there is no justification for allocating relief that causes a rate to fall below the variable cost level. Accordingly, a reasonable first step is to hold that traffic should not benefit from further relief once it reaches the variable cost level and to reallocate that traffic's share of additional relief to the remaining traffic that remains above the variable cost level.

In any event, the SAC results yield rates that are below the jurisdictional threshold for all, or nearly all shipments, in past periods. AEPCO is entitled to substantial relief based on the calculation of the jurisdictional threshold, as addressed in AEPCO's prior evidence.

Respectfully submitted,

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Dated: April 2, 2004

III-A Stand-Alone
Traffic Group

CERTIFICATE OF SERVICE

I hereby certify that on this 2nd day of April, 2004, I caused copies of Complainant's Supplemental Rebuttal Evidence, including both the Highly Confidential and Public versions thereof, to be served by hand upon counsel for Defendants, as follows:

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III. A. STAND-ALONE TRAFFIC GROUP

Defendants preface their Supplemental Reply Narrative in Part III.A with a one-sided version of the events leading to the parties' stipulation as to non-coal revenues and an entirely unfounded attack on AEPCO's reliance on cross-over movements for most of the traffic of its SARR. Supp. Reply at III.A-1 to 4. Before responding to the details of the Defendants' contentions, it is appropriate for AEPCO to address these two threshold matters.

First, BNSF/UP and AEPCO jointly agreed to the stipulation to "calculate total revenues of the stand-alone traffic group designated by AEPCO for through movements over the SARR and the residual incumbent utilizing the limited revenue adjustment that AEPCO presented in its Alternate Case in its rebuttal evidence." Joint letter from AEPCO/BNSF/UP Counsel dated December 19, 2003, included in Supp. Reb. Workpapers Vol. 1, pp. 00002-00003. The limited revenue adjustment assumes only that the trains for which AEPCO could find no matching revenue records in the traffic tape data yield the same average revenue characteristics as the trains of the same type (e.g., intermodal, manifest, automotive, and grain) for which AEPCO found some matching revenue records (even if there were only one matching revenue record for the train movement).[1] As AEPCO explained in its original Rebuttal Evidence, AEPCO believes

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[1] As explained infra, Defendants improperly applied the revenue adjustment by calculating it on an aggregate basis, rather than calculating the adjustment for each type (continued...)

that the limited revenue adjustment is very conservative.[2] AEPCO entered into the stipulation with BNSF/UP, and elected to rely on its Rebuttal Evidence, in order to avoid the delay and considerable expense associated with trying to determine the higher, correct level of revenues in a rate case that has already been too protracted and expensive.[3]

AEPCO continues to object to Defendants' claim that any alleged uncertainty as to the revenues somehow hindered or impaired Defendants' preparation of their original SAC Reply Evidence filings. As AEPCO has explained, any uncertainty as to revenues had no bearing on the trains that are handled by AEPCO's SARR, and Defendants could have presented everything they state in their Supplemental Reply Evidence in their original Reply Evidence. AEPCO thus submits that all SAC issues could and should have been resolved in its favor based on the original evidence.

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[1](...continued)
of traffic. As a result, Defendants understate revenues.

[2] AEPCO continues to believe that Defendants must have accurate data concerning their revenue-bearing traffic in their possession. For example, a BNSF assistant vice president is quoted in a recent article as stating that BNSF "can also track the contents inside the containers." Craig F. Rockey, "Progress and Promise of Rail Intermodal," 71 J.T.L.L.P. 197, 204 (2004) (quoting Dave Stropes in "Laying Down Track: Intermodal Gains Favor With Shippers," World Trade (Nov. 2003)). (A copy of Mr. Rockey's article is included in Supp. Reb. Workpapers Vol. 1, pp. 00004-00012.) If BNSF can track the contents of containers, then it should be able to track the revenue-bearing containers on an individual railcar or certainly a train.

[3] As explained infra, Defendants' efforts to extract enhanced revenue divisions on the ACE's intermodal traffic assume a level of efficiency (number of units per car) inconsistent with the revenue records.

Accordingly, as Defendants are proceeding under protest, AEPCO does so as well, with full reservation of rights.

AEPCO also objects strongly to Defendants' claim that "[t]he Board should not permit AEPCO to rely on cross-over traffic as the predominant source of revenue for its SARR." Supp. Reply at III.A-2. AEPCO's configuration of its SARR was dictated in large part by the directive in the Board's December 2001 Order at 6 that "revenues from non-issue traffic should not be relied upon to pay for portions of a SAC system over which that non-issue traffic would not move." Accordingly, just as the December 2001 Order (as reinforced by the later August 2002 Order) held that AEPCO could not have its SARR extend into Colorado and the PRB for purposes of challenging the New Mexico rates, those orders also held that AEPCO could not extend the lines of its SARR to include terminals in such locations as California, Texas, and Chicago.[4]

The Board's orders, issued in response to motions filed by the Defendants, effectively limited the scope of AEPCO's potential SARR to facilities utilized in transporting the issue traffic. The BNSF and UP lines replaced by AEPCO's SARR handle primarily non-coal, cross-over traffic, and that is the traffic that AEPCO's SARR largely handles. AEPCO's selection of the traffic group was driven by the Board's prior

[4] AEPCO does not concede that the Board's orders are necessarily correct, and reserves the right to challenge them on appeal, particularly in light of the Board's apparent determination to base cross-over divisions on so-called cost and not commercial considerations, as discussed infra.

decisions, and not by any desire or intent to "game" anything.[5] Any restriction on AEPCO's ability to handle such traffic would constitute an impermissible barrier to entry and undermine SAC principles altogether.

It is also appropriate for AEPCO to respond briefly to other matters that Defendants note in their opening discussion. First, as explained infra, Defendants' allegations concerning the divisions for the ACE's cross-over traffic (which occupy nearly half of Defendants' III-A discussion) are entirely unfounded. Their evidence fails to demonstrate that they are entitled to any enrichment in their divisions beyond that allocated under modified straight-mileage prorate ("MSP") methodology that the Board adopted in its recent Eastern decisions.[6] Moreover, their underlying thesis -- that intermodal and other exempt traffic is so expensive to handle, especially at origination and termination, that it is not particularly profitable to the carriers, even over high-density corridors such as those utilized by AEPCO's SARR, is belied by the zeal with which the carriers are currently seeking to increase that type of traffic.

Second, with respect to the DRI-WEFA forecast (Supp. Reply at III.A-4), AEPCO used the most recent forecast to which it and its consultants had access at the

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[5] Apart from the issue traffic and a small amount of additional coal traffic, the ACE does not incorporate any rerouting. The "internal" rerouting of the New Mexico coal via Vaughn-El Paso rather than Belen-Deming is entirely consistent with the Coal Rate Guidelines statement that a SARR may adopt a longer routing to achieve higher densities and was specifically addressed and allowed in the August 2002 Decision.

[6] As explained infra, Defendants have also misapplied the MSP methodology and have understated the ACE's revenues in this respect as well.

time, but AEPCO has no objection to updating the economic data, provided that the data is updated consistently for all purposes, including the cost of capital, as explained in Part III-G, infra.

AEPCO's evidence in this part in sponsored by Thomas D. Crowley, the President of L.E. Peabody & Associates, Inc., William W. Whitehurst, Jr., of William W. Whitehurst and Associates, Inc., and Frank R. Harder and Stephen C. Nieman, Principals of The Tioga Group, Inc., a transportation and logistics consulting firm with a particular emphasis on intermodal matters.[7] Statements of qualifications and verifications for these witnesses (as well as AEPCO's other witnesses) appear in Section IV, per the Board's specified format for rate case evidentiary submissions.

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[7] Before becoming a consultant, Mr. Harder worked on intermodal matters at Conrail (starting in 1979), first at the railroad itself and then at Pennsylvania Truck Lines, Conrail's intermodal motor carrier subsidiary. After Conrail spun the intermodal carrier off, Mr. Harder served as Vice President of Marketing for the entity, which was renamed PTL Transportation Services. Mr. Harder is a former chairman of the Transportation Research Board's Committee on Intermodal Freight Transport.

Mr. Nieman has held senior intermodal positions with Burlington Northern as well as American President, Consolidated Freightways, IU International and Leaseway Transportation. Significantly, BNSF/UP witness Berry, while he was at Burlington Northern, reported to Mr. Nieman.

The Tioga Group's clients include buyers and sellers of intermodal services including terminal operators, railroads, and government entities, including the Port of Oakland.

1. **Stand-Alone Railroad Traffic**

Notwithstanding their claim that AEPCO should not be allowed to rely on cross-over traffic, Defendants challenge the inclusion of only one element of AEPCO's stand-alone traffic group, the movement of coal from the York Canyon mine in New Mexico to the California Portland Cement ("CPC") plant in Rillito, AZ. Defendants claim that this traffic (which amounted to only { } cars or { } tons in 2001) should be excluded because it moves in less-than-trainload ("LTL") shipments, whereas AEPCO supposedly proposes to handle it in unit trains that are too large for the shipper to handle. Supp. Reply at III.A-4 to 6, citing Carolina at 26.

Defendants' claims are factually misplaced. AEPCO's configuration of the traffic, i.e., { } cars spread over { } trains, was taken directly from the BNSF traffic data ("TRN2001.dbf"), as reflected in AEPCO's Op. electronic workpaper "ACE Coal Traffic and Revenue.xls," worksheet "BNSF Total 01-02 coal," cells J77 and K77. For example, BNSF's traffic data shows that on {

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AEPCO Op. electronic workpaper "TRN2001.dbf." Accordingly, AEPCO does not alter how BNSF handles the traffic at least as far as Deming, the point of interchange with UP.

UP may ultimately deliver the coal to the shipper in a different configuration, but any such change in configuration appears to occur beyond the ACE's portion of the movement, especially since Defendants elsewhere indicate that UP does not

conduct significant local switching activities between El Paso and Cochise. Defendants' Supp. Reply certainly does not identify the site of any such switching activities, and one can rest assured that if any such switching occurred on the ACE's segments, Defendants would have so indicated, especially given their discussion of switching activities at Belen.

As AEPCO thus does not propose to change the manner in which Defendants currently handle the traffic between Belen and Cochise (apart from the internal reroute that Defendants do not challenge), there is thus no basis to exclude the traffic, which amounts to a small volume in any event.

Defendants' assertions concerning the calculation of the division are addressed infra.

2. Volumes (Historical and Projected)

a. Historical Volumes

i. Coal

Defendants accept AEPCO's base year (2001) coal volumes for the ACE, except for the disputed movement to CPC at Rillito. As explained above, the Rillito movement should be retained as AEPCO does not propose to change how the traffic is currently handled over the ACE's portion of the movement.

ii. Non-Coal

Defendants also accept AEPCO's base year non-coal volumes, except for what they claim is AEPCO's failure to implement the full exclusion of certain local

shipments "typically" originating or terminating in Albuquerque, Deming, or El Paso. Defendants appear to agree with AEPCO's identification of about 17,000 such units, but claim that AEPCO failed to exclude them in its original Rebuttal calculations. Defendants indicate that the correction has a "minor impact" on the ACE's volumes. Supp. Reply at III.A-7 & n.14.

AEPCO has reviewed the electronic workpapers and has concluded that there was one block of movements (out of a total fifteen blocks) that should have been excluded, but was inadvertently included due to an incorrect cell reference. AEPCO's Supp. Reb. calculations correct the inadvertent error, which has a minor impact { } on ACE revenues in any event.[8]

Defendants elsewhere claim that AEPCO is not free to have its SARR exclude Amtrak traffic from the traffic group for its SARR. Supp. Reply at III.C-15. As explained in Part III-C, infra, Defendants' claim is incorrect as the purpose of the SAC analysis is to eliminate such cross-subsidies, and past precedent correctly establishes that SARRs can exclude Amtrak traffic and the burdens associated with handling that traffic. Docket No. 37038, Bituminous Coal-Hiawatha, Utah to Moapa, Nevada, 6 I.C.C.2d 1, 46 (1989) ("Nevada Power I") ("No passenger service would be operated."). However, even

[8] The corrected cell references are in Supp. Reb. electronic workpaper "Match results 2001-RR Revised-asr.xls," worksheet "BNSF summary," cells E17-F23. The corrected revenue figure is at "ACE Non-Coal Traffic and Revenue Forecast-RR Revised-asr_(Exh III-A-20).xls," worksheet "ACE BNSF '01-'20 Traf. and Rev." cell M49.

assuming arguendo that Defendants' claim concerning the Amtrak traffic had any substance, it would be necessary to include the revenues as well as the operating burdens associated with supporting such traffic. Defendants' failure to identify the associated revenues is thus an additional reason to exclude the Amtrak traffic from the SAC analysis.

b. Projected Volumes

i. Projected Coal Volumes

AEPCO conservatively assumed that the ACE's total annual coal volumes would not, over the course of the 20-year DCF period, ever exceed the base year (2001) level, and AEPCO further recognized a slight shortfall in the coal volumes in the first part of 2002 and assumed that the return to the base year level would take an additional period of time. AEPCO's assumption of no growth beyond 2001 levels is extremely conservative, particularly considering the growth in electricity demand in Arizona and the surrounding area and the commencement of construction of at least one additional generating unit at Tucson Electric Power's Springerville plant, which is expected to be operational by the end of 2006 (http://www.tucsonelectric.com/Company/News/PressReleases/ReleaseTemplate.asp?idRec=208) (Supp. Reb. electronic workpaper "Springerville info.pdf").

Defendants purport to accept AEPCO's coal volumes except for tonnage related to an alleged fifth unit at the Cholla plant of Arizona Public Service Company

(and the Rillito movement discussed supra). Supp. Reply at III.A-8 to 9. AEPCO relied on EPA data,[9] which shows a fifth unit at Cholla. As Defendants note, there are only four units at Cholla. The fifth unit identified in the EPA data was once planned, but has not been built.

The exclusion of the fifth unit at Cholla has only a minor impact on the ACE's coal volumes. Once the Rillito movement is restored to Defendants' Supp. Reply spreadsheet ("ACE Coal Traffic and Revenue Forecast_BNSF&UP Revised.xls"), removal of the fifth Cholla unit reduces the ACE's traffic only in 2005 (by 96,309 tons), 2006 (by 258,966 tons), and 2008 (by 400,324 tons).[10] In 2007, 2009, and later years, the growth in volume in the other coal-fired units is sufficient to bring the ACE's total volume back to the 2001 cap, even without the tonnage associated with the fifth Cholla unit. Supp. Reb. electronic workpaper "ACE Coal Traffic and Revenue Forecast_BNSF&UP Revised_AEPCO Reb_(Exh III-A-19).xls."

AEPCO's own belief is that the volumes presumed to be burned at Cholla 5 in 2005, 2006, 2008 would (and will) instead be burned by other coal-fired units at Cholla or elsewhere within the ACE's traffic group. Moreover, an additional coal-fired unit is, as noted above, now being built at the Springerville Station. Nonetheless, in the interests

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[9] AEPCO Op. electronic workpaper "ACE Coal Traffic and Revenue Forecast.xls," worksheet "85% Plant Capacity Factors."

[10] As it pertains to tonnage, Defendants' spreadsheet appears to be identical to AEPCO's opening electronic workpaper, except for the Rillito and Cholla 5 volumes. The Rillito movement occurs only in 2001 and 2002, but serves to establish the 2001 cap.

of conservatism and minimizing dispute, AEPCO is accepting the stated volume reductions in 2005, 2006, and 2008 associated with the removal of the fifth Cholla unit, as shown on Exhibit III-A-19 and the related workpaper.

ii. Projected Non-Coal Volumes

AEPCO assumed that non-coal volumes would not, over the course of the 20-year DCF period, exceed the base year (2001) level. AEPCO's assumption is extremely conservative given the massive increases that Defendants project in their non-coal, especially intermodal, traffic. For example, {

}. AEPCO Op. at III-A-8 to 9. The December 2003 DRI-WEFA forecast relied upon by BNSF/UP for other purposes projected a 6.0-6.5% growth rate in intermodal loadings in 2003, followed by a 4.5-5.0% increase in 2004, and then a 5.0-5.5% increase in 2005. Supp. Reply Workpapers Vol. 1, p. III.A-0002.

Defendants understandably do not dispute AEPCO's non-coal volume projections.

AEPCO's conservative decisions to cap both coal and especially non-coal volumes at the base year (2001) level resulted from a desire to minimize controversy, particularly regarding how the additional traffic would move (e.g., more trains versus longer trains), what sorts of capacity upgrades and/or operating changes would be

required to accommodate the additional traffic, and how the resulting SARR transit times would compare to those of the future BNSF and UP. Conservatively capping the volume at the 2001 level causes the ACE to forego a substantial amount of increased revenue, e.g., intermodal volumes and associated revenues would reasonably double in real terms within the DCF period. The incremental costs associated with moving additional intermodal traffic are modest relative to the additional revenues: if the relationship were otherwise, the industry would not be pursuing the intermodal traffic, and investing in facility expansion, so eagerly (nor would the industry be characterized by its major economies of density, for that matter).

3. **Revenues (Historical and Projected)**

a. Single-Line

The issue traffic moving from the Lee Ranch and McKinley Mines to Apache is the only single-line traffic in the case. Defendants purport to accept AEPCO's revenue calculations for the issue traffic for 2001 through 2003, but disagree as to the post-2003 revenue levels, relying in substantial part on the rates that Defendants established for the issue traffic in 2004.

Defendants established their 2004 rates for the issue traffic only in December 2003, many months after AEPCO submitted its Opening and Rebuttal Evidence, and AEPCO obviously had no ability to incorporate the 2004 rates in its

analysis. Since the 2004 rates are now a matter of record, AEPCO accepts Defendants' revenue calculations for 2004 through 2020.[11]

b. Divisions--Existing Interchanges

The ACE does not interchange with carriers other than the Defendants, and all such interchanges involve cross-over traffic. Accordingly, the ACE has no divisions involving existing interchanges, and Defendants so agree.

c. Divisions – Cross-Over Traffic

In contrast to their general acceptance of most of the above portions of AEPCO's traffic group analysis, Defendants take protracted exception to AEPCO's analysis of the divisions on the non-coal cross-over traffic.

Defendants' argument, in a nutshell, is that the ACE's non-coal traffic is highly competitive, as confirmed by its exempt status, and thus of marginal profitability; that any claim to the contrary must rest on improperly calculated divisions; and that application of appropriate cost-based divisions must necessarily result in a SAC outcome that shows that existing rates are at reasonable levels and no relief is warranted. Supp. Reply at III.A-11 to 13.

As explained more fully below, Defendants' arguments are misplaced. At least some of the non-coal traffic, including premium intermodal and the auto traffic,

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[11] Supp. Reply at III.A-8 n.18 references the effect of { }, which is addressed infra.

moves at very high rates, as noted in AEPCO original Rebuttal at III-A-34 to 35 and 37 to 38 and Rebuttal electronic workpaper "BNSF_Z_{ }M.xls." Moreover, the Defendants' own actions demonstrate that the intermodal traffic is quite profitable for otherwise it would not be the fastest growing segment of railroad traffic, nor would it be so competitive. See, e.g., Gallagher, John, "Transloading its Share," in Traffic World (Feb. 16, 2004), at 28, included in Supp. Reb. Workpapers Vol. 1, pp. 00014-00018. Moreover the Verified Statement of Dean H. Wise, which is the portion of the TTX filing on which Defendants heavily rely for their intermodal cost analysis, states at p. 12 that the railroads "are increasingly dependent on intermodal traffic as important source of revenue growth." The AAR Vice President of Policy and Economics has recently commented that "intermodal need not be relegated to a 'low-margin' status." Rockey, supra, 71 J.T.L.L.P. at 207.

The Traffic World article specifically notes that "UP has embarked on a three-year, $1 billion plan to catch up [to BNSF] in what [intermodal] appears to be the largest growth market in the domestic freight arena." UP would not rationally invest $1 billion over three years to pursue traffic unless it considered the traffic to be profitable. The railroad industry and even the Board itself have elsewhere noted that capital constraints ostensibly limit the infrastructure expansions that the railroad industry is able to undertake. For example, the Board's Chairman informed the Subcommittee on Railroads of the House Committee on Transportation and Infrastructure on June 26, 2003,

that Norfolk Southern faces a 20% hurdle rate on new projects,[12] and there is little reason to expect that UP's (or BNSF's) hurdle rate would be significantly less. Accordingly, UP's billion-dollar commitment to increasing its intermodal traffic demonstrates that it expects to receive a healthy return on its investment.

Like all other railroad traffic, the exempt traffic becomes especially profitable when it moves across segments with high operating densities, which is certainly the case with the segments of the Defendants' systems that are replaced by AEPCO's SARR. Indeed, those high operating densities extend for hundreds of miles beyond the ACE's portion,[13] but the ACE is precluded from extending its lines to incorporate those other profitable segments, as well as the terminal operations, because the issue traffic does not utilize those other facilities.[14]

In the recent Eastern cases, the Board adopted MSP as a replacement for MMP, based its adoption of MSP on cost-based, as opposed to commercial considerations, and further allowed parties to claim that the normal standard that an origination or termination equates to a 100-mile block should be modified in a particular case based on cost considerations. Defendants have sought to exploit the Board's

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[12] The testimony is included in Supp. Reb. Workpapers Vol. 1, pp. 00019-00028.

[13] As explained infra, those densities explain Defendants' decision not to seek a density-based enhancement to their divisions.

[14] Defendants would have surely complained vociferously if AEPCO had designed its SARR to move the traffic west from the New Mexico mines to Los Angeles and then back east to southeastern Arizona.

approach by claiming that their divisions should be enhanced to reflect what they allege are disproportionately high terminal and off-SARR switching costs on the ACE's non-coal cross-over traffic.

As demonstrated infra, Defendants' attempts to extract cost-based enhancements to their divisions are unsubstantiated, inaccurate, and analytically deficient. However, assuming arguendo that Defendants' claims had any validity, AEPCO's position is that, in the context of its rate case, the cost-based approach is conceptually unsound, and that the divisions for its SARR should instead reflect commercial considerations, i.e., how railroads set their rates and divisions in the real world.

Defendants' attempts to extract enhanced MSP divisions flies in the face of the principles that are supposed to govern SAC analysis. Specifically, Defendants seek to reduce the SAC relief based on costs that occur off-line. Moreover, the external costs relied upon are not those of a least-cost, most-efficient provider, but those supposedly incurred by the incumbents (although Defendants provide virtually no documentation as to their actual intermodal costs). Additionally, the costs are allocated on an average unit basis that ignores demand (market) considerations, which is the equivalent of allocating SAC relief based on ton-miles instead of percentage reduction. Defendants' approach thus breeds the very sorts of inefficiencies and cross-subsidies that SAC analysis seeks to prevent. Additionally, use of cost-based divisions imposes a barrier to entry that does not confront railroads in the real world, where commercial factors determine divisions.

The Board's apparent rejection of a commercial approach to divisions is especially disappointing since commercial divisions must naturally take into account a rational, market-based allocation of the underlying costs. Furthermore, a commercial approach is consistent with the other elements of the Board's SAC methodology, but cost-based allocation is not. In particular, the Board utilizes the market-based percentage reduction method to allocate SAC relief, and not the cost-based ton-mile approach.

The inconsistency is exacerbated because a substantial portion of the Defendants' intermodal traffic is interchanged with another carrier (as opposed to being originated and terminated by one Defendant) in seamless run-through service.[15] There is no suggestion, nor can there be, that the Defendants' revenues from such movements are determined on a non-market basis. The Board's allocation of the SARR's share of those revenues on an ostensibly cost-based method is thus at odds with how the incumbent's rate was determined in the first place. Moreover, a cost-based approach serves to reward an inefficient carrier for its inefficiencies, which is inconsistent with SAC principles as well as with the national rail transportation policy at 49 U.S.C. § 10101(1) (reliance on competition and demand to establish rates to the maximum extent possible), (4), and (5) (to promote effective competition).

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[15] Supp. Reply Exhibit III-A-4 calculates this figure (Type 1 interchange) at{ } of the interchanged traffic. As explained infra, Defendants' calculation is flawed because it weights BNSF and UP equally when UP has the higher number of such movements. The appropriate figure is { } of the interchanged traffic.

Even assuming arguendo that the cost-based enhancements to MSP divisions are theoretically permissible, Defendants have failed to substantiate their claimed enhancements. As explained infra, Defendants' claims are unsubstantiated, inaccurate, and unsound, and they serve to overstate the various terminal and off-SARR switching costs, while substantially understating the line-haul costs.

i. Misapplication of the Revenue Adjustment

Defendants have misapplied the limited revenue adjustment to which the parties stipulated.

Specifically, AEPCO's original Rebuttal Evidence calculated a revenue adjustment for each type of traffic (that is, a separate adjustment for intermodal, manifest, automotive, grain and "other" traffic) based on the average revenue characteristics for each train of that type for which at least one revenue record was matched to the train movement records for the ACE trains. The average revenue and net tonnage characteristics for trains of each type that had some matched revenue file records were applied to the trains of that type (as identified by the Defendants' data "decoders" or train type identification) for which there were no matching records.

In contrast, Defendants have calculated their revenue adjustment by aggregating all train types together and then applying that aggregate ratio to all types of trains for which there were no revenue record matches. Defendants' calculation is inherently less specific and accurate, and it serves to decrease the size of the revenue

adjustment by a minor amount, from { } million under AEPCO's calculations to { } million under Defendants' calculations. The calculations are summarized in Supp. Reb. electronic workpaper "ACE Non-Coal Traffic and Revenue Forecast-RR Revised-asr_(Exh III-A-20).xls."

Because AEPCO's revenue adjustment is more specific and thus more accurate, it should be utilized.

ii. MSP versus MMP

As Defendants note, since the time that AEPCO submitted its Opening Evidence, the Board in the Eastern cases switched from the Modified Mileage Block Prorate ("MMP") method to the Modified Straight Mileage Prorate ("MSP") method as its basic methodology for calculating revenue divisions. AEPCO calculates that the switch from MMP to MSP results in an 11.6% reduction in the ACE's revenues. Supp. Reb. electronic workpaper "Restated Traffic and Revenue Summary-asr_(Exh III-A-21).xls."

AEPCO does not believe that MSP provides a better approximation of commercial divisions on the ACE's cross-over traffic than does MMP. AEPCO's original Rebuttal at III-A-62 to 65, Exhibit III-A-12, and electronic workpaper "Exhibit III-A-12.xls," demonstrated a close statistical correlation between MMP and BNSF's actual overhead divisions and further indicated that MMP served to understate UP's actual overhead divisions. That showing is unrebutted. Moreover, the ostensibly greater

accuracy from a cost-based perspective supposedly inherent in using actual miles, rather than 100-mile blocks, for the line-haul portion of the movement is rather illusory insofar as it focuses exclusively on distance and ignores numerous other matters (particularly the SARR's greater road property investment per track and route mile).

The apparent impetus for the Board's switching from MMP to MSP was alleged distortion of the mileage blocks in the Eastern cases (which were decided after AEPCO submitted its original evidence). AEPCO also notes that its routings do not contain any such alleged manipulation. In particular, the alignment of AEPCO's SARR replicates that of Defendants, and the ACE does not employ rerouting apart from the treatment of the issue traffic and a small volume of other coal traffic. Nothing in the design of AEPCO's SARR reflects any attempt to expand the system or route the traffic so as to obtain an additional mileage block or to minimize the distance within a mileage block. Nonetheless, the switch from MMP to MSP serves to reduce AEPCO's divisions by a significant amount.

Under the circumstances, AEPCO does not believe that application of MSP is required. AEPCO configured its SARR in good faith based on the Board's prevailing methodology at the time. Nonetheless, AEPCO's analysis assumes that the MSP

methodology will apply in its case without any enhancements claimed by the Defendants and addressed infra.[16]

AEPCO notes further that Defendants have misstated the results of their MSP calculations. Specifically, their computer model produces one set of figures (which agree with AEPCO's calculations), but their worksheet and exhibits show slightly smaller figures. The discrepancies, which Defendants neither document nor explain, are as follows:

Table III-A-14
Comparison of MSP Revenues Under
Defendants' Model and Spreadsheets--2001

Defendant	Source (Supp. Reply electronic workpaper)	ACE Revenues 1/
BNSF	bnrv2001rt34 traintype rev.dbf (model)	{ }
	bnrv2001rt34 traintype rev.xls (worksheet)	{ }
	Difference	{ }
UP	ccfrevlinkrt12 traintype rev.dbf (model)	{ }
	ccfrevlinkrt12 traintype rev.xls (worksheet)	{ }
	Difference	{ }
	BNSF and UP Combined Difference	{ }

1/ The revenue figures do not reflect the limited revenue adjustment.

Again, the figures in Defendants' model agree with AEPCO's calculations and should be utilized, particularly as Defendants have provided no explanation for the discrepancies.

[16] As explained infra, AEPCO is presenting two limited revenue restatements of Defendants' division enhancements, but the MSP without modifications represents AEPCO's base case, and only the base case is reflected in AEPCO's DCF analysis.

iii. Defendants' Claimed Enhancements for Costs to Originate, Terminate, Interchange, and Switch Traffic

Defendants devote III.A-14 to 36 of their Supplemental Reply (essentially half of their entire treatment of traffic group issues) to claims that the "generic" MSP divisions should be enhanced to reflect additional costs that they incur in originating, terminating, interchanging, and switching the non-coal, overhead traffic as compared to the line-haul costs that the ACE incurs in handling that traffic only as a bridge carrier.

As explained infra, Defendants' attempts to identify off-SARR costs are deficient in numerous respects and do not justify adjustment to the calculations under the MSP method for determining divisions. Defendants' calculations overstate their own costs and minimize the contribution and costs that the ACE makes and incurs in handling the through movements. Defendants also distort the nature of the traffic handled by the ACE and ignore its key characteristics. Accordingly, Defendants fail to demonstrate that they are entitled to any cost-based enhancement in their divisions.

As noted supra, AEPCO does not believe that a cost-based analysis is the appropriate analysis to be used for calculating divisions. Defendants have not proved, or asserted, that they utilize anything like their ostensibly cost-based analysis in negotiating and determining their real-world divisions, and nothing in the Board's decisions in the Eastern cases suggests otherwise. Accordingly, the record in this case, as it now stands, contains nothing that rebuts the evidence that AEPCO previously submitted from John P.

Toren that MMP provides a sound surrogate for how divisions are determined commercially in the real world for non-coal traffic.

Defendants further assert that "AEPCO has no doubt made the choice to replicate only these small portions of UP's and BNSF's systems to reduce the operating and investment costs of its SARR." Supp. Reply at III.A-15. As noted supra, the reason that AEPCO has limited the scope of its SARR is that the Board has held (in response to the urgings of BNSF and UP) that AEPCO's SARR can only include facilities that actually (in the stand-alone world) serve the issue traffic, i.e., extending AEPCO's SARR further would create a cross-subsidy. While AEPCO reserves the right to disagree with the Board's holdings, it is manifestly inappropriate for Defendants to criticize AEPCO for having done exactly what they have sought to require of AEPCO.

AEPCO also takes issue with Defendants' rationale for their failing to seek a Density Adjusted Revenue Allocation ("DARA") enhancement to their divisions, which they have recently pursued elsewhere. Defendants' claim (Supp. Reply at III.A-14 n.29) that the DARA adjustment would be "relatively modest in this case" is an overstatement. AEPCO's SARR displaces the Defendants on only a small portion of their high-density main lines that are used primarily for very long-haul traffic, and the SARR foregoes some local traffic. The SARR thus has a reduced density relative to adjoining segments. Applying DARA would thus logically increase the ACE's divisions, especially if the

adjustment reflected (as it should) the SARR's higher road property costs, which embody current costs rather than the incumbent's depreciated historical costs.

Defendants address the calculation of divisions separately for intermodal, manifest, automotive, and unit train (coal and grain) traffic. AEPCO will address the divisions in that order as well.

(a) Intermodal Traffic

For each unit of intermodal traffic, BNSF/UP claim an enhanced MSP division of 500 miles for each origination or termination, 140 miles for each interchange, and an additional 20 miles for intratrain and intertrain switching. Of course, each added mile credited for non-line-haul activities serves to diminish the ACE's line-haul division.

As explained infra, AEPCO does not believe that Defendants have met their burden to show that they are entitled to any enhancement in their divisions. Indeed, their analysis suffers from a range of factual, substantive, and analytical deficiencies.

(i) Defendants' Theory for Enhanced Divisions

Defendants do not base their claims on URCS costs, as they claim that URCS does not produce satisfactory estimates (and they make no attempt to remedy any alleged URCS deficiencies). Instead, Defendants rely on Witness William K. Berry to develop unit costs for such items as lifts, switching, sales, billing, claims, collection, terminal car costs, terminal trailer and container costs for rail supplied equipment, drayage, facility capital costs, steel and rubber-wheel interchange costs, and I&I

(intratrain and intertrain) switching. These costs are converted to a per-mile line-haul equivalent by using the TTX Company's current 62-cent per car-mile "Basic Mileage Rate" ("BMR") payment to railroad users of TTX equipment for movement of empty (actually brand new) intermodal cars, to which Defendants add adjustments for use of cars and trailers. The conversion of Mr. Berry's costs into mileage equivalents is performed by BNSF/UP Witness Benton Fisher. Supp. Reply at III.A-16 to 32.

The evident purpose of BNSF/UP's calculations is to show that terminal and other non-line-haul costs are high relative to line-haul costs. In effect, Defendants are seeking to inflate the ratio of the costs of originating and terminating the traffic to the line-haul cost because the ACE serves as an overhead carrier. To achieve their ends, Defendants both overstate the non-line-haul costs (the numerator) and understate the line-haul costs (the denominator).

(ii) Threshold Faults in Defendants' Analysis

Defendants' approach suffers from several critical, and related, threshold flaws.

First, Defendants eschew URCS ostensibly because "[i]t is widely acknowledged that the Board's Uniform Rail Cost System does not produce satisfactory estimates of the costs associated with rail intermodal transportation, including terminal activities." Supp. Reply at III.A-17. In support, Defendants cite AEPCO's own original Rebuttal Ex. III-A-10 at 3 to 6 and Review of the General Purpose Costing System, 2

S.T.B. 659, 662-63 (1997), which AEPCO cited as well. AEPCO, however, noted that one of URCS's primary deficiencies with respect to intermodal traffic is its failure to adjust for the type and characteristics of the equipment, and AEPCO proceeded to make appropriate adjustments for such equipment in its analysis of the randomly selected BNSF intermodal movements, where the specific equipment was identified.[17] In contrast, Defendants jettison URCS in its entirety without specifying a single flaw which is allegedly so "widely acknowledged." In particular, BNSF/UP provide no indication of whether they believe the terminal or other costs are too high (which would tend to make the traffic appear more marginal in terms of profitability) or too low.

Instead of relying on any generally recognized costing scheme, Defendants instead turn to their Witness Berry, who opines as to the level of railroad costs for handling intermodal traffic (except for line-haul costs) based "on information in the public domain, his discussions with knowledgeable railroad personnel and review of railroad data, and his own accumulated knowledge and experience of intermodal operations and marketing." Supp. Reply at III.A-18. Defendants then reference all of 14 pages of workpapers containing some handwritten notes, faxes, BNSF's circular for its Oakland terminal, and annotated printouts of a few spreadsheets (Supp. Reply

[17] However, UP's records did not identify the type of equipment involved, and AEPCO was not able to make appropriate adjustments for the UP intermodal movements.

Workpapers Vol. 1, pp. III.A-0068-0081) as well as what Defendants refer to as the "Fire Study" (Supp. Reply Workpapers Vol. 1, pp. III.A-0082-0132).

In an attempt to discern a tangible basis for Witness Berry's cost claims, AEPCO submitted a number of workpapers requests to Defendants for information concerning the sources and bases for Witness Berry's claims, but AEPCO was essentially told that the testimony and workpapers contain all the information there is and nothing more will be produced. Defendants' standard response was as follows:

> Response: The workpapers used by defendants' witnesses to produce the evidence covered by this request were submitted with defendants' supplemental reply evidence. *See* BNSF/UP Supplemental Reply Workpapers, Vol 1. To the extent this request seeks additional materials, defendants object on the grounds stated in defendants' general objections.

Defendants' full responses are included in Supp. Reb. Workpapers Vol. 1, pp. 00029-00045.

Defendants' decision to rely on the generalized, unsubstantiated, and minimally documented knowledge of an outside witness for their intermodal costs, rather than present any information as to the level of their actual costs or the costs that they utilize in costing their intermodal services,[18] completely undermines any potential credibility in their assertions. It is impossible to imagine that UP would now be investing $1 billion over three years to increase its intermodal traffic without having any internal

[18] The one exception is the cost for terminal facilities, but Witness Berry's presentation of these costs suffers from other shortcomings.

sense of what it will cost to serve that traffic in terms of terminal, switching, and line-haul activities. As intermodal traffic constitutes BNSF's largest source of revenues,[19] BNSF must also have devoted considerable effort to analyzing the costs of serving that traffic. BNSF's and UP's failure to produce any internal cost data, or even provide any explanation for its absence, is thus a glaring omission, and provides an adequate basis all by itself for rejecting their claims that MSP methodology should be modified.

The Fire Study serves only to underscore the multiple shortcomings in Witness Berry's analysis. To begin with, the Fire Study, by its own admission (p. 3), was prepared for an entirely different purpose, "to provide an industry context for public officials who are interested in short haul rail corridors," which did not require or entail the level of care and precision required by the AEPCO case. The study was actually titled Rail **Short Haul** Intermodal Corridor Case Studies: Industry Context and Issues (emphasis added), thus confirming the study's limited focus.[20]

Moreover, the Fire Study assumes an optimized line-haul efficiency per container with articulated, five-well doublestack cars carrying ten containers, which

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[19] Intermodal accounted for 33% of BNSF's 2003 revenues. UBS Investment Research, North American Railroads Weekly, "Commodity Profiles" (March 12, 2004) at p. 2, included in Supp. Reb. Workpapers Vol.1, p. 00048.

[20] Moreover, the industry appears to be overcoming the challenges noted in the Fire Study for short-haul intermodal movements. Rockey, supra, 1 J.T.L.L.P. at 207-08 ("railroads are beginning to break into the short-haul (under 1,000-mile) intermodal market" through such means as "improving terminal productivity," and "[s]ome short haul intermodal routes are already successful").

reduces the line-haul cost per container (which enables Defendants to overstate their "enhanced" terminal divisions). As explained infra, the ACE's intermodal cars average far fewer containers, which significantly increases the line-haul cost per container. Additionally, the Fire Study relied on URCS, the very methodology that Defendants reject. These fundamental differences as to focus, underlying assumptions and their suitability for the traffic group at issue, and basic costing method all serve to confirm that the Fire Study provides no meaningful support for the Defendants' assertions.

(iii) Fundamental Errors in Defendants' Analysis

Apart from these threshold issues, there are fundamental problems with Defendants' basic analysis.

The most basic problem is that Defendants appear to have calculated terminal and other non-line-haul costs on a full or total cost basis, but then compared the full terminal cost to a purported line-haul cost that is calculated at a level demonstrably below the Defendants' variable cost per line-haul mile. Dividing full terminal and other non-line-haul costs by a less than variable line-haul cost results in an inflated mileage equivalent for the terminal and other non-line-haul costs.

Notwithstanding Defendants' failure to provide meaningful documentation, little question exists that Mr. Berry's non-line-haul costs were calculated to represent and purport to allocate the full (100%) amount of the enumerated terminal, interchange, and switching cost items (physical plant, lifts, switching services, equipment, and drayage),

without any attempt to segregate and allocate just a variable portion of such costs. Supp. Reply Workpapers pp. III.A-0056-0060. Mr. Berry nowhere attempts or purports to include a variability percentage in his calculations.

In contrast, Defendants' figure for line-haul costs is not at a full or even a variable cost level. Defendants instead explain that they derived the line-haul cost from the TTX Company ("TTX") Basic Mileage Rate ("BMR") that applies to movement of empty TTX intermodal cars, which is supposedly "intended to compensate the railroad for the directly attributable costs, including the variable portion of road property ownership." Supp. Reply at III.A-22 (emphasis added). Insofar as the rate covers "directly attributable" costs, it is unclear (especially in light of Defendants' failure to provide any further information) whether the rate covers total variable costs or something more akin to directly variable costs that are considerably lower, as demonstrated infra.

Defendants' efforts to rely on the TTX BMR suffers from a number of other critical shortcomings.

First, while Defendants claim that the BMR is "widely used," they provide no indication of how often the rate is actually used, they do not provide the back-up for how the TTX rates were established, and they also make no effort to show that the underlying assumptions on which the BMR was derived conform to the ACE's traffic group. In fact, all indications are that the BMR does not conform to the ACE's traffic group.

Second, the TTX rates do not purport to define the full universe of line-haul intermodal costs incurred by the railroads. The Wise V.S. that was part of the TTX filing, and which is the document that Defendants rely upon as the source for their figures and calculations, states at p. 12 that 31% of the national intermodal fleet is not owned by TTX. Defendants do not acknowledge the presence of the non-TTX intermodal fleet in general, nor do they attempt to quantify the mix of TTX and non-TTX equipment in the ACE's intermodal traffic group. Assuming that it tracks the national average, almost a third of the ACE's intermodal traffic moves on equipment that is never subject to the BMR or its individual constituents. The same document (Wise V.S. at 15) notes that the TTX rates are lower than the rates for non-TTX equipment: "if TTX's average car hire rates had followed the same trend as the Class I railroads' car hire rates during this [1994-2002] period, TTX car hire rates would be 24 percent higher in 2002 than they actually were." The rate used by Defendants to represent actual line-haul costs is clearly well below the actual costs incurred, be they variable or full, for Class I railroads.

Third, the basic purpose of TTX's calculation was to establish a minimum line-haul charge, and the Wise V.S. states at p. 15 that the "cost to move an empty platform is at least 13 cents per platform-mile" (emphasis added), which necessarily implies that the actual cost (particularly the full variable as opposed to just the directly variable cost) is likely higher. Understating the charge might well be acceptable for TTX's purposes (demonstrating TTX's alleged savings), but not for purposes of

calculating divisions (where an understated line-haul cost results in an overstated terminal division and an understated line-haul division). Supplement No. 78, which establishes the basic rate mechanism, states that the rate is to be calculated annually. BNSF and UP are both TTX owners and thus should have access to the underlying calculations of the rate,[21] which is supposed to represent a "nationwide" average, but have chosen not to include any such information in the record.

The TTX arrangement, by its nature, gives its partners, which include BNSF and UP, ample reason to set the BMR at a relatively low level. TTX represents a pooling arrangement under which the member carriers participate both by using the cars and transporting the cars for others, with the BMR appearing to apply only when a movement is made for the benefit of the pool as a whole. Under that circumstance, all the participants would reasonably have a collective interest in setting the transportation charges relatively low so as not to enrich one member at the expense of the others. In particular, the BMR appears to apply only for brand new cars (a rare occurrence) or when a party has accumulated an excessive number of cars (in which event there is an understandable incentive not to reward the party for having hoarded cars).

Fourth, Defendants' effort to calculate line-haul cost per unit-mile, Supp. Reply at III.A-22 to 23, involves unsupported, self-contradicting internal assumptions and

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[21] Also, the TTX filing was submitted by UP's counsel in AEPCO's rate case on Jan. 7, 2004, in Finance Docket No. 27590 (Sub-No. 3), thus indicating their access to information regarding the how TTX BMR was calculated.

further assumes a level of efficiency that is not present in the movements that form the ACE's intermodal traffic group in any event. The understated line-haul costs translate into an overstated terminal division for Defendants. Defendants' basic calculations are as follows:

(a) the average car in the TTX fleet has 4.9 platforms, so that the BMR of 62 cents per car-mile equates to an average line-haul cost of $0.13 per unit-mile ($0.62 / 4.9) (Wise V.S. at 12 & n.4);

(b) implicit in (a) is the assumption that each platform is 100% occupied, that is, that one unit moves on each of the 4.9 platforms per car, even though the BMR is applied only to empty railcars, i.e., a 0% occupancy rate; in other words, Defendants equate their "per-unit" line-haul cost with a "per-platform" expense, when the two are not interchangeable;

(c) the average TTX rental rate for a type "S" articulated five-well, doublestack car is $45.36 per car-day and $0.068 per car-mile;

(d) those rates (in b) equate to a total cost of $0.014 per unit-mile over the ACE's route, assuming, as Witness Berry did, that nine units move on each railcar and the traffic moves at an average speed of 33 miles per hour from origin to destination; and

(e) the cost of trailer/container is $11.00 per day (an unsupported figure that is also utilized in the terminal costs), which equates to a cost of $0.014 per unit-mile, again assuming the same average speed from origin to destination; and

(f) the total cost per unit-mile (the sum of (a), (c), and (d) is $0.158. Supp. Reply Workpapers Vol. 1, p. III.A-0062.

Defendants' underlying assumptions -- an average of nine units per car for railcars that average 4.9 platforms -- are self-contradictory and are in no way reflective of the ACE's intermodal group. With an average of 4.9 platforms per car, Mr. Berry's

railcars cannot possibly average nine intermodal units. Stated differently, Defendants have assumed a 90% occupancy factor for a 10-platform railcar for purposes of calculating time and mileage rates, but their average railcar used to calculate car cost per unit-mile has only 4.9 platforms and further assumes a 100% occupancy factor. Defendants' basic line-haul cost analysis is thus dependent on assumptions that are internally inconsistent, and their analysis cannot be relied upon for that reason alone.

Moreover, the assumed level of efficiency vastly exceeds that reflected in the ACE's traffic group. Specifically, the average number of containers per railcar for the ACE's intermodal traffic group is only { }, and the { } ratio is only for those railcars where there were some revenue (traffic tape) records that matched the train movement records.[22] AEPCO notes that it found full matches between the revenue and train records for less than { } of the trains, that it found no matches for a significant number of trains (including approximately { } of the intermodal trains[23]), and that the revenue adjustment was limited to just those trains for which AEPCO found no matching revenue records.

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[22] See Supp. Reb. electronic workpaper "unitpercar01.xls." This figure is based only on BNSF data. UP's data does not identify the types of intermodal cars in a train, and so the number of platforms and average occupancy rate cannot be calculated.

[23] AEPCO original Rebuttal Table III-A-7 at page III-A-8, AEPCO Rebuttal Exhibit III-A-7, and AEPCO Rebuttal electronic workpaper "Match Results 2001 (III-A-7 & III-A-9pl).xls."

Accordingly, the ratio of units to cars on the trains handled by AEPCO's SARR is { }, not nine. The overstatement of the revenue-bearing units per car demonstrates that the Defendants' analysis does not in any way reflect the characteristics of the ACE's traffic. Even if it were internally consistent (and it is not), Defendants' approach would still not reflect the equipment and efficiency realities of the ACE's traffic. In effect, Defendants are seeking to reduce the ACE's revenues based on traffic it never handled and efficiencies it does not achieve. Such an approach is manifestly erroneous and inequitable.

Defendants' 15.8-cent cost per unit-mile is unrealistically low in any event. As applied to the ACE's 259-mile segment between Defiance and Vaughn, the 15.8-cent per mile figure equates to a cost of less than $41 per unit. However, for the 30-movement randomly-selected sample of BNSF intermodal movements that AEPCO examined in its original Rebuttal, the variable cost is over $86 per unit. See AEPCO Reb. electronic workpaper "Intermodal_Train_Sample_BNSF.xls."[24] Defendants' figure thus covers less than half of the variable line-haul cost of moving the traffic. Defendants' revenue enhancements are thus over double what they should be for this reason alone, even

[24] Significantly, Defendants found that the thirty-movement samples were appropriate for the manifest and automotive traffic segments. The fact that the intermodal sample yields a cost more than double that claimed by Defendants cannot be dismissed.

assuming it is appropriate to compare full terminal costs to variable line-haul costs, which is totally inappropriate from an economic perspective.

(iv) Overstatements in Terminal Costs

While understating the line-haul costs by a significant margin, Defendants also overstate the terminal as well as other non-line-haul costs (the numerator in their division enhancement analysis).

First, Defendants make no adjustment for the fact that a portion of their intermodal traffic originates and/or terminates at private terminals. At such private terminals, the shipper is responsible for the terminal costs, either by providing the services itself (particularly in the case of large ocean carriers who represent the fastest growing segment of intermodal traffic[25]) or by contracting with the terminal operator.[26] In these instances, the Defendants are not responsible for some components of terminal cost. By reviewing the revenue records, AEPCO has determined that { } of the

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[25] UBS Investment Research, North American Railroads Weekly, "Intermodal Gridlock Looming?" (May 16, 2003) at 2, included in Supp. Reb. Workpapers Vol. 1, p. 00067.

[26] AEPCO submitted an additional workpaper request to Defendants seeking details as to their costs incurred at known private terminals that originate or terminate movements that are part of the ACE's traffic group. Defendants' response stated that they "made no 'assumptions' about the specific costs applicable to the listed facilities" and instead "used information from a wide variety of sources to develop a representative cost per unit for each origination and termination event." Defendants' filing reveals no effort to take private terminals into account in developing their "representative" cost. AEPCO's request and the Defendants' response is included in Supp. Reb. Workpapers Vol. 1, pp. 00029-00045.

ACE's 2001 intermodal traffic originated or terminated at what are known to be private terminals. See Supp. Reb. electronic workpaper "Pct RR Term.xls."[27] For the movements at private terminals, Defendants incur no facility capital costs or lift expense, and so these categories of costs are overstated by at least { } for this reason alone. Moreover, this percentage is increasing as the use of private terminals become more prevalent. In particular, the Alameda Corridor project, as explained by Witnesses Harder and Nieman, provides an incentive for freight delivered by ocean carriers to be routed through private terminals to avoid drayage costs in the congested Los Angeles area, as evidenced by, for example, Maersk's 2002 opening of Pier 400, its large private terminal at Terminal Island in Los Angeles.[28]

Second, Witness Berry provides no meaningful support for his claimed cost of $30 per lift. In the opinion and experience of AEPCO witnesses Harder and Nieman, the average cost per lift at railroad terminals is $25. This figure includes the contractor's estimated price to the railroad as well as additional costs such as snow removal and facilities management incurred by the railroad at the intermodal terminal. Unlike Mr. Berry's calculation, their figure is supported by a bottom-up analysis, as shown in

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[27] The known private terminals are identified in BNSF's intermodal facilities guide, included in Supp. Reb. Workpapers Vol. 1, pp. 00088-000191. AEPCO's workpaper requests were designed to determine whether some other terminals were private in whole or in part. Defendants refused to provide the additional information. Accordingly, the 10.3% figure is likely understated.

[28] Information regarding the terminal is included in Supp. Reb. Workpapers at Vol. 1, pp. 00192-00198.

supporting Supp. Reb. electronic workpaper "AEPCO Terminal.xls." That spreadsheet analysis reflects the model that they have used in advising their clients, including terminal contractors, railroads, and government agencies, as to terminal costs on an ongoing basis, and thus does not constitute a "made for litigation" analysis. Moreover, their spreadsheet shows that the largest single component in lift costs is labor. Their $25 per lift cost reflects an average of 3 lifts per man-hour, and they further note that this figure is conservative as a number of railroad terminals achieve productivity of 3.5 and even up to 5 lifts per man-hour. Witnesses Harder and Nieman further indicate that railroad terminals regularly achieve a rate of 3 lifts per man-hour and that the productivity level is generally higher at newer terminals, such as the ones that Mr. Berry relies upon in his calculation of facility costs, discussed infra.

Third, Mr. Berry's switching cost of $9.38 per unit (Supp. Reply at III-A-19) appears overstated. Mr. Berry provides a nominal basis for this figure ($4.17/minute times 2.25 minutes per unit for each origination or termination event). Supp. Reply Workpapers Vol. 1, p. III.A-0059. Messrs. Harder and Nieman state that in their experience, which includes working for BNSF, Conrail, major intermodal trucking lines, and intermodal customers, modern intermodal terminals are specifically designed to minimize the need for switching in the first place. Mr. Berry ignores this consideration altogether. Also, in order to establish an upper bound on the number of switch minutes required, Witness Harder suggests the following approach. In the BNSF portion of the

ACE's intermodal traffic group, { } of the traffic passed through just { } BNSF terminals. See Supp. Reb. electronic workpaper "bnsf matrix16 v3.xls," worksheet "Term Type List," cell H79. Intermodal terminals typically do not have full-time switch engines in any event, but even assuming the terminals each had one full-time switch engine, they would have a maximum of 525,600 available switch minutes per year (365 days/year times 24 hours/day x 60 minutes/hour). Accordingly, the maximum switching ratio would have been { } switch minutes per lift ({ } lifts, as shown in Supp. Reb. electronic workpaper "Average Terminal Size Backup.xls," lifts divided by 525,600 switch minutes expended), and not the 2.25 minutes assumed (with no support or back-up) by Mr. Berry. Mr. Berry's $9.38 cost may be overstated by a factor of { } for this reason alone.

Fourth, Mr. Berry, based solely on his personal knowledge and experience with intermodal operations, includes $10 for each origination and termination event to cover sales, billing, claims and collection costs. Mr. Berry explains that these "customer-relations costs [are] borne by the carriers that originate and terminate movements, who serve as the points of contact for intermodal customers." Supp. Reply at III.A-19. Mr. Berry does not, however, demonstrate or even directly claim that these "back office" costs relate exclusively to origination and termination, or that they would not be incurred in the absence of origination and termination. Indeed, in the opinion of AEPCO Witnesses Harder and Nieman, these costs are at least equally attributable to the provision of line-

haul services. For example, where carriers do provide only a "hook and haul" operation, they still undertake these activities and incur these expenses. Moreover, AEPCO's expense analysis for the ACE includes provision for performing these services, and Defendants elsewhere go to considerable lengths to increase those costs by very significant amounts. See discussion in Part III-D, infra. Defendants have not shown how these costs are attributable to origination and termination services specifically, and it is inappropriate to award Defendants any enhancement in their divisions for such activities.[29]

Fifth, Mr. Berry's calculations for terminal car, trailer, and container costs are substantially lacking in documentation. These costs are in substantial part time-based, and Defendants have not provided support for the time attributed to the alleged terminal portion. Furthermore, Defendants (or their Witness Fisher, according to Supp. Reply at III.A-20 n.40) demonstrably distort the number of private boxes through improper rounding. Defendants assert that "approximately 20 percent moves in railroad-owned trailers or containers," and the rest moves in private boxes, for which there is no charge to the railroad. However, the actual figure is 19.38%, which rounds to 19% instead of 20%. See Supp. Reb. electronic workpaper "Intermodal Restatement_(Exh III-A-16&17).xls."

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[29] AEPCO acknowledges that URCS assigns these costs to terminal operations. However, Defendants have rejected the accuracy of URCS for terminal costs, and so cannot rely on URCS for one purpose while rejecting for all others. Moreover, the fact that the same costs arise with private terminals demonstrates that the costs exist independently of terminal operations.

The improper rounding overstates the number of railroad-owned trailers/containers, which in turn overstates the terminals costs.

Sixth, Mr. Berry calculates an average drayage cost of $3 per unit for each origination or termination event based on a cost of $75 per dray as applied to the "approximately 4 percent" of the intermodal traffic "is drayed at railroad expense." Supp. Reply at III.A-20. Mr. Berry's calculations are flawed. In particular, the "approximately 4 percent" is actually { } based on { } drays out of a total of { } units, as shown in Supp. Reply electronic workpaper "bnrv2001 matchback route2.xls," worksheet "summary." Rounding is not necessarily objectionable, but here it amounts to a { } discrepancy, which is not de minimis, and furthermore should round to { }, not 4%. Moreover, Mr. Berry calculated his drayage ratio by using the number of units, instead of terminal events, as the denominator, while using the number of drays (O and T) as the numerator, which improperly increases the resulting ratio. The proper calculation should thus be { } drays divided by { } terminal events, which is { }, as opposed to the 4% ratio claimed by Defendants. See Supp. Reb. electronic workpaper "Pct RR Term.xls" Even assuming that the $75 cost per dray figure is correct, the resulting cost is { } per lift, and not the $4 per lift ({ } more) claimed by Defendants.

Seventh, Mr. Berry's calculation of terminal capital costs is also deficient. Mr. Berry does not purport to have determined the capital costs at the full range of

locations where the ACE's intermodal traffic is originated or terminated. Instead, the analysis is based on "recent UP and BNSF experience in constructing" such terminals. Supp. Reply at III.A-21 n.43. One would reasonably expect the recently-constructed terminal costs to have higher capital costs because of the effects of inflation.[30] Accordingly, the analysis seems intended to inflate the facility costs.

Other errors abound in Mr. Berry's analysis. First, he considers only five such terminals, throws out the high and the low based on his calculation of cost per lift, and then relies on the simple average of the per lift capital cost at the three remaining terminals to determine the terminal capital costs for the ACE's entire intermodal traffic group without giving any consideration to the other terminals (some of which are bigger) involved in handling the ACE's traffic. Second, Witness Berry assumes a { }-year life for the intermodal terminals when UP's R-1 reports (Schedule 332, line 18, column (d)) depict a 30-year life (1/0.0333) and BNSF's R-1 reports depict a 27.2-year life (1/0.0368) for terminals. Supp. Reb. electronic workpaper "BNSFUPR-1.pdf ." Third, the Joliet terminal includes large automotive and classification operations, and it is far from clear that Defendants separate the intermodal function from the other functions.[31] Fourth,

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[30] One would also expect the more recently-constructed terminals to have a greater efficiency in terms of number of lifts per man-hour, but Mr. Berry appears to have made no effort to take this into account in calculating his costs per lift, as noted supra.

[31] A BNSF "Fact Sheet" for the Joliet (BNSF Logistics Park), included in Supp. Reb. Workpapers Vol. 1, pp. 00199-00203, shows that less than a third of the terminal's acreage is devoted to intermodal usage.

Witness Berry relies on a simple average of the cost per lift at the three non-excluded terminals, even though the lowest cost facility (Rochelle) of those three non-excluded terminals has a lift capacity { } that is { } greater than that of the two other remaining terminals combined { }.

The differences in capital cost per lift among the five listed terminals are also substantial and entirely unexplained. The capital cost at the most expensive terminal { } is over { } times the cost of the least expensive { }. There are also even larger differences in the number of lifts per acre at the terminals with the ratio at { } and { } being { } times that at the other { } terminals. These disparities indicate that the operations and functions at the terminals are not identical, and further begs the question why Defendants did not prepare an analysis weighted to conform to the ACE's traffic group.

As shown on Supp. Reb. electronic workpaper "Intermodal Restatement.xls," worksheet "facility cap," the impact of these factors is substantial. Simply adjusting the useful lives to match the Defendants' R-1s and weighting all five terminals on the basis on lifts results in an average capital cost per lift of $11.15. If { } is properly excluded, the average becomes $9.21, which is then reduced to { } after the adjustment reflecting { } private terminal events.

The terminal costs calculated by Mr. Berry are thus unreliable and substantially overstated.

(v) Overstatements in Interchange Costs

Defendants also seek enhanced divisions for their costs in interchanging traffic in such locations as Chicago. Supp. Reply at III.A-24 to 31. Defendants present a listing of different types of interchanges and purport to calculate and then weight the costs associated with each. However, their treatment suffers from some of the same errors as their terminal cost analysis as well as some additional ones.

In particular, as previously explained, overstatements are present in the $30 lift cost incorporated in Witness Berry's claimed costs for Type 4, 5, and 7 interchanges, the switching/yard transfer costs in Types 2 to 4 and 6 to 7, and the terminal facility capital costs in Types 4, 5, and 7.

An additional error relates to the weighting of the various interchange types. For example, the Type 1 interchanges involve highly-efficient run-through arrangements, and Defendants rightly do not seek additional credit for these interchanges. Moreover, they constitute the largest category of interchanges. However, Defendants underweight the proportion of such interchanges.

Specifically, Defendants calculate that { } of the intermodal interchanges { } fall in this category, as shown in Supp. Reply Exhibit III-A-4. However, Defendants calculate their figure by taking the simple average of the BNSF and UP percentages. The simple averaging is inappropriate because the number of UP

interchanges falling in this category is over three times the number of BNSF interchanges of this type. Weighting the distribution according to the number of such movements (units) results in a figure of { }, as shown in Supp. Reb. electronic workpaper "Intermodal Restatement.xls," worksheet "matrix," and also reduces the weight of the more expensive interchange types proportionately.

The per diem portion of interchange costs for the flat car, trailer, and container is also overstated for some interchange types because, in the experience of Witnesses Harder and Nieman, the interchanges do not take as along as claimed by Defendants (Richard Gray and unnamed intermodal personnel for BNSF who spoke to Witness Fisher). In particular, Defendants assumed a half-day for the Type 2 interchanges, which involve merely a change of power and associated crews, and a full day for the Types 3 through 7 interchanges. Defendants provided no specific support for their assumptions.

There is no sound reason to expect that Defendants and their Eastern counterparts would allow time-sensitive intermodal trains subject to a Type 2 interchange to sit, on average, for half-a-day simply before attaching power and crews so that the trains can proceed. These operations are far more efficient, and in Messrs. Harder and Nieman's experience, four hours is a far more reasonable estimate for the average time involved in making the Type 2 interchanges. Additionally, Defendants apparently assumed that the half-day costs for the car and trailer/container would apply in both

directions (outbound and incoming), whereas they distinguish between the delivering and receiving carriers for the other interchange types, and hold the receiving carrier responsible only after the car is received.

Defendants' calculation for Interchange Types 3 to 7, which assumes a full day (for both the delivering and receiving carrier) for both the car and trailer/container, is also unsupported and unreasonable. Even when a non-Type 1 or 2 interchange is performed at relatively congested locations such as Chicago, half-a-day represents a more realistic estimate for the time involved, as, according to Witness Harder and Nieman, crosstown equipment that arrives in Chicago in the morning moves across town by rail or truck during the day and normally heads out of town on a departing train on a connecting carrier later that day.

In sum, the interchange costs posited by Defendants are significantly overstated across most interchange types and the interchange types are improperly weighted as well.

(vi) Overstatements in I&I Switching

Defendants also assert an average cost per unit of $8.31 for I&I switching that applies to 34% of the units to yield an average cost of $2.82 per unit. Supp. Reply at III.A-31 to 32.[32] However, no source is given for the underlying assumptions as to half

[32] AEPCO adds that the inclusion of any adjustment for I&I switching is objectionable for the reasons noted in the discussion of manifest traffic, infra.

an origination and termination for the switching cost and half a day for car and trailer/container costs. Defendants provide no information as to how many cars are switched at a time as part of a single block, although Defendants do refer to block-swapping, which should cause switching operations to be quite efficient, as opposed to the 12 hours that Defendants allot for such activities (on average). The fact that such block switching appears to occur on a regular basis should also contribute to additional efficiencies. Defendants' figure thus appears to be significantly overstated.

(vii) Assessment of Defendants' Calculations

In light of all of the undocumented assumptions, the other assumptions that are plainly not representative of the ACE's traffic group, and the outright analytical errors in the Defendants' calculations intended to support their claims for enhanced divisions for non-line-haul activities, the only appropriate and permissible outcome is for the Board to apply its MSP method, with 100-mile blocks for the origination or termination, without modification. While the Eastern cases do provide the parties with the opportunity to show that the divisions should be altered, Defendants' showing is so deficient that it fails to qualify at a threshold level. Defendants have plainly failed to overcome the presumption for assigning 100-mile blocks for origination and termination, and their analysis is riddled with gaps and assumptions that are manifestly not in accord with the facts and are demonstrably unrepresentative of the intermodal traffic group handled by the ACE.

Under the circumstances, AEPCO does not believe that it should be required to present, and should not be faulted for failing to present, any sort of restatement of the comparison between the costs associated with the line-haul and non-line-haul portions of the intermodal movements. Accordingly, AEPCO's DCF analysis reflects application of the standard MSP formula as adopted in the Eastern cases.

Nonetheless, AEPCO recognizes the possibility that the Board might find that Defendants have somehow met their threshold burden for seeking a modification of MSP and that a shipper that does not submit a quantified restatement of the carrier's showing as to a disputed issue may do so at its peril. Accordingly, without any sort of waiver or compromise of its position that Defendants' division analysis should be rejected outright, AEPCO offers the following as to what a more representative cost-based divisions analysis would demonstrate. The underlying calculations are presented in AEPCO's electronic workpapers, so that the Board may utilize the restatements if it deems it appropriate.

(viii) Restatement of Division Enhancements

AEPCO's qualified restatement of Defendants' calculations of enhanced divisions are in Supp. Reb. electronic workpaper "Intermodal Restatement_(Exh III-A-16&17).xls." The file contains (1) a restatement that is largely limited to correcting Defendants' technical errors, and (2) a restatement utilizes more realistic assumptions as to two substantive inputs.

The most fundamental problem with Defendants' analysis is that it rests on an analysis that is totally generic and unsupported, which defects cannot be addressed through a mere restatement. However, the most basic technical problem with Defendants' analysis is that it compares terminal costs at a full or total cost level to line-haul costs that are below even the variable level. The resulting calculations necessarily result in an inflated ratio of non-line-haul to line-haul costs.

The underlying inconsistency is logically resolved by restating all costs on a full or "apples to apples" basis. This approach recognizes Defendants' non-URCS treatment of terminal costs, while also recognizing that Defendants did not identify any specific criticisms of the URCS line-haul costs.[33] As noted supra, the chief fault in applying URCS to intermodal was the failure to adjust for the specific equipment type, which can be addressed through manual adjustment, which AEPCO did in the case of the thirty-movement sample presented in AEPCO's original Rebuttal.

Moreover, there is an established procedure, application of the URCS constant cost markup ratio (1.34320 in the case of 2001 STB URCS for BNSF), that AEPCO Witness Crowley has used to restate the previously-calculated variable line-haul

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[33] Indeed, Defendants assert that their TTX-derived line-haul costs are close to the URCS-based costs identified in the Fire Study, although that study, like the TTX analysis, assumes a high degree of efficiency (intermodal units per car) that is simply not present in the ACE's traffic group. Specifically, the Fire Study assumes that all movements occur in unit intermodal trains consisting exclusively of 5-well, articulated, double-stack cars with fully-loaded platforms.

costs at the full cost level. Additionally, the non-line-haul costs can be adjusted by the general overhead ("GOH") ratio (1.113 in the case of the 2001 STB URCS for BNSF, WT E2, Line 219, Column (1)), for the purpose of restating that cost at a full level. Accordingly, restating all costs on a full basis is clearly the most appropriate way to reconcile the two costs.

Furthermore, in calculating the line-haul costs it makes sense to utilize the 30-movement randomly-selected BNSF sample that AEPCO Witness Whitehurst presented in AEPCO's original rebuttal. As noted, the BNSF data includes the information on equipment type that is needed to make an accurate cost assessment. Defendants' Supplemental Reply did not identify any criticism of the sample or AEPCO's costing of the sample. Also, Defendants' analysis (discussed infra) adopts the samples that AEPCO presented for the manifest and automotive traffic.

The weighted average variable line-haul cost per unit for the intermodal sample as calculated in AEPCO's original Rebuttal was $0.31286 per mile, a figure that is itself nearly double the line-haul cost figure used by Defendants (meaning that their division enhancements are double the appropriate level for this reason alone). Application of the BNSF 2001 constant cost markup ratio results in a full cost of $0.42337 per mile, which is over 150% greater than the figures used by Defendants. After the non-line-haul costs are adjusted by the GOH ratio, Defendants' claimed

divisions enhancements are reduced by 42% just by using the line-haul costs for the actual sample of the ACE's traffic.[34]

It is also appropriate to adjust the non-line-haul costs in light of the various deficiencies in Defendants' presentation of those costs noted previously. AEPCO Reb. Exhibit III-A-16 presents a restatement of those costs limited to the following:

(a) adjusting the lift and facility capital costs to reflect the { } private terminal ratio;

(b) adjusting the drayage cost to reflect a { } and not a 4% dray ratio that corresponds to the dray per terminal event and not per unit handled;

(c) adjusting the capital costs to reflect the actual expected lives for intermodal facilities, weighting lift cost by annual lifts, and excluding the Joliet terminal because of the presence of substantial non-intermodal activities;

(d) adjusting the car, trailer, container, and switching/yard transfer cost to more accurately reflect the time involved in interchange and terminal activities as they were described by Defendants, including the blocking of cars;

(e) weighting the various interchange types appropriately and applying a 19.38% ratio for railroad-owned boxes;

(f) applying the GOH markup to the non-line-haul costs so as to state them on a full basis;

(g) applying the constant cost markup to the variable line-haul costs for the thirty-move sample as costed in AEPCO's original rebuttal to state them on the same full basis; and

(h) not rounding to the nearest five miles.

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[34] The Increase in line-haul cost denominator is ($0.31286/$0.158) x (1.34320/1.113) = 2.3896730. Decrease in divisions equals the reciprocal (1 divided by increase in the denominator) or 41.85%.

Making these changes results in an average credit of 175 miles for each origination or termination, 41 miles for each interchange, and five miles for I&I switching.

The above analysis, as reflected in Supp. Reb. electronic workpaper "Intermodal Restatement_(Exh III-A-16&17).xls," represents the absolute minimum restatement that is required to remedy the most basic errors in Defendants' calculations. In contrast, the second restatement utilizes what AEPCO, through its Witnesses Harder and Nieman, considers to be a more reasonable and appropriate set of adjustments and yields a smaller restated enhanced division calculation. The assumptions utilized in Supp. Reb. Exhibit III-A-16 are the same as in AEPCO Reb. Exhibit III-A-17, except as follows:

(a) the cost per lift (at non-private terminals) is assumed to be $25/lift using an assumed average rate of productivity that is particularly appropriate for the recently constructed terminals used to determine facility capital costs; and

(b) the sales and billing "back office" charges are not included at all because they are not attributable simply to the origination and terminal activities, as explained supra.

Making these additional changes results in an average credit of 137 miles for each origination or termination, 39 miles for each interchange, and 5 miles for I&I switching.

AEPCO emphasizes that even the calculation presented in Exhibit III-A-17 still overstates the cost-based division that should be available to the Defendants. In particular, the line-haul cost denominator reflects the average of 6.1 units per car (184 units divided by 30 cars from the movements sampled by AEPCO), whereas the ACE's

BNSF intermodal traffic group as a whole averages only { } units per car, as shown in Supp. Reb. electronic workpaper "unitpercar01.xls." The calculation also does not take into account the fact that the SARR provides a 1,000-mile inspection for the intermodal trains traveling in both directions, as well as locomotive fueling that is sufficient to permit the locomotives to travel several times beyond the length of the ACE's segment without needing to refuel. Also, as noted by Witnesses Harder and Nieman, the switching/yard transfer and car and trailer/container costs may be overstated as well.

Even giving the Defendants the benefit of very substantial doubt, the maximum enhancement in their divisions to which they could be entitled is relatively modest, and even that enhancement is still overstated because of the disparities in the sample relative to the ACE's intermodal traffic group (to the extent the ratio of units to cars can be discerned from BNSF's traffic). Under the circumstances, the Board should rightly conclude that the Defendants have not met their burden and find that no enhancement is in order. To award any enhancement here, where the largest adjustment that might be reasonably awarded is so modest, and the Defendants' showing is so riddled with errors and omissions, would be a dubious exercise in judgment. It would reward a party for making a defective submission and thus invite more deficient showings in the future, while serving to make rate cases more complicated, expensive, and protracted. Under the circumstances, the appropriate action is not to award Defendants any enhancement at all on their divisions for intermodal traffic.

(b) Manifest Traffic

Defendants also seek enhanced divisions as to the manifest cross-over traffic handled by the ACE. Supp. Reply at III.A-32 to 35.

Defendants' treatment of this subject is much briefer than their treatment of intermodal divisions. Specifically, Defendants purport to rely on the two 30-movement traffic samples (one for BNSF, and one for UP) addressed by AEPCO's Witness Whitehurst in AEPCO's original Rebuttal to develop a ratio of (a) terminal costs to line-haul costs, and (b) I&I switching costs to line-haul costs. Defendants claim a termination block of 180 miles for BNSF and 195 miles for UP, and I&I switching credit of 95 miles for BNSF and 160 miles for UP.

Defendants' analysis does not suffer from most of the defects that plague their analysis of intermodal costs. In particular, their analysis is based on a comparison of variable costs to variable costs. Nonetheless, their analysis is inherently unacceptable for its intended purpose.

AEPCO's cost analysis of the sample movements, from which Defendants ostensibly derive their division enhancements, was presented for the specific purpose of comparing (a) the R/VC ratios for the segment of the movements assigned to the SARR, to (b) the R/VC ratios for the segments of the movements retained by the residual

incumbents.[35] Even the STB proceeding cited by Defendants regarding intermodal costs recognizes that the use of URCS costs, without attention to specific cost factors and special studies, is "more of an art than a science . . . that incorporate[s] many assumptions and generalizations." Review of the General Purpose Costing System, 2 S.T.B. at 660.

For AEPCO's comparative analysis, the level of cost specificity was sufficient because any errors in the actual costs versus system average costs could be assumed to have been generally equal for the SARR's and the residual incumbents' portions of the movement. In particular, the length of the line-haul handled by the residual incumbents was a multiple of the portion handled by the SARR, which meant that the analysis was not inherently sensitive to terminal costs.

In contrast, Defendants have manipulated the analysis to develop a ratio of system average terminal costs and switching costs to system average line-haul costs. Such an analysis of disparate components of the movement has an inherent tendency to devolve into an "apples to oranges" comparison unless attention is paid to the specific movement and cost characteristics. Defendants' own analysis of the intermodal traffic, while defective, demonstrates how terminal costs can vary. However, Defendants made no attempt to take into account any of the particular characteristics of the sample movements (as confirmed by their treatment of I&I switching costs, as demonstrated

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[35] Furthermore, the analysis was submitted in conjunction with a demonstration of the commercial reasonableness of divisions calculated under MMP.

below). Since Defendants did not examine, much less adjust for, any of the particular terminal characteristics of the movements, their ratios cannot be validated, and their claims for enhanced divisions on these movements cannot be accepted.

Furthermore, Defendants' efforts to include an I&I switching component in MSP cannot, as a threshold matter, be categorized as simply an adjustment to the Board's established or preferred formula. Instead, the inclusion of I&I amounts to the creation of a new model as it introduces an entirely new variable to the division equation. Defendants' I&I calculations for both the BNSF/UP and ACE segments (before adjustment) assume one switch event every 200 miles, or 1/200 per mile, which effectively means that the I&I switch is distanced-based and therefore already reflected in MSP. Additionally, the Defendants' proposed modification is one-sided, as it attempts to consider one factor ("I&I switching") allegedly favorable to Defendants in this instance, while ignoring other factors (e.g., the SARR's road property investment at replacement cost levels as compared to Defendants' use of depreciated assets, the SARR's need to absorb the costs of new interchanges and perform 1,500-mile inspections and fuelings, which benefit the movement far beyond the length of the SARR, etc.) that would support additional cost-based compensation for the SARR. A substantial burden should thus attach to such efforts to recast just part of the MSP formula.

Defendants' I&I switching calculations are particularly defective since they do not reflect the characteristics of the movement. In particular, Defendants altered the

Phase III URCS costing used by Witness Whitehurst, which assumes as a default that switching occurs every 200 miles, and assigned the I&I switching portion associated with the ACE's segment to the residual incumbents' segments. The effect of Defendants' manipulation was to assign all of the I&I switching to BNSF or UP and exclude it from the ACE. The outcome is an inflated mileage additive for BNSF and UP related to I&I switching.

AEPCO has prepared a qualified restatement to be considered only in the event that the Board finds that Defendants have met their initial burden to obtain an enhanced division of this traffic. For restatement purposes, AEPCO has corrected Defendants' calculations by first removing the I&I switching activity associated with the ACE's segment from the Defendants' total variable cost for each movement and assigning that I&I switching activity back to the ACE's segment. AEPCO next adjusted the switching factors to reflect the amount of switching that the sample movements actually experienced on BNSF.[36] The UP records are insufficient to permit this identification because they do not contain data as to the number of switches, or mileage between switches, for UP revenue movements. Accordingly, AEPCO applied the average

[36]To determine when a sample movement was switched en route, AEPCO relied on the train symbols as reflected in the traffic tape records for the sampled movement. Specifically, a railcar was deemed to have been switched when the movement was identified as moving on a train with a different identifying symbol. Stated conversely, when the train symbol remained the same, the sample railcar was deemed to have remained on the same train since different trains have different train symbols.

ratio of I&I switches per unit per movement from the BNSF sample to the UP traffic sample.

The actual rate of switching for the sampled movements was far below the URCS default of one switch every 200 miles. Specifically, the average length of the 30 BNSF sample manifest movements was { } miles, and the average number of trains per sample movement was { }, as shown in Supp. Reb. Exhibit III-A-18 and electronic workpaper "Switch2001_(Exh III-A-18).xls." Furthermore, the average switching rate was one switch every { } miles. Applying the actual figures instead of the URCS default (which assumes that switches occur nearly { } times as frequently) resulted in an average I&I switching cost equivalent of 33 line-haul miles for the BNSF manifest traffic and 65 line-haul miles for the UP manifest traffic.

As stated, AEPCO's position is that Defendants' analysis does not meet the threshold level of acceptability and that Defendants should not receive any division enhancement on their manifest traffic. However, the I&I switching enhancement should not exceed 33 miles for BNSF and 65 miles for UP in any event.

(c) Automotive Traffic

Defendants' treatment of the divisions for the automotive traffic is equivalent in all respects to its treatment of the manifest traffic. Specifically, Defendants seek a 170-mile credit for BNSF originations and terminations, a 215-mile credit for UP

originations and terminations, a 110-mile credit for BNSF I&I switching, and a 140-mile credit for UP I&I switching.

Defendants' analysis for the automotive traffic is the same as that for the manifest traffic, and their analysis is deficient for the reasons noted in AEPCO's discussion of the manifest traffic. Calculation of the actual switching on the BNSF sample automotive movements showed an average movement of { } miles and average of { } trains per movement. The average switching rate was one switch every { } miles. Applying the actual figures instead of the URCS default of one switch every 200 miles (over { } times as frequently) resulted in an average I&I switching cost equivalent of 19 miles for the BNSF auto traffic and 30 miles for the UP auto traffic. See Supp. Reb. electronic workpaper "Switch 2001.xls_(Exh III-A-18)." While AEPCO's position is that no enhanced division is appropriate for the automotive traffic, the enhancement for I&I switching should not exceed 19 miles for BNSF and 30 miles for UP.

AEPCO has also restated BNSF automotive terminal costs because { } of cars moving on BNSF auto trains are not auto racks and thus the URCS terminal costs are not applicable. Making this correction reduces the BNSF automotive terminal additive from 169 miles to 167 miles, as shown in Supp. Reb. electronic workpapers "BNSF Vehicle AAR.xls" and "BNSF Auto Restatement.xls."

The following table summarizes the ACE's division as a percentage of 2001 revenues for the categories of traffic[37] under the various calculations:

Table III-A-
Comparison of ACE 2001 Non-Coal Revenues
Under Different Calculations of Divisions

Type	MSP[1/]	Defendants' Enhanced[2/]	AEPCO Technical Restatement[1/]	AEPCO Substantive Restatement[1/]
Intermodal	{ }	{ }	{ }	{ }
Manifest	{ }	{ }	{ }	{ }
Automotive	{ }	{ }	{ }	{ }
Total	{ }	{ }	{ }	{ }

1/ Supp. Reb. electronic workpaper "Restated Traffic and Revenue Summary-asr_(Exh III-A-21).xls."
2/ Supp. Reply electronic workpaper "Restated Traffic and Revenue Summary.xls."

[37] Defendants' intermodal, manifest, and automotive trains carry some traffic that is non-intermodal, non-manifest, and non-automotive, respectively. Defendants applied their intermodal division enhancements to all intermodal traffic, even if it moved in non-intermodal trains. Defendants also applied their automotive division enhancements to all non-intermodal traffic moving in automotive trains, and their manifest division enhancements to all non-intermodal traffic moving in manifest trains.

Accordingly, AEPCO, for purposes of restatement, accepted Defendants' approach, except that, as noted supra, AEPCO adjusted the automotive enhancement to reflect that cars other than auto racks moved in automotive trains. AEPCO's substantive restatement thus results in increased ACE divisions for the intermodal portions of the manifest and automotive traffic, even though the substantive restatement is identical to the technical restatement with respect to manifest and automotive traffic. Stated differently, the additional adjustment to the manifest and automotive divisions under the substantive restatement is attributable to the intermodal traffic moving in those trains.

(d) Coal and Grain Traffic

Defendants do not seek any adjustment for the divisions for coal and grain traffic and instead apply the MSP approach.

iv. Rerouted Coal Traffic and Mileages

Defendants do not challenge (in Part III-A) AEPCO's rerouting of the coal movements involving the issue traffic, the movements to Tucson Electric Power's Irvington plant from the McKinley and Lee Ranch Mines served by the ACE, and the Rillito movement, Supp. Reply at III.A-39, nor can they in light of the December 2001 Decision, and the August 2002 Decision as well as the Coal Rate Guidelines themselves.[38]

However, at Supp. Reply at III.A-37 to 39, Defendants seek to challenge one aspect of AEPCO's calculation of divisions on the rerouted traffic. Defendants' concern is that the cross-over divisions should reflect Defendants' actual route of movement, not the ACE's internal rerouting which increases the distance of the SARR relative to the residual incumbents, e.g., UP still claims { } of the route miles for the Cochise-Tucson segment of the Irvington traffic.

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[38] Nonetheless, Defendants suggests that AEPCO's reroutes should be disallowed if they are less efficient than the existing routing. AEPCO's reroutes are all internal, the costs of the reroutes are reflected in the DCF analysis, and concerns with the efficiency of reroutes has been confined in past cases to external reroutes only. Defendants' suggestions are thus entirely misplaced. Morever, in Part III-C, inra, AEPCO demonstrates that the transit times on the ACE's internally-rerouted coal movements are better than Defendants' transit times.

AEPCO accepts the proposition that the residual incumbents' divisions should not be reduced below the level that applies under the Defendants' original routing (before the reroute). Indeed, AEPCO calculated its distances in that manner, and AEPCO did so using the distances recorded in Defendants' actual traffic tapes (as discussed in the next section). While these mileages may vary slightly from those utilized by Defendants, the basic approach is the same, and AEPCO's distance calculations should be used because they reflect Defendants' own traffic tape data.

Regarding the York Canyon movements (which occur only in 2001 and 2002), Defendants claim that their division should reflect the movement of the traffic via the Belen-Deming segment. It is appropriate to calculate the ACE's division for the Belen-Vaughn-El Paso-Cochise segment utilizing the shorter Belen-Deming-Cochise routing instead of the longer Belen-Vaughn-El Paso-Deming-Cochise routing. AEPCO, therefore, accepts the change.

v. Overstated SARR Mileages

AEPCO concurs in Defendants observation that AEPCO overstated the ACE's overhead mileages on the El Paso-Vaughn segment by five miles in the case of westbound traffic and four miles in the case of eastbound traffic. As Defendants note, the misstatement was entirely academic under MMP, but has a minor impact under MSP, and AEPCO's Supp. Reb. calculations adopt Defendants' correction.

d. Other - Projected Revenues for Non-Issue Traffic

i. Projected Coal Revenues

Defendants present two objections to AEPCO's projection of future coal revenues of non-issue traffic. Supp. Reply at III.A-41 to 44.

First, Defendants criticize AEPCO's use of an outdated DRI-WEFA (now Global Insight) forecast for both the RCAF-U and the RCAF-A, and Defendants note that the most recent forecast shows considerably less rapid increases in both indices. As noted supra, AEPCO does not object to use of the more recent (December 2003) forecast, provided the cost of capital is also updated appropriately to reflect the observed effects of lowered expectations of inflation. Otherwise, the SARR will face a real cost of capital higher than of the Defendants. Causing the SARR to face an entry barrier that does not confront the Defendants constitutes an impermissible entry barrier.

Second, Defendants fault AEPCO for having failed to{

} AEPCO agrees that the { } should be reflected and has done so in its Supp. Reb. analysis of revenues.

AEPCO does note, however, that Defendants have correctly applied the

{

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ii. Projected Non-Coal Revenues

(a) BNSF Non-Coal Revenues

Defendants' only objection to AEPCO's calculation of BNSF's non-coal revenues is that AEPCO supposedly used the wrong field in BNSF's traffic tapes in adjusting for revenue adjustments such as contract allowances. Supp. Reply at III.A-45 to 46. AEPCO accepts Defendants' criticism, and AEPCO's Supp. Reb. calculations adopt the correction, which has a small impact.

(b) UP Non-Coal Revenues

Defendants criticize three aspects of AEPCO's projections of revenues for UP's non-coal traffic: (a) AEPCO's allegedly improper use of change in revenue per unit instead of revenue per ton for the change in 2003 intermodal revenues, which affects the revenue adjustments for 2003-2020; (b) AEPCO's treatment of "Q" trains as intermodal rather than automotive trains; and (c) AEPCO's inclusion of intermodal traffic in determining the rate of escalation for manifest traffic. Supp. Reply at III.A-46 to 48. While the Defendants' first criticism has a factual premise, their conclusion is unwarranted. Defendants' second criticism is sound, and AEPCO has corrected its calculation accordingly. Defendants' third criticism is true, but their proposed correction

contains a larger error that, when corrected, results in an increased rate of escalation for the manifest traffic. These matters are addressed below.

(i) Intermodal Revenue Projections

Defendants criticize AEPCO for having projected UP's intermodal revenue growth based on a 1999-2003 geometric average that included the change in revenue per unit rather than revenue per ton for the 2002-2003 period as shown in data generated by "Prophecy," UP's planning tool. Defendants' observation is factually correct, but it does not support the large reduction in intermodal revenue growth that Defendants seek to impose.

In particular, Defendants seek to make this adjustment only for intermodal traffic, but not for the other segments of the ACE's UP non-coal traffic. Defendants' failure to make the adjustment for the other segments was not inadvertent, as the calculations for all traffic types occur on the same worksheet of the same electronic workpaper. Making the same adjustment for the other traffic groups would increase the annual rate of revenue growth for agricultural products, chemicals, energy, industrial products and manifest traffic (total without energy). Defendants should not be allowed to cherry-pick the manner in which they apply their technical corrections so as to include only those that decrease SARR revenues, and exclude those that increase SARR revenues.

Additionally, Defendants' approach would introduce a data inconsistency into the four-year (1999-2003) geometric average. For years 1999-2001, UP provided data only on the basis of revenue per unit, and not on the basis of revenue per ton. UP's data permits calculation of a revenue per ton only for 2002 and 2003. Accordingly, UP's approach entails use of mathematically inconsistent data (change in revenue per unit for 1999-2002 and change in revenue per ton for 2002-2003). Such an apples to oranges comparison constitutes both incorrect mathematics and unsound economics.

While Defendants' observation is factually correct, their proposed "correction" is unsound and internally inconsistent, and thus should not be adopted. Therefore, AEPCO has not altered its UP intermodal revenue projection methodology.

(ii) Treatment of Q Trains

As noted in the parties' previous filings, UP produced two "decoders" for its train symbols. One decoder defined "Q" trains as intermodal trains, and another defined them as manifest trains. Defendants have indicated that the second decoder should apply.

Defendants note that AEPCO applied the intermodal revenue escalator instead of the manifest revenue escalator to the Q trains. Defendants' observation is correct, and AEPCO has adjusted its Supp. Reb. calculations accordingly.

(iii) Average Change in Revenue Traffic

Defendants' final criticism is that AEPCO's revenue escalation for UP manifest traffic improperly includes intermodal traffic, that is, "AEPCO escalates revenues for UP manifest traffic using changes in the average revenue-per-car for all traffic, excluding coal, but improperly including intermodal traffic." Supp. Reply at III.A-48.

Defendants' observation is correct, but their "correction" includes a larger offsetting flaw, namely, the inclusion of automotive traffic in the traffic group used to calculate changes in revenue for manifest traffic. When both automotive and intermodal traffic are excluded from the calculation, the annual average rate of change per unit for manifest traffic is increased to 1.0%, as compared to the 0.9% originally calculated by AEPCO and the 0.8% calculated by Defendants. See Supp. Reb. electronic workpaper "ACE Non-Coal Traffic and Revenue Forecast-RR Revised-asr_(Exh III-A-20).xls." Accordingly, AEPCO has utilized the 1.0% revenue escalation figure for the manifest traffic.

AEPCO's revised traffic and revenue forecasts are shown in AEPCO Supp. Reb. Exhibits III-A-19 (coal), 20 (non-coal), and 21 (combined coal and non-coal).

III-B Stand-Alone
Railroad System

III. B. STAND-ALONE RAILROAD SYSTEM

In this Part, AEPCO responds to the Defendants' Supplemental Reply concerning the ACE stand-alone railroad system developed by AEPCO's rail operations and engineering experts, Frederic Yocum, Robert Pattison and Harvey Stone. The ACE extends 786.01 route-miles from the McKinley and Lee Ranch Mines in New Mexico to Cochise, AZ, via Defiance, Belen and Vaughn, NM; El Paso, TX; and Deming, NM. See AEPCO Op. Exhibit III-A-1.

1. Route and Mileage

The Defendants have accepted the ACE's route and its route-miles as calculated by AEPCO in its Opening Evidence. However, they continue to assert the supposed improprieties of AEPCO's use of trackage rights between Vaughn and El Paso as part of the ACE's configuration. See Supp. Reply at III.B-4 to 11.

In support of their position Defendants reference their separate Motion to Dismiss on Reopening (to which AEPCO filed a separate reply on February 16, 2004 ("Reply")) and assert (or, more accurately, reassert, since most of their claims also appear in their Motion to Dismiss) that: (1) AEPCO's reliance on any trackage rights calculation is impermissible, and AEPCO's complaint should be dismissed for failure to submit a viable SARR; (2) the 3.2 mills per gross ton mile figure in the Defendants' existing trackage rights agreement that AEPCO utilized in its earlier evidence is "plainly inadequate;" (3) "AEPCO could never demonstrate on the record in this case that a usage

fee satisfies the objective of the SAC test;" and (4) "Defendants cannot develop a usage fee that would satisfy the purposes of the SAC test," although (5) "solely for purposes of completing a DCF analysis ... Defendants have applied a 9.05 mills ... usage fee."

Each of Defendants' claims is defective for the reasons AEPCO stated in its Reply and for additional reasons stated below.

First, as AEPCO explained in its Reply, Defendants' Motion to Dismiss cannot possibly be granted as AEPCO has simply elected one of the two options (resting on its previously-filed evidence) squarely presented in the Board's November 2003 Decision.[1] Exercise of an option presented in a decision denying a motion to dismiss based on the same theory (use of trackage rights) cannot possibly constitute the predicate for dismissal of the underlying complaint.

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[1] The November 2003 Decision (at 6) stated that:

> Nor will the Board require AEPCO to prepare an entirely new case-in-chief at this late date. Rather ... AEPCO will be allowed to rely on its rebuttal SAC presentation as its case-in-chief, if it does not wish to prepare a new case-in-chief. However, if AEPCO chooses to rely on its rebuttal SAC evidence, the defendants will be entitled to demonstrate the inadequacy (for purposes of the SAC analysis) of the usage fee reflected in the existing BNSF-UP trackage rights agreement and to show the level at which a usage fee would need to be set to satisfy the objectives of the SAC test. AEPCO would then have an opportunity to present rebuttal evidence on that issue.

Second, as explained in AEPCO's Reply, the 3.2 mills figure for use of the trackage rights could not be "plainly inadequate" as SP (UP's predecessor for the Vaughn-El Paso segment) voluntarily agreed to the fee in the trackage rights agreement with BNSF in conjunction with the BN/Santa Fe merger. Finance Docket No. 32549, Burlington Northern, Inc. and Burlington N. R.R. -- Control and Merger -- Santa Fe Pacific Corp. and The Atchison, T. & S.F. Ry. Co. (ICC served Aug.13, 1995) ("BN/Santa Fe").

Because SP was not an applicant in the BN/Santa Fe merger proceeding, the ICC had no cause to pass directly on the reasonableness of the trackage rights fee in that context. 10 I.C.C.2d at 767, 769. However, in the later UP/SP merger proceeding, Finance Docket No. 32760, Union Pacific/Southern Pacific Merger, 1 S.T.B. 233, 415 & n.168 (1996) ("UP/SP"), the Board had ample cause to address the appropriate level of trackage rights over UP/SP, as the Board noted in the November 2003 Decision. In particular, BNSF observed in the UP/SP proceeding that the trackage rights fee under consideration was "nearly identical" to that in the BN/Santa Fe merger, where the same, or virtually identical, fee applied both to the trackage rights that BNSF granted and that BNSF received, including those between Vaughn and El Paso.[2]

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[2] BNSF noted that "SP ha[d] moved more than three billion gross ton-miles of traffic over trackage rights subject to nearly identical fees in just the first three months of" 1996. BN/Santa Fe's Response to Inconsistent and Responsive Applications, et al. (BN/SF-54), filed April 29, 1996, in UP/SP, Vol. 1, at 7.

(continued...)

In the UP/SP proceeding, UP/SP offered a very vigorous defense of the reasonableness of the "nearly identical" trackage rights fee, explaining that "[t]he compensation levels provided for in the BN/Santa Fe settlement agreement are entirely reasonable" and "were arrived at in arm's-length negotiations between two highly sophisticated parties." Applicants' (UP/SP) Rebuttal, Public Version (UP-SP231), filed April 29, 1996, in UP/SP, Vol. 1, at 118. UP/SP further noted that "[i]n past merger cases, the ICC has repeatedly made clear its preference for privately negotiated terms and conditions for trackage rights" and "has also repeatedly set forth the compensation principles that it expects railroads to bring to bear in their negotiations, including the necessity for the tenant to contribute to fixed costs and asset replacement in order to avoid a cross-subsidy from the landlord." Id. at 125-26, citing BN/Santa Fe.[3] UP's comments thus indicated that a fee of about 3.2 mills would be sufficient to cover trackage rights over its lines in terms of both fixed costs and asset replacement.

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[2] (...continued)
Relevant portions of the UP/SP and BNSF filings in UP/SP, including a copy of the Verified Statement of Richard F. Kauders discussed infra, are included in AEPCO's Supp. Reb. Workpapers Vol. 1 pp. 00219A-00219BBB.

[3] BNSF also explained in UP/SP that the trackage rights fee calculation needed to include (1) a variable cost component relating to the tenant's operations, (2) a maintenance and operations component, which also encompassed taxes and assessment, and (3) a rental component, calculated at the pre-tax cost of capital. BN/SF Response, Public Version (BN/SF-55) filed April 29, 1996, Vol. II, Verified Statement of Christopher D. Kent and John C. Klick, at 34-38. Mr. Kauders referenced the same items at pp. 50-51 of his testimony.

The Board – and other parties – should be entitled to rely on statements that jurisdictional common carriers make to the Board, and carriers should be estopped from making assertions at odds with such prior representations. Defendants' past representations that the trackage rights fee is "entirely reasonable" are thus more than sufficient to rebut their present claim that the fee is somehow "plainly inadequate."

Otherwise, the Defendants' claims concerning the inadequacy of the trackage rights fee rest on the claim that the ACE's payments would suffice to cover the construction costs of only 12 miles of the Vaughn-El Paso segment. Supp. Reb. at III.B-6 & nn. 3 and 4. Defendants' analysis is irrelevant and meaningless as it ignores all of the other traffic that moves over the segment. Defendants surely have access to abundant information concerning the other traffic that traverses the segment, and their failure to even attempt to take that traffic into account renders their pseudo-analysis worthless.

Third, Defendants' claims that AEPCO could never demonstrate that a usage fee satisfies the objective of the SAC test are also rebutted by Defendants' prior statements. Specifically, in its UP/SP merger testimony, UP showed how its derivation of the 8.32 and 9.05 mills figures referenced in the November 2003 Decision suffices to overcome the substantive SAC concerns noted in Defendants' Supp. Reply and in the November 2003 Decision (which is presumably the reason that the Board referenced the figures in its decision). Richard F. Kauders, UP's then-Manager of Economics Research, developed and presented the figures in his Rebuttal Verified Statement in the UP/SP

merger, for purposes of defending the reasonableness of lower BNSF/UP trackage rights fees virtually identical to the 3.2 mills that Defendants criticize.[4]

In footnote 34 at p. 59 of his testimony, Mr. Kauders stated that "[t]he annuity method [which yields the 8.32 mills figure] is very similar to the discounted cash flow ('DCF') technique used in stand-alone rate cases." He further explained that the SAC steps are rearranged in the annuity calculation because the objective is "to identify the correct amount of revenue," whereas the purpose of the SAC DCF analysis is to compare the revenue stream and costs.

Mr. Kauders's testimony at pp. 59-60 further explained that in the annuity calculation, "an engineering study is used to calculate the cost of replacing the lines," and "[a]n annual rental amount is then determined by calculating an annuity that takes into account the return on investment required by investors (the railroads' cost of capital), depreciation, income taxes, and the value of the lines at the end of the annuity period." While Mr. Kauders did not include operating and maintenance costs in his annuity calculation (although he did include a 10% mark-up for engineering and contingencies), he noted both that the facilities would be new and would need little initial maintenance, and that his calculation of the cost of the facilities reflected upgrades (concrete bridges and CTC) that would lower the operating and maintenance costs. Kauders Reb. V.S. at

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[4] UP/SP Applicants' Rebuttal, Public Version (UP-SP231), supra, Vol. 2, Part A, at Tab 12. Mr. Kauders's testimony is reproduced beginning at p. 00219A of Volume 1 of AEPCO's Supp. Reb. Workpapers.

61-64. Moreover, Mr. Kauders's alternate replacement-cost-new-less-depreciation calculation (the 9.05 mills figure cited by Defendants) included UP/SP system-average operating and maintenance expenses at 0.86 mills per gross ton-mile (id. at 70). Accordingly, the 9.05 mills figure identified in the November 2003 Decision does "take into account the full costs of providing and maintaining the physical plant needed to serve the traffic--costs which the joint-rate defendants collectively must bear" and thus enables 'the SAC test [to] ... serve its purpose," thus comporting with the standard set by the November 2003 Decision.

In short, not only would it be possible for AEPCO to demonstrate that "a" usage fee satisfies the objectives of the SAC test, but Defendants did actually make a demonstration in the context of the UP/SP merger filings that the 8.32 and 9.05 mills figures do satisfy the SAC test.

Fourth, the prior derivation of the 8.32 and 9.05 mills figures also suffices to overcome Defendants' claims that they are incapable of developing a usage fee that would satisfy the purposes of the SAC test. Not only could Defendants do so, they actually did so. Since the Defendants had already done so, the Board was plainly entitled to assign them the burden of showing that the 3.2 mills trackage right fee utilized by AEPCO was too low (assuming that AEPCO elected, as it did, to rest on its prior Rebuttal

as its case-in-chief) and what would be a more appropriate trackage rights fee.[5] In particular, to the extent that Defendants wanted to assert that there were any shortcomings or limitations in the earlier analysis that derived the 8.32 and 9.05 figures, they were plainly in a position to do so, especially as it was their analysis that produced the figures in the first place.[6]

Fifth, Defendants' assertion that they adopted the 9.05 mills figure in their SAC analysis ("solely for purposes of completing a DCF analysis" or otherwise), Supp. Reply at III.B-10 to 11, III.D-153, is also erroneous. In fact, BNSF/UP's actual calculations (e.g., Supp. Reply Exhibit III-H-1, Table K, line 11) appear to utilize the same 3.2 mills figure that AEPCO used on Opening and in its original Rebuttal.

Since Defendants' Supplemental Reply calculations use the same 3.2 mills per gross ton-mile trackage rights fee that AEPCO utilized in its Opening and original Rebuttal Evidence, AEPCO continues to believe that use of that figure is correct. Accordingly, AEPCO's "base" calculations in its Supplemental Rebuttal DCF Analysis continue to use that figure. Moreover, AEPCO continues to believe that to preclude it

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[5] Notwithstanding Defendants' protestations to the contrary, very rarely do defendant carriers refrain from offering specific cost figures in their criticisms of cost calculations submitted by shippers in stand-alone rate cases.

[6] In light of the prior delays in this proceeding, much of which stemmed from dispute over the trackage rights, the Board was also entitled to modify the normal allocations of the burdens of going forward and responding on this particular issue. The Board was certainly entitled to find that AEPCO had already met its initial burden of going forward, especially in light of the Board's prior decisions in the case, and the Board is also free to revise the allocation of procedural burdens in a particular instance.

from using the same trackage rights fee specified in UP's existing agreement constitutes an impermissible entry barrier, e.g., Nevada Power I, 6 I.C.C.2d at 54, especially in light of the Board's prior ruling that AEPCO is precluded from combining traffic of both defendants across a particular segment.

However, in the interests of prudence and caution, AEPCO has also calculated that the additional costs resulting from calculating the annual trackage rights fee at 8.32 mills and 9.05 mills would be $4.3 million and $4.7 million, respectively, assuming that the ACE's Vaughn-El Paso traffic equates to 517 million gross ton-miles in 2001.[7] As noted in Part III-H infra, AEPCO has not submitted separate DCF calculations to reflect these figures, but modifying the electronic workpapers to reflect these values is a relatively simple matter. Moreover, making the changes results in very little change in the ultimate stand-alone relief, i.e., the resulting SAC rate level is five cents to six cents higher, and still below the jurisdictional threshold.

2. Track Miles and Weight of Track

As noted in AEPCO's original Rebuttal Evidence, AEPCO's operating and engineering experts developed track configurations and traffic-control systems for the two east-west portions of the ACE system (Defiance-Vaughn and El Paso-Cochise) that

[7] Using AEPCO Op. electronic workpaper "AEPCO Operating Expenses.123," the trackage rights fees for 2001 equal $1,655,335 based on 3.2 mills per gross ton-mile. Adjusted values are based on the applicable trackage rights fee and 517,729,166 gross ton-miles.

virtually replicate the existing BNSF and UP facilities. They also developed yard and other facilities needed to interchange cross-over traffic with the residual incumbents, fuel and service locomotives, repair cars, perform required car inspections and maintenance-of-way, and house the ACE's line operations, maintenance and supervisory personnel.

For the most part, the Defendants have accepted AEPCO's proposed track configuration and weight of track (rail) for the ACE as adequate to support its peak-period traffic.[8] Indeed, Defendants could hardly do otherwise given that AEPCO's experts replicated Defendants' existing configurations – and even enhanced slightly the present BNSF track configuration on ACE's busiest line between Vaughn and Defiance. However, Defendants have proposed a few main-track additions primarily to accommodate the residual incumbents' off-SARR operations at two of the principal interchange points for cross-over traffic (Vaughn and El Paso). These additions include a total of 12.22 miles of additional second main track/passing sidings, as described below (together with AEPCO's response).

a. <u>Defiance-Vaughn</u>

There are three areas between Defiance and Vaughn where the ACE's second main track is not parallel (adjacent) to the first main track. On Opening, AEPCO included 35.13 miles in total for these three sections of the Defiance-Vaughn line

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[8] The Defendants have also accepted the ACE's track specifications, train speeds and most elements of its traffic control (signal) and communications system. <u>See</u> Supp. Reply at III.B-2 and III.B-27 to 28.

segment.[9] In their Supplemental Reply Defendants included 37.91 miles in total for these three sections.[10] In this Supplemental Rebuttal, AEPCO has accepted Defendants' 37.91 miles for the total length of the non-parallel second main track between Defiance and Vaughn.

Defendants also propose to add a total of 7.84 miles of second main track to the portion of the replicated BNSF Clovis Subdivision between Belen and Vaughn, as well as 2.63 miles of second main track immediately east of Vaughn (i.e., on the residual BNSF itself and off the ACE system altogether), for a total proposed addition of 10.47 track miles. See Supp. Reply at III.B-3 to 4 and accompanying electronic workpaper file "III F Track Mile Reconciliation.xls." The additions include:

- MP 878.00 to MP 876.83 – 1.17-mile extension of passing siding/ addition of second main track at west end of Abo Canyon.
- MP 797.80 to MP 791.13 – 6.67-mile section of new second main track from west of Vaughn Yard through the yard to the east end of the ACE's Defiance-Vaughn line.
- MP 791.13 to MP 788.50 – 2.63-mile eastward extension of the double track described immediately above, all on the presently-single track residual BNSF line east of the easterly terminus of the ACE's line at Vaughn.

Upon review of the Defendants' evidence with respect to these proposed additions, AEPCO's expert rail operations witness, Frederic Yocum, accepts one of the

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[9] See Op. Workpapers Vol. 8, pp. 04494-04502.

[10] See Supp. Reply electronic workpaper "III F Track.xls," Tab "Track Data," lines 8, 11 and 23.

Defendants' proposed additions: the proposal to extend the existing passing siding that ends at Milepost 876.83 (near the west end of Abo Canyon) 1.17 miles further west.[11] Unlike BNSF, the ACE operates a few loaded AEPCO and other coal trains eastward from Belen to Vaughn. As Defendants' witness Wheeler has pointed out (Supp. Reply at III.B-3), these coal trains have to ascend a grade in this area, and the extended siding would assist in assuring that these trains do not delay high-priority trains containing non-coal traffic. (Mr. Yocum notes, however, that the likelihood that loaded coal trains would delay high-priority trains is remote. During the peak week studied for purposes of evaluating the ACE's capacity, only two loaded coal trains operate over this portion of the Clovis Subdivision – or one train every four days.)[12]

Mr. Yocum disagrees with the other two proposed track additions on the Clovis Subdivision. The proposed second main track between MP 797.80 and MP 991.13 represents a 6.67-mile easterly extension of a section of ACE second main track that presently ends at MP 797.80 (see page 13 of AEPCO Exhibit III-B-1). The avowed purpose for adding this 6.67-mile of second main track is to "provide efficient and simultaneous movement of trains into and through the [Vaughn] yard, and [] to provide

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[11] The ACE passing siding is shown on page 9 of AEPCO's Exhibit III-B-2 and extends from MP 876.83 to MP 875.03. Extending this siding 1.17 miles further west, to MP 178.00, would convert it into a 2.97-mile section of double track. The extension is shown on page 9 of Supp. Reb. Exhibit III-B-4.

[12] See AEPCO Op. electronic workpaper file "Peakweek_AEPCO.xls," level "Coal Trains BNSF" – coal trains between September 12 and September 18.

access to the double lead tracks from either mainline track adjacent to the yard." Supp. Reply at III.B-18. This statement is puzzling since the double-track would extend 3.6 miles to the west of Milepost 794.2 which is the westerly end of Vaughn Yard.[13] There is no rational reason why double track would need to be extended 3.6 miles merely to "provide access to" a yard lead track.[14]

Mr. Yocum's configuration already includes a 2.2-mile section of second main track between Mileposts 793.89 and 791.69. AEPCO's modeling of the ACE's peak-period operations confirms the fluidity of the operations in this area with the track configuration Mr. Yocum designed on Opening. Thus, there is no need for extension of this double-track segment in either direction.

With respect to capacity modeling, Mr. Yocum points to the following statement by the Defendants at Supp. Reply III.B-3: "Since ACE's expected traffic volume is similar to current traffic volumes on the defendants' lines, the defendants have not conducted a detailed capacity analysis." In other words, unlike AEPCO, the Defendants have not performed capacity modeling of the ACE configuration or undertaken any other objective analysis of its adequacy to accommodate the railroad's peak-period traffic efficiently.

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[13] See AEPCO Op. Exhibit III-B-1 at 13a and Supp. Reply Exhibit III.B-2.

[14] See III-B-20 to 21, infra, for a discussion of the Vaughn Yard lead tracks. As Defendants acknowledge (Supp. Reply at III.B-17), AEPCO's design for the Vaughn Yard includes double lead tracks at the west end of the yard.

The final mainline capacity addition on the Clovis Subdivision involves the installation of 2.63 miles of second main track east of Vaughn. The ACE should not be required to install and pay for additional main track off the SARR system altogether – even if Defendants had demonstrated that the additional track is needed (which they have not).

A SARR has never been (and should not now be) required to pay for changes in the residual incumbent's facilities or operations resulting from the handling of cross-over traffic where, as here, there is no change in routing for the traffic. See AEPCO Reb. at III-C-8 to 11. For the same reasons, it would be inconsistent with SAC principles to require AEPCO to pay for a capacity enhancement on the residual BNSF east of Vaughn. In any event, as explained at III-C-2 to 6, infra, the cost of the second main track east of Vaughn (as well as the other off-SARR increased operating costs allegedly incurred by BNSF) is more than offset by savings in BNSF crew costs resulting from insertion of the ACE as an overhead carrier for non-coal traffic moving between Defiance and Vaughn. Thus, if the Board were to conclude that the SARR is to be burdened with such off-system costs, it should receive the benefit of the more-than-offsetting savings.

Defendants' explanation for the track addition east of Vaughn is as follows:

> In order to provide adequate and simultaneous access to ACE's Vaughn Yard for interchange to BNSF, defendants also provided a second mainline on BNSF extending to the east

between Mileposts 791.13 and 788.5 to connect with the existing double track on the residual BNSF.[12]

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[12] Although BNSF currently has single track at this location, it does not have a yard and the resulting congestion of slow moving trains while entering and departing the newly-created Vaughn Yard. The double tracking is required at this location on the ACE line to provide efficient access to the yard added by AEPCO at Vaughn.

Supp. Reply at III.B-18. Other than this generalized opinion testimony – which, again, is not backed up by any operational modeling or other objective study of BNSF's operations involving the interchange of traffic with the ACE at Vaughn – BNSF has not presented any evidence to support its unusual thesis that double track is required at a location where it presently has single track merely to allow trains to enter and depart a yard.

b. El Paso-Cochise

It is difficult to parse the Defendants' Supp. Reply in terms of exactly what they propose for additional main track on the portion of UP's Lordsburg Subdivision between El Paso and Cochise being replicated by the ACE. It appears that Defendants propose to add 1.75 miles of additional main track through the ACE's El Paso Yard, between Mileposts 1292.82 and 1291.07 See Supp. Reply Exhibit III.B-4 and electronic workpaper file "III F Track Mile Reconciliation.xls."[15] However, at Supp. Reply at III.B-24, Defendants state that they have added only a crossover to facilitate the movement of

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[15] Defendants provide no explanation as to why this additional main track is needed.

trains between Tracks 1 and 2. AEPCO is unsure where this "added" crossover is supposed to be located as both AEPCO's and Defendants' track diagrams for the El Paso Yard show crossovers at Milepost 1292.94 and Milepost 1290.96. See AEPCO Op. Exhibit III-B-1, page 15a and Supp. Reply Exhibit III.B-4.

It appears that Defendants may be confused with respect to the ACE track configuration in the vicinity of the El Paso Yard. AEPCO provided two main tracks around the yard, one on each side of the yard. These main tracks are shown as dashed lines in blue color on the yard schematic (page 15a of AEPCO Op. Exhibit III-B-1). Based on Defendants's yard diagram (Supp. Reply Exhibit III.B-4), it appears that Defendants have either added a second main track on the north side of the yard (the bottom of the page) and treated the southernmost track in AEPCO's configuration (at the top of the page) as a yard track, or relocated the main track on the south side of the yard to the north side.

Notwithstanding the uncertainty as to exactly what Defendants intended, AEPCO's witness Yocum does not believe that any changes in the main tracks through the El Paso Yard are necessary. Two main tracks are already provided at this location, with crossovers between them at both ends of the yard. AEPCO's modeling of the ACE's peak-week operations indicates that this configuration permits the ACE to handle all traffic moving through El Paso efficiently – and the configuration is being enhanced by

the addition of a lead track at the west end of the yard, as proposed by Defendants. See p. III-B-34, infra.

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In summary, the Defendants apparently have proposed to add a total of 12.22 miles of additional main track to the ACE's configuration, including both the Defiance-Vaughn and Vaughn-El Paso main lines. However, due to other adjustments to the ACE's mainline track configuration, which again are not explained in detail, it appears that Defendants have posited a net reduction of 2.11 mainline track miles. See Supp. Reply at III.B-3, Table III.B.1.[16] If the Board accepts AEPCO's position that only the 1.17 miles of second main track on the Clovis Subdivision at the west end of Abo Canyon should be added, the result should be an additional reduction of 9.30 track miles on the Clovis Subdivision and 1.75 miles on the Lordsburg Subdivision, or a total reduction of 11.05 track miles. This increases the net reduction posited by the Defendants from 2.11 to 13.16 mainline track miles.

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[15] On Opening, AEPCO's engineering experts made a minor upward adjustment to the main track miles to reflect the fact that the miles shown in the track diagrams (Exhibit III-B-2) did not accurately reflect the ACE's route-miles (this affected primarily the track-mile total for "Main Track 1"). The Defendants appear to have removed this adjustment, then added the miles back in at the appropriate locations. See Supp. Reply electronic workpaper file "III F Track Mile Reconciliation.xls." Defendants then added the main-track enhancements described in the text.

c. Yards

The ACE has six yards, including small yards at Defiance, Dalies, Belen and Cochise and larger yards at Vaughn and El Paso. The Defendants have accepted AEPCO's proposed configuration for the Dalies, Belen and Cochise Yards (see Supp. Reply at III.B-21), but propose modifications to the other three yards. The net result is that Defendants propose to add 6.75 miles of additional yard tracks to the 44.16 yard track-miles proposed by AEPCO. See Supp. Reply at III.B-2, Table III.B-1.

AEPCO herein addresses each of the three disputed yards (Defiance, Vaughn and El Paso) in turn.

i. Defiance Yard

The Defendants propose to add four 4,000-foot car storage tracks immediately adjacent to the Defiance Yard. See Supp. Reply at III.B-20. Otherwise, Defendants have no quarrel with the Defiance Yard as configured by AEPCO.

The proposal to add four storage tracks at Defiance Yard is grounded on changes in the residual BNSF's operations allegedly required to perform switching of cars into and out of trains that presently occurs at BNSF's Belen Yard. Id.[17] However, as AEPCO noted in AEPCO Reb. at III-A-19 to 22 and III-C-12 to 16, where it addressed this subject, a SARR should not have to pay the costs for traffic it does not handle. As

[17] For the same reason, Defendants also propose to add four similar tracks adjacent to the ACE's Vaughn Yard. AEPCO's response is the same with respect to the storage-track additions at both yards.

noted supra and in AEPCO Reb. at III-C-8 to 11, a SARR is a replacement for rather than a competitor of the residual incumbent. Therefore, absent a change in routing for the issue traffic (which is not involved here), the ACE should not be required to pay for changes in the residual incumbent's facilities or operations resulting from the handling of cross-over traffic.

If the Board were to determine (improperly) that the ACE should pay for such additional storage tracks, then the Board should also consider the significant savings in crew costs BNSF would realize from the ACE's existence and deduct those costs from the ACE's annual operating expenses. See III-C-2 to 6, infra.

ii. Vaughn Yard

Vaughn Yard is the ACE's principal yard. The functions to be performed at Vaughn Yard include car inspections; locomotive fueling, servicing, inspections and maintenance; railcar repairs; and the insertion of spare/repaired railcars into trains. AEPCO's operating and engineering experts configured the Vaughn Yard to enable these functions to be performed quickly and efficiently.

Although the Defendants have accepted the basic configuration of and functions to be performed at the Vaughn Yard, they have proposed several changes to the yard configuration and facilities (in addition to the addition of four railcar storage tracks, discussed previously). These include:

- Construction of additional facilities to enable the ACE to dispense diesel fuel transported from Belen to Vaughn in tank cars, including unloading facilities and additional storage facilities (Supp. Reply at III.B-13 to 15).[18]

- Widening of the space between track centers from 15 feet to 30 feet between two pairs of the yard relay/inspection tracks (id. at III.B-16).

- Installation of two additional sets of double fuel racks, thus bringing the total to six sets instead of the four proposed by AEPCO (id. at III.B-16 to 17.

- Installation of a second lead track at the east end of the yard, thus providing for double leads at both ends of the yard (id. at III.B-17).

- Relocation of the wye track from AEPCO's proposed location near the west end of the yard (see AEPCO Op. Exhibit III-B-2 at p. 13a) to a location east of the car repair facility (Supp. Reply at III.B-18 and Exhibit III.B-2).

- Provision of 4,000 feet of trackage for storage of bad-order, repaired and spare railcars cars (Supp. Reply at III.B-19).

- Addition of a running track between the locomotive shop and either end of the yard (id. at III.B-19 to 20).[19]

AEPCO's experts accept three of the seven Vaughn Yard changes proposed by Defendants, namely: (1) the addition of a second lead track at the east end of the yard (which would facilitate the movement of cross-over trains to and from the residual BNSF

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[13] In addition, Defendants propose to add facilities to BNSF's Belen Yard to load fuel from storage tanks into tank cars for transportation to Vaughn. Id at III.B-14.

[19] Defendants also propose either the addition of another main track through the Vaughn Yard area or the construction of an additional crossover between the two main tracks provided by AEPCO. This proposal was discussed earlier in connection with the ACE's mainline track miles; see pp. III-B-12 to 15, supra.

and local trains to and from El Paso/Cochise); (2) increasing the distance between track centers for two pairs of relay/inspection tracks; and (3) relocating the wye track from the west end of the yard to a location east of the car repair facility. The other four changes represent unnecessary "gold-plating" of this yard.

Fuel transport facilities. The Defendants' assertion that the ACE must construct facility additions at Vaughn (and Belen) to enable the transport and dispensing of fuel moved from Belen to Vaughn in tank cars is grounded on the fact that a petroleum products pipeline serves BNSF's Belen Yard (where large numbers of locomotives are presently fueled) but not Vaughn, which is "in the middle of nowhere." Supp. Reply at III.B-13 to 14. Thus, according to Defendants, fuel must be transported from Belen to Vaughn in tank cars and additional facilities installed at both locations to accommodate the handling of the tank-car movements and the storage/dispensing of fuel.[20]

Defendants' argument is misplaced both in terms of what would occur in the real world if the ACE were actually built and as a matter of SAC principles.

The Defendants' assertions concerning the need to deliver diesel to Vaughn in tank cars are wrong. Materials produced by Defendants in response to a supplemental workpaper request by AEPCO indicate that, in fact, an existing petroleum products pipeline comes within 30 miles of Vaughn. See Supp. Reb. Workpapers Vol. 1, pp.

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[20] As discussed in Part III-D-1-d, infra, Defendants would also require the ACE to pay a hefty fee to the residual BNSF for moving the tank cars.

00205-213 and electronic workpaper file "Pipeline_001.pdf." AEPCO asked George L. Donkin, an expert in pipeline economics, to evaluate: (1) whether a pipeline lateral or spur could economically be constructed between a connection with this pipeline and the ACE's Vaughn Yard, and (2) the cost to the ACE of acquiring diesel fuel delivered by such a pipeline. Mr. Donkin's evaluation is as follows.

According to Defendants, the ACE would need to take delivery of an average of 485,000 gallons of diesel fuel per day at its Vaughn Yard (Supp. Reply at III.B-13). This translates to 177.025 million gallons per year. The most cost-effective way of transporting such a large quantity of diesel fuel daily to the ACE's Vaughn Yard is by pipeline. In particular, it would be significantly less costly to deliver diesel fuel to Vaughn via the existing pipeline, including a new, 30-mile, eight-inch diameter pipeline supply lateral, than it would be to deliver diesel fuel first by pipeline to BNSF's Belen Yard, and then by tank car from Belen to Vaughn.

The existing pipeline transports petroleum products in an east-to-west direction along Interstate U.S. Highway 40 in New Mexico. It is located approximately 30 miles to the north of Vaughn. The area between a point of connection with this pipeline and the ACE's Vaughn Yard (located more than a mile west of the town of Vaughn) is rural, largely uninhabited, and has no significant creeks, streams or other waterways that would have to be crossed.

As a matter of both economic theory and pipeline design economics, a totally new, least-cost pipeline delivery system would serve the diesel fuel markets at BNSF's Belen Yard and at the ACE's Vaughn Yard at approximately the same transportation cost per gallon. This is because the location and the quantity requirements of the BNSF and the ACE loads would be taken into account in designing a new pipeline to meet both markets on a least-cost basis. To the extent a cost advantage might exist under a totally-new-pipeline system scenario, such a cost advantage most likely would be enjoyed by the ACE's Vaughn Yard, inasmuch as it is located about 80 miles closer to the low-cost diesel fuel supply areas east of Belen and Vaughn, in Texas and Oklahoma.

Serving the ACE diesel fuel demand at Vaughn via the pipeline as currently located north of Vaughn would require a new, 30-mile, eight-inch diameter pipeline supply lateral from the existing pipeline to the ACE's Vaughn Yard. The capital costs of constructing the new pipeline supply lateral, including material, labor, right-of-way, surveying, engineering, overheads, carrying costs during construction and miscellaneous fees, would range between $160,000 per mile and $240,000 per mile, at 2001 cost levels. The mid-point of that range is $200,000 per mile. Because most of the route of the new pipeline supply lateral passes through an uninhabited area, the cost of constructing it would likely be at or below the mid-point of that range.

Supp. Reb. Exhibit III-B-5 presents three estimates of the annual costs of pipeline delivery service at the ACE's Vaughn Yard. Each of these three estimates is

based on the assumption that the existing pipeline north of Vaughn was not also supplying BNSF's Vaughn Yard in 2001.[21] Therefore, this scenario assumes that the ACE's Vaughn Yard diesel fuel load represents a new or incremental market demand on the existing pipeline. The calculations presented in Exhibit III-B-5 use as a point of departure the actual 2001 calendar year operations and costs of Valero Logistics Operations, LP ("Valero Pipeline"), as reported in Valero Pipeline's 2001 FERC Form 6 Annual Report. Valero Pipeline was selected for this purpose because it transports petroleum products to the Albuquerque area from supply areas in Texas and Oklahoma along the I-40 corridor, 30 miles north of Vaughn. Valero Pipeline's actual 2001 cost of service data was then adjusted to reflect the incremental costs Valero Pipeline would have incurred to build a new, 30-mile, eight-inch diameter pipeline supply lateral to serve ACE's Vaughn Yard diesel fuel requirements.

The analysis in Exhibit III-B-5 shows a range of outcomes, based on a range of pipeline construction costs that varies between $160,000 per mile on the low end and $240,000 per mile on the high end.[22] As shown, in each of the three pipeline construction cost scenarios, Valero Pipeline's adjusted cost of service after building the new pipeline supply lateral goes up, but its average cost of service per gallon of

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[21] Although requested to do so in a supplemental workpaper request by AEPCO, BNSF did not identify the source of the diesel fuel delivered to its Belen Yard or the pipeline used to transport it.

[22] The total cost of constructing the new 30-mile Vaughn lateral is shown in line 6, entitled "Rate Base."

throughput declines. This result occurs because the additional throughput at Vaughn would more than offset the additional cost that Valero Pipeline would incur to serve the new demand.

Supp. Reb. Exhibit III-B-6 is similar to Exhibit III-B-5, except in preparing this exhibit it was assumed that BNSF's diesel fuel requirements at its Belen Yard also were met by pipeline service from Valero Pipeline in 2001. Under this approach, the new diesel fuel demand at the ACE's Vaughn Yard would have displaced an equivalent volume of the BNSF diesel fuel demand at Belen. Accordingly, Valero Pipeline's 2001 total cost of service and its average cost of service per gallon of throughput after building a new supply lateral to serve the Vaughn Yard would have been somewhat higher.

As shown in both Exhibit III-B-5 and Exhibit III-B-6, Valero Pipeline's actual average cost of service in 2001 was $0.0105 per gallon of throughput. If the ACE's Vaughn Yard diesel fuel requirement of 177.025 million gallons per year would have been a new or incremental load for the Valero Pipeline system, then a cost-based transportation charge for the diesel fuel delivered by Valero Pipeline at Vaughn in 2001 would have been equal to or below the cost of diesel fuel delivered by Valero Pipeline elsewhere in New Mexico, including deliveries in the Albuquerque/Belen area.

If Valero Pipeline was already serving that same diesel fuel market at BNSF's Belen Yard, then building a new pipeline supply lateral would have resulted in an increase in total costs, without a corresponding increase in pipeline throughput. As is

shown in Exhibit III-B-6, the resulting increase in Valero Pipeline's average total cost of service would have been about $0.0002 per gallon. If that increase were shared by the ACE and Valero Pipeline's other customers, including BNSF at its Belen Yard, then Valero Pipeline's delivered cost of diesel fuel at both Belen and at Vaughn would have been about the same. On the other hand, if Valero Pipeline would have directly assigned the costs of building the new pipeline lateral to the ACE's Vaughn Yard service, then the charge for that service would have been higher than the charge for diesel fuel delivered elsewhere in New Mexico, including service at BNSF's Belen Yard. Depending on the actual cost per mile to build a new pipeline supply lateral to Vaughn, the amount of that additional charge would have ranged between a low of $0.0045 per gallon ($799,315 divided by 177.025 million gallons) and a high of $0.0068 per gallon ($1,198,973 divided by 177.025 million gallons). The mid-point of that range is $0.0056 per gallon.

Assuming the absolute worst-case, i.e., that the additional Valero Pipeline charge for delivering diesel fuel to Vaughn compared with delivering it to Belen is $0.0068 per gallon, the next step in the analysis is to determine whether the delivered cost of diesel fuel by pipeline at Vaughn is likely to be below BNSF's 2001 system-average cost of diesel fuel of $0.911 per gallon since that is the number assumed by AEPCO in its SAC presentation.

BNSF's system-average cost of diesel fuel in 2001 was derived from BNSF's diesel purchases at various locations throughout the BNSF system. These

locations included Long Beach/Los Angeles, Richmond/Oakland and Barstow, CA; Seattle, WA; Denver, CO; Chicago, IL; Minneapolis/St. Paul, MN; Fort Worth, TX; and Belen, NM.

For decades, the U.S. government has used Petroleum Administration for Defense Districts (PADD) in reporting petroleum industry data. New Mexico is part of the PADD 3 Gulf Coast supply area, which also includes Alabama, Arkansas, Louisiana, Mississippi and Texas. Diesel fuel prices in the PADD 3 Gulf Coast supply area are almost always significantly lower than diesel fuel prices in most other supply areas. This is especially so with respect to diesel fuel price differentials for the Gulf Coast and California supply areas. For example, as reported by the U.S. Department of Energy's Energy Information Administration, in 2001 the average of the daily FOB spot prices of low-sulfur diesel fuel in the Gulf Coast area was $0.7097 per gallon, versus $0.7741 per gallon in Los Angeles, CA. Much larger retail price differentials often exist between the Gulf Coast area and West Coast markets for diesel fuel for on-highway usage, although a portion of those price differentials may be due to differences in state taxes. See Supp. Reb. electronic workpaper file "Donkin Workpapers.xls."

It is therefore highly unlikely that the total cost of diesel fuel delivered in 2001 to the ACE's Vaughn Yard (via the supply lateral described earlier) would have been below: (1) the prices of most if not all of the diesel fuel purchased by BNSF outside of New Mexico and Texas, and (2) BNSF's total system-wide average cost of diesel fuel.

This conclusion is valid whether or not the ACE diesel fuel requirements at Vaughn would have been new or incremental demand for the Valero Pipeline. This same conclusion is also valid for diesel fuel deliveries in 2001 to the ACE's yard at El Paso, TX, since the same relative economics apply with respect to El Paso versus other locations on the BNSF system (and the UP system as well).

The Defendants claim that it would have cost $0.045 per gallon to transport diesel fuel in 2001 from Belen to the ACE's Vaughn Yard (Supp. Reply at III.D-6). The cost of service calculations presented in Supp. Reb. Exhibits III-B-5 and III-B-6 show that, looking only at the transportation component, the first-year unit cost of a new pipeline supply lateral to deliver fuel directly by pipeline to the ACE's Vaughn Yard, instead of first shipping it by pipeline to Belen and then back to Vaughn by tank car, would have been less than $0.007 per gallon.[23] It is therefore clear that the cost of transporting diesel fuel in 2001 by pipeline, including the cost of a new, 30-mile pipeline supply lateral from the existing Valero pipeline to Vaughn, would have been significantly lower than Defendants' estimated cost of delivering fuel first by pipeline to Belen, and then back to Vaughn by tank car. The 2001 cost advantage for the "all pipeline"

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[23] This figure assumes a return of and on the capital invested in the new lateral and a component to reflect income taxes, but no incremental operation and maintenance (O&M) expenses. If Valero Pipeline would have incurred incremental O&M expenses in serving the ACE's Vaughn Yard, these incremental expenses would have been very small, and in no event above $0.005 per gallon.

transportation scenario would have been at least $0.033 per gallon ($0.45 minus $0.007 minus $0.005) and more likely closer to $0.039 per gallon ($0.045 minus $0.006).

When the relationship of total delivered diesel fuel prices in New Mexico to total diesel fuel prices in other regions where BNSF purchases substantial quantities of diesel fuel (such as Southern California) is factored in, the only logical conclusion is that the ACE would have had the ability to obtain diesel fuel at Vaughn in 2001 (and at El Paso) at a cost well below BNSF's 2001 system-average fuel cost.

* * * *

Not only are Defendants' assertions concerning the need to transport diesel fuel to Vaughn factually incorrect, they are also wrong as a matter of SAC theory. The stand-alone construct involves an assumption of unlimited availability of resources. See Coal Rate Guidelines, 1 I.C.C.2d at 528-29; West Texas Utilities, 1 S.T.B. at 668-70. Thus the hypothetical ACE must be presumed to have access to a sufficient supply of diesel fuel for the fueling of locomotives at Vaughn.

The bottom line is that the ACE does not need to provide additional facilities at either Vaughn or Belen for the transport of fuel to Vaughn in tank cars and its storage and delivery to the locomotive fueling facilities.

Additional fuel racks. AEPCO's experts provided for four sets of double fuel racks at Vaughn, with two sets to be located at each end of the yard. See AEPCO Exhibit III-B-1, page 13a. This permits fueling on four tracks simultaneously (two

eastbound, two westbound). The Defendants propose to add two more sets of double fuel racks, one at each end of the yard, and to relocate one of the sets provided by AEPCO.[24] The asserted reason for the additions is to enable fueling of the locomotives on four eastbound and four westbound trains simultaneously. See Supp. Reply at III.B-17.

There is no need for additional fuel racks beyond the four sets of double racks provided at Vaughn. AEPCO inadvertently located two sets of racks between each of the same two pairs of tracks (Tracks R1 and R2 and Tracks R6 and R7). However, there is no need for two sets of racks between the same pairs of tracks at both ends of the yard. The only ACE trains that require fueling at both ends of the train are its coal trains, as they are the only trains with a DP locomotive configuration (the ACE's non-coal trains have head-end power only). Only four loaded and two empty coal trains move through Vaughn during the 2001 peak eight-day period modeled by AEPCO's experts. On the infrequent occasions when the rear (DP) unit on a coal train needs to be fueled, this will be performed by tanker truck.

The proper location of the fuel racks at Vaughn is to have two pairs at the west end of the yard between two different sets of relay/inspection tracks (i.e., one set between Tracks R1 and R2 and one set between Tracks R3 and R4), and a similar configuration at the east end of the yard (i.e., one set between Tracks R5 and R6 and

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[24] Although AEPCO's experts do not believe the relocation is necessary, they have no objection to it.

another set between Tracks R7 and R8.[25] This enables up to eight trains (four in each direction) to be fueled simultaneously. Thus, there is no need for the additional fuel racks proposed by Defendants.

Additional railcar storage tracks. AEPCO's track configuration for the Vaughn Yard includes two rip tracks, totaling 7,871 feet in length, and four car storage tracks, totaling 6,674 feet in length. These tracks are used to repair bad-order cars removed from trains after the inspection process and to store repaired cars pending their insertion back into trains. The rip tracks can hold 149 cars (7871 ÷ 53') and the storage tracks can hold 126 cars (6,674 ÷ 53').[26] These tracks are more than ample to hold the 13 bad-ordered cars that would occur daily and the 35 spare cars that must be kept at Vaughn Yard, according to Defendants (Supp. Reply at III.B-19). In fact, AEPCO provides more track feet at Vaughn for these purposes than Defendants do. Thus, Defendants' apparent position that the ACE needs additional car repair/storage tracks at Vaughn makes no sense.

Additional running track. The Defendants propose to add a running track on the north side of Vaughn Yard "to provide access between the locomotive shop and either end of the yard to facilitate efficient movement of locomotives to and from the locomotive shop. . . [and to] provide access between the car shop, the car storage tracks,

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[25] The corrected locations for the fuel racks are shown on the revised schematic of the Vaughn Yard appearing on page 13a of Supp. Reb. Exhibit III-B-4.

[26] See Supp. Reb. electronic workpaper file "yard computations.xls."

the fuel unloading facilities and the wye track." Supp. Reply at III.B-20 to 21; see also Supp. Reply Exhibit III.B-2.

AEPCO witness Yocum disagrees that this running track is needed. He has agreed to Defendants' proposal to move the wye track from the west end of the yard to the location proposed by Defendants, just east of the railcar maintenance facility and the car storage tracks. Relocating the wye helps facilitate the movement of locomotives and cars and thus resolves the "problem" Defendants want to resolve by adding the running track. In addition, as previously explained, the ACE does not need fuel unloading facilities or storage/hold tracks for tank cars carrying diesel fuel, which reduces the need to accommodate the movement of cars in the yard.

iii. El Paso Yard

The ACE's El Paso Yard is shown in AEPCO Op. Exhibit III-B-1, page 15a. As with the Vaughn Yard, the Defendants have accepted AEPCO's basic configuration for the El Paso Yard as well as the functions to be performed there (primarily car inspections and locomotive fueling). Supp. Reply at III.B-22. However, Defendants have proposed the following changes at this yard:

- Addition of two short tracks to hold spare road locomotives and switch locomotives, with one track long enough to accommodate up to six units (Supp. Reply at III.B-22).
- Addition of one 500-foot track to store repaired cars pending their placement on outgoing trains (id. at III.B-23).

- Addition of a lead track at the west end of the yard, accompanied by reconfiguration of one set of turnouts (id. at III.B-23 to 24).

- Addition of a crossover between the two main tracks to enable eastbound train destined to UP points east of El Paso to cross back over from Main Track 1 (which provides access to the inspection/ fueling tracks) to Main Track 2 (id at. III.B-24).

- Addition of one double (two-track) set of fuel racks at the west end of the yard (id. at III.B-24-25).

- Addition of a small car repair facility (id. at III.B-26).

- Addition of a locomotive inspection pit where 92-day inspections can be performed (id. at III.B-26).

AEPCO's experts agree with four of the seven El Paso Yard changes proposed by Defendants, namely: (1), (2) the addition of a track to hold/store locomotives and repaired cars; (3) the addition of one lead track, at the west end of the yard; and (4) the addition of a small car repair facility for use by the car-repair contractor. The other three additions are unnecessary. The changes that AEPCO has agreed to are shown in the revised schematic of the El Paso Yard on page 15a of Exhibit III-B-4.

Locomotive/car hold tracks. Defendants propose three separate, short tracks for these functions: two tracks for locomotives and one for the storage of railcars. The longest of the three tracks would be 500 feet. See Supp. Reply at III.B-22 to 23. While agreeing that a similar amount of additional trackage should be added at El Paso Yard, rather than having three short tracks, AEPCO's experts have consolidated them into one longer track, which would connect the two present double-ended tracks at either end

of the yard, with an additional set of crossovers provided to facilitate the movement of locomotives and cars to other parts of the yards. This avoids having to widen El Paso Yard unnecessarily. The new, extended track is shown in Exhibit III-B-4, page 15a.

Lead track. Although he is not convinced that it is absolutely necessary, AEPCO witness Yocum has agreed to the addition of a 6,000-foot lead track at the west end of the El Paso Yard as it would facilitate the movement of ACE trains between the main line and the yard relay/inspection tracks as well as switching activity in the westerly portion of the yard (where the bad-order/repaired/spare railcar storage tracks are located). A lead track is not needed at the east end of the yard. Although Defendants assert that an eastern yard lead track would be desirable, they have not included such a track in their reconfiguration of the yard. See Supp. Reply at III.B-23 to 24 and Exhibit III.B-4.

Main-track crossover. As indicated earlier in the discussion of the Defendants' proposed mainline track additions, it is not clear from the Supp. Reply narrative or exhibits where the Defendants propose to relocate the proposed additional crossover between the two main tracks at El Paso Yard. Defendants' yard diagram (Supp. Reply Exhibit III.B-4), like AEPCO's (Op. Exhibit III-B-1, page 15a), shows two crossovers, one at Milepost 1292.94 and the second at Milepost 1290.96. A third crossover is not shown in Defendants' diagram. Moreover, as indicated previously, Defendants appear to be unaware that AEPCO's configuration for the El Paso Yard places one main track on each side of the yard.

In any event, Defendants' avowed reason for installing an additional mainline crossover (to facilitate the movement through the yard of eastbound non-coal trains destined to UP points east of El Paso) makes no sense. Crossovers already exist at both ends of the yard, to facilitate movements in both directions between both main tracks and the yard tracks. Eastbound trains destined for the UP have ample room to "bypass other ACE trains that are stopped in the yard for fueling and inspection" (Supp. Reply at III.B-24), either on one of the yard relay tracks or on one of the two main tracks. As the Defendants themselves note (id. at III.B-21), eastbound cross-over trains will be delivered to UP at UP's El Paso yard, and thus do not have to stop in the ACE's yard at all.

Additional double fuel rack. Defendants want to add another set of fuel racks at El Paso because the ACE allegedly needs fueling capacity on four tracks rather than two so that more than two trains at a time can be fueled at a time, thus enabling the ACE "to fuel all westbound trains without incurring significant delays" (id. at III.B-25). (Eastbound trains are fueled by UP.) However, Defendants have not provided any empirical support for the proposition that significant train delays would occur absent an additional set of fuel racks.

Notwithstanding this failure of proof, two sets of double fuel racks are sufficient to accommodate up to four trains at a time if they are properly located. AEPCO's Opening schematic for El Paso Yard, Exhibit III-B-1 at p. 15a, shows one set of double fuel racks between the same pair of tracks (shown in green color, at either end

of the yard). This placement is incorrect; the set near the east end of the yard (the left side of the schematic) should have been placed near the west end, between the pair of tracks shown in orange color.[27] This enables up to four westbound trains at a time to be fueled simultaneously, as Defendants suggest (eastbound trains are fueled at UP's El Paso yard). A total of only two westbound loaded coal trains move through El Paso Yard during the peak eight-day period modeled by AEPCO's experts. As in the case of Vaughn Yard, the rear DP unit on these infrequent coal trains would be fueled by tanker truck. Thus, there is no need for additional fuel racks beyond the two sets of double racks provided in AEPCO's original El Paso Yard configuration.

Locomotive inspection pit. Under the theory that the ACE must perform 92-day inspections of its locomotives at El Paso, Defendants propose the addition of a locomotive inspection pit at El Paso Yard. This facility is unnecessary. As AEPCO witness Yocum indicated on Opening, all of the ACE's locomotives are inspected and maintained at Vaughn. Locomotives on the overhead trains operating between El Paso and Cochise will be exchanged with locomotives on the ACE's coal trains (which operate through both Vaughn and El Paso) as necessary to cycle them through the Vaughn locomotive shop. AEPCO Op. at III-D-1 to 2.

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[27] The correct placement of the fuel racks is shown on the revised schematic of the El Paso Yard on page 15a of Supp. Reb. Exhibit III-B-4.

Defendants dispute the ACE's ability to cycle its locomotives on the Vaughn-El Paso overhead trains through Vaughn for inspections and maintenance because (1) AEPCO operates only 100 coal trains a year through El Paso (or about one every three days), and (2) AEPCO has not allowed any dwell time at El Paso for its empty coal trains to swap power with overhead trains. With respect to the first point, it is true that coal trains operate relatively infrequently between Vaughn and El Paso. However, under the horsepower-sharing arrangement assumed by AEPCO (without objection from Defendants) for run-through service on the non-coal overhead trains, UP will perform most of the locomotive inspections and maintenance on these long-haul trains and the ACE would supply locomotives to UP (including locomotives that have been inspected and serviced at Vaughn) for off-SARR use. With respect to the second point, locomotives would be swapped from westbound (loaded) coal trains, not empty coal trains. Westbound coal trains stop at El Paso for 1.25 hours for 1,000-mile inspections, fueling, etc. See AEPCO Op. at III-C-18 to 19.

* * * *

In summary, AEPCO has accepted three of the Defendants' seven proposed yard configuration changes at Vaughn and four of their seven proposed yard configuration changes at El Paso. The net result is to increase the ACE's yard track miles from 44.16 (as proposed on Opening) to 46.83, or an increase of 2.67 track miles. See Supp. Reb. electronic workpaper file "yard computations.xls."

d. Other tracks

On Opening, AEPCO provided for two sets of double-ended setout tracks, each 860 feet long (thus providing 600 feet of clearance), at each mainline FED with one setout track located on each side of the detector. As noted at page III-F-126, infra, the ACE has a total of 25 FEDs, and a total of 66 setout tracks are provided (two are provided at double-track locations) with spacing at intervals of approximately every 25 miles.

The Defendants contend that some of the ACE's setout tracks need to be longer to accommodate maintenance-of-way equipment. They propose a 2,000-foot MOW setout track every 20-25 miles along the route, essentially extending approximately every other setout track from 860 to 2,000 feet. See Supp. Reb. at III.B-11, referencing Supp. Reb. III.F-95.

There is absolutely no reason why the ACE needs an extra 13,680 feet (2.6 miles) of setout track to accommodate work train or other MOW equipment. For programmed MOW work, the contractor(s) will provide equipment. This equipment requires only temporary storage when a track program is in progress, which can be accommodated in a yard, an interchange point, passing siding or setout track depending on the particular location involved.

AEPCO's setout-track total provides 2,400 feet (in the clear) of setout track every 25 miles in double-track territory and 1,200 feet of setout track every 25 miles in single-track territory. In most instances, this is more track space than Defendants state is

required (2,000 feet, or 1,860 feet in the clear, for every other setout track). Although it is desirable to have a single track on which to store work-train equipment, such equipment can be set out on more than one setout track at a time. The ACE's ability to do this is accommodated by the fact that its setout tracks are located either directly across from each other in double-track territory or within a few miles of each other in single-track territory (i.e., on either side of each FED).

A review of BNSF's and UP's track charts for the lines being replicated indicate that their own setout tracks are not consistent with the recommended lengths and spacing they advocate on Supplemental Reply.[28] Most of both carriers' setout tracks are between { } feet in length, and they are not evenly spaced in relation to the FED's. In fact, in double-track territory {

} Thus, it is obvious that BNSF and UP use yards and passing sidings as the primary storage sites for work equipment performing a track program.

In terms of routine "spot" maintenance, the ACE's work-train needs are limited to a few occasional cars of ballast (e.g., for surfacing a switch) or other material,

[28] The BNSF and UP track charts for the replicated lines are reproduced in AEPCO OP. Workpapers Vol. 7, pp. 03333-03526VV.

which would be moved by a single locomotive. Each of the ACE's setout tracks as configured by AEPCO can accommodate a locomotive and up to 10 standard-length cars, which is plenty of space to accommodate these short trains. All other ACE MOW equipment is hi-rail equipment that does not need to be stored on-track at all.

In short, Defendants have failed to demonstrate that the additional setout track-miles they propose are needed by the ACE.

III. C. OPERATING PLAN

The Defendants addressed certain aspects of the ACE's operating plan in their original Reply Evidence. Their principal discussion of the operating plan related to changes in the residual BNSF's and residual UP's operations (and operating costs) that might result from the ACE's handling of non-coal cross-over traffic in overhead service between Defiance and Vaughn and between El Paso and Cochise. AEPCO responded to these issues in its original Rebuttal Narrative at III-C-7 to 29. Defendants also briefly discussed the computerized string diagram analysis conducted by AEPCO to verify the ACE's capacity to accommodate its peak-period traffic and to develop certain operating statistics used in the DCF model to calculate the ACE's annual operating expenses. AEPCO responded to Defendants' comments on the string analysis at III-C-2 to 7 of its original Rebuttal Narrative.

In Part III-C of their Supplemental Reply Evidence, Defendants accept the ACE's operating plan as developed by AEPCO witness Yocum in most respects.[1] However, they re-argue the same two issues (and address a few additional issues related to rerouted coal traffic and locomotives). As indicated in Part I, supra, Defendants should not be permitted a second bite at the apple on the off-SARR operations and string diagram analysis, and these portions of the Supp. Reply therefore should be stricken.

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[1] For example, Defendants generally accept the trains and equipment posited in AEPCO's operating plan, including the fact that the ACE will not operate any local freight trains. See Supp. Reply at III.C-5 to 6.

Out of an abundance of caution AEPCO herein responds to the Defendants' recycled arguments concerning the ACE's operating plan, as well as to the additional issues raised.

1. Impact of the ACE's Operations as an Overhead Carrier on the Operations and Costs of the Residual Defendants

The Defendants assert that AEPCO's operating plan "represents a significant departure from the operations that occur today on the BNSF lines that are replicated by ACE" because the ACE's overhead trains enter and leave this portion of the system at its end points (Defiance and Vaughn), whereas "[i]n the real world, all trains traversing this line segment [between Defiance and Vaughn] stop in BNSF's Belen Yard [which] . . . supports BNSF's extensive local service in the southwest." Supp. Reply at III.C-1.[2] Defendants further assert that "[i]n order to accommodate ACE's overhead service as designed by AEPCO, the residual BNSF would have to undertake significant changes in its operations" involving cars distributed to and from various points via Belen. Id. at III.C-3. Finally, Defendants claim that the ACE should compensate BNSF for the increases in costs resulting from its altered operations because "[i]n the *TMPA* case, the Board made it clear that when a complainant uses crossover traffic in a way that imposes operational changes on the residual incumbent, it must investigate the impact of those

[2] Defendants acknowledge, however, that the ACE would "perform [the same] basic train servicing operations" for its trains and equipment at Vaughn that BNSF performs at Belen. Id.

changes and include any cost attributable to them," which AEPCO failed to do. Id. at III.C-4.

These claims are a re-hash of arguments BNSF made in its original SAC Reply filed May 27, 2003. AEPCO responded to those arguments in detail in its original Rebuttal Narrative at III-C-7-to 29. Rather than repeating that response here, AEPCO incorporates it by reference with a few additional comments.

In its original Rebuttal Narrative, AEPCO demonstrated that it is wrong as a matter of SAC theory and precedent to require a SARR to cover alleged increases in a residual incumbent's costs for handling cross-over traffic where no rerouting of such traffic is involved. Id. at III-C-7 to 11. In this regard, Defendants' continued reliance on the Board's TMPA decision is misplaced. TMPA held that a complainant needs to take into account the cost of changes in a residual incumbent's operations resulting from the conversion of single-line traffic to cross-over traffic only when a change in the routing of the traffic is involved. The discussion at pages 21-22 of TMPA (cited by Defendants) involved the complainant's proposal to change the route for non-issue cross-over traffic originated by the SARR such that the residual incumbent would receive it in interchange at a point that was not on the existing route for the traffic, and which also faced capacity constraints. In this specific context, the Board held:

> [R]edirecting the off-SARR portion of traffic introduces new variables that extend the inquiry well beyond the original parameters of the SAC analysis. Such new variables might include: off-SARR operational issues (such as, in this case,

> rerouting traffic through the busy rail network in the Houston metropolitan area); off-SARR cost issues (for example, whether the residual carrier would need additional off-SARR facilities to handle traffic along the different route); . . . . Thus, to reroute non-issue traffic, the complainant's SAC analysis must either take responsibility for the entire movement from origin to destination or fully account for the ramifications of requiring the residual carrier to alter its handling of the traffic.

Id.; emphasis supplied. The Board has never held that off-SARR operations and costs should be taken into account where, as here, no off-SARR rerouting of cross-over traffic is involved.

Even assuming, arguendo, that it is somehow appropriate to consider the effects of changes in the residual BNSF's operations resulting from the ACE's presence as an overhead carrier between Defiance and Vaughn, AEPCO demonstrated in its original Rebuttal that BNSF in fact would not be likely to incur any net increases in either its costs of handling local traffic at Belen Yard (id. at III-C-12 to 16) or in its crew costs (id. at III-C-16 to 24). In particular, AEPCO demonstrated that the ACE's presence would enable BNSF to rearrange its present crew district between Clovis, NM and Winslow, AZ to provide turn-around rather than straightaway service, which would enable it to realize large saving in crew costs – savings that would dwarf any cost increases BNSF would incur as a result of the ACE's presence as an overhead carrier. Id. at III-C-18 to 24 and III-C-29.

In the Supplemental Reply, BNSF has quantified increased costs for locomotives, fuel and crews that it alleges would result from the changes in off-SARR operations caused by the ACE's insertion as an overhead carrier. These costs total ${ million annually; see Supp. Reply electronic workpaper "bnsflocal.xls."[3] However, they pale in comparison to the ${ million in net annual crew-cost savings that AEPCO showed in its original Rebuttal that BNSF would realize by rearranging its crew assignments between Clovis and Winslow. See AEPCO Reb. at III-C-18 to 24 (in particular Tables III-C-6 and 7) and III-F-3. These savings include the following:

Savings in crew lodging and taxi costs	${	million
Crew cost savings	{	million
	${	million
Additional crew facilities cost (capital)	{	million
Net BNSF savings	${	million

It is telling that BNSF never addresses the potential savings in costs resulting from the ability to re-arrange its crew assignments between Clovis and Winslow in the Supplemental Reply. AEPCO's evidence on such savings thus stands as the only evidence of record on this issue.

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[3] It is unclear whether these costs include the potential costs entailed in rearranging BNSF's crew district between Clovis, NM and Winslow, AZ (discussed at pp. III-C-14 to 19 of BNSF's original SAC Reply). BNSF did not separately quantify any such crew cost increases, either in its original or its Supp. Reply – probably because, in fact, BNSF knew it would actually realize huge savings in crew expenses.

AEPCO submits that if the Board is going to delve into changes in off-SARR operations and costs as a result of converting single-line traffic into cross-over traffic where there is no routing change, then it has to consider all of the cost implications including the undisputed cost reductions the residual incumbent will realize. In the circumstances presented here, the ACE would have to be credited with a net reduction of at least ${ million in annual operating expense (${ million in residual BNSF crew, lodging and taxi cost savings minus ${ million alleged increase in the residual BNSF's cost of handling local traffic).

AEPCO notes that UP has also presented some Supplemental Reply evidence with respect to changes in its operations in the El Paso area resulting from the ACE's insertion as an overhead carrier between El Paso and Cochise. That evidence is set forth in Supp. Reply Part III-D, so AEPCO addresses it in Part III-D, infra.

2. Trains and Equipment

The Defendants generally accept the parameters established by AEPCO in its Opening Evidence for the ACE's trains and equipment, except in one minor respect. They have been unable to identify the type of switch locomotive described by AEPCO, and therefore propose to substitute EMD SD40-2 locomotives as the locomotive type to be used by the ACE for switching service. Supp. Reply at III.C-5 to 6. Defendants also claim that AEPCO failed to include any separate costs for non-road locomotives on

Opening. The latter claim is incorrect. Examination of AEPCO Op. Exhibit III-C-2 shows that four switch locomotives are provided for on the ACE system.

While more advanced switch locomotives are currently under development (see Workpapers Vol. 2, p. 00448), AEPCO witness Yocum concurs with Defendants that the SD40-2 is an appropriate switch locomotive for the ACE. Accordingly, AEPCO accepts this locomotive type for switch service. AEPCO uses the lease costs for SD40-2's developed by AEPCO on Opening and adopted by Defendants in their Supplemental Reply.

3. AEPCO's String Diagram Analysis

a. Introduction

On Opening, AEPCO witness Thomas D. Crowley used the computerized string diagram model developed by his firm, L.E. Peabody & Associates, Inc., to verify the ACE's capacity to accommodate its peak-period traffic efficiently and to develop certain operating statistics used in the DCF model to calculate the ACE's annual operating expenses. Collectively, the Defendants devoted less than one full paragraph of their separate original SAC Replies to a discussion of AEPCO's Opening string diagram analysis. BNSF orig. Reply at III.C-1. AEPCO responded to BNSF's generalized criticisms of the string model at pp. III-C-2 to 7 of its original Rebuttal Narrative. A copy of the model itself as presented on Opening is contained in AEPCO Op. (Third Errata - filed April 7, 2003) electronic workpaper file "string_ACE_Errata.zip." The output from

the program is set forth in AEPCO Op. (Third Errata) electronic workpaper files "Chart50A.xls," "Chart 50B.xls," and "Chart50C.xls.".

Notwithstanding that the Defendants had an opportunity to address AEPCO's string diagram analysis in their original Reply evidence, and BNSF (although not UP) availed itself of that opportunity, Defendants' Supplemental Reply evidence contains an additional, more extended discussion of the string analysis. AEPCO responds below to the Defendants' supplemental material.

It is important to understand the context in which the string diagram analysis was presented. Although AEPCO witness Crowley used it to verify that the ACE's track and yard configuration has the capacity to accommodate the railroad's peak-period traffic with no diminution in service (and, in fact, improved service as measured by train transit times) compared with the Defendants' 2001 peak-period service offerings, such a separate showing generally was unnecessary for at least three reasons.

First, the ACE's main-track configuration for its two east-west mainline segments replicates both Defendants' track configurations, with the addition of several capacity enhancements to BNSF's configuration between Defiance and Vaughn (described in AEPCO Op. at III-B-9 to 10).

Second, AEPCO has agreed to add a 1.17-mile section of second main track at Abo Canyon on the Clovis Subdivision (see pp. III-B-11 to 12, supra). This

further enhances the ACE's capacity to accommodate coal trains as well as non-coal traffic east of Belen.

Third, the ACE's peak traffic year is an historical year (2001), and AEPCO did not include all of the trains either BNSF or UP operated over these lines in that year. Specifically, AEPCO excluded all Amtrak passenger trains and local freight trains.

In 2001, Amtrak operated (and operates today) one daily passenger train in each direction over BNSF's Defiance-Vaughn main line between Vaughn and Dalies, NM (142.7 miles[4]), and one train in each direction three days a week over the full length of UP's El Paso-Cochise main line. In addition, during the 2001 peak-period studied by Mr. Crowley, BNSF operated an average of approximately two daily local trains (defined as trains that carry traffic not included in the ACE traffic group) on various portions of its line between Vaughn and Defiance. See AEPCO Op. electronic workpaper file "Bnsactrn01.dbf." During the same peak period, UP also operated an average of two daily local trains between El Paso and Cochise. AEPCO has rerouted a few coal trains that presently operate via Belen-Rincon-Deming to the ACE route via Vaughn and El Paso. (These internal reroutes are discussed infra, in the next section.) However, AEPCO notes that the ACE averages only one rerouted loaded coal train every other day in this period (and one empty coal train every four days).

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[4] See AEPCO Op. electronic workpaper file "aepco route.xls."

BNSF and UP obviously were able to accommodate all of the trains that actually operated over these lines in 2001, including the passenger and local freight trains that the ACE does not operate (and which outnumber the coal trains AEPCO has added east of Belen). Thus the ACE's capacity is not a serious issue in this case. Unlike the situation in TMPA, AEPCO's string analysis does not form the basis for the SARR's operating plan. The only legitimate question, then, is whether AEPCO's string program is an appropriate tool for developing certain peak-year operating statistics used in the DCF model (and for determining the cycle times of the coal trains that have been rerouted via Vaughn and El Paso).

b. Defendants' Criticisms of AEPCO's String Diagram Model are Without Merit

Several of the Defendants' criticisms of the string diagram model were presented in summary form in BNSF's original Reply Narrative, and addressed in AEPCO's original Rebuttal Narrative.

Before turning to a detailed response to the somewhat more detailed claims in Defendants' Supp. Reply, AEPCO notes that the witnesses sponsoring Defendants' supplemental Reply evidence on string model problems include only a computer programming witness (Mr. Monk) and a representative from Defendants' economic consultants, FTI Consulting, Inc. ("FTI"), who apparently has no experience or

qualifications in rail operations modeling.[5] Defendants did not present any evidence by a rail operations expert concerning the ACE operating-plan inputs to the string diagram model (yard dwell times, crew-change points, crew-change times, etc.). Nor, in fact, did Defendants present an operating plan for the ACE at all. Rather, they simply assumed that the ACE would have to operate its trains in exactly the same manner as BNSF and UP do, and that the ACE's peak-period train transit times would be the same as the real-world cycle times for the corresponding trains in 2001. Therefore, since AEPCO presented the only specific operating plan, its evidence on the operating inputs used to calculate transit times must be accepted.[6]

At Supp. Reply III.C-7 to 13 Defendants present several specific criticisms of AEPCO's string diagram modeling of the ACE's operations. AEPCO responds to each of these criticisms below. As a result of some of these criticisms (and the revisions to the ACE's track configuration described in Part III-B-2, supra), AEPCO's experts have revised some of the inputs to the string diagram model and re-run the model for purposes

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[5] The Statement of Qualifications of this witness, Karl Leopold, indicates that he has a Bachelors Degree in Government and Politics and joined FTI (apparently right out of college) in 1997. Supp. Reply at IV-21. This hardly qualifies Mr. Leopold as an expert on rail modeling.

[6] The Supp. Reply does contain a few generalities, in a different context, concerning alleged "extra time" that would be needed for interchanges. Id. at III.C-16 (discussing Defendants' use of actual 2001 BNSF and UP transit times for the non-coal overhead trains that comprise more than 95% of the ACE's traffic to calculate operating statistics, a subject AEPCO addresses infra). This evidence is hardly sufficient to rebut the detailed, specific evidence on the ACE's operating plan provided by AEPCO's witness Yocum. See AEPCO Op. at III-C-16 to 28 and III-D-11 to 15.

of this Supplemental Rebuttal. The results are shown in Supp. Reb. electronic workpaper file "aepco_supreb.zip." The net result is only a minor change to the statistics produced by the string diagram model (e.g., the result is a net increase of two road locomotives).

> Criticism 1: AEPCO's string model assumes that each ACE train would operate with four locomotives, but the number of locomotives on the trains according to AEPCO's own average-consist determinations is less than four locomotives. (Supp. Reply at III.C-7 and III.C-8.)

This criticism is technically correct, but it underscores a problem in attempting to correlate operations in the hypothetical stand-alone world with modeled operations in the stand-alone world. As Defendants point out, the average locomotive consist size of the trains operating over the ACE is between 3.24 and 3.55 locomotives. (Supp. Reply at III.C-8, n. 12.) If AEPCO had attempted to include in its simulation model the average number of locomotives per train, i.e. 3.24 to 3.55 locomotives, AEPCO would likely have been criticized for modeling partial locomotives on its study trains – obviously a physical impossibility. In order to avoid modeling partial locomotives in its simulation, AEPCO's experts chose to round its average locomotive consists up to the nearest whole number of locomotives (in this case four).

In its Supplemental Rebuttal simulation, AEPCO has addressed the Defendants' criticism by adjusting the model to utilize the actual number of locomotives on each ACE train as indicated in the BNSF and UP train movement files for the 2001 peak period.

> Criticism 2: AEPCO's string model understates the weight of railcars on trains moving in the non-prevailing direction by assigning them weights of 30 gross tons. The majority of the traffic moving in the non-prevailing direction is non-coal traffic with higher average weights per car than 30 tons. AEPCO's understatement allows cars moving in the non-prevailing direction to achieve transit times that could not be achieved in the real world. (Supp. Reb. at III.C-8.)

AEPCO agrees with Defendants that its Opening string diagram model simulation understated the weight of railcars on trains moving in the non-prevailing direction (i.e., the direction of AEPCO's empty coal trains). However, AEPCO's review of railcar weights also revealed that it had overstated the weight of cars moving in the prevailing direction, which could contribute to increased transit times for the traffic moving in this direction.

Defendants correctly note that the string model assumed that all cars in trains moving in the non-prevailing direction weighed 30 gross tons. The model also assumed that all trains moving in the prevailing direction (the direction of the issue traffic) weighed 133 gross tons.[7] A review of the BNSF and UP train event files used to generate the train list used for AEPCO's string model simulation shows that the average railcar weight for trains traveling in the prevailing direction during the simulation period was actually 69.8 tons.[8] This would indicate that trains moving in the prevailing direction exhibited transit times that are slower than could be expected in the real world.

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[7] See AEPCO Op. (Third Errata) electronic workpaper file "aepco.string.prg" at lines 938 to 940.

[8] See AEPCO Supp. Reb. electronic workpaper file "pktrns_revised.xls."

In response to the Railroads' criticisms, AEPCO has adjusted its string-model program to utilize the actual individual train weights for all trains moving in both the prevailing and non-prevailing directions during the eight-day peak study period.

> Criticism 3: AEPCO's string model prioritizes trains based on direction and not on train type. Therefore, the model is "simplistic" and "rudimentary," which makes it useless for simulating a railroad operation. (Supp. Reply at III.C-8 and III.C-9.)

The string program does assign train priority by direction, but Defendants' criticism is irrelevant because the ACE provides better (faster) service than the incumbent carriers in both directions. Therefore, it does not need to utilize the Defendants' existing train priorities which are based primarily on train type. The true test is not how the string diagram model prioritizes trains, but rather whether the SARR provides at least the same level of service for the traffic traversing its system as the incumbents do. As AEPCO demonstrated in its original Rebuttal evidence, when transit time is used as the standard, the ACE provides better levels of service over its system than BNSF and UP do, in most cases surpassing their service levels by a large factor ({ for westbound UP trains, { for eastbound BNSF trains, and { for westbound BNSF trains).[9]

It is unnecessary to constrain the ACE to operate trains with the same priorities that Defendants use, so long as the ACE meets its service commitments to its

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[9] See Table III-C-5 on page III-C-7 of AEPCO's original Rebuttal Narrative. None of the numbers in that table increases as a result of the revised Supplemental Rebuttal string program analysis.

shippers (which it clearly does). Defendants have not identified any shipper that is made worse off by the ACE's proposed operations, and as a group the ACE's shippers are plainly made better off with faster transit times. Utilizing a different train-priority system might affect how the transit time improvements are distributed (more in one direction than in another), but it would not alter total savings and thus the SARR's overall efficiency, which is the focus of the string analysis.

> Criticism 4: AEPCO's string model program does not provide for any track outages as a result of non-scheduled disruptions or "random failures" that occurred during the peak week study period. (Supp. Reply at III.C-9.)

Non-scheduled disruptions, by their very nature, cannot be scheduled, hence their "randomness." Accordingly, it is difficult if not impossible to model them except by arbitrary assignments of out-of-service time. As indicated below, Defendants' have failed to quantify any specific train delays that may have resulted from the random failures on their replicated lines that occurred during the ACE's peak traffic week in 2001.

Defendants' argument that the ACE would experience random failures that should be taken into account in determining its capacity and train transit times is presented primarily in Supp. Reply Part III.D-4-a. In this regard Defendants have presented a spreadsheet (Supp. Reply electronic workpaper file "BNSF Random Failures 2001.xls"), referred to as the BNSF "Random Failures file," which identifies a number of signal-related failures that actually occurred on the replicated BNSF main line in August 2001 and in the ACE's peak traffic week in September 2001. However, as discussed in

detail at pp. III-D-95 to 107, infra, Defendants have provided no evidence that these events (which largely involved older signal components and wiring) would either (1) occur on the brand-new, CTC-equipped ACE during the study period, or (2) result in any significant delays to trains.

As described in Part III-D, infra, it is highly unlikely that the failure events reflected in BNSF's Random Failures file would disrupt train operations to any significant extent, and it is evident that no specific allowance should (or can) be made as a result of them. Given Defendants' failure to provide any specific train-operations impacts, or to quantify any specific delays during the peak period, it is impossible for AEPCO to take any such impacts into account in its modeling.

Moreover, as AEPCO explained in its Opening Narrative at III-B-9 to 10, its experts made several modifications to the existing real-world BNSF track configuration between Defiance and Vaughn to improve its capacity – and they have added an additional capacity enhancement on Supplemental Rebuttal, as described at pp. III-B-11 to 12, supra, to assure that the ACE's few coal trains can co-exist with its service-sensitive non-coal overhead trains. These enhancements, combined with the fact that the ACE is not handling all of the trains that actually moved over the replicated BNSF and UP lines in 2001, enable the ACE to accommodate its 2001 peak-week and peak-day train counts with improved (faster) service than that provided by the incumbents over the same lines. This allows for occasional variations from expected normal

operations, thus ensuring beyond any reasonable doubt that the ACE will suffer no diminution in the level of service provided by the incumbents.

AEPCO's approach of utilizing actual mine dispatch and interchange arrival times in its string diagram model means that the ACE's coal trains will arrive back at the mine, and its non-coal overhead trains will reach the next interchange point, sooner than the corresponding real-world trains did. This provides a cushion of time that allows for the impact of any unforeseen occurrences that might impact the operation of trains over the ACE system. Finally, reviewing the two-dimensional string diagrams produced by the string diagram model shows that ACE has sufficient windows where no traffic moves over a line segment to perform any required emergency maintenance even during the peak period of the entire 20-year DCF model.[10]

Criticism 5: AEPCO's string model overstates the available locomotive tractive effort on some of the ACE's trains. (Supp. Reply at III.C-9 to 10)

The Defendants claim that the string diagram program overstates the tractive effort available to locomotives traveling at a speed of less than 10 mph, and for locomotives on some ACE trains traveling at speeds greater than 10 mph. This claim is correct in some, but not all, cases for trains traveling at speeds greater than 10 mph. However, it is completely incorrect with respect to trains traveling at less than 10 mph.

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[10] AEPCO's approach is extremely conservative because it does not consider where sidings or double track exist. In other words, AEPCO's approach assumes that all tracks over the segment could experience a shut-down during these windows.

With regard to the tractive effort available for trains traveling less than 10 mph, Defendants attempt to support their claim by comparing tractive effort statistics generated using the equations in AEPCO's string program to average tractive effort statistics for SD70 and C-44 locomotives produced in various public documents (included in their Supp. Reply workpapers). See Supp. Reply at III.C-10, n. 19, and Supp. Reply Workpapers Vol. 1, pp. III.C-0004 to 0010. What these workpapers actually show is that AEPCO's string program understates tractive effort at starting and at low speeds, and does not overstate it as Defendants contend. The workpapers show that the starting tractive effort for the ACE locomotive types ranges from 159,000 to 175,000 pounds of force, versus the conservatively-assumed 144,900 pounds calculated in AEPCO's string program. (Id.)

Furthermore, UP's Train Performance Simulator ("TPS") submitted in Defendants' Supplemental Reply evidence confirms that the tractive effort statistics produced by the string diagram model for trains traveling less than 10 mph are conservative, and do not overstate tractive effort.[11] The TPS program generates its tractive effort statistics by reading tractive effort tables specific for each type of

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[11] As is discussed more thoroughly in Part III-D, infra, Defendants attempted to estimate stand-alone fuel consumption statistics using the TPS. The TPS {

While the TPS maybe a useful tool for running simple "what-if" analyses, the fact that it {
makes it a useless tool in a stand-alone cost presentation.

locomotive used in the simulation. These tables, which AEPCO has extracted from the TPS model and included in its Supp. Reb. electronic workpaper "UP TPS Tractive Effort Statistics.xls," show that C44-9 locomotives traveling less than 10 mph generate an average of { pounds of tractive effort, while SD-70 locomotives generate an average of { pounds of tractive effort – both { the string-models estimate of 144,900 pounds. Clearly the string model program does not overstate tractive effort for locomotives traveling less than 10 mph.

The Defendants also claim that the available tractive effort on some trains is overstated because the string model assumes that each locomotive on the train produces 4,400 horsepower. AEPCO's experts have analyzed this claim, and determined that for some trains, the model did slightly overstate the tractive effort available. Accordingly, on Supplemental Rebuttal AEPCO has adjusted its string model program to utilize the actual available horsepower on each train.[12] The actual horsepower per train was extracted from the UP and BNSF train event files which were included in AEPCO's opening evidence workpapers.[13] The impact on the results is insignificant. As shown in the restatement of the ACE's operations using the string model, all of the changes, including the use of actual horsepower, resulted in an increase in locomotive hours of less than five percent.

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[12] See AEPCO Supp. Reb. electronic workpaper file "aepco_string_rebuttal.txt," at lines 953, 1660 and 3295.

[13] See AEPCO Op. electronic workpaper file "Peakweek_AEPCO.xls."

Criticism 6: AEPCO's string program calculation of air drag resistance treats all car types as exhibiting the same level of resistance, and the air drag coefficient used in the program is not found in AEPCO's workpapers. (Supp. Reply at III.C-11.)

AEPCO's string program utilizes the Canadian National Railroad version of the Modified Davis Equation to calculate the aerodynamic resistances acting upon the ACE trains.[14] The model assumes that the air drag coefficient for railcars traveling on the ACE is 5.5. As shown in AEPCO's Opening workpapers, most railcar types, including the majority that travel on the ACE, have air drag coefficients less than or equal to 5.5. This includes loaded coal cars (coefficient of 4.2), box cars (4.9), tank cars (5.5) and TOFC/COFC (5.0).[15] AEPCO's use of a uniform air drag coefficient factor of 5.5 thus provides a conservative estimate of air drag resistances acting upon ACE trains.

Criticism 7: AEPCO's string model does not account for reverse grades (depending on direction); nor does it apply acceleration and braking factors for empty coal trains moving in the prevailing direction. (Supp. Reply at III.C-12.)

The Defendants are correct with respect to these two aspects of the string model as presented on Opening. The typographical errors that led to the model's failure to account for reverse grades and to apply acceleration and braking factors for empty trains moving in the prevailing direction have been corrected and the corrections have been incorporated into AEPCO's Supplemental Rebuttal version of its string model.

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[14] See AEPCO Op. Workpapers Vol. 8, pp. 3570-3571.

[15] Id. at p.3571. This reference also refutes Defendants' claim that the coefficient value used by AEPCO is not found in its workpapers.

Criticism 8: AEPCO's string program allows trains to enter sidings when other trains have already occupied the space. (Supp. Reply at III.C-12.)

The Defendants assert that the string model fails to accurately consider the size of the necessary sidings, resulting in more trains in a siding than can physically be placed there. However, to the extent this occurred in the modeling of the ACE operations, the problem can be remedied by making a manual adjustment to hold trains at prior sidings or yards. This is no different than what occurs with computerized dispatching in the real world if the train cannot proceed ahead until siding capacity or yard capacity is available.[16]

In response to Defendants' criticism, AEPCO's experts reviewed the string model output for the ACE's peak day within the peak operating period with respect to this problem.[17] Based on that review, AEPCO's experts determined that 20 trains need to be manually adjusted to avoid any capacity problems at sidings. This manual adjustment creates an increase in the train hours produced by the string diagram model of 30.7 hours on the peak day, or an increase of 1.3 percent.[18] The aggregate locomotive hours and car

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[16] AEPCO's manual adjustments are shown in Supp. Reb. electronic workpaper file "string_supp_manual.xls." Each adjusted train time is shown in red. The calculations for each adjustment are also shown.

[17] As noted in AEPCO's Opening Evidence, the peak day within the peak operating period was September 16, 2001 and the movement of the trains on that day was graphically shown in Attachment No. 1 to AEPCO Op. Exhibit III-C-2.

[18] See AEPCO Supp. Reb. electronic workpaper file "Statoutput_supp rebuttal.xls."

hours for the entire peak period were increased by this percentage for purposes of AEPCO's Supplemental Rebuttal string model analysis. (The operation on the peak day is graphically shown in AEPCO Reb. Exhibit III-C-5.)

> Criticism 9: AEPCO's string analysis failed to make any connection between empty coal trains returning from destinations (including interchange points) and loaded trains departing from the McKinley and Lee Ranch mines for these destinations. (Supp. Reply at III.C-13)

This is the so-called "disappearing train" problem which has been raised in other recent coal rate cases where the string diagram model has been used. The Defendants assert that the failure to "link" the empty and loaded trains "marks a significant departure from the real world unit coal train service that AEPCO purports to provide" (Supp. Reply at III.C-13). These assertions are without merit. Moreover, the "disappearing train" issue is insignificant in this case because the ACE's traffic group includes a small number of coal trains (particularly moving east/ south from the two New Mexico mine origins), and these trains generate a small number of train, locomotive and ton-miles compared with the ACE's non-coal traffic.[19]

The process used for flowing ACE's peak-week trains through the string model is discussed in AEPCO Op. Exhibit III-C-3. In developing the flow of traffic for the string diagram model, AEPCO started with the actual departure time for each of the

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[19] The issue is non-existent with respect to the non-coal trains because AEPCO used the actual times when these overhead trains reached the ACE system in both directions.

loaded coal trains in the ACE's traffic group. Using the actual departure times to seed SARR coal trains reflects the actual loading time that was utilized at the mine origin. The string diagram model then flowed the loaded trains to interchange or destination. After the allowance for the movement off-line or for unloading time at destination, the empty trains were then returned to the origin mine.

Because the trains move over the ACE at speeds that are faster than actually occurred on Defendants' real-world systems, the empty trains do not return at the times that occurred in BNSF/UP's actual operations. However, this problem cannot be avoided unless the actual loading times for the subsequent trips of the same coal trains are ignored. AEPCO's modeling approach thus does not reflect a flaw, but rather a constraint imposed by comparing real world operations versus the hypothetical operations of a stand-alone railroad.

Any computer model that analyzes round-trip coal train cycles in the SAC environment has to deal in some manner with the "linking" of the trains from one complete cycle to the next. The only ways to avoid such a problem would be (1) to cycle trains continuously, which ignores actual loading times, or (2) for the SARR to perform exactly like the railroad that it is replacing and ignore any economies and efficiencies resulting from its streamlined facilities and operations.[20] The latter approach is

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[20] As discussed elsewhere herein, in many instances Defendants have asserted that the ACE cannot operate more efficiently than the real-world BNSF and UP do. AEPCO (continued...)

completely contrary to the fundamental underpinnings of the Guidelines and SAC policies and theory. AEPCO's solution was to begin with the actual mine loading times. For the reasons discussed above, AEPCO's solution is an accurate representation of how the ACE would operate for purposes of (1) determining the feasibility of the ACE facilities and operations, and (2) calculating the operating statistics for the ACE.[21]

The "linking" problem described by the Defendants involves time gaps caused by the fact that because the ACE exists in the optimally-efficient SARR world, involving less congestion, fewer delays, etc., it is able to cycle coal trains from and to the mines faster than the incumbents do. Using actual departure times for subsequent trains enables AEPCO to test the feasibility of the entire ACE system by beginning each cycle based on known mine load-out availability and customer demand for coal. AEPCO's objective was to demonstrate the feasibility of the ACE using actual 2001 loaded train dispatch times to begin each cycle. The difference in the cycle times achieved by the ACE and BNSF/UP in the real world means that empty trains in the SARR world arrive back at the mine early, thus causing the "phantom-time" problem. This problem would

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[20] (...continued)
has demonstrated that in fact the ACE can and does operate more efficiently than the incumbents, and to impose the incumbents' operating procedures on the ACE would violate the least cost, most efficient standard of the Coal Rate Guidelines.

[21] The output of the string diagram model is utilized to calculate the number of locomotives, number of railroad-owned railcars, and the number of crew personnel (including taxi service and lodgings) required by the ACE.

vanish if AEPCO had chosen not to use actual loaded train dispatch times except for the first cycle.

If the ACE were actually constructed and in existence in 2001, and achieved the train transit times shown, its coal trains of course would neither "vanish" nor be held at the mine until the next scheduled loading time. They would, in fact, cycle continuously. Because this would result in the customer's receiving its annual (or quarterly or monthly) coal requirements early, the customer would reduce the number of trainsets it provides to the railroad to use in its service. This could be accomplished by selling one or more trainsets or terminating the lease for such set(s), or subleasing the set(s) to a railroad or to another utility until it is needed again. However, the ACE is a hypothetical railroad, and the modeling approach adopted by AEPCO's experts is a reasonable way of determining whether the ACE's facilities and operations are feasible and various operating statistics used to calculate annual operating expenses in the DCF model.

c. Defendants' "Transit-Time" Analysis for Calculating ACE Operating Statistics Should Be Rejected

Based on the alleged problems with AEPCO's string diagram analysis, Defendants state that they cannot use the train transit times resulting from that analysis to calculate operating statistics. Since Defendants have neither submitted an operating plan for the ACE nor performed any overall modeling of the ACE's operations (except for

some limited modeling for rerouted coal trains, discussed infra), they fall back on their actual 2001 transit times for each non-coal ACE train. Supp. Reply at III.C-14.

Defendants argue that real-world transit times are an appropriate proxy for the transit times ACE trains could achieve because "AEPCO has largely replicated the track configuration and capacity of the real-world BNSF and UP and it purports to run essentially the same number of trains over the SARR that traverse the relevant track segments today." Id. This is extremely misleading. In fact:

- The ACE improves upon the Defendants' track configuration and capacity, particularly on the busiest line segment between Defiance and Vaughn. An additional enhancement has been added on rebuttal, as a result of AEPCO's acceptance of Defendants' proposal to add 1.17 miles of second main track on the replicated BNSF mainline at Abo Canyon.

- AEPCO is running fewer freight trains over its east-west mainlines than either BNSF or UP ran in 2001 (the peak-week reduction is an average of approximately two trains per day between Defiance and Vaughn and two trains per day between El Paso and Cochise).

- The ACE does not run any Amtrak passenger trains, which consume inordinate capacity because they must be accorded priority over all other trains.[22] Amtrak operates two trains daily (one in each direction) across 55% of the Defiance-Vaughn line and one daily train six days a week (a train in each direction every other day) across the entire El Paso-Cochise line. Amtrak trains thus operate at a significantly higher frequency than the

[22] Defendants argue that AEPCO is not "entitled to assert that ACE will improve its performance by omitting Amtrak operations" because Defendants are legally required to allow Amtrak to operate over their lines. Supp. Reply at III.C-15. This is certainly a novel argument, but it is inconsistent with SAC principles which allow a shipper to choose less-than-all of the traffic moving over the lines being replicated. Coal Rate Guidelines, 1 I.C.C.2d at 543-44; Nevada Power I, 6 I.C.C.2d at 46, 48-50 (no passenger service operated over the SARR's lines).

ACE's coal trains. (A total of only four coal trains, both loads and empties, operated during the eight-day peak period studied by AEPCO witness Crowley.)

- The ACE operates only complete run-through trains, between two pairs of discrete points, insofar as the non-coal trains in issue are concerned. Unlike BNSF and UP (which are the products of mergers and union work rules), the ACE's yards, facilities, crew districts, car inspection procedures, maintenance-of-way procedures, etc., have been specifically designed from the ground up to accommodate its unique traffic group and its single kind of train service.

Given these facts, it is absurd to argue that a stand-alone railroad such as the ACE cannot achieve better transit times (and reduced operating costs) compared with the large, less efficient real-world Class I carriers whose lines it replicates.

4. Rerouted Coal Traffic

The Defendants challenge AEPCO's decision to reroute the issue and other coal traffic from the present routing via Belen-Rincon-Deming to a longer route via Vaughn-El-Paso-Deming because the reroute "imposes significant inefficiencies on the stand-alone railroad's operations" including allegedly longer coal-train cycle times. Supp. Reply at III.C-16 to 17.

Defendants' principal argument is that the rerouting increases the distance for the coal trains by 222 miles (43 percent) and shifts them from a lightly-traveled line onto high-density mainlines. Id. at III.C-17. However, AEPCO's string model analysis demonstrates that, in fact, the ACE coal trains operate at faster cycle times using the

longer routing than the corresponding real-world trains did in 2001. This improvement is not surprising, notwithstanding the additional distance involved.

For example, Defendants assert that the ACE operates numerous non-coal overhead trains on the replicated BNSF line between Belen and Vaughn, and that "these trains, most of which are high-speed, service-sensitive intermodal trains, must be able to pass or overtake AEPCO's coal trains with almost streetcar-like frequency." Id. at III.C-19. This statement is contradicted by Defendants' acknowledgment four pages earlier that "not a single overtake occurs" (i.e., a non-coal train does not pass a coal train moving in the same direction) during the eight-day peak period modeled by the string program. Id. at III.C-15. It is also belied by the fact that the ACE handles only a total of four loaded and two empty coal trains during the same eight-day period, out of a total of { trains of all types moving between Belen and Vaughn.[23] Coal trains (including empties) thus represent only { percent of the total peak-period trains moving over this line segment. To say the least, non-coal trains do not have to pass coal trains with "streetcar-like frequency."

Moreover, as noted supra, neither the ACE's coal trains (which average less than one train a day counting both loads and empties) nor its non-coal trains have to contend with daily Amtrak trains or local freight trains, as BNSF and UP's corresponding

[23] See AEPCO Op. (Third Errata) electronic workpaper "Peakweek_AEPCO.xls."

real-world trains do. In addition, only the loaded coal trains (less than one every other day) operate at slower speeds, thus potentially interfering with non-coal overhead trains.

In addition to encountering less traffic than that currently faced on the incumbents' lines, the single-line service provided by the ACE eliminates the significant dwell time presently faced by coal trains at the Deming, NM interchange. Based on BNSF and UP train event data provided in discovery (and included in AEPCO's Opening workpapers), AEPCO analyzed the Deming dwell time faced by AEPCO coal trains for the first eight months of 2001. During this period, the average daily dwell time at Deming was { hours.[24] Given the extensive time it takes the incumbents (including the Southwestern Railroad which handles the traffic between Rincon and Deming) to interchange coal trains at Deming, and the frequent UP delays in picking up empty coal trains after unloading at Apache Station, it is obvious why the single-line movement on the ACE can result in faster cycle times than the incumbent railroads achieve.

Even if the ACE's service were materially slower than the incumbents' with respect to the rerouted coal traffic, the deficiency could be readily addressed by a modest increase in the number of coal railcars (e.g., by leasing a unit trainset for one or two cycles).[25] While the modest additional railcar cost should logically be absorbed by the

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[24] See AEPCO Supp. Reb. electronic workpaper file "Deming Dwell.xls," worksheet "Matching," cell AF65.

[25] AEPCO notes that any deterioration in transit times for the rerouted coal traffic would be largely offset by an improvement in cycle time for the other ACE coal traffic (continued...)

SARR as part of its overall cost of service (with an insignificant impact on the overall SAC result), AEPCO's witness Mark Schwirtz, its Senior Vice President and Chief Operating Officer, indicates that AEPCO would be willing to absorb this cost itself, for its own movements, in exchange for the rate reductions shown in Part III-H, infra.

5. ACE Locomotive Requirements

Although Defendants accept AEPCO witness Yocum's proposal to have the ACE contribute road locomotives to a pool used for run-through service, they assert that AEPCO's total ACE road locomotive count is understated because it is based on the output of its string program analysis with modifications to reflect annual operations during 2001 rather than the peak-period operations. Supp. Reply at III.C-26. Defendants instead calculated the ACE's locomotive requirements by "simply calculating locomotive hours for each train" in 2001 using actual, real-world 2001 transit times. Id. at III.C-26 to 27.

In addition, Defendants claim that AEPCO's five percent locomotive spare margin is inadequate "since the five percent. . . does not encompass the many times when a locomotive is not being serviced but is also unavailable for use on a train." Defendants substitute a separate spare margin for C44-9 and SD40 locomotives, respectively, based

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[25] (...continued)
(i.e. the traffic moving west to the APS/Cholla, SRP/Coronado and TEP/ Springerville power plants and the AEPCO traffic moving to Cochise from Colorado and Powder River Basin origins, which moves over the ACE only between El Paso and Cochise) as a result of the ACE's more efficient operations compared with the incumbents.

on the percent of time BNSF's locomotives were either unavailable for service or available and not utilized.[26] Supp. Reply at III.C-27 to 28.

The combination of Defendants' "simple calculation" of locomotive hours and the use of BNSF's actual locomotive utilization experience results in an unnecessary and unwarranted increase in the number of locomotives required by the ACE from 102 locomotives (the number in AEPCO's April 7, 2003 Errata to its Opening Evidence and used in AEPCO's original Rebuttal) to { locomotives. The errors in Defendants' calculations are discussed below.

a. Locomotive Hours

The Defendants object to AEPCO's determination of locomotive unit hours because of AEPCO's reliance on its string program results (discussed previously) and because of an alleged peaking issue. Specifically, Defendants state that AEPCO's calculation of locomotive unit hours is incorrect because it:

> . . . derives a number of locomotive unit hours based on the string program's artificially fast transit times, reduces that number of hours (without explanation) by multiplying by the ratio of the tonnage AEPCO claims would be transported annually based on the peak period divided by the tonnage AEPCO claims would actually be transported over the full year 2001, and divides by the number of hours in a year to produce a locomotive count.

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[26] The spare margin used by Defendants is { percent and { percent for C44-9 and SD40 locomotives, respectively. See Supp. Reply electronic workpaper file "Loco Spare Margin_AEPCO.xls". Defendants also apply the { percent spare margin for SD70 locomotives.

Supp. Reply at III.C-26. Defendants then proceed to describe their method for determining locomotive unit hours as follows:

> . . . defendants sought to more accurately determine locomotive requirements by simply calculating locomotive hours for each train identified by AEPCO that traversed the SARR in 2001 . . . . Locomotive hours were assigned to each engine on each train by using the real-world transit times described in Section III.C.2.b. above. Having assigned a locomotive hour number for each engine on each train, defendants summed the locomotive hours by locomotive type to calculate locomotive hours for the 2001 base year.

Id. at III.C-26 to 27.

The actual calculations underlying Defendants' approach to determining locomotive hours for the 2001 base year contain numerous errors which result in an overstatement of the locomotive hours. As a result, Defendants' calculations are unreliable and cannot be used. As BNSF/UP use different data and methods to calculate locomotives hours for ACE trains on their separate portions of the ACE system, the overstatements in determining locomotive hours are discussed separately for the BNSF and UP.

First, with respect to locomotive hours over the replicated BNSF lines, there are two errors in Defendants' calculation of the ACE's locomotive hours in 2001:

1. BNSF's data shows a different number of locomotives on many trains when one train enters the ACE system than when it leaves the ACE system – a total of { trains, or { % of all trains. In each of these instances, when calculating the number of locomotive hours, Defendants incorrectly assume that the number of locomotives on the train when it enters the ACE system is the number of locomotives that are on the train the entire time it is

on the ACE system. See Supp. Reb. electronic workpaper file "BNSF Reply Calculations of LUM.xls."

2. In their Supplemental Reply at III.C-26 n.49, when discussing the accumulation of locomotive hours for determining the number of locomotives required, Defendants indicate that where an actual BNSF or UP train had more than { locomotives, Defendants assumed "that some locomotives were being ferried and used only { locomotives in determining AEPCO's locomotive requirements." BNSF trains have more than { locomotives in { instances, or about { % of the time. In each of these instances, BNSF improperly accumulated locomotive hours for all locomotives on the trains. See Supp. Reb. electronic workpaper file "BNSF Reply Calculations of LUM.xls."

With regard to the ACE's locomotive hours for operations over the replicated UP lines, Defendants' data identifies up to { specific locomotive unit numbers for each train, and uses the number of units that were identified regardless of the number of units actually on the train to calculate locomotive hours. There are three errors in using the identified locomotive units in Defendants' calculation of locomotive hours for the ACE in 2001 over the replicated UP lines, including the following:

1. Duplicate entries exist for locomotives specifically identified on { trains. See Supp. Reb. electronic workpaper file "UP Reply Calculations of LUM.xls."

2. The actual number of locomotives on the train when it enters or leaves the ACE system is less than the number of locomotives specifically identified on { trains. Id.

3. As indicated in item 2 for BNSF above, Defendants state that they limited the number of locomotives included in their count to { locomotives per train. However, UP did not make this limitation. Instead for { trains, UP included all locomotives specifically identified (including duplicates) with a maximum of { units for any given train. Id.

For the foregoing reasons, the Board should reject Defendants' improper calculation of locomotive hours and accept AEPCO's calculation on Supplemental Rebuttal.

b. Spare Margin

As noted previously, Defendants utilize a { percent spare margin for C44-9 and SD70 locomotives and a spare margin of { percent for SD40 locomotives. In contrast, AEPCO utilized a spare margin of five percent on Opening, as specified in { .[27] AEPCO continues to use the same five percent spare margin for purposes of its Supplemental Rebuttal.

Defendants' proposed spare margin substantially overstates the ACE's locomotive requirements by imposing existing BNSF locomotive requirements on the ACE, including any requirements created by its transcontinental service or inefficiencies resulting from its ongoing transition from one primary locomotive type to a more current locomotive fleet.

Defendants assume, without explanation, that whatever utilization BNSF may experience for its C44-9 fleet assigned to Barstow, California is also an appropriate utilization rate for the ACE. There is no basis for this assumption, as BNSF's Barstow

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[27] { } AEPCO's Opening Workpapers Vol. 8, pp. 03650-657.

fleet bears no relationship to the demands for traffic moving over the discrete replicated BNSF line between Defiance and Vaughn and the UP lines between Vaughn and El Paso and between El Paso and Cochise that comprise the ACE.

Moreover, with regard to SD40 locomotives, Defendants state that:

> . . .older engines tend to have a lower utilization factor than C44-9s and SD70s. The lower utilization rate of these engines stems from their gradual replacement by C44-9s and higher power SD locomotives. While the SD40-2s used to be the pre-dominant road locomotives in North America, they have been increasingly relegated to second-tier locomotives and are essentially used in road service on an as need basis or for periods of peak traffic.

Supp. Reply at III.C-29. This statement admits that Defendants' SD40-2 fleet is excessive because that fleet is being replaced by more current locomotives. There is no reason for the ACE to replicate the incumbents' excessive fleet. Instead, it would provide only those locomotives to the pool necessary to meet the requirements of the traffic moving over its system and would not be burdened by the inefficiencies inherent in the incumbents' legacy fleets.[28]

On Supplemental Rebuttal, AEPCO continues to calculate locomotive hours for the peak period based on the string model. These hours are then annualized and base

[28] Defendants' argument that the SARR must replicate their locomotive utilization factor for the aging SD40 fleet is inconsistent with their claim that the SARR will not experience any future productivity because it is based on a least-cost, most-efficient operation.

year locomotive hours are then determined by applying the ratio of tons carried in the base year of the DCF model (2001) to the annualized peak tons.

The resulting locomotive unit hours are divided by hours in a year to determine the number of required road locomotives. The road locomotives are then increased by the five percent spare margin. Rather than adopt BNSF's utilization factor, which is irrelevant to the ACE's operations, AEPCO developed a peaking factor, described in the next paragraph, that measures the need for additional locomotives over and above those provided for by the five percent spare margin. This peaking factor is specific to the needs of the ACE and its variation in traffic volumes throughout the year, rather than being formulated based on BNSF's C44-9 requirements and its outdated SD40 fleet.

In developing the first-year operating expenses, AEPCO applied the peaking factor to be sure that locomotive requirements are not being understated. The peaking factor was applied to the first-year expenses and the DCF model took over for subsequent years. The peaking factor was developed by solving the following equation:

PF = 1 + (A / B), where

PF = peaking factor

A = The sum of the trains for each day in the first year that the number of trains transporting traffic in the ACE group was greater than the daily average

B = Total ACE trains in the first year

Application of this peaking factor (which is calculated using data filed by AEPCO on Opening) ensures that there is no understatement of annual locomotive requirements in the DCF model.[29]

As a result of AEPCO's revised Supplemental Rebuttal string diagram model runs, the ACE requires 100 road locomotives, including spare and peak locomotive requirements. It also requires five SD40-2 locomotives (four for switching service and one for work-train service). See Supp. Reb. Exhibit III-C-4, line 6.

Defendants also changed the ACE switch locomotives to SD40-2s (a change AEPCO previously indicated is acceptable), and added four SD40-2 locomotives "for use on two full-year work trains that the SARR would require." Id. at 29. The determination that two full-time work trains are needed was made by Defendants' witness Albin based on an annual requirement of 460 work-train days (380 days for program replacement work and 80 days for "miscellaneous maintenance" (presumably spot maintenance work). Id. at III.D-145 to 146.

AEPCO addresses the need for work trains in Part III-D-4, infra. It will not repeat that discussion here except to note that it is providing one additional SD40-2 locomotive for "spot" work train service. The ACE does not need to provide work trains or additional locomotives for programmed maintenance. To the extent the field

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[29] The peaking factor (6.2%) and the spare margin (5.2%) are multiplied by the number of road locomotives required in the base year. See Supp. Reb. Exhibit III-C-4.

maintenance crews occasionally need to use or move a few carloads of material, AEPCO has provided the additional SD40-2 for that purpose. This locomotive can also be used as a spare switch locomotive at El Paso when the switch locomotive at that location requires inspection/repair. It would be exchanged with the spare SD40-2 stationed at Vaughn when it needs inspection or maintenance.

III. D. OPERATING EXPENSES

In their Supplemental Reply Evidence, Defendants estimate the ACE's first-year (2001) operating costs at a level that is more than 70 percent higher than the costs that AEPCO documented in its Opening Evidence. Specifically, Defendants contend that the ACE's annual operating expenses will total $343.7 million, rather than the $199.4 million reflected in AEPCO's evidence (i.e., an annual difference of $144.3 million). See Supp. Reply at III.D-157.

Defendants' estimates are vastly overstated and are inconsistent with STB precedent regarding the expenses to be attributed to a least-cost, most efficient – yet feasible – SARR. See Ex Parte No. 347 (Sub-No. 3), General Procedures for Presenting Evidence in Stand-Alone Cost Rate Cases (STB served March 12, 2001), at 6 ("It is not sufficient for a railroad to show that another way of providing the stand-alone service would be superior, because the purpose of a SAC analysis is to identify the ***least*** cost at which the current level of service for each member of the traffic group could be provided.") (emphasis in original). The most significant overstatements in Defendants' Supplemental Reply evidence include the following:

Locomotive Fuel Consumption Rates Per Locomotive Unit-Mile 23.9% Above System-Average Levels: Rejecting the system-average fuel consumption rates

utilized by AEPCO on Opening (a level accepted by the Board in other SAC rate cases),[1] Defendants instead have offered the results of a fuel simulation study to increase fuel consumption rates for the ACE's locomotives by 23.9%.[2] Defendants' fuel study lacks any proof that its results are consistent with actual measured fuel consumption experience. Morever, Defendants improperly skew the inputs to their fuel simulation model to suggest that the ACE's trains spend an inordinate amount of time either in top throttle position or idle. This assumption conflicts both with the intended operations of the ACE and with BNSF's own published guidelines for fuel-efficient operations. Finally, Defendants' TPS study also contains a number of mathematical and analytical errors.

Fuel Transportation Costs: Defendants propose to burden the ACE's demonstrably overstated fuel budget with the additional costs of transporting fuel by rail from Belen to Vaughn (in order to fuel both the ACE's *and* the residual BNSF's locomotives), on the ground that a fuel pipeline currently does not exist at Vaughn. This unprecedented cost constitutes an impermissible barrier to entry and should be excluded by the Board. In particular, Defendants have not demonstrated that BNSF was required to

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[1] AEPCO determined gallons of fuel consumed by applying BNSF and UP Uniform Rail Costing System ("URCS") factors to the specific operating characteristics of trains moving on the ACE system. See AEPCO Op. at III-D-3 and AEPCO Op. electronic workpaper file "Fuel.xls."

[2] When compounded by Defendants' overstatement of LUMs, Defendants overstate total ACE fuel consumption by 41.5% (i.e., 25.3 million gallons per year).

finance the establishment of a fuel supply chain to Belen. Absent such a demonstration, the Board should not impose these costs upon the ACE. In any event, AEPCO demonstrates that Defendants' cost estimates for the establishment of a fuel supply at Vaughn are misdirected. Indeed, as AEPCO demonstrates in Part III-B supra, if the ACE were actually constructed, a nearby pipeline would have ample incentive to extend its line and deliver fuel to Vaughn at a lower price than BNSF's system average fuel price. Moreover, the system-average fuel price used by Defendants already includes a fuel transportation component. Defendants' approach thus double-counts fuel transportation expense.

Increased Maintenance-of-Way Costs: Defendants have estimated MOW costs for the ACE at a level nearly four times the level documented by AEPCO in its Opening Evidence, based in large part upon the excessive real-world MOW force employed by BNSF. Significantly, Defendants' own evidence shows a tremendous disparity between the MOW staffing levels of the two Defendants, with BNSF's staffing level amounting to one MOW employee per { } route miles and UP's staffing level amounting to one MOW employee per { } route miles. The UP statistics demonstrate that a high-volume railroad can (and does) maintain its lines in a manner that is far more cost-effective than that reflected by BNSF's approach. Consequently, the ACE should benefit from at least the same efficiencies evidenced by UP's own MOW operations. In

addition, Defendants have improperly included labor costs in their MOW equipment expense, thus double-counting labor expense for the ACE.

Additional Operating Personnel: Defendants propose to add a large number of additional operating employees to AEPCO's plan, including, inter alia, 27 "crew haulers/utility clerks," 24 additional train crew members, 23 additional equipment inspectors, and five yardmasters. These additional operating personnel are unnecessary for the operation of the ACE. As AEPCO explains infra, the ACE's personnel as provided on Opening are abundantly capable of performing the task of operating the railroad. Moreover, Defendants' analysis of train crew requirements is riddled with data inconsistencies that increase the ACE's purported crew needs.

Insurance: Defendants insist that the ACE should pay for insurance at rates { } percent above their own rates. This figure is entirely unrealistic and bears no relation whatsoever to insurance ratios accepted by the Board for other stand-alone railroads. Moreover, Defendants' purely revenue-based argument ignores the reduced level of risk associated with the ACE's operations, when compared with its supposed real-world "peers."

General & Administrative Expenses: Defendants decline to develop their own specific evidence of G&A staffing and compensation levels, and instead rely simply upon a "top-down" argument that the ACE's G&A expenditures are not as high as the levels that Defendants observe from supposed real-world "peers." Once again,

Defendants err by ignoring the significant distinctions between the operations of the ACE and the "peer" railroads that they identify. Moreover, Defendants completely ignore the relationship between the ACE's G&A expenses and the G&A levels accepted by the Board in recent SAC cases, which demonstrates that AEPCO's estimate of the ACE's G&A expenses is, if anything, too high.

Training and Start-Up: Defendants include $7.6 million in training and start-up costs for 2001. Defendants' treatment of this amount as an expense is inappropriate since it violates the so-called "matching rule" of accounting, which holds that expenses should be matched with the revenues that those expenses were used to produce. Since the ACE's hiring and training of employees relates to the generation of revenue for a number of years into the future, the ACE's training and hiring costs should be matched (i.e., amortized) against future revenue.

Improper Operating Assumptions/LUMs: Defendants improperly assume that the ACE's operations will replicate BNSF's and UP's existing operations (see Part III-C, supra).[3] As a result, Defendants overstate their calculation of locomotive unit-hours and locomotive unit-miles (LUMs) for the ACE. As AEPCO explains, infra, this error leads to a number of cost overstatements including locomotive lease expense,

[3] In this regard, Defendants do not posit an operating plan for the ACE at all, nor do they critique many elements of AEPCO's operating plan.

locomotive maintenance expense, T&E crew and other SARR staffing needs, fuel costs, etc.

The cost impacts of these disputes between the parties regarding operating expenses, ranked in order of magnitude, are as follows:

TABLE III-D-1
Principal Disputes Regarding
Annual Operating Expense for the ACE (2001)
($ millions)

No.	Item	AEPCO Rebuttal Amount	Supp. Reply Amount	Difference
1	Locomotive Fuel and Servicing	$57.7	$91.1	$33.4
2	Operating Personnel (including Materials and Supplies)	27.9	60.2	32.3
3	Maintenance-of-Way (Spot)	10.6	38.5	27.9
4	Locomotive Maintenance	15.4	29.0	13.6
5	Insurance	6.4	18.1	11.7
6	Locomotive Lease Expense	7.2	18.4	11.2
7	Year 1 Training and Start-Up	0	7.6	7.6
8	General and Administrative	13.3	18.6	5.3
9	Other	60.9	62.2	1.3
Total		**$199.4**	**$343.7**	**$144.3**

Source: Supp. Reply at III.D-157; "Additional Errata to Complainant Arizona Electric Power Cooperative, Inc.'s Opening Evidence," dated March 20, 2003

AEPCO will address each of these operating cost issues in turn.

1. Locomotives

a. Leasing

i. Road Locomotives

There is a single dispute between the parties with respect to the ACE's locomotive lease unit costs.[4] While Defendants have accepted AEPCO's annual lease costs for both SD70s (i.e., { } per locomotive) and SD40-2s (i.e., { } per locomotive), Defendants have objected to AEPCO's estimate of 2001 lease costs for C44-9 locomotives.

AEPCO based its annual cost estimate of { } for C44-9 locomotives on a lease agreement provided by BNSF in discovery. Under the terms of that agreement, BNSF paid { } per locomotive in 2001 to lease thirty C44-9 locomotives.[5] Defendants, however, have argued that the annual locomotive lease costs drawn from the subject lease agreement vary over time and therefore must be "normalized" over the 21.5-

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[4] In its Opening Evidence narrative, AEPCO designated four types of road locomotives for use by the ACE; namely SD90s, SD70s, C44-9s, and SD40-2s. See AEPCO Op. at III-D-1. In the cost calculations that it submitted on Opening and Rebuttal, however, AEPCO included costs for only three types of road locomotives; i.e., the SD70s, C44-9s, and SD40-2s. As BNSF/UP correctly assumed in their Supplemental Reply, AEPCO hereby clarifies that it does not intend to include SD90 locomotives in the ACE fleet.

[5] The { } figure constituted the sum of the first two semi-annual lease payments found in the BNSF locomotive lease agreement. See AEPCO Op. Workpapers Vol. 8, p. 3596.

year life of the agreement, resulting in an annual lease cost of { }. See Supp. Reply at III.D-1 to 2.

The actual BNSF lease specifies fixed payments for each semi-annual period throughout the life of the lease. These payments are not subjected to an inflation index. By contrast, the DCF model used by the Board in stand-alone proceedings calculates total operating expenses for the first quarter of the base year and then increases these expenses in the aggregate each quarter based on an overall RCAF index, which reflects future increases in the lease expenses. Defendants' proposed use of a "normalized" lease cost will thus result in a double-count of the increase in lease payments over time. This overstatement would amount to { } per unit over the 20 year DCF period (if the Board were to use Defendants' proposed cost index).

In TMPA, BNSF attempted to utilize the same "simple average" procedure that Defendants advocate in the instant case. The Board rejected that procedure, finding that it "overstates the annual cost in the early years of the lease." See TMPA at 79. Instead, the agency utilized the "actual lease payment schedules in the lease agreements . . . Neither party has justified a departure from this obvious measure." Id. The same result should apply in this case.

ii. Switching Locomotives

On Opening, AEPCO inadvertently mis-identified the ACE's switch locomotives as "SP-15" locomotives. In their Supplemental Reply, Defendants propose

to use SD40-2 locomotives for switch operations and Defendants accept AEPCO's unit cost for those locomotives. AEPCO concurs with Defendants that the ACE should use SD40-2 locomotives for switching operations and includes the cost of four SD40-2 locomotives in its Supplemental Rebuttal cost restatement for switching service and one for work-train service.[6]

b. Maintenance

Defendants contend that AEPCO erred in certain respects regarding the annual maintenance cost per locomotive unit-mile and the cost for periodic overhauls of each locomotive. See Supp. Reb. at III.D-2.

i. C44-9 Locomotives

First, as to C44-9 locomotives, Defendants indicate that AEPCO understated the maintenance costs per locomotive unit-mile by using the unit costs associated with incremental locomotives from the contract on which AEPCO relied rather than the costs associated with base locomotives in that contract. (The contract specifies one maintenance cost for the first { } locomotives and a separate, lower maintenance cost for additional units added to the contract). Defendants are correct that AEPCO utilized the incremental cost rather than the base cost, and AEPCO is correcting that error in its Supplemental Rebuttal restatement of ACE operating expenses in the DCF model.

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[6] As indicated in Parts III-C supra and III-D-4 infra, AEPCO disagrees that the ACE needs to provide more than one additional SD40-2 locomotive for work train service.

AEPCO, however, has identified another error in the parties' evidence regarding locomotive maintenance. Specifically, AEPCO inadvertently utilized the 4Q01 maintenance rate level rather than the 1Q01 rate level on Opening. Defendants, in turn, adopted the 4Q01 rates for the base locomotives, as well. In this Supplemental Rebuttal, AEPCO uses the correct 1Q01 rate level from the subject maintenance contract. See AEPCO Op. Workpapers Vol. 8, pp. 3614-3617.

In addition to the foregoing, when Defendants "corrected" AEPCO's use of the C44-9 locomotive maintenance costs, Defendants applied those costs incorrectly, as follows:

(1) The base unit cost applied only to the first { } unit miles per month and per unit, but Defendants applied the base unit cost to all locomotive unit miles per unit (i.e., { } LUMs per unit).

(2) The overmile maintenance rate for between { } LUMs per unit should be the base rate "reduced" by { }. Defendants instead used { } of the base rate for miles between { } miles. This error is in addition to incorrectly applying the base rate to these miles as discussed in (1) above.

(3) The overmile rate for LUMs above { } should be the base rate "reduced" by { }. Defendants used { } of the base rate rather than reducing the base rate by { }. As with the previous overmile rate, this rate was used in addition to the base rate discussed in (1) above.[7]

[7] The maintenance agreement used to determine these rates is included in AEPCO's Opening Workpapers. See AEPCO Op. Workpapers Vol. 8, pp. 3618-3693.

In this Supplemental Rebuttal, AEPCO is using the maintenance rates from 1Q01 for the base locomotives in the contract and applying the base and overmile unit costs in the correct manner.

ii. SD40-2 Locomotives

Next, as to SD40-2 locomotives, Defendants contend that AEPCO did not specify a separate per-mile or overhaul maintenance cost. Defendants are correct in this observation, but Defendants overstate their maintenance cost for SD40-2 locomotives in three ways.

(1) First, in the same manner as described supra regarding the C44-9 locomotives, Defendants incorrectly applied the base rate to all miles rather than applying the base rate merely to the first { } LUMs per unit per month and then applying the overmile rate to miles above the first { } miles.

(2) Second, the maintenance agreement calls for two semi-annual payments for each locomotive equal to the base { } LUMs for six months multiplied by the unit cost, which in this instance is { } per LUM. Defendants have incorrectly interpreted this language to mean that one should first double the unit cost to { } and then multiply it by total annual miles (base miles plus overmiles), thereby doubling the maintenance cost.[8] The correct approach to determining base rate maintenance cost is to multiply the { } miles for six months, then multiplying this product by two to represent a full year, and only then adding the overmile portion of the rate.

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[8] For example, the correct annual amount is equal to two semi-annual payments of { } LUMs or { } per unit. Defendants double the unit price to equal { } and multiply it by annual miles of { } miles (when using only minimum base year miles) to equal an annual cost of { } per unit.

(3) Third, as stated in (1) above, Defendants applied the base rate *and* overmile rates to miles greater than { } LUMs per unit per month. In addition, Defendants also doubled the overmile rate, just as they doubled the base rate in item (2) above. The contract calls for an overmile rate of { } and Defendants have used an overmile rate of { }.[9]

Defendants' locomotive maintenance discussion also criticizes AEPCO's calculation of LUMs for the ACE. See Supp. Reply at III.D-3. AEPCO addresses the subject of LUMs in Part III-D-1(d)(iv), infra.

c. Servicing

Defendants have accepted AEPCO's locomotive servicing cost of { } per locomotive unit-mile for LUMs associated with the replicated BNSF lines, but have applied a much higher cost of { } per locomotive unit-mile for LUMs associated with the replicated UP lines.[10] It is improper to use UP's cost per LUM in this case because stand-alone cost theory dictates that ACE should be able to benefit from BNSF's lower (yet obviously feasible) cost. In this instance, BNSF's unit cost is lower than UP's unit cost and there is no reason to arbitrarily impose UP's higher unit cost on the ACE for the portion of the move over the real-world UP's system. Moreover, Defendants have not followed this same procedure elsewhere. For example, as discussed in Part III-D-3, infra, Defendants apply BNSF crew wages to all of the ACE's T&E

[9] The maintenance agreement used to determine these rates and their application is included in Defendants' Supplemental Reply Workpapers. Id. at III.D-0017 to 0024.

[10] These locomotive servicing costs are based on BNSF and UP's system average costs for 2001 as developed from their respective R-1 Annual Reports.

employees without even examining UP's T&E personnel wage rates. Defendants' inconsistent approach should be rejected.

d. Fuel, Sand & Lubrication

Defendants attempt to increase the ACE's fuel expenses in a number of different respects. Each effort is improper and should be rejected by the Board.

As an initial matter, AEPCO notes that the { } per gallon fuel price that it utilized on Opening is itself significantly overstated. In particular, AEPCO derived a 1Q01 fuel price of { } per gallon by indexing BNSF's 2001 average price per gallon from the R-1 Annual Report to 1Q01 based on the AAR fuel index.[11] This amount is then indexed in AEPCO's DCF model to future quarters using the RCAF-A and indexed in Defendants' DCF model to future quarters using the RCAF-U. In both instances, this indexing procedure results in an overstatement of BNSF's actual fuel price. In fact, in 2001, BNSF paid an average of only { } per gallon for fuel. See AEPCO Supp. Reb. Workpapers Vol. 2, p. 00223. Applying the RCAF-A and RCAF-U results in an average fuel price per gallon for the ACE of { } and { }, respectively. See Supp. Reb. electronic workpaper file "BNSF Fuel Price Comparison.xls." Both of these numbers exceed the actual amount paid by BNSF in 2001.

[11] BNSF's actual 1Q01 fuel price was { } per gallon as shown in AEPCO Supp. Reb. Workpaper Vol. 2, p. 00222.

Despite this overstatement, AEPCO is continuing to use its Opening fuel price of { } per gallon to calculate the ACE's fuel expense. Given the overstatement inherent in this number, however, it is evident that Defendants' proposal to sharply increase this figure reflects a huge and improper increase over Defendants' true system-average fuel costs.

i. BNSF/UP's Proposed Cost of Transporting Fuel Constitutes an Impermissible Barrier to Entry

Defendants wrongly contend that because no fuel supply source currently exists at the principal location at which the ACE fuels its locomotives (i.e., Vaughn, NM), the ACE is responsible for the cost of transporting locomotive fuel to Vaughn from the point of BNSF's existing fuel supply (i.e., Belen, NM), which is located 106.5 miles to the east. See Supp. Reply at III.D-5 ("No source of fuel currently exists at Vaughn, which is an isolated rural outpost far from any refinery, pipeline or other industrial infrastructure."); id. ("BNSF today obtains most of its fuel at Belen from a pipeline that runs through Belen (but does not run near Vaughn).").

Defendants propose that the only logical method for the ACE to obtain its needed fuel is to arrange for delivery of fuel in railroad tank cars moving in tariff service via the residual BNSF from Belen to Vaughn, and assert that the ACE would incur an expense of { } per year for this service. See Supp. Reply electronic

workpaper "Fuel Work Sheet.xls."[12] Notably, Defendants claim that the ACE should bear the transportation costs of fuel to be used in ACE locomotives and in the residual BNSF's locomotives, as well. Id. at III.D-6 to 7. This latter category generates the majority (i.e., 66%) of the fuel transportation costs that Defendants would add to the ACE's annual fuel budget. See Supp. Reply electronic workpaper file "Fuel Work Sheet.xls," lines 105-128.

In seeking to force the ACE to incur a cost that Defendants themselves avoid, Defendants are seeking to impose an impermissible entry barrier. See West Texas Utilities, 1 S.T.B. at 670 ("WTU would define as entry barriers, and exclude from the SAC computation, any costs that a new entrant must incur that were not incurred by the incumbent . . . We agree with WTU's approach, because it comports with our regulatory purpose of constraining a railroad from monopoly pricing.");[13] Arizona Public Service Co. v. The Atchison, Topeka and Santa Fe Ry., 2 S.T.B. 367, 386 (1997) ("APS") ("[A] SAC computation should exclude any sunk costs that were not incurred by the incumbent.").

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[12] Defendants also propose in Part III-F that the ACE would be required to spend over $63 million to construct facilities capable of unloading fuel from these BNSF-delivered tank cars. See Supp. Reply at III.F-191.

[13] See Burlington N. R.R. v. STB, 114 F.3d 206, 214 (D.C. Cir. 1997) ("Here, the Board defined barriers to entry as those 'costs that a new entrant must incur that were not incurred by the incumbent.' . . . We are satisfied that the Board's classification of land assemblage and grade-crossing costs was reasonable. . . . The Board's approach is consistent with [the] scholarship and with the Commission's precedents. . . .").

Defendants fail even to suggest – let alone demonstrate – that BNSF's corporate predecessor actually financed the construction of a fuel supply chain to Belen, and thus, it would be improper to compel the ACE to bear costs related to the fuel supply chain to Vaughn. See, e.g., West Texas Utilities at 672 ("BN has not shown where it was the junior party. Therefore, we do not include any grade separation costs in the SAC analysis."); APS at 386 ("Santa Fe has not shown that it incurred these costs when the original right-of-way was constructed, however, and we therefore exclude such costs from the SAC computation."). This complete absence of proof in the BNSF/UP Supplemental Reply regarding the financing of the existing fuel supply at Belen requires that the Board reject the proposed fuel transportation cost between Belen and Vaughn as to both ACE and BNSF locomotives.

In any event, Defendants are mistaken that the ACE could not obtain fuel at Vaughn for the same price that is reflected in BNSF's R-1 Report. In fact, AEPCO's witness George L. Donkin, who is an expert in the evaluation of pipeline economics, has confirmed that a fuel supplier would easily be able to extend the existing pipeline to Vaughn and deliver fuel at prices below the fuel cost assumed by AEPCO in its Opening Evidence. See pp. III-B-21 to 29, supra.

ii. Use of UP Unit Costs

Defendants contend that in order to calculate the cost of fuel consumed by ACE locomotives on the southern portion of the ACE's system, the Board should utilize

system-average fuel prices from UP's, rather than BNSF's, 2001 R-1 Report. See Supp. Reply at III.D-7. UP's system-average fuel price was { } cents per gallon for the first quarter of 2001. Id.

Defendants fail to offer any basis for their contention that the ACE should be precluded from purchasing locomotive fuel at a consistent price. Given the fact that both the BNSF price and the UP price are system-average figures, and Defendants' failure even to suggest that those figures are entirely uniform across their respective systems, there is no basis for Defendants' argument that the ACE should pay a higher fuel price at El Paso than at Vaughn. See also pp. III-B-21 to 29, supra.

iii. Escalation Using the RCAF-U

Defendants argue that it is improper for AEPCO to have escalated the ACE's fuel price using the RCAF-A rather than the RCAF-U. See Supp. Reply at III.D-8. As AEPCO explains in detail in Part III-G, infra, the Board should escalate ACE operating costs using the RCAF-A.

iv. Fuel Consumption Rate

Defendants contend that the Board should reject AEPCO's use of the system average fuel consumption rates actually experienced by BNSF, and instead should rely on a "TPS" simulation purportedly demonstrating a fuel consumption rate (in gallons per LUM) a staggering 23.9% higher than the fuel consumption rate calculated by AEPCO based on the ACE's train statistics and URCS consumption factors. See Supp.

Reply at III.D-8 to 15.[14] In support of this study, Defendants argue that "it is well known that intermodal trains, which comprise the majority of ACE's traffic, have unusually poor aerodynamic characteristics, caused by the varying heights of trailers and containers and the gaps between them." Id.[15] As AEPCO demonstrates, however, Defendants' fuel study is improper and should be rejected by the Board.

First, AEPCO notes that Defendants filed three rounds of variable cost evidence in this case prior to filing their Supplemental Reply. In each instance, Defendants relied upon system-average fuel costs to determine the variable costs of the issue movement, notwithstanding their present claim regarding the superiority of TPS estimates,[16] and their observation that "[l]ong before this case came before the Board, UP and BNSF agreed to allocate their responsibility for fuel consumption in connection with interline movements of AEPCO's coal. . . . The fuel consumption identified in that agreement was determined using UP's train performance simulator." See Supp. Reply at III.D-13.[17] It is entirely reasonable to ask why Defendants should be permitted to

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[14] Defendants' overall estimate of gallons consumed (i.e., gallons per LUM multiplied by total LUMs for each locomotive type) exceeds AEPCO's estimate by an even greater 41.5%.

[15] Defendants do not quantify the impact of this "aerodynamic" issue.

[16] See Supp. Reply at III.D-13 ("TPS is particularly well suited for use in estimating fuel consumption rates in this case.").

[17] Significantly, AEPCO requested in discovery that Defendants produce: (i) studies of locomotive fuel consumption for the issue traffic; and (ii) agreements

(continued...)

advocate the use of system-average fuel consumption for variable cost purposes but to advocate the use of a TPS simulation for stand-alone cost purposes, when by their own admission, they have generated TPS simulations for both the issue traffic and the ACE's traffic group. At the very least, this inconsistency strongly suggests that Defendants' existing – but unfiled – TPS analysis of fuel consumption for the issue movement shows fuel costs ***below*** system-average levels. The Board should hold Defendants to their prior arguments in favor of system-average fuel costs.

Next, relevant precedent confirms that the Board will not accept the results of a fuel simulation study absent confirmation that the results of that study are consistent with measured fuel consumption. Specifically, in its Wisconsin decision, the Board rejected fuel consumption statistics that similarly were drawn from a TPS simulation performed by Union Pacific:

> We also cannot accept UP's evidence on this [locomotive fuel] expense. UP would have us rely on fuel consumption rates generated by its "Train Performance Simulator" (TPS), a computerized simulation model. However, as WPL points out, there is no evidence that the results of UP's TPS model correlate with measured fuel consumption of any actual trains.

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[17](...continued)
between the Defendants regarding the issue traffic. See AEPCO Request Nos. 22 and 34 and AEPCO Interrogatory Nos. 5-13 included herewith in Supp. Reb. electronic workpaper file "AEPCO Discovery Requests and Responses.pdf." Defendants failed to produce their TPS studies of the issue traffic and argued that the agreements sought by AEPCO were irrelevant to this case. Id. The Board agreed with Defendants in this respect its decision served December 31, 2001, at 7.

See Wisconsin at 55 (emphasis added).

The same defect that the Board identified in Wisconsin also is present in this case; namely, there is "no evidence that the results of [Defendants'] TPS model correlate with measured fuel consumption of any actual trains." While Defendants attempt to distinguish their use of TPS from the Wisconsin case, Defendants fail even to mention this chief failure of proof in Wisconsin, and they fail to offer any evidence of a correlation between the TPS model and actual (i.e., measured) fuel consumption in this case as well.[18]

This lack of evidence is particularly striking here in light of Defendants' comments that "TPS simulations are widely used in the railroad industry" and that "TPS is a tool that UP, BNSF and other railroads have used for many years in the ordinary course of their businesses to estimate fuel consumption rates . . . ." See Supp. Reply at III.D-12. In this regard, Defendants even go so far as to observe that:

> [l]ong before this case came before the Board, UP and BNSF agreed to allocate their responsibility for fuel consumption in connection with interline movements of AEPCO's coal. The fuel consumption identified in that agreement was determined using UP's train performance simulator.

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[18] Defendants attempt to distinguish the Board's rejection of TPS-derived fuel consumption rates in Wisconsin by arguing that "[t]he Board's resolution of the *variable cost* issue in WP&L should have no bearing on the treatment of fuel consumption rates *for SAC purposes* in this case." See Supp. Reply at III.D-12 (emphasis in original). This argument is inapposite because the same need for validation of cost estimates (i.e., conformity with measured fuel consumption) exists with respect to stand-alone cost estimates.

(a) Overstatement of the Number of Locomotives per Train

As to BNSF, Defendants determined the number of locomotives per train by utilizing AEPCO's opening electronic workpaper "bnsfsactrn01.xls," which, amongst other data, summarized the number of active locomotives on each 2001 BNSF train at the on-SARR and off-SARR points of the ACE system. BNSF then utilized the on-SARR number of locomotives for each train in determining the average number of locomotives per train type.[21] The overstatement occurs because, in many cases, BNSF trains entering the ACE system at Defiance have locomotives removed at Gallup and Belen. For example, train "B3PHXKCK07A2001-01-07" arrived at Defiance with { } locomotives, had { } removed at Gallup, { } removed at Perea, NM, and { } removed at Belen.[22] Given BNSF's methodology, even though { } percent of the locomotive power was removed, BNSF utilized all { } in its fuel consumption analysis. This type of overstatement was not an isolated instance. As shown in Rebuttal workpaper "BNSF Overcount.xls," over { }

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[21] In some instances, due to corrupted data in BNSF's train movement files, the on-SARR number of locomotives was zero. When this occurred, Defendants used the off-SARR number of locomotives.

[22] It is reasonable to question the accuracy of underlying BNSF train movement data provided in discovery on which AEPCO based its opening workpaper. The { } locomotives assigned to this bare-table (empty flat cars) intermodal train gave it a horsepower to trailing ton ratio of { }, i.e., over { } times higher than all scheduled Z-trains. See AEPCO Supp. Reb. electronic workpaper files "BNSF Loco overcount examples.xls" and "BNSF Scheduled HP Per Trailing Ton.xls."

percent of the trains had a lesser number of locomotives when they left the SARR than when they entered it.

On the other hand, Defendants determined the number locomotives on trains operating over the UP portion of the ACE route by performing a special analysis of UP's train event records to extract what Defendants claim is the number of locomotives on each UP train when it reaches the on-SARR and off-SARR points of the ACE route.[23] Defendants then determined the number of locomotives per train by taking a simple average of the reported on-SARR and off-SARR number of locomotives. This methodology overstates locomotives in two ways.

First, according to UP train event records, UP adds and removes locomotives to many of its trains at Straus, NM, 17.7 miles from El Paso, which is the eastern end of the ACE's replicated UP line segment.[24] By taking a simple average of the on-SARR and off-SARR locomotive numbers, UP is implicitly indicating that it adds locomotives to its trains half way along the ACE route, not near the very end.

Second, the train event data which UP used to develop its on-SARR and off-SARR train counts routinely double counts the number of locomotives on the UP trains. AEPCO found that in 4.9 percent of the records used by UP, it double counted the

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[23] See Supp. Reply electronic workpaper file "upsactraf01.zip."

[24] The UP line segment between Cochise and El Paso that is replicated by the ACE is 236.3 miles in length.

number of locomotives on the trains. See Supp. Reb. electronic workpaper file "UP Reply Calculation of LUM.xls."

(b) Defendants' Simulation Operated Trains Considerably Differently than Real-World Train Operations

Defendants simulated fuel consumption using the TPS model. The TPS model estimates each train's fuel consumption by estimating the time each locomotive spends in each throttle position, and then multiplying the time spent in each throttle position by the amount of fuel consumed per hour by throttle position. The higher the throttle position the locomotive is in (with "idle" being the lowest position and Notch 8 being the highest), the more fuel is being consumed.[25] Using what Defendants assert are average train specifications, Defendants' TPS model simulated each train type (i.e., loaded coal, empty coal, high priority intermodal, manifest, etc.) moving over the ACE route in an unimpeded manner at maximum allowable train speeds.

Significantly, Defendants' TPS simulation assumed that the ACE's trains would operate at average rates of speed far beyond real-world speeds and those speeds developed by AEPCO in its string diagram model simulation of the ACE's operations. Defendants therefore were faced – by their own admission – with the need to account for

[25] Fuel consumption is greatly increased when a train is run at high speeds (i.e., in a high throttle position) between stations and then left to idle for long periods of time while at stations. (Fuel consumption increases disproportionately as throttle position increases.)

the cycle time disparity that their "super-speed" assumption created. Id. at III.D-11 ("[T]he total time that the simulated trains spent on ACE lines was less than the time ACE trains would spend on the SARR when other traffic was present."). Defendants chose to fill this time with the assumption that the ACE locomotives would sit for long periods in the idle throttle position. Id. ("It was necessary to make an adjustment to reflect this difference in transit times in order to determine fuel consumption for the entire time the train was on the ACE system. To make the adjustment, defendants' expert Mr. Wheeler assumed that the difference between the actual transit times for ACE trains and the transit times resulting from the TPS simulation was idling time.").[26] In other words, Defendants created a "problem" through improper operating assumptions, and then devised a "solution" to that problem. Notably, the manufactured problem and the artificial solution each improperly increased Defendants' fuel consumption calculation.[27]

An example of Defendants' improper speed assumption is seen in the simulation of BNSF "Z-Trains." The Z-Trains are a special class of the real-world

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[26] Defendants could have obtained more accurate results by modifying their "top throttle position" assumption such that simulation transit times would have matched AEPCO's ACE transit times. With such a modification, the fuel consumed by the ACE's locomotives during actual movements would have been shown to be lower, and there would have been no need for Defendants' artificial "idling" adjustment.

[27] Excessive time spent at full throttle (or sitting in the idle throttle position in a yard) greatly increases fuel consumption per LUM relative to normal locomotive operations. See Supp. Reply at III.D-9 ("Fuel consumption does not increase in direct linear proportion to increases in velocity. Fuel consumption increases at an increasing rate as speed increases, particularly at higher speeds.").

BNSF's high-priority service to intermodal shippers with time-sensitive shipments. They are the most time sensitive of BNSF's intermodal traffic. Time from origin to destination is designed to be competitive with over-the-road trucks operated by teams of drivers, and trains cover as much as 1,100 miles per day. Z trains are the highest priority freight traffic on the BNSF system. Special steps must be taken to ensure that they meet their tight schedules. All potential causes for delay are minimized. Hence, little or no switching activity occurs on most Z trains. Dispatchers give priority to Z trains, directing other trains to pull into sidings to allow Z trains to pass when necessary. Z trains, in turn, rarely stop for other trains to pass or meet, and would usually do so only if meeting another Z train running on a tighter schedule. Even track maintenance windows are scheduled to avoid delaying Z trains.[28]

In Defendants' TPS simulation, the average running time for eastbound and westbound Z-Trains on the ACE system was { } and { } hours, respectively. Average actual running times for eastbound and westbound Z-Trains on the real-world BNSF, however, are { } and { } hours, for differences of { } and { } hours, respectively.[29] Given that Z-trains are rarely if ever placed on sidings to let other trains pass, one would expect that the simulated times would be nearly equal to the actual times.

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[28] This description of Z-train traffic was drawn from the Public Version of BNSF's Reply filing in the Otter Tail case. See Docket No. 42071, BNSF Reply Narrative at III.A-45 to 46.

[29] See Supp. Reply electronic workpaper file "UP BNSF Train TIME-FUEL1.xls," worksheet "BNSF Trains."

The fact that actual transit times are less than simulated times means that even BNSF's highest priority trains are operated at less than their maximum speeds in the real-world (and less than top throttle positions), and therefore consume less fuel than Defendants contend.

Notably, Defendants' operating assumptions significantly deviate from BNSF standard operating rules for conserving fuel, as outlined by BNSF in its "Air Brake and Train Handling Rules" handbook. See Supp. Reb. Workpapers Vol. 2, pp. 00228-232. Included in this handbook at Section 106 are rules designed specifically for conserving fuel:

(1) Rule 106.1.1 – Regulating Horsepower per Ton - Train and engine crews are required to isolate units in a consist that are in excess of the scheduled Horsepower per ton ("HPT").

(2) Rule 106.1.2 – Speed Reductions for Fuel Conservation – The train dispatcher may issue instructions for train speed to be reduced to less than maximum authorized timetable speed for fuel conservation.

(3) Rule 106.1.3 Empty Unit Trains – Horsepower Restrictions – Empty unit trains, i.e., coal, taconite, grain, potash and sulfur must not operate with more than 9,000 working horsepower ("HP") on line.

(4) Rule 106.1.7 – Locomotive Shut Down Policy – At all points, when locomotives will not be used within one (1) hour, all locomotives must be shut down, when current and expected ambient temperatures is 40 degrees F or above.

The simulated train runs on the TPS and the adjustments made after the simulations violate every one of the foregoing train operating rules which the real-world BNSF employs to conserve fuel:

Rule 106.1.1 - Regulating Horsepower per Ton

Rule 106.1.1 states that engine crews are required to isolate units in a consist that are in excess of the scheduled HP. Crews working on trains with symbols "Z," "Q," or "P" must isolate excess units to be close to (but not below) scheduled HP. Crews working all other train types must isolate excess units, but not more than 0.5 HPT below scheduled HPT.

In discovery, BNSF provided Train Schedules for certain trains operating over the ACE route. These Train Schedules included the scheduled HPT. A review of Defendants' analysis, in which they assigned locomotives to each ACE train type, shows that in many cases they violated BNSF's own rule 106.1.1 in their TPS simulation.

AEPCO has summarized the scheduled HPT for BNSF Z-Trains operating over the ACE route.[30] The scheduled HPT for these trains range from { } HPT, with the majority of the trains scheduled to operate with { } HPT. For those Z-Trains where BNSF provided a Train Schedule,[31] AEPCO compared the scheduled HPT

[30] AEPCO analyzed Z-Trains because their scheduled HPT were constant over the entire length of the ACE route.

[31] BNSF did not provide Train Schedules for each train operating over the ACE route.

to the HPT BNSF used on these trains in determining their average train statistics for the fuel simulation. AEPCO found that when the Defendants simulated trains in their TPS, they violated BNSF's HPT rules in over 1,300 instances by utilizing excess operating horsepower in its trains. This excess operating power overstated the locomotive requirements on the Z-Trains, and, therefore, led to an overstatement of fuel consumption.[32]

Rule 106.1.2 - Speed Reductions for Fuel Conservation

As stated above, the TPS simulations operated trains at their maximum allowable speeds at all times. This rule would indicate that BNSF's dispatchers routinely slow trains below the maximum allowable speeds to conserve fuel. This is the most likely reason actual Z-Train time discussed above are below the simulated Z-Train times.

Rule 106.1.3 Empty Unit Trains - Horsepower Restrictions

This operating rule states that empty unit trains must not operate with more than 9,000 working HP on line. In their TPS simulation, Defendants placed { } working HP on empty eastbound coal trains, { } working HP on empty westbound coal trains and { } working HP on empty east bound grain trains.[33] In

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[32] See Supp. Reb. electronic workpaper file "BNSF Scheduled HP Per Trailing Ton.xls."

[33] See Supp. Reply electronic workpaper file "bnsfsactrn01 mode trains.xls," worksheet "BNSF trains."

other words, Defendants utilized { } times as much HP, and therefore, consumed { } times as much fuel, as BNSF's operating rules allow.

Furthermore, in determining the operating characteristics for Other Unit Trains, or "U" Trains, Defendants overpowered empty unit trains over 25 percent of the time by placing more than 9,000 HP on these trains.[34]

Rule 106.1.7 - Locomotive Shut Down Policy

This operating rule states that locomotives must be shut down when locomotives will not be utilized within one hour. In developing their idle time fuel consumption adjustment to the TPS fuel consumption data, Defendants assigned a dwell time at Vaughn ranging from { } hours depending on the train type. Those trains that had dwell times at Vaughn greater than 1.0 hours should have had their locomotives shut down, and should not have been included in the fuel consumption analysis.

(c) Mathematical and Analytic Errors in the Fuel Consumption Study

In developing their fuel consumption study, Defendants: (1) overstated idle fuel consumption rates; and (2) improperly classified empty trains as loaded trains. First, as to fuel consumption, Defendants assert in their simulation that SD-70 idle fuel consumption equals { } gallons per hour. See Supp. Reply electronic workpaper file

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[34] See Supp. Reb. electronic workpaper file "BNSF Scheduled HP Per Trailing Ton.xls," range "Other_Unit_Train."

"UP BNSF Train Time – Fuel1.xls," worksheet "Idle fuel consumption," cell B8. The TPS simulation software, however, itself states that actual SD-70 idle fuel consumption is { } gallons per hour, or { } lower than that assumed by Defendants.[35]

With regard to the classification of loaded/empty trains, Defendants improperly classified empty coal and grain trains as loaded trains. In their Reply electronic workpaper "UP BNSF Train TIME-FUEL1.xls," worksheet "BNSF Trains," Defendants indicate that empty eastbound and westbound coal trains have { } and { } loaded cars, respectively and { } empty cars. Similarly, eastbound grain trains, which BNSF states are really empty grain trains, or "X" trains, have on average { } loaded cars and { } empty cars.[36]

Classifying empty trains as loaded trains impacts fuel consumption in two ways. First, as discussed above, empty unit trains are scheduled to use less locomotive power than loaded trains, and therefore consume less fuel. Second, because empty trains weigh less than loaded trains, they experience less rolling and grade resistance and therefore consume less fuel.

* * *

For each of the foregoing reasons, the Board should reject Defendants' TPS fuel simulation.

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[35] See Supp. Reply electronic workpaper file "LOCTRN.txt."

[36] See Supp. Reply electronic workpaper file "UP BNSF Train TIME-FUEL1.xls," worksheet "BNSF Trains."

v. Locomotive Unit Miles

Defendants state that in calculating locomotive maintenance costs, they did not use AEPCO's calculation of locomotive unit miles because they were "clearly unreliable." See Supp. Reply at III.D-3. Defendants describe AEPCO's method for calculating locomotive unit miles as follows:

> First, AEPCO derived the number of LUMs for its "peak" period from its string program which, as descibed in Section III.C above, is fundamentally flawed for a variety of reasons. Second, as shown in AEPCO Opening Exh. III-C-2, AEPCO purported to calculate a "peak" annual number of LUMs. AEPCO then reduced that so-called peak number by multiplying by the ratio of the tonnage AEPCO claims would be transported annually based on the peak period divided by the tonnage AEPCO claims would actually be transported over the full year 2001. There is no reason to take this convoluted approach when all of ACE's 2001 train and their routes over the ACE network have been specified by AEPCO.

Id. at III.D-3 to 4.

Defendants then proceed to describe their method for determining locomotive unit miles as follows:

> Defendants derived the number of LUMs accrued by ACE in 2001 by simply identifying the number of route miles traveled by each train over the SARR, counting the appropriate number of LUMs for each locomotive on each train, and summing the LUMs for all locomotives on all trains.

Id. at III.D-4.

AEPCO's methodology yields 28.6 million LUMs in 2001 for the ACE and Defendants' methodology produces 32.6 million LUMs in 2001 or 14.3 percent more than AEPCO's calculation.[37] While at first blush Defendants' approach to determining LUMs for the 2001 base year may seem reasonable, examination of their actual calculations yields numerous errors which result in an overstatement of the LUMs in the 2001 base year. As a result, Defendants' calculations are unreliable and cannot be used. These overstatements are discussed separately below for the BNSF and UP portions of the ACE route as the Defendants use different data and methods to calculate LUMs for ACE trains on these separate portions of its system.

First, with respect to LUMs over the replicated BNSF lines, there are three errors in Defendants' calculation of the ACE's LUMs in 2001:

1. When summing LUMs for trains with C44-9 locomotives, Defendants' spreadsheet points to an incorrect cell, thereby miscalculating the LUMs associated with these locomotives. C44-9 locomotives are used on 20,715 of the 24,437 BNSF trains moving over the ACE in 2001. See Supp. Reb. electronic workpaper file "BNSF Reply Calculations of LUM.xls."

2. BNSF's data shows a greater number of locomotives on 1,733 trains when they enter the ACE system than when they leave the ACE system. In each of these instances, when calculating the number of LUMs, Defendants incorrectly assume that the number of locomotives on the train when it enters the ACE system is the

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[37] See AEPCO Reb. Exhibit III-C-2 and Defendants' Supp. Reply electronic workpaper files "bngfsactrn01.xls" and "upsactrn01.xls." In this Supplemental Rebuttal, AEPCO calculates locomotive unit-miles of 32.1 million LUMs. See Supp. Reb. Exhibit III-C-4.

number of locomotives that are on the train the entire time it is on the ACE system. Id.

3. In their Supp. Reply at III.C-26 n.49, when discussing the accumulation of locomotive hours for determining the number of locomotives required, Defendants indicate that where an actual BNSF or UP train had more than six locomotives, Defendants assumed "that some locomotives were being ferried and used only six locomotives in determining AEPCO's locomotive requirements." Assuming that this equally applies to the correct calculation of LUMs for the ACE, Defendants should not include LUMs associated with more than six locomotives on any given train. BNSF trains have more than six locomotives in 454 instances. In each of these instances, Defendants improperly accumulated locomotive unit miles for all locomotives on the trains. See Supp. Reb. electronic workpaper file "BNSF Reply Calculations of LUM.xls."

Next, with regard to the ACE's LUMs for operations over the replicated UP lines, Defendants' data identifies up to seven specific locomotive unit numbers for each train, and uses the number of units that were identified regardless of the number of units actually on the train. There are also three errors in using the identified locomotive units in Defendants' calculation of LUMs for the ACE in 2001 over the replicated UP lines:

1. Duplicate entries exist for locomotives specifically identified on 661 trains. See Supp. Reb. electronic workpaper file "UP Reply Calculations of LUM.xls."

2. The actual number of locomotives on the train when it enters or leaves the ACE system is less than the number of locomotives specifically identified on 447 trains. Id.

3. As stated in item 3 for BNSF above, Defendants state that they limit the number of locomotives included in their count to six locomotives per train. However, Defendants did not make this limitation. Instead, for 216 trains, Defendants included all locomotives

specifically identified (including duplicates) with a maximum of seven units for any given train. Id.

For the foregoing reasons, the Board should reject Defendants' improper calculation of LUMs.

2. Railcars

Defendants have accepted AEPCO's base year railcar expense figure of $55,412,947. See Supp. Reply at III.D-15.

3. Personnel

a. Operating

Significant differences exist between the parties regarding operating personnel, both as to staffing levels and compensation. AEPCO notes that Defendants violate the basic premise of the stand-alone cost model by failing to identify the least-cost, most efficient means of providing the subject service.

In terms of the organization of evidence, the parties differ as to the classification of mechanical personnel. Specifically, AEPCO treats mechanical personnel within its discussion of operating employees. See AEPCO Op. at III-D-15 to 17. Defendants treat the ACE's mechanical personnel as non-operating employees. See Supp. Reply at III.D-32.

i. Staffing Requirements

(a) Transportation

Defendants propose to add 60 additional operating employees to the ACE staff, including: (i) five yardmasters; (ii) 27 crew haulers/utility clerks; and (iii) 24 train crew members and four work train crew members. AEPCO will address each proposal in turn:

***Yardmasters*:** Defendants contend that the ACE requires a yardmaster position at Vaughn to be staffed on a 24/7 basis by five individuals. See Supp. Reply at III.D-17 to 19. According to Defendants, it is "apparent" that the Manager and Assistant Manager of Train Operations at the Vaughn Yard "will not have the time, nor physically be in a position, to manage the minute-by-minute operation of the Vaughn Yard as required . . ." Id. at III.D-18. Accordingly, Defendants argue that a yardmaster is needed to be responsible for the operation of the yard. Essentially, Defendants' argument is that because the Manager and Assistant Managers of Train Operations at Vaughn have "overall responsibility for the operation of the terminal" (id.), they do not have the time to manage the operations within the yard. As such, Defendants' argument is circular and unavailing.

Each of the job functions that Defendants have created for the yardmaster can be performed either by the Manager of Operations Control headquartered at Vaughn or by the Manager and Assistant Managers of Train Operations at Vaughn. As AEPCO

explained in its Opening Evidence, these supervisory positions are responsible for the following functions:

> The Manager of Operations Control is responsible for coordination of the ACE's train and locomotive operations, and for supervising the train dispatchers and the crew management personnel who are on duty during [the Manager of Operations Control's] shift.
>
> . . . [and the Managers and Assistant Managers of Train Operations] are responsible for train operations . . . [and] perform FRA-mandated and other appropriate testing, and respond to and investigate accidents and day-to-day operating problems encountered by any busy railroad.

See AEPCO Op. at III-D-9 to 10. These responsibilities of existing ACE personnel cover those of the yardmaster position that Defendants would create. Accordingly, that position is unnecessary.

AEPCO's witness Yocum reports that during his tenure as Vice President-Transportation at CSX (C&O) in the early 1980's, CSX operated a yard at Elkhorn City, KY which handled a large volume of coal and manifest traffic (more than 25 trains per day) and which was also an interchange point. CSX had neither a yardmaster nor any other supervisors at the Elkhorn City Yard. No Trainmaster (the equivalent of the ACE Manger of Train Operations) was even stationed there; the closest Trainmaster was headquartered 15 miles away at Shelby, KY. Yet the yard functioned smoothly.[38]

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[38] Mr. Yocum further notes that the ACE does not require a yardmaster at Vaughn because the ACE is staffed by highly trained employees who can make decisions for (continued...)

Crew Haulers/Utility Clerks: Next, BNSF/UP argue that the ACE requires two around-the-clock crew hauler/utility clerk positions at each of the Defiance and Vaughn Yards, and one such position at each of the El Paso and Cochise Yards. According to Defendants, the "main duties assigned to these positions involve transporting train crews to and from trains within the yards and providing transportation for relief train crews that have exceeded their twelve hours-of-service limitation on the mainlines." See Supp. Reply at III.D-19 to 20. BNSF/UP propose that these crew haulers perform janitorial duties when not occupied with moving train crews. Using a multiplier of 4.5 individuals per position, BNSF/UP calculate that 27 additional ACE employees (equipped with Chevrolet Suburbans) are needed.

The crew hauler positions and associated vans are not required by the ACE as AEPCO has provided taxi service for all transport crew functions listed by Defendants except for moving crews within yards. The crews moving from trains to on/off duty locations can walk between these points rather than being driven.

Defendants also provide the taxi service referenced above, therefore to provide crew haulers (with Suburbans) and taxi service is redundant and double counts the associated costs. BNSF includes { } for crew haulers and approximately { } for the vehicles in addition to { } for taxi service.

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[38](...continued)
themselves. This model has been used successfully by many regional railroads.

Train Crew Members: Next, Defendants argue that AEPCO's determination of train crew (also referred to as "T&E") staffing requirements is too low and that an additional twenty-four train crew members and four work train crew members should be added. See Supp. Reply at III.D-20 to 23.

Defendants first insist that AEPCO's approach to annualizing crew needs understates those needs by 16 percent (id. at III.D-20 to 21), but Defendants then estimate the ACE's train crew count at a level that is only 9.5 percent higher than AEPCO's. In particular, Defendants contend that the ACE's train crews would consist of a total of 277 individuals, rather than the 253 identified by AEPCO. Id. at III.D-17.

Defendants fault AEPCO's determination of the ACE train crew requirements in the 2001 base year because it is based on the output of AEPCO's string model. See Supp. Reply at III.D-20 to 21. AEPCO determined the required number of crew personnel by multiplying the weekly crew starts determined for the peak week by 52 to obtain the annual number of crew starts in the annualized peak week, then made a downward adjustment to annual crew starts in the base year by multiplying the annualized peak week crew starts by the ratio of the annualized peak week tons to the 2001 base year tons. These crew starts were multiplied by crew members per start and then divided by 270 shifts per year to yield 253 T&E crew members required.

Defendants claim that a "straight-forward" counting exercise demonstrates that AEPCO has not provided sufficient crews to man the trains that would move across

the ACE. Defendants' Table III.D.4 (see Supp. Reply at III.D-22) claims to show the number of trains that would move over each segment of the ACE during 2001 and shows how many crew starts would be required based on these trains and the assumption that each crew member works 270 shifts per year. Defendants' methodology yields a total of 277 T&E crew members for the ACE in 2001.

Defendants' method maybe straightforward, but it is based on inconsistent data which results in an overstatement of the number of crew members required by the ACE. The inconsistencies result from the fact that the number of trains shown in Table III.D.4 does not match the number of trains in the underlying data. For example, Table III.D.4 shows that there are 13,207 trains moving between El Paso and Cochise, while the underlying data contained in Defendants' electronic file "upsactraf01.xls" shows only 13,179 trains moving over this segment in 2001. Similarly, Table III.D.4 shows 1,216 coal trains moving over BNSF segments and Defendants' underlying electronic data base "bnsfsactrn01.xls" shows only 1,172 coal trains moving over these segments.

In its Supplemental Rebuttal cost restatement, AEPCO continues to rely on the annualized peak week crew starts, adjusted to the base year, to determine T&E road crew requirements. See Supp. Reb. Exhibit III-C-4 (indicating that 276 T&E road crew members are required).[39]

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[39] The number of road crews increased in Supplemental Rebuttal from those shown previously as a result of the limited revenue adjustment discussed supra, at p. III-A-1.
(continued...)

On a related matter, Defendants argue that $253,000 should be added to the ACE's operating expenses for taxi costs associated with traffic flow imbalance problems. See Supp. Reply at III.D-23. This figure reflects a distance of 230 miles and a cost of $150 per trip. AEPCO accepts this argument and has included the $253,000 cost in its Supplemental Rebuttal calculations. See Supp. Reb. electronic workpaper file "AEPCO Operating Expenses.123."

Finally, Defendants address the crew needs for work trains. AEPCO addresses work trains in Part III-D-4, infra.

(b) Mechanical

Defendants state in their Supplemental Reply that AEPCO made inconsistent references to the number of inspection crews (i.e., two crews or three crews) that the ACE will employ at Vaughn:

> On page III-C-27 of its Opening Narrative, AEPCO states that "[t]wo [four-person] inspection crews will be on duty on a 24/7 basis at Vaughn and one [four-person] 24/7 inspection crew will be on duty at El Paso." . . .
>
> On page III-B-16 (sic) of its Opening Narrative, however, AEPCO states that, "three four-person crews will work each shift at Vaughn on a 24/7 basis" and "one four-person inspection crew will be on duty at El Paso on a 24/7 basis." . . .

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[39](...continued)
This adjustment has the effect of reducing the tons handled by the ACE in both the peak week and the base year, which in turn decreased the reduction in crew starts from the annualized peak week to the 2001 base year as shown in Supp. Reb. Exhibit III-C-4.

> Finally, in the summary of ACE Operating Employees in Table III-D-1 (page III-D-8 of AEPCO's Opening Narrative), AEPCO lists only 27 equipment inspectors.

See Supp. Reply at III.D-32.

Defendants, however, overlook the Errata filing that AEPCO made on March 20, 2003 to resolve this inconsistency. See "Additional Errata to Complainant Arizona Electric Power Cooperative, Inc.'s Opening Evidence."[40] Therein, AEPCO corrected its Opening evidence to indicate, inter alia, that: (i) two – rather than three – 24/7 inspection crews are needed at Vaughn; (ii) a total of 54 – rather than 27 – equipment inspectors will be needed on the ACE; and (iii) the ACE's total annual salaries for crew inspectors will be { } rather than { }. As shown in Table III-D-2 below, the actual disparity in the parties' inspector counts is 23, not the 50 that Defendants identify in their Supplemental Reply.

[40] Unfortunately, AEPCO itself overlooked this filing in submitting its original Rebuttal costs in this case. AEPCO's Supplemental Rebuttal cost restatement properly reflects the changes that AEPCO made in its March 20, 2003 errata filing.

TABLE III-D-2
Comparison of Equipment Inspector Staffing

	No. of 24/7 Crews at Vauhgn	Total Staffing for Vaughn	No. of 24/7 Crews at El Paso	No. of "One-Shift" Crews at El Paso	Total Staffing at El Paso	Total Equip. Inspector Staffing
AEPCO	2	36	1	0	18	54
Defendants	3	54	1	1	23	77
Difference	1	18	0	1	5	23

Note: Both AEPCO and Defendants utilize a 4.5 multiplier to determine the total staffing associated with 24/7 crews.

Source: AEPCO's March 20, 2003 Errata at 3; Supp. Reply at III.D-32 to 33

In support of their claim that three four-person inspection crews are needed at Vaughn, Defendants state that the three four-person crew figure is "consistent with the current number of car inspectors used by BNSF at Belen for approximately the same level of traffic." Id. at III.D-32 to 33. AEPCO's expert, Mr. Yocum, however, has reviewed Defendants' claim and found it to be unpersuasive. The nature of the ACE's more efficient operations at Vaughn – relative to BNSF's real-world operations – permits the ACE to meet its car inspection needs with two four-person crews. The ACE's efficient inspection procedures at Vaughn, which are detailed in AEPCO Op. at III-C-27 to 29, were not challenged by Defendants.

With respect to the El Paso Yard, the only dispute between the parties relates to Defendants' argument that "an additional 4-person crew for one shift per day, 7-days per week [is needed] to provide adequate staffing to inspect trains that arrive in groups in order to avoid backing up trains." Id. at III.D-33. Once again, Mr. Yocum has determined that this additional four-person crew is not necessary in light of the peak-week train frequency and the nature of the ACE's inspection procedures at El Paso. Defendants offer no specific evidence quantifying their claim that the "backing up" of trains is a likely result of AEPCO's proposed staffing. In the absence of some demonstration to that effect, AEPCO will not modify its staffing proposal.

(c) Maintenance-of-Way

AEPCO discusses its maintenance-of-way ("MOW") plan and personnel requirements for the ACE in Part III-D-4, infra.

ii. Compensation

Defendants contend that total compensation for the ACE's operating employees should be increased by $15.6 million as to transportation department employees[41] and { } as to mechanical personnel.[42] This total disparity arises

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[41] The $15.6 million figure shown here differs from the $22.2 million figure set forth in Defendants' Table III.D.6 (see Supp. Reply at III.D-30 to 31) due to mathematical errors in Defendants' Table.

[42] Defendants' calculation of the difference between the parties' compensation for mechanical personnel is overstated by { } as a result of the fact that Defendants ignore AEPCO's March 20, 2003 Errata filing.

because of the staffing differences referenced supra, and because of a number of differences in compensation levels per employee, principally the compensation of train crew members.

(a) Transportation Department Compensation

The principal dispute between the parties with regard to the compensation of transportation department employees pertains to the annual compensation of train crew members. AEPCO pays train crew members { } per year based on BNSF system average straight time plus overtime and pertinent constructive allowances ("CA") at { } of straight time plus overtime. See AEPCO Op. electronic workpaper file "AEPCO Salaries.xls." By contrast, Defendants propose to pay train crew members { } per year. Defendants calculate this figure based on the straight time, overtime, and CA actually paid to crews that: (i) work on BNSF non-coal trains moving between Belen and Vaughn, NM; and (ii) work more than { } shifts per year for conductors and { } shifts per year for engineers. See Supp. Reply at III.D-29 n.45.[43]

Defendants' criticize AEPCO's estimate of train crew compensation in three principal respects: (1) AEPCO's treatment of constructive allowances; (2) AEPCO's supposed manipulation of inflation indexes; and (3) AEPCO's proposal to afford "average" compensation for "above-average" work.

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[43] The parties agree on a fringe benefit ratio of { }. See Supp. Reply at III.D-25 n.37.

Constructive Allowances: Defendants first criticize AEPCO's determination of the CA that the ACE would incur with respect to its train crew personnel. On Opening, AEPCO used a CA of { } percent based on the CA's that are likely to be paid by a non-union SARR. See AEPCO Op. electronic workpaper file "BN Vacation and meals markup.123." In their Supplemental Reply, Defendants advocate the use of a number of additional CA's based on BNSF's 2001 system average CA's of { } for engineers and conductors respectively. (Notably, Defendants fail to offer any evidence regarding the CA's paid by UP).

Defendants' figure, of course, represents the level of CA's paid by one large, unionized railroad, and thus has no bearing on the compensation levels that should be paid by the ACE. Nevertheless, in the interests of presenting a conservative case regarding employee compensation, AEPCO has determined that it will accept certain of the CA's proposed by Defendants[44] but that it will continue to reject others as inconsistent with the nature of payments that a non-union railroad such as the ACE would pay. In that regard, AEPCO has identified a copy of a draft agreement between Wisconsin Central ("WC") and the UTU which designates the CA's to be included for WC T&E personnel in a union contract that was negotiated when WC first became a unionized carrier. See Supp. Reb. Workpapers Vol. 2, pp. 00451-471. This agreement suggests that certain

[44] The acceptance of these additional CA's increases the CA level for the ACE crews to { }.

CA's at least arguably should be paid to the ACE's employees. However, as explained by Mr. Tom Power, WC's then-Executive Vice President and Chief Financial Officer, it remains the case that most of the additional CA's that Defendants have proposed for the ACE are improper for a large regional carrier.[45] Most notably, these improper CA's include guarantees, car scale additive, side trip additive, initial terminal delay, reduced crew allowance, final terminal delay and others. AEPCO's Supplemental Rebuttal electronic workpaper file "ACE Constructive Allowances.123" lists all of BNSF's CA's and shows those included in AEPCO's calculation of the CA ratio of { } percent.

Inflation Indices: Next, Defendants argue that AEPCO has improperly manipulated inflation indices to deflate crew salaries to the 1Q01 level. See Supp. Reply at III.D-26. Defendants argue that AEPCO has incorrectly indexed annual 2001 wages to 1Q01 by mixing the annual wage index with quarterly wage indexes. Defendants' argument is mistaken.[46]

On Opening, AEPCO calculated ACE wages by dividing the compensation found on each line of the BNSF 2001 Wage Forms A and B by the average number of employees at mid-month. AEPCO then de-escalated this amount by applying the ratio of the AAR first quarter 2001 wage index of 308.9 divided by the annual wage index of 314.1. The result is that wages are de-escalated by 1.7 percent (i.e., 1- 308.9/314.1).

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[45] See Supp. Reb. Workpapers Vol. 2, pp. 00472-473.

[46] Defendants also argue that AEPCO has improperly utilized the RCAF-A to escalate wages. AEPCO addresses cost indexing for future years in Part III-G, infra.

Defendants claim that this approach is improper because it mixes and matches quarterly with annual data and therefore falsely deflates 2001 wages. Instead, Defendants suggest that AEPCO should have averaged the index for each quarter of 2001 and used the result for the base upon which to de-escalate wages to first quarter 2001. This would result in an average 2001 quarterly index of 310.4 (i.e., (308.9 + 309.9 + 311.4 + 311.4) / 4). See Supp. Reply at III.D-26 n.41. Once applied, wages would only be de-escalated by 0.5 percent (i.e., 1 - 308.9/310.4).

In using an average of quarterly indices as a proxy for the 2001 wage index, Defendants inappropriately assign quarterly indices to annual costs. Because the ACE's wages are based upon annual wage statistics as reported in BNSF's 2001 Wage Forms A and B, these should be applied to an annual index. According to a footnote in the AAR Railroad Cost Indexes publication, "[t]he final annual wage rates and wage supplements are derived from Annual Wage Statistics and the Annual Report Form R-1 . . . ." See Supp. Reb. Workpapers Vol. 2, p. 00485. These are the very same BNSF wage statistics that AEPCO used as the basis for the ACE's crew wages. The quarterly indices that Defendants utilize, on the other hand, are "updated in accordance with labor union contract provisions and benefit cost changes." See Supp. Reb. Workpapers Vol. 2, p. 00486. It is inconsistent to base annual costs on an average of quarterly indexes to which they are not related.

AEPCO's approach is the more appropriate methodology and should, therefore be accepted by the Board.[47]

Supposed Relationship Between Crew Starts and Compensation: Third, Defendants argue that AEPCO has improperly determined that it will pay "average" salaries to train crew employees who perform "above-average" work (as measured in crew starts per year). Defendants' hypothesis that crews that work more shifts are more highly compensated is not supported. In fact, examination of the compensation paid to BNSF T&E crews working on AEPCO trains show that there is little correlation between the annual number of shifts worked and total compensation. For example, engineers working { } shifts per year were paid virtually the same as engineers working { } shifts per year and conductors working { } shifts per year were paid virtually the same as conductors working { } shifts per year. The graphs set forth in Supp. Reb. Exhibit III-D-1 demonstrate that there is little correlation between the number of shifts worked per year and the annual compensation for crews working on the ACE's trains.

[47] Defendants' approach understates the change in wages between 2000 and 2001, which was considerable at (314.1/304.6 - 1) or 3.1 percent. If AEPCO had been incorrect as Defendants claim and had relied strictly on annual index amounts, AEPCO would have imputed a quarterly index by dividing the index change by four. This would have resulted in a first quarter index of 304.6 + (314.1 - 304.6)/4 or 307.0. Wages would then have been de-escalated by (1 - 307/314.1) or 2.2 percent. This approach would have been consistent with BNSF's logic but yielded a very different result.

Defendants argue that the number of ACE crew shifts per year (270) greatly exceeds the number of shifts per year worked by the average BNSF crew member.[48] Although Defendants contend that those few T&E employees that work as many as 270 shifts per year are far more highly compensated than the average BNSF crew, Defendants provide no data to support this claim.

Moreover, Defendants' analysis of wages paid in 2001 to those BNSF T&E personnel working on non-coal trains moving on the ACE system reflects an improperly small sample. On average, these { } personnel work only { } shifts per year and that only { } percent of the personnel work more than { } shifts per year. Using the { } non-coal T&E personnel as their universe of data, Defendants calculate the average compensation paid to the { } engineers working more than { } shifts per year and { } conductors working more than { } shifts per year. Based on the straight-time, over-time and CA's paid to these personnel, Defendants conclude that the ACE must pay wages of { } per T&E crew member.

Defendants, however, have determined ACE crew wages based on the pay for only { } T&E personnel out of the { } engineers and conductors on BNSF's entire system. Defendants fail to explain why the selected { } percent of BNSF's

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[48] Defendants, however, do not challenge the premise that the ACE's T&E crews can work 270 shifts per year. Indeed, the Board accepted 270 shifts per year in TMPA. Id. at 86.

engineers and conductors should be regarded as a proper source for determining the compensation for the ACE's personnel.[49]

Defendants use wages for only a few of the T&E personnel involved in moving trains on the ACE system, i.e., they included only { } of the { } BNSF employees working on BNSF non-coal trains moving between Belen and Vaughn. In so doing, Defendants excluded from their analysis all BNSF personnel moving coal trains on the ACE system, including the issue traffic, and they excluded all UP T&E crews moving coal and non-coal trains on the ACE system, including crews working on trains moving the issue traffic. A total of { } UP T&E crews worked on AEPCO trains, { } BNSF T&E crews worked on AEPCO trains, and { } BNSF T&E crews worked on non-coal trains between Belen and Vaughn for a total of { } T&E crews.[50] The { } crew members included in Defendants' analysis thus also is hardly representative of the amount paid to crews that worked on those of Defendants' lines that comprise the ACE.

* * *

[49] If one also were to consider UP's { } engineers and conductors, the { } T&E personnel relied upon by Defendants represents only { } percent of the engineers and conductors on the BNSF and UP systems combined.

[50] These T&E crews still exclude UP crews working on non-coal trains moving between Cochise and El Paso and both BNSF and UP crews working on other than AEPCO coal trains that move on the ACE system.

Additional compensation disputes are identified in Defendants' Supplemental Reply, as well. See Supp. Reply at III.D-30 to 31. These differences are based on three issues.

The first issue is a difference in the indexing procedures used, which AEPCO addressed, supra.

The second issue involves a difference in the classification of job titles regarding four positions on the ACE. See 49 C.F.R. § 1245.5. These positions include: (1) Manager-Operations Control; (2) Assistant Manager - Train Operations; (3) Manager-Locomotive Operations; and (4) Director-Customer Service. Upon review, AEPCO has determined that it will accept Defendants' classification for each of these positions except Assistant Manager-Train Operations. In that instance, Defendants have assigned job classification code 201, which encompasses professionals such as attorneys, medical officers, engineers, auditors, etc. See Supp. Reb. Workpapers Vol. 2, pp. 00475-482. This designation is plainly incorrect for an Assistant Manager-Train Operations and AEPCO therefore continues to use code 104 for this position.

The final difference pertains to AEPCO's reduction from the BNSF system-average salary for two positions, the Assistant Manager- Train Operations and the Manager - Customer service, by $5,000 and $10,000, respectively. In this Supplemental Rebuttal, AEPCO is utilizing the system average amounts for these positions without reduction.

(b) Mechanical Department Compensation

Defendants address mechanical department compensation at pages III.D-33 to 34 of their Supplemental Reply. Based on their improper approach to indexing, Defendants have proposed modest increases to AEPCO's evidence regarding the annual compensation of each mechanical department employee. The vast majority of the difference in the parties' evidence regarding mechanical department compensation, however, results from their dispute as to the number of employees. AEPCO has addressed that dispute at Part III-D-3-b, supra.

iii. Materials, Supplies & Equipment

There is a significant difference between the parties' estimates of the ACE's expenses associated with materials, supplies, and equipment ("M&S"). The difference between AEPCO's Opening estimate of $590,777 and Defendants' Supplemental Reply figure of $7,565,915 is due to four issues:

First, Defendants included capital and operating cost related to IT systems in the Operating Materials and Supplies expense category rather than the G&A category where it should be placed. The resulting difference in IT costs represents $5,856,220, or nearly all, of the difference in the parties' M&S estimates. This is an obviously improper double-count of costs for the ACE in that Defendants apply G&A costs on an amount per revenue ton-mile basis rather than on an item-specific basis. As a result, any G&A amounts that Defendants place in another expense category are counted in both

Defendants' generic G&A cost and as a separate item. In this regard, it is important to note that Defendants accept AEPCO's IT capital and operating expense, adjusted only for the differences in the number of personnel they claim is necessary. See Supp. Reply electronic workpaper file "OPR_EXP.xls."

The second reason for the difference in M&S operating expense is related to the difference in the number of T&E crew members, non-transportation operating personnel, and equipment inspectors. Those differences are addressed elsewhere in this Part.

The third reason for the difference in M&S expense is related to unit costs for three specific items: (1) motor vehicles; (2) desks; and (3) safety equipment. On Opening, AEPCO assumed that ACE operating personnel would be equipped with 13 Ford F-150 pickup trucks. With little explanation, Defendants would have the ACE purchase six Chevrolet Suburbans for crew haulers and 40 Ford F-150 pickup trucks. Defendants assign 20 pickups to their 77 equipment inspectors; however, they only have five inspector teams on duty at any given time, which means that those inspectors (even if necessary) would only require five pickups. Moreover, Defendants' inclusion of Chevrolet Suburbans is redundant and unnecessary in light of the ACE's taxi service. Because the crew haulers are not necessary, the six Suburbans provided to them are not necessary either.

Defendants also have increased costs for the ACE's automobiles by subjecting them to a financing cost of { } percent. There is no reason why the ACE would incur this costs when car loans would be available at significantly lower interest rates.[51] Defendants' payment calculation also improperly treats the automobile salvage value as a cash outflow. The BNSF depreciation tables that were the source of Defendants' amortization include a { } percent positive salvage value for automobiles, but Defendants' calculation treats this amount as a negative salvage, thus increasing annual payments.

Desks and chairs are another example of Defendants' attempt to include extraneous costs for the ACE. Defendants include a cost for desks and chairs of $1,160 per unit each year. To achieve this unit price, Defendants propose that the ACE finance two sets of chairs and desks at one time, i.e., the set that it buys at time 0 and the set that it will buy in five years to replace the current set. Both sets are financed at a hypothesized { } percent cost of capital, { } salvage value and a { } percent inflation rate. AEPCO continues to rely on its unit cost of $488 per desk and chair set used in its Opening Evidence. See AEPCO Op. Workpapers Vol. 8, pp. 3842-3844.

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[51] According to the Federal Reserve Consumer Credit Report, the interest rate on new car loans in 2001 was 5.65 percent. Application of this rate in an amortization of the value of motor vehicles used by the ACE produces virtually the same annual cost for motor vehicles as included in AEPCO's Opening Evidence. See Supp. Reb. electronic workpaper file "Supp Rebuttal M&S.xls," sheet "Amort_Truck_Costs."

Defendants also disagree with AEPCO's estimate for safety equipment of $27.50 per T&E employee. Instead, Defendants would outfit the ACE employees with a variety of clothing and safety gear, including not only hard hats, reflective vests and belts and protective eye wear, but also cold and warm weather boots, cold and warm weather gloves and prescription eye wear. Defendants include $240.87 per year for safety equipment for each T&E employee and $287.35 per MOE employee.

According to AEPCO's operating expert, Fred Yocum, railroads do not typically supply employees with clothing items such as boots and gloves, and Defendants have submitted no proof to the contrary. Employees normally would supply these items themselves. Furthermore, expensive prescription eye wear would be unnecessary because plain glasses would fit over employees' own prescription glasses. When all extraneous items are excluded, Defendants' estimate of safety equipment is similar to the estimate of $27.50 per employee that AEPCO proposed on Opening.[52] AEPCO continues to use $27.50 per T&E and MOW employee per year for safety equipment in this Supplemental Rebuttal.

The fourth and final reason for the difference in the parties' M&S expenses relates to travel expense. Defendants have arbitrarily added travel expenses equal to 5% of non-train operating and mechanical personnel salaries. In AEPCO's Opening evidence, no provision was made for travel for operating personnel. However, in light of

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[52] See Supp. Reb. electronic workpaper file "Supp Rebuttal M&S.xls."

the Board's decision to include travel in the recent Eastern rate cases, AEPCO is including a travel budget for the positions that may require travel. These positions are classified as G&A positions,[53] and as a result, AEPCO has not included travel for M&S operating expenses.

b. Non-Operating

AEPCO categorizes all of its staffing for the ACE under the operating and G&A headings of the Board's outline for presenting evidence in stand-alone cost cases.

c. General and Administrative

Notwithstanding the relatively minor annual cost difference between the parties regarding G&A expenses ($5.3 million), Defendants have submitted an inordinately lengthy commentary regarding the supposed defects in AEPCO's G&A evidence. Despite this extensive G&A argument from Defendants (to which AEPCO responds with unavoidable length itself), however, AEPCO is the only party to this case that has submitted specific evidence regarding G&A staffing and compensation levels.

Rather than developing their own staffing levels, Defendants merely have criticized AEPCO's specific and detailed evidence and presented an overall "estimate of what ACE's G&A expense should be" based on comparisons with other railroads. See

[53] Four of the AEPCO's G&A positions that Defendants classify as operating managers do have a travel budget, which is included in AEPCO's Supplemental Rebuttal G&A materials and supplies expense. These positions include the Director-Operations Control; Director-Train and Locomotive Operations; Director-Customer Service; and Manager-Operating Rules and Safety.

Supp. Reply at III.D-35; id. at III.D-42. This failure of proof completely undermines Defendants' G&A estimate, as the Board found in FMC. See FMC at 165. AEPCO strongly disagrees with Defendants' approach and continues to rely upon the specific, detailed G&A evidence that it submitted on Opening. See AEPCO Op. at III-D-20 to 56.

Notably, Defendants have steadfastly avoided making any comparison of the ACE's G&A staffing to prior G&A staffing levels that the Board recently has accepted for stand-alone railroads. Those prior decisions confirm the validity of AEPCO's staffing proposal. For example, in West Texas Utilities, the Board accepted Burlington Northern's proposed G&A staffing level of a mere 38 individuals for a SARR with $433 million in revenues. See West Texas Utilities at 695. Similarly, Defendants have avoided making any comparisons between the level of the ACE's G&A expenses as a percentage of first-year SARR revenues with expense levels accepted in recent Board decisions. See, e.g., Duke v. CSXT at 52 ($12.6 million in G&A expenses for a SARR with $496.8 million in revenues (2.5%)); Carolina at 55 ($13.0 million in G&A expenses for a SARR with $512.6 million revenues in its first full year of operations (2.5%)); Duke v. NS at 67 ($13.0 million in G&A expenses for a SARR with $494 million in revenues (2.6%)); TMPA at 78 ($13.4 million in G&A expenses for a SARR with $927 million revenues in its first full year of operations (1.4%)); West Texas Utilities at 689 ($3.4 million in G&A expenses for a SARR with $433 million in revenues (0.8%)). In the instant case, AEPCO has proposed that total annual G&A expenditures for the ACE at the

2001 level will be $13.3 million. This amount constitutes 2.7% of the ACE's $485.9 million first-year revenues, and thus is entirely consistent with Board precedent, and in fact, exceeds the percentages accepted by the Board in each of the cited cases.

Defendants' non-specific estimate of G&A expenses, on the other hand, suggests that the ACE should spend $18.9 million in 2001. This amount constitutes 3.9% of the ACE's first-year revenues, and is entirely out-of-line with Board precedent.[54]

In support of their aggregate G&A figure, Defendants present: (i) a so-called "backdrop" for evaluation of AEPCO's evidence; and (ii) a "critique" of AEPCO's methodology. AEPCO will respond to each section in turn.

i. BNSF/UP's "Backdrop for Evaluation"

Ignoring the actual nature of the ACE's operations – and the impact that those operations have on G&A expenses – Defendants instead argue that AEPCO's proposed G&A expenses of $13.3 million are too low on the basis of a series of comparisons between the ACE and real-world "peer" railroads. In particular, Defendants compare the G&A expense of the ACE and the seven railroads reporting data to the STB in 2000, 2001, and 2002 in terms of a percentage of total operating expense, a percentage of total operating revenue, and a percentage of net revenue (id. at III.D-41 to 42). Defendants argue that the ACE is deficient in each respect.

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[54] Defendants' estimate of G&A expenses amounts to 4.7% of Defendants' understated estimate of the ACE's 2001 revenues (i.e., $393.4 million).

Defendants' comparisons between the ACE and real-world carriers involve statistics with no relevance to the question of an appropriate G&A staffing level for a SARR. Indeed, the first three comparison charts that Defendants include within their "backdrop" for evaluation do not even purport to address G&A expenses. Instead, Defendants compare the ACE with real-world Class I carriers in terms of: (i) overall employment levels (including operating, non-operating, and G&A employees); (ii) operating ratio; and (iii) the ratio of revenue to the carrier's total number of employees (including operating, non-operating, and G&A employees).

None of the railroads selected by Defendants for their comparisons (either for G&A purposes or for the other, irrelevant purposes referenced supra) is remotely similar to the ACE. The ACE operates primarily as a bridge carrier for large volumes of trainload intermodal traffic currently moving via Defendants' high-density, east-west mainlines in New Mexico and Arizona. In fact, the ACE serves only two local origins (the McKinley and Lee Ranch mines) and only one local destination (AEPCO's Cochise plant). This configuration and traffic base allow the ACE to generate significant levels of revenue with a simple and uniform operation. This simple operation permits the ACE to avoid the excessive G&A expense that Defendants attempt to impose.

No real-world Class I railroad (or large regional railroad) serves only two local origins and one local destination. If the Board were to compare the ACE to the real-world "peer" railroads that Defendants have identified on a basis that accurately reflected

these unique characteristics, the Board would find that the ACE's G&A expenses are far more than adequate. For example, a comparison of G&A expenses per origin or destination served by the railroad would undoubtedly demonstrate that the ACE spends far more on G&A than real-world railroads. The same is true with respect to the number of yard facilities and the nature of the operations performed at those yards.

The absence of a comparable real-world peer, which is entirely plausible under SAC analysis, mandates a different approach to developing the ACE's G&A expenses than Defendants have advocated. A proper approach to developing G&A expenses for the ACE should consider not only total revenues and route-miles, but must specifically analyze the nature of the ACE's operations and the purposes to be served by the ACE's G&A expenditures. Only AEPCO's bottom-up development of G&A expenses allows the Board to match specific G&A dollars with specific business needs.

In any event, the most striking fact evident from Defendants' actual G&A-based comparisons is that a huge degree of variation exists among the set of Class I "peer" railroads presented by Defendants. For example, the ratios of G&A expense to total operating expense for real-world railroads vary from 7.73% (Soo) to 21.97% (CN-GTW). Similarly, the ratios of G&A expense to total operating revenue vary from 6.54% (Soo) to 19.76% (CN-GTW). Finally, the ratios of G&A expense to net revenue vary from 40.31% (UP) to 196.09% (CN-GTW). These staggeringly large disparities which Defendants present for their collection of real-world peers demonstrate that actual G&A

expenditures can vary by a wide margin even among railroads with similar operating expenses, similar operating revenues, and similar net revenues. It therefore should come as no surprise that a radically different railroad such as the ACE would reflect significantly different G&A needs.

ii. BNSF/UP's Critique of AEPCO's Methodology

Next, Defendants offer three separate lines of argument which they characterize as a "critique" of AEPCO's G&A methodology. First, BNSF/UP seek to minimize the experience of AEPCO's G&A witnesses, arguing that without independent support, the costs developed by these witnesses cannot be accepted. See Supp. Reply at III.D-42 to 44 (citing FMC at 165 and 167). Second, Defendants complain that the ACE is too similar to Defendants to warrant a finding that it would achieve G&A cost efficiencies relative to those carriers. Third, Defendants raise a number of individual "problems" with AEPCO's G&A expenses. None of these lines of argument is valid.

(a) AEPCO's G&A Expenses are Well-Supported

AEPCO's Part III-D evidence is sponsored by witnesses who have considerable expertise in matters relating to both operating and G&A expenses, and collectively have spent many years working for Class I and other railroads in positions of significant responsibility. For example, AEPCO's principal G&A witness, Fred Yocum, has over thirty years' experience in high-level operating and executive positions with railroads including more than twenty years with CSX Transportation, Inc. ("CSXT") and

Chicago and North Western Transportation Company ("CNW"). In addition, Mr. Yocum has served as President of several regional railroads.

In each of its recent decisions in Duke v. NS and Duke v. CSXT, the Board accepted the complainant's G&A expenses on the basis of its observation that the complainant's G&A staffing levels "are based on the experience of former senior-level railroad employees, [and] are reasonable and supported . . ." See Duke v. NS at 73; Duke v. CSXT at 59. Significantly, AEPCO's witness Yocum served as one of the principal witnesses in support of the development of G&A costs in each of these two cases. In light of this wealth of real-world experience in matters with direct relevance to G&A expenses, Defendants' claim that AEPCO has not met its burden of proof is manifestly inaccurate.[55]

(b) AEPCO's G&A Expenses Need Not Mimic those of the Defendants

Second, Defendants contend that AEPCO's overall plan for meeting the ACE's G&A needs assumes an unprecedented degree of efficiency relative to existing railroads using the same strategies (e.g., outsourcing). See Supp. Reply at III.D-44. According to this line of argument, the ACE's operations are too similar to the real-world operations of Defendants, and its proposed outsourcing budget is too low, to justify

[55] In contrast, Defendants' G&A witness, Mr. Kent, has no experience working for a railroad, much less the significant experience evidenced by AEPCO's principal G&A witness Mr. Yocum.

significant differences in the G&A expenses between the ACE and Defendants. Id. at III.D-45 ("The service the ACE allegedly will provide to its customers will essentially mimic that provided by Defendants today."); and III.D-44 ("ACE will only spend $860,108 per year on outsourcing."). Since the operations supposedly are so similar, Defendants' witness Kent argues that "the results contemplated by AEPCO [in terms of operating efficiency] could only occur if railroad economics were changed in a dramatic manner." Id.

Contrary to Defendants' statement, the operations of the ACE are not identical to the service provided by the incumbents over the issue lines and certainly are not even remotely similar to Defendants' system-wide operations. As indicated supra, the ACE serves only two local origins and one local destination, and operates principally as a bridge carrier. Defendants' systems are incomparably more complex than the ACE's system. Consequently, there is no reason why the ACE's G&A expenditures should mimic the G&A expenditures of the incumbents.

(c) BNSF/UP's Specific "Problems" are Specious

Third, BNSF/UP raise a number of individual "problems" with the specific G&A staffing evidence that AEPCO submitted to the Board. These matters are presented as the comments of Mr. Kent of the FTI firm, and thus lack the support of a witness with any experience – let alone the senior level of experience held by Mr. Yocum and AEPCO's other G&A witnesses – working for an actual railroad. Without such

experience, Mr. Kent has no basis to dispute the staffing developed by AEPCO's witnesses.

AEPCO's G&A experts have reviewed Mr. Kent's comments and have concluded that they are without merit. Among the chief defects of each of Mr. Kent's comments, of course, is the fact that Mr. Kent does not quantify any remedy to his perceived problems. Absent such a quantification, Mr. Kent's comments are insufficiently definite to constitute valid evidence. Moreover, AEPCO's proposed department-by-department staffing levels are similar to those accepted by the Board in the three recent Eastern rate cases, which involved complex coal-gathering operations that the ACE does not have.

In light of the Board's recent decision in Carolina, however, AEPCO is modifying its Opening G&A plan to increase the number of individuals serving on the ACE's Board of Directors. Although Mr. Kent fails to identify a specific number of Directors that he contends is necessary, AEPCO will accept the level accepted by the Board in Carolina (i.e., three outside and two management Directors). This level is proper because the oversight needs of the ACE are consistent with the oversight needs of the SARR in Carolina, and in fact, should be lower given the greater simplicity of the ACE's operations.

* * *

For the foregoing reasons, the Board should rejected Defendants' G&A estimate, and instead utilize AEPCO's evidence to determine the ACE's G&A costs.

iv. Other – Training and Start-Up Costs

Defendants indicate that they "will not challenge the unit hiring and training costs proposed by AEPCO here" (see Supp. Reply at III.D-52), but a review of the parties' actual costs confirms that in six of ten instances, Defendants' unit costs are substantially higher than those used by AEPCO, typically because they include substantially higher employee wage costs during the training period. See Supp. Reply electronic workpaper file "OPR_EXP.xls." These higher unit cost are not discussed or supported in Defendants' narrative. In addition, there is no support for Defendants' training cost for MOW employees in their workpapers or for their use of { } of salaries for recruiting costs.

In this Supplemental Rebuttal, AEPCO is continuing to use the same training and recruiting cost used in opening with the exception that it accepts Defendants' use of ongoing training costs for new employees based on an attrition rate of 5.5% annually.

d. Other (Information Technology Requirements)

As AEPCO noted on Opening, the ACE is dissimilar to real-world railroads in that it will handle only complete trains. This reduces the complexity of computer systems required to support its operations. For a typical Class I or regional railroad, the

computer system requirements are very complex due to the large number of customers served, large number of commodities handled, thousands of different origin and destination pairs, different types of equipment required involving classification and blocking of cars, keeping track of service commitments to customers on an individual car basis, etc. The ACE operating plan involves predominantly overhead trainload traffic and some unit coal trains, with repetitive movements handled on a daily basis, only a few customers, six interchange points, predominately private cars, service measurements by train, no intermediate switching or blocking requirements, and multiple-car billing with the RMI revenue system used to allocate revenues. This type of operation simplifies the information technology ("IT") requirements enormously. AEPCO's Opening Evidence Narrative identified the basic needs for a computer system to operate the ACE in a satisfactory manner at pp. III-D-44 to 56.

Defendants' witness Kent[56] observes that the IT staff of the WCS includes 17 personnel and as many as six consultants. Significantly, however, Mr. Kent does not differentiate information technology needs between the ACE's operations and WCS's operations which involve the handling of numerous commodities, various car types, hundreds of customers, hundreds of origin and destination pairs, yard operations to handle blocking, etc. For the WCS to handle a typical carload, a transaction would be created to

[56] Mr. Kent's statement of qualifications does not indicate that he has any IT experience at a railroad or any other organization. In contrast, AEPCO's witness Kruzich has a wealth of IT experience in senior management position at ATSF and KCS.

process the shipper car order, create yard blocks, assign local or industry job to deliver car to customer, assign local or industry job to pickup the carload at customers location, create train block to destination, create yard blocks at destination, assign to local or industry job to deliver carload to customer. On the ACE, in contrast, a transaction would be created to process shipper request for an empty train (for coal movements), assign train crew to pickup train, and deliver the train to shipper or interchange point. The interchange process for the non-coal, overhead trains is even simpler. This is a significant difference between the two railroads in terms of the kind and number of transactions needed to handle carloads. In designing a computer or communications system, the number of transactions generated is the key element in determining requirements for staffing, size and type of computer equipment, databases, storage peripheral, and many other critical issues.

Mr. Kent also wrongly suggests that the ACE and the WCS outsourcing environments are similar. There simply is no comparison between UP's Transportation Control System, which is the WCS outsourcer, and the RMI Transportation Management System that the ACE utilizes. The UP's system is a very large and complex mainframe system whereas RMI is an IBM AS400 mid-range, personal computer network-based system. In this regard, when AEPCO's witness Kruzich served as CIO at the Kansas City Southern, KCS considered various alternatives of outsourcing before deciding to develop an in-house transportation system. One of the systems that was considered was UP's

Finally, Mr. Kent is incorrect in his statement that AEPCO assigned no cost for IT outsourcing. On Opening and Rebuttal, AEPCO included the following outsourcing items in its operating expenses:

RMI-Transportation Management System	$2,784,264
RMI-Car Hire Payable System	342,072
RMI-Car Hire Receivable System	108,564
RMI-Revenue System	1,705,320
TOTAL	$4,940,220

See AEPCO Op. electronic workpaper file "ACE-Operating Budget.xls."

4. Maintenance-of-Way

The parties differ substantially in their estimates of the total annual maintenance-of-way ("MOW") costs for the ACE. In its Opening Evidence, AEPCO submitted a MOW plan for the ACE that was designed by AEPCO's expert engineering witnesses, Robert K. Pattison, Harvey H. Stone, and William Krestinski. These experts concluded that a conservative and prudent estimate of annual MOW costs for the ACE is $41.1 million. See AEPCO Op. at III-D-70 and AEPCO's March 20, 2003 Errata filing. Seventy-four percent (or $30.4 million) of these costs were allocated to program (capital) work, and 26 percent (or $10.6 million) were assigned to operating expense. Id. and AEPCO Op. electronic workpaper file "SpotMaint.xls." In their Supplemental Reply evidence, Defendants present a remarkably different view of the annual MOW costs that would be experienced by the ACE. Based upon a plan developed by Mr. Gerald G. Albin, a former BNSF employee, Defendants suggest that the total annual cost of maintaining

the ACE, including costs for personnel, materials, equipment, and outside contract work, is an astounding $84.8 million at 1Q01 levels. Supp. Reply at III.D-147. Of this amount, Defendants attribute 45.5% (or $38.5 million) to operating expense, and the remaining 54.5% (or $46.3 million) to program work.

The differences in the parties' presentations can best be attributed to the different methodological approaches taken in calculating MOW costs. For example, a common theme that runs throughout the Defendants' critique of AEPCO's MOW evidence is the notion that "[a]s ACE will carry nearly the same tonnage as the incumbent Railroads carry on the lines replicated by ACE, one would expect that ACE would experience similar maintenance requirements and thus would have similar staffing and equipment needs." Supp. Reply at III.D-66. This notion reflects the further devolution of SAC theory as advocated by the defendants in recent rate cases. Underlying SAC principles most certainly do not assume that the SARR's requirements for staffing and equipment should mirror the incumbent carrier's experience. Further, SAC theory does not, as the Defendants continuously imply, assume that the Class I railroads' current mode of operations is representative of how a least-cost, most-efficient yet feasible new entrant would approach issues such as MOW and other operating expenses.

Rather, consistent with the Coal Rate Guidelines, AEPCO developed a MOW plan for a newly formed, efficient railroad operating in a hypothetical world unencumbered by the vagaries of antiquated labor agreements, merger labor protective

conditions, older equipment and facilities, constrained resources, and barriers to entry and exit. AEPCO developed the MOW plan based on its new equipment and facilities, its route structure and *defined* traffic volumes for the life of the SARR. In this regard, a SARR differs greatly from the real-world railroads on which Mr. Albin purports to base his maintenance plan – a SARR's operating characteristics are not subject to the large variations that real-world railroads encounter. Its traffic volume will be *as defined* in each of the years in the DCF Model. Any consideration of the Defendants' critique of AEPCO's MOW plan that is based on not matching real-world experience must be considered in this context. While AEPCO acknowledges that its plan must be feasible, such feasibility must be judged under SAC principles and must recognize the efficiencies that are available to the SARR that have not been available to (or taken advantage of by) incumbents like BNSF and UP. When these principles are properly applied, it is evident that AEPCO's MOW plan is feasible and that Defendants' plan greatly inflates staffing levels and is not representative of an efficient approach to maintaining a SARR.

a. Critique of AEPCO Approach

The Defendants' lengthy critique of AEPCO's MOW plan meanders through an endless stream of repetitive, disjointed subject areas, but actually raises relatively few items that account for the great bulk of the parties' differences in the calculation of MOW costs. These differences are discussed in the sections that follow.

compared to those utilized to maintain the UP portion of the route. Further, they offer no suggestion that UP's MOW staff is undermanned, or that the efficiencies that UP has been able to implement are unavailable to either BNSF or the ACE. Many of these efficiencies were the product of UP's aggressive efforts to reduce its workforce, and lower operating costs, in order to become more competitive. These efforts included increased capital investment, mechanization and increased use of outside contractors. Indeed, during the same period it was using these techniques to advance these reductions, UP was able to do exactly what Defendants criticize AEPCO for doing here – it reduced the staffing necessary to maintain its lines while at the same time *increasing* the tonnage moved over those lines. See AEP Texas North Opening Evidence in Docket No. 41191 (Sub-No. 1) filed March 1, 2004 (Public Version), at III-D-69 to 70 (citing the fact that at same time UP was triple tracking its east-west main line across Nebraska to keep up with extensive growth on its PRB coal corridor, it was *decreasing* the size of its field MOW forces). The UP experience in this regard demonstrates the fallacy of Defendants' attempt to impose BNSF's less efficient staffing for its Defiance-Vaughn line on the ACE.

For example, UP's MOW staff on the El Paso-Cochise line has responsibility for { } route miles per employee,[58] as compared to only { } route

[58] The calculation of route miles per employee is based on {

(continued...)

miles per employee[59] for BNSF's Defiance–Vaughn line. The BNSF staffing level is also out of line with one of the benchmarks cited at Supp. Reply III.D-119. This evidence reflects that Montana Rail Link ("MRL") { } per every field employee.[60] Defendants offer no explanation for why BNSF has { } as many route miles per employee as MRL and UP. These two benchmarks, which come from Defendants' own evidence, confirm that BNSF's field MOW staff level is not representative of a least-cost operation, even among real-world examples, and should not be used as a basis for defining the ACE staffing level.

Accordingly, the Board should reject Defendants' underlying assumption that "one would expect that ACE would experience similar maintenance requirements and thus would have similar staffing and equipment needs." Supp. Reply at III.D-66. Instead, one would expect that the ACE, as a least-cost SARR, would at *least* be able to achieve the same level of efficiencies experienced by the unionized UP and MRL workforces.

Thus, if the Board is otherwise inclined to accept the Defendants' MOW staffing levels, Defendants' own filing suggests that the Board should use the UP ratios

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[58](...continued)

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[59] The calculation of route miles per employee is based on {

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[60] Defendants' calculation of a rate of { } route miles per employee includes supervisory personnel. Id.

(rather than the combined BNSF/UP ratio) for the entire ACE system (i.e., one employee per every { } route miles). Such an approach alone would reduce the number of field personnel needed to maintain the ACE from { },[61] or an approximately { } reduction in field staff. If one reduces the dollars assigned to staffing by Defendants by the same percentage, their annual MOW personnel costs for the ACE drop from $30.4 million to { } million.[62]

As further explained below, this reduction still would result in vastly overstated staffing levels and related personnel expenses for several key reasons. When each of the additional reasons for the Defendants' overstatement of staffing needs is considered, as addressed below, it is clear that AEPCO's MOW plan is feasible and preferable to the inflated plan submitted by the Defendants.

ii. The ACE Would Not be Subject to Union Work Rules

Unlike the ACE, the real-world railroad workforces that are used as the benchmarks by Mr. Albin in establishing his MOW staffing plan are all subject to antiquated labor agreements and union work rules. As AEPCO explained in its Opening Evidence, the ACE's MOW workforce would not be subject to these same restrictions. AEPCO's witness Krestinski has substantial experience with Canadian railroads that are

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[61] Based on the application of the UP ratio of { } route miles that comprise the ACE.

[62] Similarly one would expect that Defendants' inflated estimate of the equipment needed by this overmanned staff, discussed infra, would also be reduced substantially.

bottom-line sensitive operations that also operate in an environment that is not encumbered by the restrictive labor conditions imposed on the large Class I roads in the United States. As summarized in Table III-D-4 below, many of these Canadian railroads have been able to streamline their MOW staff levels to levels that are in line with the staffing levels proposed by AEPCO in its Opening Evidence:

TABLE III-D-4
Experience of Canadian Railroads

Railroad:	Route Miles:	Tonnage:	MOW Employees:[1]	RouteMiles/ Crew Member:
BC Rail	1442.1	42.1	72	20.00
Ontario Northland	706.0	5.9	89	7.93
Ottawa Valley	341.7	12.0	31	11.02
Huron Central	179.4	2.9	14	12.81
Canadian Pacific (Montreal-Tor.)	174.2	30.0	14	12.44
ACE	**517.5**	**99.3**	**42**	**12.32**

[1] Excludes supervisory staff.

While, AEPCO's ACE has considerably larger tonnage densities than the railroad shown above, the basic maintenance effort (represented by the MOW crews) does not increase in direct proportion with tonnage. Whether one considers Class I, regional or short line railroads, the scope of work included in "spot maintenance" is generally consistent across the board. This reality is crucial to understanding and evaluating field staff design. Only the bottom-line conscious will be concerned about over-maintenance of

the infrastructure. While no railroad strives to be under-maintained, extravagant field staffing is inconsistent with the concept of developing a SARR that is least-cost and efficient, yet feasible. A leaner staff developed in a manner consistent with SAC principles will attend to the basic needs of the railroad without over-staffing. Knowing the difference between what is truly necessary, and what is over-staffing, is the key to the design of a proper and adequate basic work force.

Generally, the basic MOW field force is to varying degrees responsible for everything that occurs on the right-of-way. Specifically, the basic maintenance forces attend to switch inspections and adjustments, defective rail replacement, joint maintenance, shimming track, picking up (surfacing) joints, bridge deck/culvert inspection, flagging contractors' activity, frog/rail end welding/grinding and, when required, participation in mandatory track inspection. These activities are common to all railroads. Except for railroads dedicated to passenger traffic, the higher class of railroad is usually reflected in its tonnage so that railroads carrying 300 MGT annually will be maintained to a standard significantly superior to that of a railroad carrying 1/10 of such tonnage. However, this standard is not maintained by the basic MOW field force, but through program maintenance executed by outside contractors. Indeed, in Mr. Krestinski's experience, lower tonnage carriers actually have a more difficult time staying abreast of spot maintenance since capital investment is not always justifiable given the earnings of lower tonnage lines, which has resulted in deferred program maintenance.

iii. Cross-Training

The Defendants' proposed ACE MOW staffing level, even if adjusted to reflect the UP employee ratios, would still be overstated because Defendants refuse to recognize that the ACE staff could be cross-trained to perform a variety of activities, thereby minimizing the total staff that would be necessary. See AEPCO Op. at III-D-58.

Defendants are highly critical of AEPCO's cross-training assumption, and take great umbrage at the suggestion that a track repairman could perform cross-functional tasks, such as driving a truck. Again, Defendants' critique in this regard reflects an attempt to force the ACE to simulate their own historical mode of MOW operation, with its built-in inefficiencies and without any regard for what is possible and feasible for a newly formed non-unionized SARR workforce that is designed to maintain a brand-new, high-quality roadbed and track structure.

AEPCO does not dispute that the large Class I carriers (including BNSF and UP) have not embraced cross-training to date. Because most, if not all, Class I railroads employ unionized labor in their non-supervisory ranks, they have not attempted nor been successful in cross-training efforts. Organized labor unions guard very zealously against management attempts to broaden employee classification, which the unions see as a dilution of hard-won distinctions between classes of employees. It is therefore not surprising that Class I railroads are dismissive of the benefits which accrue from cross-trained employees.

By contrast, most short line railroads have been successful primarily due to this one overriding consideration, i.e., existing Class I labor agreements are done away with and the new owners are free to hire non-union employees of their choice. Mr. Krestinski's experience in Canada is also noteworthy in this regard. Where the prevailing provincial (in Canada) jurisdictions insist on preserving labor agreements there is little or no interest in the purchase of properties from the Class I carriers (CP and CN). A case in point: Canadian National's offer of some $30 million in 2003 to purchase the assets of and operate the 706 route-mile network of the Ontario Northland Railway, a regional carrier, was abandoned when it became clear that the Province of Ontario was not prepared to allow CN to effect staff reductions necessary for efficiencies which would justify the investment. CN, having abandoned its pursuit of Ontario Northland Railway, went after and successfully acquired the 1,442 route-mile network of British Columbia Rail later in the same year where retention of existing labor agreements was not required.

Along similar lines, Mr. Krestinski is intimately familiar with and responsible for the design of the MOW force on the Huron Central Railway and the Quebec Gatineau Railway, both Canadian short lines, as well as VIA Rail's Alexandria/Smiths Falls Class 5 track (passenger/freight) network, where cross-trained employees have successfully been incorporated. Undeniable benefits have accrued to their owners. Track Maintainers are able to inspect bridges and structures and effect minor repairs as needed. Signal Maintainers assist their colleagues with track repairs.

Welders are similarly assigned to track repairs, delivery of materials, etc. All of these personnel are rules-competent, permitting their attendance to flagging requirements in accommodating not only work undertaken by the internal railroad forces but by outside contractors.

The use of cross-trained employees is not a function of railroad size. In other words, to suggest that use of such employees may work on small networks having relatively low tonnage but not on large Class I railroads carrying heavier density, including high axle loads, is to ignore what is happening in the non-Class I railroad world in order to hold steadfastly to the Class I's own heavily-staffed operations in which most MOW work is performed in-house by large, specialized crews. Here, Defendants have not presented any evidence as to why their workers could not be cross-trained. Rather, they merely state that it "does not work on a major coal-hauling/intermodal railroad with the trains, tonnages and configuration assumed for ACE." See Supp. Reply at III.D-70. Defendants offer no specific examples of where cross-training has been tried and rejected. They also offer no details explaining why a track repairman cannot also perform some cross-functional duties like driving a truck or performing routine track inspections.

The fixed-plant infrastructure elements of all railroads are the same and differ only in detail. For example, many short lines maintain 100/115 pound rail jointed or welded, on tie plates supported by wood ties. Class I Railroads more typically maintain 115/136 pound rail, likely welded, on tie plates supported by wood or concrete ties. The

difference between the two does not somehow render impotent the cross-trained short line employee on the property of the Class I. It is a case of management will. Class I carriers may very well have to stake their future success on: (1) accepting the benefits of cross-training; and (2) "going to the mat" at labor negotiations to achieve a breakthrough. This has been achieved in the whole area of contracting out which the unions at one time strenuously opposed.

AEPCO is not suggesting that track maintainers would be trained in highly technical areas such as the maintenance of failed equipment detectors (FEDs) or design of track circuits. A cost-conscious MOW design does not allow for much idleness and it is expected that employees of all disciplines will be fully engaged. For this reason, alone, the luxury of work "ownership" is not tenable, as it prevents signal staff from participating in track and bridge activities where additional help is required. The ACE follows the successful short line model under which all field MOW personnel, be they track maintainers, welders, lubricator technicians, or signal staff, assist one another, drive a vehicle or operate a piece of machinery/equipment. Whether the Class I roads like it or not, this development and use of "generic" persons is the direction in which all efficient companies who are concerned about their bottom-line, including railroads, are headed.

Field MOW employees today are trained to multi-task. Multi-tasking is a facility which is not reserved only for Chief Engineers as Mr. Albin states (see Supp. Reply at III.D-70 n.81). As a former high-level railroad MOW manager, Mr. Krestinski

is better equipped than Mr. Albin (who has a long-standing U.S. Class I management mentality) to attest to the flexibility and adaptability of dedicated field non-supervisory staff. Mr. Krestinski's training over 30 years was of a different kind, intended to prepare him to identify needs and fill them with appropriate resources, including cross-trained employees.

iv. Salaries

On Opening, APECO indicated that certain of its personnel would have some of their time allocated to capital projects, and therefore only part of their salaries would be included in the spot maintenance budget. See AEPCO Op. at III-D-69 to 70. While Defendants do not take issue with this approach in general – indeed they allocate certain positions' time to capital – they did note that AEPCO did not properly apply the method it described on Opening. Supp. Reply at III.D-57 to 58. AEPCO has determined that Defendants are correct. AEPCO has corrected its "SpotMaint.xls" spreadsheet to properly allocate the salaries. As Defendants did not dispute the specific allocations, AEPCO has continued to use those it designated on Opening (i.e., 25 percent to spot for senior managers, 65 percent for Field Maintenance Supervisor, 90 percent for Assistant Field Maintenance Supervisors, and 100 percent for all other employees).

v. Contract Work

Defendants' attempt to minimize the amount of work that feasibly can be contracted out further serves to inflate their proposed ACE MOW staffing level (even if

one assumes the UP ratio of route-miles per employee is substituted for the use of the blended BNSF/UP ratios). As reflected in Table III.D.4-6 (Supp. Reply at III.D-147), Defendants recognize that outside contract work will be necessary. They dispute, however, that contractors could perform all program maintenance and spot maintenance to the degree suggested by AEPCO. In "support" of this view, Defendants offer generalized, unsupported, undocumented claims of contractor inability to respond in a timely fashion. See Supp. Reply at III.D-82. They claim that contractors can handle derailments, washouts and embankment failures, but that "their response time ranges anywhere from two to five hours." Id. There is no support for this statement other than their say-so. Also, there is no evidence that Defendants' internal workforce can respond to major incidents more quickly than a contractor can. Similarly, Defendants suggest, without any support whatsoever, that contract forces typically have a large turnover of employees and assumes that a contractor will be unable to provide a dedicated workforce.[63]

The principles underlying SAC support the use of outside contractors. One of the key principles of SAC theory is the assumption that resources are available to the SARR on an unconstrained basis. See, e.g., West Texas Utilities, 1 S.T.B. at 668-70. Thus, in the MOW setting, the SARR has the right to assume that contractors will be

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[63] These statements are belied by publicly available information indicating that UP makes extensive use of contractors in clearing derailments and performing related track repairs. See Supp. Reb. Workpapers Vol. 2, p. 00483.

available, as will necessary equipment and labor to respond promptly. Given the scope of the contract work, it is reasonable to assume that any concerns about response time and a dedicated workforce would be minimal. As Mr. Krestinski attests, even an in-house workforce presents issues of response time. Crews are not always "on location." The assumption that a dedicated contractor, or group of contractors, would not respond promptly when needed is illogical and unsupported by any evidence of record. Indeed, it has been Mr. Krestinski's experience that contractors often can be more responsive because they are not burdened by the daily requirements that the in-house staff must perform in addition to the event-driven maintenance activities that AEPCO intends to staff with contractors.

As the Defendants note, "the differences between Mr. Albin's estimates of contract work and those of AEPCO are driven for the most part by their use of different unit costs and different standards for determining the frequency with which track maintenance activities must be done." See Supp. Reply at III.D-127. Defendants claim that AEPCO has offered no explanation for its costs, and no support for the standards it uses. Id. They then claim that Mr. Albin bases his standards on the tonnages involved, his many years of experience, and the actual, tried and proven standards currently applied by heavy tonnage railroads. Id.

Once again, Defendants' critique of AEPCO's costs appears to be premised primarily on a "that's not the way we do it" approach. As noted above, that is not the

governing standard in considering whether a SARR MOW plan is feasible. The Defendants' reference to their own costs and "standards" does not disprove that the approach proposed by AEPCO is infeasible. Likewise, Defendants' approach proves nothing with regard to whether their own plan is a "least cost" approach to properly maintaining a railroad that, like the ACE, is newly constructed and will have a predictable traffic density level in each of the years of the DCF Model. In any event, as explained below the differences between the parties on the various contract areas are either overstated or unsupported by Defendants and have little impact on the overall calculation of SAC.

- Weed Spraying: The parties differ on the amount allocated for contract work relating to weed spraying by approximately { }. Defendants claim that this difference is attributable to AEPCO's failure to include all costs specified in the contracts. AEPCO agrees with this claim and has increased the costs for this item accordingly.

- Ultrasonic Rail Testing: The parties' difference on ultrasonic rail testing is roughly { }, and is the result of Defendants' inclusion of additional miles in their testing program. Defendants claim that AEPCO has provided no support for the frequency of its testing, and then rely upon a BNSF "rule-of-thumb" that rail with tonnage above 50MGT or more is tested four times a year, and rail with less than 50MGT is tested twice a year. Defendants offer no evidence in support of their claim that this

"rule-of-thumb" represents a least cost approach on this issue, or that the approach advocated by AEPCO is not feasible. As noted in its Opening Evidence, AEPCO's approach is based on the extensive experience of its witnesses, the tonnage levels on the subject trackage and industry practice. Regardless of what BNSF may rely upon as a "rule-of-thumb," Defendants have not established that AEPCO's approach is infeasible.

- Rail Grinding: The parties' calculations of rail grinding costs differ by approximately { }. As reflected in AEPCO's workpapers, AEPCO's rail grinding assumptions are based on a calculation performed by its MOW witnesses that takes into account a variety of factors, including tonnage, miles, and curvature. See AEPCO Op. Workpapers Vol. 9, pp. 4191-4192.

Defendants claim that AEPCO provides "no support" for its approach, and counter with their actual experience which they claim represents the "best practices in rail grinding." Supp. Reply at III.D-131. Again, even if BNSF's approach were considered consistent with "best practices," BNSF's historical experience neither evidences a least-cost approach nor renders AEPCO's approach infeasible. Indeed, as AEPCO explained in its Opening Evidence, its approach to rail grinding is consistent with recent studies indicating that "premium rail in high-density territory with heavy curves can withstand well in excess of 150 million gross tons ("MGT") without the need for grinding." See AEPCO Op. at III-D-64, citing Kevin Sawley, Transportation Technology Test Center

Inc., Report 928, "North American Rail Grinding Practices and Effectiveness," August 1999; *Railway Tracks and Structures,* December 2000, page 15.

AEPCO conservatively developed a plan to grind premium rail every 100 MGT, and to grind standard rail used in main tracks and passing sidings every 50MGT. Defendants simply have not shown that AEPCO's approach in this regard is infeasible. Rather, they merely suggest that the way they approach grinding is different than the way AEPCO's experts have approached this issue. AEPCO has shown that its approach is consistent with sound modern rail industry practice.

- Track Geometry Testing: Defendants' calculation of annual track geometry testing costs exceeds AEPCO's by approximately { }. Mr. Albin attempts to justify these additional costs by claiming that his calculations are based on BNSF's "policy" to test from two to four times per year on lines with densities proposed for the ACE, while AEPCO would test only two times a year. Mr. Albin defaults to the BNSF "policy" because he claims that AEPCO cites no standard for its assumption that testing twice per year is sufficient. Again, Defendants have not provided any evidence that the AEPCO approach is infeasible – they have merely stated (without any written documentation or other support for this alleged policy) that BNSF tests more frequently on its own lines.[64]

[64] Defendants have not presented any evidence as to UP's testing practices.

Mr. Albin also applies higher unit costs for track geometry testing, claiming that the cost quote that AEPCO received from Holland/Trackstar does not include mobilization costs or overtime allowances, or that the contractor did not account for these matters in its bid. See Supp. Reply at III.D-133 to 134. As a result, Mr. Albin claims that AEPCO's costs should be rejected because they are not "realistic" and counters with BNSF's actual cost for 2001 track geometry testing. This results in more than doubling the unit costs for this item. Again, Mr. Albin offers no evidence that there would in fact be a need for "mobilization costs" or "overtime." He simply assumes that the difference in BNSF's unsupported cost numbers and the quote received by AEPCO relates entirely to these items. In so doing, Mr. Albin incorrectly assumes (yet again) that BNSF's current operations must be considered a least-cost approach and represent the only feasible means of performing the subject work.

- Miscellaneous Outside Contracting: AEPCO includes $750,000 for miscellaneous outside contracting services (including surveys and bridges) and $150,000 for contract maintenance on buildings. Defendants claim AEPCO has failed to provide adequate support for either of these items, and suggest that the correct amounts are { } for bridges and { } for building maintenance, for a total of { } for these miscellaneous contract services. See Supp. Reply at III.D-134 to 135. Thus, the parties differ by only { } for these services.

AEPCO's $750,000 for outside contracts includes bridge inspections, repairs and surveys. The Defendants ignore the fact that the ACE will be constructing all new bridges. AEPCO estimates that the cost of yearly inspections for these bridges will be approximately $500,000, but that repairs will be minimal. In fact, based upon AEPCO's engineering experts' experience, the costs associated with bridge repairs for such new structures are very minimal when dealing with bridges that are under 40 years old and that are constructed to modern standards. Accordingly, AEPCO has continued to use $750,000 for Miscellaneous Contracting.

AEPCO has also included $150,000 for contract maintenance on its buildings. The Defendants claim that there is no basis for this amount and state that contract maintenance costs are generally 0.5% of the construction costs of such facilities. When this percentage is applied to AEPCO's construction costs, rather than Defendants' inflated construction costs, the amount necessary for building maintenance is actually reduced to $60,000. Accordingly, AEPCO has continued to use $150,000 for contract maintenance and believes this amount is conservative even under Defendants' standard.

- Ditching: Mr. Albin accepts AEPCO's cost for this item.
- Snow Removal, Derailment and Casualty Repairs: AEPCO included $50,000 for snow removal based on the very low typical snowfalls in the geographic area where the ACE will operate. Defendants apply a cost that is based on the application of BNSF's alleged per-mile system costs without any showing that the AEPCO approach is

infeasible, or that use of a system average approach represents a least-cost approach. Instead, Defendants rely upon BNSF's system average with a 20% reduction to "account for the fact that BNSF's weather-related costs on its southern lines tend to be less than BNSF's average snow removal costs." Supp. Reply at III.D-135 to 136. Defendants offer no support for this arbitrary conclusion. There simply is no evidence of record to suggest that it snows 20% less in the ACE's territory than elsewhere on the BNSF system, which includes substantial trackage in the Upper Midwest extending to the Pacific Northwest – areas that have some of the highest annual snowfalls in the country.

Weather records for the two regions in which the ACE operates reflect that average annual snowfall for the northern route from Gallup to Vaughn is 19.7 inches per year, whereas the southern route from El Paso to Cochise has an average of only 1.9 inches per year. See Supp. Reb. Workpapers Vol. 2, p. 00494. In addition, a great deal of the snow removal costs experienced by BNSF relates to yards, parking lots and other non-mainline facilities that would not be as prevalent on the ACE. Again, Defendants have offered no support for the notion that BNSF's system average costs have any bearing on the snow removal costs that would be experienced by the ACE.

With respect to derailments, AEPCO included $1 million based on Mr. Krestinski's experience. Defendants counter with derailment costs of $1.6 million for the "Northern route" (Defiance–Vaughn) based on the clean-up costs for eleven derailments experienced by BNSF on that line in 2001. Supp. Reply at III.D-136. Mr.

Albin then estimated the derailment costs for the "Southern route" (El Paso–Cochise) by using UP's system average per mile cost for derailments, and developed an annual cost of { } for derailments for the ACE. He then added an additional allowance of { } million to cover casualties to track structures resulting from washouts, floods, land slides, slope failures and the like. Id. Thus, Defendants' costs for derailments and other casualties (which are accounted for in the loss and damage section of III-D) exceed AEPCO's costs by approximately { } million on an annual basis.

Defendants offer no basis to conclude that these historical derailment costs bear any relevance. They fail to explain the nature of these derailments, and/or why UP's system experience is relevant to the ACE's operations. Accordingly, AEPCO has not made any adjustment for derailment costs.

- Environmental Cleanup & Prevention: Defendants assume that the ACE would experience the same level of cleanup and prevention costs that BNSF has historically experienced with respect to its fuel tanks at Belen, NM. Based on this experience, and Defendants' recurring assumption that their own experience represents what is both feasible and least costly, Defendants conclude that "it is only reasonable to assume that fueling facilities on ACE would require the same." Supp. Reply at III.D-137.

AEPCO has chosen to maintain a much smaller fueling operation at Vaughn and El Paso than BNSF maintains at Belen. Fuel tank size alone is one tenth the size of the fuel tanks used for storage at Belen. The size of AEPCO's fueling operation is also

impacted by the fact that it will be fueling less than half as many locomotives as are being fueled by BNSF at Belen. These fueling facilities will be new and will contain the latest and best fueling technology, as compared to the mix of older and newer equipment that is used by BNSF at Belen. As such, AEPCO believes it is feasible to assume the ACE's costs for cleanup and prevention will be lower than the BNSF costs the Defendants seek to impose.

- Yard Cleaning: Defendants accept AEPCO's costs for yard cleaning.

- Special Maintenance Costs: Defendants also claim that some portions of the lines that are being replicated by the ACE require special maintenance attention and that this is not accounted for in AEPCO's MOW plan. See Supp. Reply at III.D-138 to 140. For example, the Defendants quantify special costs for stabilization issues relating to track along the Abo River and west of El Paso and ballast fouling issues west of Deming, NM in the amounts of { }, respectively. Id. AEPCO offers the following response:

Abo River Stabilization Issues: AEPCO has provided sufficient funding for its maintenance and miscellaneous contracting to cover this line, especially through Abo Canyon. The Defendants provide no explanation or basis to understand the nature of the $150,000 of special costs BNSF experienced on this line. As noted above, since AEPCO actually has budgeted more for Miscellaneous Contracting than Defendants believe is

necessary (i.e., $750,000 - { }), the excess { } would be more than enough to offset the costs of any special needs in both Abo Canyon and the area west of El Paso.

Stabilization West of El Paso: In addition to dealing with the problems identified by Defendants related to this line with the excess Miscellaneous Contracting funds discussed above, AEPCO has constructed earthen berms to protect the track west of El Paso from blowing sand and other problems.

Ballast Fouling: AEPCO has instituted a ballast program for its railroad that will provide for surfacing in the area west of Deming every three years. No additional special costs should be incurred.

Alto Flats Subgrade Instability: The line east of Cochise was constructed over 80 years ago. Construction equipment and technology was not as advanced as it is today. AEPCO's contractors will provide a wider subgrade than was originally constructed, which will help to spread the load more uniformly over a larger area. The construction equipment will also provide better compaction of the subgrade resulting in less problems with the subsidence issues that UP has encountered. Accordingly, AEPCO does not believe it is appropriate to include additional special costs for this area.

vi. Random Failures

In a further effort to distort the MOW staffing needs of the ACE, the Defendants also claim that the ACE is understaffed because AEPCO has failed to

consider the impacts of random failures. Defendants cite 2,418 random failure events that occurred in 2001 on the line segments replicated by the ACE, with a claimed average duration of approximately 3.3 hours per outage. See Supp. Reply at III.D-63 to 64 and workpaper sources cited for Table III.D.4-1. Defendants imply that each of these failures had a direct impact on the operation of their trains. Id. For example, they claim that "when a signal indication appears on the dispatcher's board, for safety reasons a train must stop and wait for clearance to proceed." Id. They also note that in August of 2001 BNSF's Gallup Subdivision experienced an average of 4.4 unplanned occurrences per day, with an average of 2.8 hours per outage. Thus, if one accepts Defendants premise that these random failures require the train to "stop and wait for clearance to proceed," Railroads' trains were "stopped" an average of 12.32 hours per day in the month of August 2001. However, Defendants offer no concrete evidence that any of these failures had an actual impact on train operations,[65] and they make no effort to quantify the length of any train delays that may have been actually experienced.

In an effort to determine whether these random failures actually impacted operations to the extent suggested, AEPCO asked its operating and engineering experts to review BNSF's "Random Failures" electronic workpaper file (see Supp. Reply electronic workpaper file "BNSF Random Failures 2001.xls") to determine whether any of the

[65] If actual train delays of this magnitude occurred, BNSF's transcontinental main line would have become completely gridlocked – something that, as far as AEPCO is aware, did not occur.

reported failures were of a nature that would in fact require trains to "stop" and wait for clearance. This review confirmed that the impact of these failures has been grossly overstated and that there is no need for any additional staffing beyond the MOW staffing identified in AEPCO's Opening Evidence to deal with such random failures.

In particular, AEPCO's experts focused their analysis on failures reported in BNSF's Random Failures file for the Communication & Signal Department on the Gallup and Clovis Subdivisions during the August 2001 period cited in the Supplemental Reply at III.D-64. They also analyzed the Random Failures file as related to the week of September 12-18, 2001 (i.e., the ACE's peak traffic period in AEPCO's SAC presentation).

BNSF's Random Failures file is essentially what is known as a trouble desk failure log. Each line item on the log is the product of a trouble call received by a dispatcher from the field. The log reflects the time the call is logged, particulars gathered from the reporting person, and identification of the appropriate craft to be contacted to investigate the reported event. The log also reflects: the actions taken to address the reported event, if any; the time the failure was cleared (either by repair or by determination that there was no need for repair); and the duration of the time between the opening of the item and the closing of the log. The log, however, does not include any information relating to train delay hours, nor does it convey the actual period of time (if any) that a train or trains were delayed due to any item. Rather, the Random Failures file

merely gives an indication of what types of failures occurred, where they occurred, what method was used to clear the failure, and the duration of the fault as an open item. Therefore this data is not indicative of any actual train delays that may have been incurred during the period, and cannot be used to calculate manpower hours needed for C&S or MOW functions.

(a) August 2001

Messrs. Stone's and Yocum's review of BNSF's random failures file for August 2001 reflects that, with the exception of a few isolated failures, it is impossible to reach Defendants' conclusion that the trains operating on the Gallup and Clovis Subdivisions needed to "stop and wait for clearance to proceed" as a result of the cited failures. The August 2001 data in the file was resorted by time to clear the failure and listed from the longest duration to the shortest. See Supp. Reb. electronic workpaper file "BNSF Random Failures Aug.2001.xls."

The longest open failure on the Gallup Subdivision was reported on August 22, 2001 at MP 65.83. It was a detector alarm of the absolute[66] type and the duration was reported as 3,658 minutes, or just less than 61 hours. BNSF offers no evidence, however,

[66] Detectors are set up to fail either under an absolute parameter or a differential parameter. An absolute parameter may be a false indication such as a sticking brake shoe, which the train crew would not find while checking out the wheel set bearing with a temple stick as it may not indicate a sticking brake shoe. A differential alarm takes into account the difference in temperature between the left side and right side of the axle to determine if there is a temperature differential between sides that would give a valid indication of a hot journal.

that its trains were stopped (or otherwise impacted) for 61 hours (or any fraction thereof) on account of this detector failure. This same detector is also reported with alarms on August 13th and August 28th for an additional total of over eleven and a half hours. Additional detector delays are attributed to the detector at MP 28.23 for the 22nd and 28th of the month for a total duration of 57 hours.

As a general rule of operations within the rail industry, a failed detector or suspect alarm means that the train has to operate at some lower speed (such as 30 mph) until it clears the next detector free of an alarm after being checked by a crew member or car department personnel. It does not require, as Defendants suggest, that all trains must "stop and wait for clearance to proceed." There is no basis on this record to assume that train operations were (or would be) shut down for any period, much less an extended period as implied by Defendants, because of a single failed detector.

There are other instances of "delays" in BNSF's random failures file for August 2001 that are similarly unlikely to have had any credible impact on train operations. For example:

- AEPCO's experts identified 367 minutes attributed to a "walked on" radio transmission reported as a "detector silent." Standard operating rules state that in the event that a detector is not heard, or acknowledged, no remedial action is necessary. BNSF and UP operate under the General Code of Operating Rules. In the Fourth Edition, April 2, 2000 Section 2-Railroad Radio Rules 2.6-Communication not Understood or Incomplete, these Rules state: "An employee who does not understand a radio communication or who receives a communication that is incomplete must not act upon the communication and must treat it as if it was not sent." See Supp.

Reb. Workpapers Vol. 2, pp. 00495-496. In this case, it appears that the condition at this location was logged and monitored for slightly over six hours then reported cleared as no further problems were observed. Again, there is no evidence that any train was delayed for even one minute by this event.

- AEPCO's experts also identified the report of a lengthy problem resulting from a restrictive signal at MP 137.3. A restrictive signal results when a signal does not give the most permissive indication for an unknown reason. The dispatcher has many options short of "stopping trains" under such circumstances. For example, the dispatcher could talk the train past the restrictive signal, if need be, or allow the train to obey the signal and travel at a lower than maximum speed. As to this specific signal, BNSF's records reflect that a BNSF maintainer replaced a flasher relay and reported the problem cleared approximately 12 hours after it was reported. There is no basis to conclude that the maintainer took 12 hours to repair the relay. Rather, it appears the problem was addressed on a priority basis and was repaired as quickly as it could be addressed. Train operating delays may or may not have occurred, and even if they occurred may or may not have been significant, depending on the restrictive indication and the means used by the dispatching staff to address this operating fault. Defendants offer no evidence demonstrating that delay was actually associated with this repair.

- On August 2nd, the log reflects a false activation of a grade crossing flashing light signal. Such events represent a reportable FRA incident. Normally a vehicle stop and protect would be placed on the crossing in this situation until the apparatus could be inspected and tested by the maintainer. For some reason, a BNSF maintainer was not immediately able to check the crossing, and the "delay" item remained open for over eight hours. It appears that the cause of this failure was wet track conditions shunting the circuit. Again, BNSF has offered AEPCO and the Board no way of knowing how much train delay (if any) occurred on account of this event, nor how long it took the maintainer to accomplish the actual repair. In any event, as Mr. Yocum can attest from his extensive rail operating experience, what can be discerned is that there would be no need to "stop" trains because of a false activation of a crossing flasher as the crossing gates would be in the down position.

- On August 15th, the signal at MP 72.3 was reported as dark, meaning that the light was out and in such case the aspect would have to be the most restrictive for that signal. It was recorded that the bulb had to be replaced. This trouble call was logged for a duration of 3.53 hours. Most certainly BNSF did not shut down operations on the railroad for almost four hours as a result of this fault, and it almost certainly did not take the maintainer almost four hours to reach the site and change a light bulb.

Other incidents include additional detector alarms, shorted track, dark signals, misadjusted switch machines, gapped points, failed rectifiers, false activations etc. These are all common problems on any signaled railroad or railroad with active grade crossing protection devices. These failures, and the labor and manpower to not only repair but to perform the FRA mandated inspections, have been incorporated into AEPCO's MOW planning. In sum, there is no basis to conclude, as Defendants suggest, that the 4.4 unplanned occurrences per day in the month of August 2001 on BNSF's Gallup Subdivision caused the type of disruption of train operations implied in order to inflate the ACE's MOW staffing needs.

(b) Peak Week (Sept. 12-18, 2001)

In a further effort to determine whether there was any basis to conclude that trains were "stopped" by the events reported in BNSF's Random Failures file during the ACE's peak week, AEPCO's experts also reviewed the file for that week. This review proved to be similarly inconclusive as to any connection between the reported failures and whether, and the extent to which, any trains may have been actually delayed.

AEPCO's experts observed a total of 40 hours of open trouble faults relating to the

replicated portion of the Clovis Subdivision for the period of September 12-18, 2001. Twenty hours, or 50 percent, of those faults were attributable to track signal failures. Of these twenty hours, 9.3 hours were reported cleared prior to the arrival of the maintainer sent out to investigate, or were weather related (i.e., wet track shorting out the circuit). There is no basis to conclude that any BNSF trains had to be "stopped" to wait for these signals to be cleared.

Similarly, as to the remaining twenty hours, the Random Failures file does not present the types of events that would halt operations on a highly efficient, predominantly double-tracked railroad such as the ACE. As attested to by Messrs. Stone and Yocum, the following events are unlikely to have "stopped" trains:

- Twelve hours, or 30% of the faults, were related to detector problems, one of which was an operational problem (i.e., the train operated too slowly past the detector). A detector problem generally stops the first train while the bearing temperatures and wheels are checked. When it is found that there is no problem, the detector problem is radioed to the Dispatcher who gives clearance to proceed. The Dispatcher then notifies the next trains that the detector is not operating properly and for them to proceed through that detector to the next one at a reduced speed until the problem has been cleared.

- Three hours of open log faults related to AC commercial power out, but it is unclear how this is related to train delays, if any.

- The log shows 3.1 hours due to switch problems relating to adjustments of points or locking indicators

possibly reflecting poor maintenance or inspection procedures.

The remaining time was spent in replacing a broken gate arm at a grade crossing, most likely due to a motor vehicle incident. In sum, of the 40 hours of failures reported on the Clovis Subdivision for the peak period, AEPCO's experts are unable to verify the duration and delay of any trains because of these events. Any delays that resulted were certainly only a fraction of the 40 hours cited because the GCOR Operating Rules, in concurrence with FRA guidelines, allow for the continued movement of trains pending resolution, provided prudent safety guidelines are followed. These guidelines would make for minimal delays in the specific instances cited in the Random Failure logs. In sum, of the 40 hours of failures reported on the Clovis Subdivision for the peak week period, AEPCO's experts have been unable to verify that a single train was stopped because of any of these events.

AEPCO's experts review of the Random Failures file for the Gallup Subdivision for the same peak period is similarly inconclusive. On the Gallup Sub for the period of September 12-18, 2001, 109 hours of open logged failures were recorded. Almost 43 hours (40%) of these faults were due in some way to signal problems. Of these 43 hours, 14.1 hours, or about one-third, were cleared on their own prior to the maintainer being able to respond. Five hours of the 43 hours were related to adjusting signal alignment (most likely due to a train crew calling in an improperly displayed signal) and reflect either poor maintenance practices by the C&S department, or obsolete

equipment that has problems coping with adverse weather conditions or maintaining adjustment and tolerance.

Older and obsolete equipment tends not to function to peak tolerances and reliability. As an example, worn mounting brackets on signal lights are harder to adjust and keep tight on aging signal masts, and old-style relays fail causing signal problems. Also, older motion units at grade crossings or older track cable may initiate faults especially in damp or wet weather causing false activations at grade crossings.

The Gallup Subdivision log also shows that 38.8 hours (36%) were due to track faults related to the track signal circuitry. Twenty-eight percent of the track signal faults were cleared prior the arrival of the maintainer, and 17.5 hours worth of the track fault time was due to storm damage. There were 2.6 hours attributed to a short caused by "dead communication wires" hanging down onto active signal wires. These events represent maintenance occurrences that are necessitated by the poor condition of the BNSF facilities. These types of problems would not be a factor with the ACE as there are no obsolete and derelict apparatus or components to interfere with the integrity of the system.[67]

An additional 18.4 hours were attributed to a faulty equipment detector. The Servo detector referenced in the Random Failure log refers to an older, now-obsolete

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[67] BNSF did not complete the installation of CTC on the Gallup Subdivision until mid-2001. See AEPCO Op. Workpapers Vol. 6, pp. 03534-542.

scanner. This "scanner silent" defect would restrict train speeds through the area of the inoperative device, but in no way would such a defect stop ACE trains as all of the equipment and cabling or radio DAX (Digital Access Cross Connect System) posited by AEPCO is solid state and new. This fault accounts for about 17% of the events in the peak week open fault log for the Gallup Subdivision.

Slightly under 10% of the weekly faults were due to poor switch adjustment, grade crossing apparatus problems, or rock that fell into the switch points. Such events are not likely to result in train stoppages because they would be cleared when the first train was stopped, or would result in a quick "stop and proceed" situation for following trains.

Indeed, AEPCO's experts found only three reported failures that on their face might suggest the need for stopping trains. Two of these events related to track "pull apart" and one involved "broken rail." As to the former, 49 C.F.R. § 213.121(d) provides: "In the case of conventional jointed track, each rail shall be bolted with at least two bolts at each joint in Classes 2 through 5 track and with at least one bolt in Class I track." However, the ACE's main track and passing sidings are constructed exclusively with CWR, with special attention to proper anchoring procedures and anchor maintenance, so the likelihood of this type of delay occurring is very minimal. Moreover, it is far from clear that the broken rail listed in the fault log caused the kind of delay that Defendants suggest. The broken rail appears to have occurred at Milepost 47.2 on the

Gallup Sub. This is a section of double track, between two crossovers. Thus, it is not even clear with respect to this broken rail incident that trains had to be stopped – rather, it is more likely that at most the operations were altered to allow trains to use the cross-overs to maneuver around the broken rail.

FRA regulations under 49 C.F.R. § 213.113 allow for numerous means of remedial action for continuing operations where there is a broken rail, depending on the type of break. Accommodations can be made to reduce speed, monitor the break or walk a train over at a maximum speed of 10 mph, even without continuous visual supervision for a period of 24 hours. See 49 C.F.R. § 213.113(2)A2.

* * *

In sum, analysis of BNSF's Random Failure file by AEPCO's experts confirms that there is no basis to conclude that the number of hours needed to clear a random failure is any indication of whether, and to what extent, trains may have been delayed by the reported event. Many of the reported failures were the product of obsolete equipment, poor maintenance and inspection procedures and operational errors. Further, many of the events identified are part of the normal course of operating a signaled railroad and have been built into the resource allocation that is reflected in the annual operating costs resulting from the ACE's operating plan. Accordingly, Defendants' reliance on the random failures file as a means to require additional staff for MOW activities is misplaced. There simply is no basis to conclude from Defendants' evidence

that these random failures have a quantifiable impact on the ACE's operations or MOW staffing requirements. Accordingly, the Board should not rely on this evidence as supporting a requirement for additional MOW staff.

vii. Responses to Miscellaneous Criticisms

The Defendants' filing contains many other unsupported and unwarranted criticisms of AEPCO's MOW evidence – most of which are based on its further perpetuation of the "principles" that the SARR should be expected to be as *inefficent* as the incumbents. Rather than belabor each and every one of these criticisms, AEPCO highlights the following:

- Mr. Albin's critique on the size of the ACE's crew districts ignores the significance of the efficiencies that will be available to the ACE staff, that the incumbents have used far more sparingly. See Supp. Reply at III.D-67 to 71. As noted above, the ACE will be relying on cross-training and outside contractors to maximize efficiencies and perform its necessary maintenance in a least-cost manner. Traditionally (large) sized crew districts are not necessary under these circumstances, given the far more limited scope of duties performed by each crew. Furthermore, the Defendants' suggestion that the size of the ACE's crew districts will have a negative impact on familiarity with the territory and ability to respond to emergencies is totally lacking in any support. On the contrary, AEPCO has reasonably assumed that its contractors will perform their duties diligently, and that given the scope of their responsibilities will have

a workforce that is at least as responsive as the over-manned, unionized local railroad forces. In sum, there is absolutely no basis to conclude from the record that the Defendants' internal forces are any quicker to respond to emergencies.

- Defendants erroneously suggest that AEPCO has made no provision for special mobile welder/grinder and switch maintenance crews and, more subtly alleges that curve maintenance is ignored. Supp. Reply at III.D-62. In fact, AEPCO's MOW staff clearly includes three 2-person mobile welding gangs and three lubricator technicians equipped with hi-rail trucks. See AEPCO Op. at III-D-62.

- In another attempt to mislead the Board, the Defendants state that "each crew of five is expected to handle all of the routine FRA required inspection of track." Supp. Reply at III.D-89. In fact, AEPCO's MOW plan clearly states that "the Assistant Field Maintenance Supervisors have primary responsibility for inspecting track twice-weekly, as mandated by the FRA." See AEPCO Op. at III-D-61.

b. Defendants' Restated MOW Operating Expenses

At pages III.D-87 to 140 of their Supplemental Reply, Defendants repeat many of their stated criticisms of AEPCO's MOW plan, and present their views on what a "principled" plan should look like. As noted above, the overriding "principle" the Defendants appear to be applying is that the SARR's approach should mirror the highest-cost incumbent's approach, regardless of efficiencies that are available using another feasible approach. Accordingly, Defendants construct a MOW plan that is premised on

the assumption that the ACE can do no better than BNSF, even though Defendants have presented evidence and workpapers conclusively demonstrating that BNSF's own MOW staffing greatly exceeds the staffing levels of its co-Defendant UP. Defendants use BNSF practices, wage rates, and corporate experience, with minimal modification to account for the significant advantages and efficiencies that are available to SARRs that incumbents, like BNSF, do not enjoy.

At Supp. Reply III.D-88 to 119, Defendants recycle their views concerning the personnel requirements that are allegedly necessary for the ACE to provide the same service as they do. As detailed in the previous section, Defendants' explanation of current staffing levels does not prove that the plan submitted by AEPCO lacks feasibility. Rather, it merely shows that an unnecessarily large staff based on BNSF's current operations and MOW practices is feasible. This approach, however, does not refute the feasibility of AEPCO's MOW plan. As noted above, and as detailed on Opening, AEPCO's plan is based on well-established SAC principles that allow for a SARR to provide service as a least-cost, feasible competitor. Consistent with these principles, AEPCO's experts designed a MOW staff premised on:

- use of an efficient workforce consistent with the stand-alone concept;
- consolidation of activities to the maximum extent feasible;
- coordination/matching of the maintenance plan to the requirements of the ACE's unique traffic group;

- use of outside resources (contractors) rather than in-house MOW forces wherever this is more cost-efficient; and
- reliance upon empowered employees to carry out assigned responsibilities with minimum oversight.

See AEPCO Op. at III-D-57 to 58. In addition, AEPCO's plan recognizes that the ACE is a brand-new railroad, as opposed to one that operates over a roadbed that is more than 100 years old. The ACE is also unencumbered by union work rules, older equipment and/or facilities, or merger protective conditions.

Based on these principles, AEPCO has presented a MOW staff that is consistent with what is feasible. At a minimum, AEPCO has demonstrated that Defendants' use of BNSF staffing levels as their principal benchmark causes a significant overstatement in MOW staff needs. Other railroads, such as MRL and UP, have significantly leaner staffs that are better evidence of what a real-world railroad can achieve when its goal is not to overstate requirements in order to justify inflated rates.

Perhaps even more overstated than their staffing needs is Defendants' calculation of the equipment that would be needed for spot maintenance by the ACE. Defendants estimate that the total annual expense for spot MOW equipment costs is $6,691,944, as compared to AEPCO's estimate of $1,044,930. See Supp. Reply at

III.D-126 and Exhibit III.D.4-1. Defendants' estimate of these expenses, as summarized in their Exhibit III.D.4, is based on data derived from a March 1995 BN spreadsheet[68] entitled "Maintenance and Ownership Costs for Establishing Rental Rates Including Adjustment Factor and Overhead." See Supp. Reply Workpapers Vol. 1, pp. III.D.4-00171 to 00174. This data includes line items for various types of equipment, annual field labor costs, annual field material costs, annual shop labor, annual shop material, fuel costs, annual ownership costs, and total annual cost (which is a cumulative total of all the other items). Defendants use this data to calculate equipment costs by indexing the data to reflect 2001 costs. A review of this workpaper and Supp. Reply Exhibit III.D.4, however, reveals that Defendants' estimate of the necessary equipment and related expense is not only overstated in terms of the amount of the equipment that would be needed, but it is grossly inflated by the inclusion of labor/operational costs that appear to be accounted for elsewhere in Defendants' MOW and general operating costs.

For example, Defendants include 19 "Air Compressors with Tool" at a cost of { } per compressor ({ }). See Supp. Reply Workpapers Vol. 1, p. III.D.4-00171. Defendants then add { } per compressor for annual operating costs ({ }), and claim a total cost of { } for these compressors. Id. Thus, { } of the total cost for this item relates to labor costs that are already accounted for

[68] This spreadsheet pre-dates the merger of BN and ATSF to form BNSF.

elsewhere in Defendants' inflated MOW personnel costs. Similarly outrageous markups include:

- Four "Tie Cranes" at a cost of { } per crane ({ }), plus { } per crane for annual operating costs ({ }), resulting in a total cost of { } for these cranes. Id. Thus, { } of the total cost for this item relates to labor.

- Six "Trenchers" at a cost of { } per trencher ({ }), plus { } per trencher for annual operating costs ({ }), resulting in a total cost of { } for this item. Id. at 174. Thus, { } of the total cost for this item relates to labor.

- Seven "Cranes – Rubber Tire," at a cost of { } per crane ({ }), plus { } per crane for annual operating costs ({ }), resulting in a total cost of { } for this item. Id. at 171. Thus, { } of the total cost for this item relates to labor.

As these examples demonstrate, Defendants' inclusion of labor costs in their equipment cost calculation vastly increases the equipment cost estimate. For the four items discussed above alone, Defendants have added { } to the annual operating costs. To correct the overstatement that is included in Defendants' calculation of MOW equipment costs, AEPCO has accordingly recalculated Defendants' spreadsheet to exclude the labor double-count. When these labor costs are removed from Defendants' calculation of spot maintenance equipment costs, the total annual spot maintenance of way equipment costs is reduced from { } to $1,953,962, or a nearly { } reduction. See Supp. Reply Exhibit III.D.4-1. Even this reduced equipment cost is overstated to the extent that it is based on supplying equipment to a MOW field

maintenance staff that is manned at levels that reflect BNSF's inefficient staffing levels discussed above. If one applies the same adjustment to reflect UP/BNSF route miles per employee ratios to the equipment calculation, Defendants' equipment costs for spot maintenance can be reduced further to { }.

Equally unfounded is Defendants' criticism that AEPCO has neglected to include certain "essential items of equipment," including tampers, generators, brush cutters, speed swings, tie cranes, trenchers, ballast regulators, snooper cranes, dozers, anchor machines, tie adzers, loaders, mowers, curve lubricators, backhoes and track inspectors' trucks. See Supp. Reply at III.D-125. With the exception of speed swings, ballast regulators, curve lubricators and track inspection trucks, all of these items relate to program maintenance and will be provided by the contractors performing the relevant service. With the exception of speed swings, Defendants' suggestion that the spot maintenance equipment was not included in AEPCO's plan is simply incorrect. Each of the other items is accounted for in AEPCO's Op. electronic workpaper file "SpotMaint.xls."

AEPCO addresses Defendants' claims concerning the deficiencies in its reliance on contractors in the previous section.

c. ACE Capital MOW

As AEPCO explained in its Opening Evidence, AEPCO followed the general guidelines provided by BNSF in discovery in determining whether a particular

MOW activity is capital versus expense work (with the exception of work that is contracted out). See AEPCO Op. at III-D-68. AEPCO provided some examples of each of these activities in Table III-D-8 at AEPCO Op. III-D-69. AEPCO's Opening Evidence further explained that while 100% of its field maintenance crew time would be expensed, its MOW managerial employees would devote a percentage of their time to planning, assisting and overseeing capital projects involving the work of contractors. A breakdown of the time devoted to such activities was provided in Table III-D-9 at AEPCO Op. III-D-70, and was based on the extensive prior experience of AEPCO's engineering witnesses.

i. ACE Capital Replacement Programs

Defendants dispute AEPCO's allocation of 25% of the ACE's internal workforce salaries and equipment costs as capital expenditures, and claim there is no "principled explanation for AEPCO's calculations." Supp. Reply at III.D-141. Once again, Defendants appear to be of the view that the only "principled" way of doing things is to mirror their own inefficient approach to labor management and resource allocation.

Defendants are incorrect in suggesting that AEPCO did not explain its approach. AEPCO explained that it was allocating 100% of ACE field staff time to operating expense. It further explained that a portion of the ACE managerial staff would be allocated to capital expense, and that the degree of allocation was based on its expert engineering witnesses' vast experience in the area.

Defendants' witness Albin's approach is not a least-cost approach. On the contrary, the so-called "bottom-up" approach he employs results in the perpetuation of the MOW overstaffing that is prevalent on BNSF. At Supp. Reply III.D-127, Defendants state that: "The railroads have found it imperative and more efficient to handle all or a portion of these responsibilities internally." These responsibilities are spelled out in the preceding sentence as ". . . communication, signal, derailment cleanup and restoration of track, and track programs maintenance." Defendants do not provide any evidence that the real-world approach taken is either necessary or more efficient than AEPCO's approach.

Considering only staffing associated with track program maintenance, the Defendants propose to maintain the following staff (see Supp. Reply Exhibit III.D.4-1, at p. 2):

Rail	44
Tie	40
Surfacing	8
Turnout	6
Crossing	6
Switch tie	6
Switch undercutting	6
Track undercutting	6
Shoulder undercutting	6
Total	**128**

ii. Annual Track Replacement

The Defendants' assumption that 128 full time employees will be needed as a full-time staff to perform the annual replacement maintenance program (see Supp.

Reply Exhibit III.D.4-1) is grossly excessive. These 128 full time employees appear to be in addition to the 222 staff members that Defendants claim need to be on staff to perform routine "spot" or expense maintenance. Defendants thus are proposing a combined field staff of 350 employees, which produces ratios of only 1.48 route miles per employee and only 2.3 track miles per employee. These numbers greatly overstate the employee requirements that are actually experienced on real-world railroads that Defendants cite as examples, including UP.

AEPCO's Opening evidence assumes that the replacement maintenance program will be performed and staffed by contractors. Nothing in Defendants' Reply evidence suggests that such an approach is infeasible. The presentation of grossly inflated internal staff to perform these same functions is irrelevant to whether AEPCO has a feasible capital replacement program, and should be rejected.

iii. Annual Bridge and Culvert Replacement

The Defendants agree with AEPCO's assumed asset lives and methodology for estimating the capital budget for bridge and culvert replacement, but disagree with its underlying assumptions relating to investment in facilities and buildings. AEPCO addresses those differences in Part III-F, infra.

iv. Annual Signal and Communication Replacement

The Defendants agree with AEPCO's assumed asset lives and methodology for estimating the capital budget for signal and communication replacement, but disagree

with its underlying investment costs. AEPCO addresses those differences in Part III-F, infra.

v. Equipment Requirements for the Capital Budget

Not surprisingly, Defendants' inflation of the ACE's MOW staffing has a significant impact on their views concerning the equipment requirements for the Capital Budget. Much of this equipment can, and should, be eliminated simply by reducing the staffing to more reasonable levels in keeping with the SARR concept, under which all major repairs and programmed maintenance are to be performed by outside contractors.

Furthermore, Defendants' estimate of program maintenance equipment needs suffers from the same infirmity discussed above in connection with their estimate of spot maintenance equipment needs. In both instances, Defendants have included a labor markup that effectively results in a substantial double-count. When this labor component is eliminated from Defendants' calculation of program maintenance equipment needs, the estimated costs are reduced from { } to $2,929,239, representing a reduction of approximately { }. See Supp. Reply Exhibit at III.D.4-1.

In addition, Defendants curiously suggest that AEPCO has omitted certain equipment from its "system production gangs," including anchor machines, anchor removers, backhoes, cranes, spike drivers, hopper cars for hauling ballast, tie adzers, rail grinders, and rail expanders. Supp. Reply at III.D-145. Since AEPCO will not maintain

in-house system production gangs, the inclusion of this equipment is unnecessary. Rather, it is appropriate to assume that the necessary equipment will be provided by the contractors hired to perform these tasks.

Defendants also criticize AEPCO's plan because of its alleged failure to provide work train equipment. Supp. Reply at III.D-145 to 146. The ACE has no need nor does it want to maintain work trains that it would use only several times per year. Instead, its contractors will provide work train equipment for program work when it is needed.

The ACE would need a locomotive occasionally to deliver material used by its field maintenance forces for routine maintenance. This would include items such as a few cars of ballast for surfacing a switch or another area requiring spot surfacing. AEPCO's experts have provided one additional SD40-2 locomotive to be used for this purpose. This locomotive would be exchanged with the spare SD40-2 stationed at Vaughn when it needs inspection or maintenance. It could also be used as a spare switch locomotive at El Paso when the switch locomotive at that location requires inspection/repair.

d. Total Annual MOW Costs

On Opening, AEPCO concluded that based upon the facts, experience and judgment of its engineering experts, 74 percent of the ACE's total annual MOW cost (or $30.4 million) constitutes program (capital) work, and 26 percent (or $10.6 million)

should be assigned to operating expense. See AEPCO Op. at III-D-70 and AEPCO's March 20, 2003 Errata filing. Defendants dispute AEPCO's allocation of capital/expense work, and claim that a more appropriate allocation is to assume that 45.5 percent of all costs should be assigned to operating expense. In support of this inflated assumption, Defendants cite "actual experience of BNSF and other real-world railroads comparable to ACE." Supp. Reply at III.D-148. The only support for the alleged BNSF experience is Mr. Albin's reliance upon communications with BNSF's Assistant Vice President of Engineering Services in which he suggested that the OE portion of the total BNSF MOW budget was forty percent (40%) in 2001 and 2002. Id. Defendants make no effort to explain how this system-wide BNSF allocation relates to the far less complex and smaller ACE.

AEPCO submits that the Board's treatment of this issue in other rate cases provides a far better benchmark for what is feasible for the ACE. These treatments present benchmarks relating to railroads that are truly comparable to the ACE – i.e., a new competitor, operating with a new roadbed and track structure and unburdened by the inefficiencies of the incumbent. These cases demonstrate that AEPCO's use of a 26% allocation for operating expense is comparable to the levels used by the Board.

For example, in West Texas Utilities, the Board allocated maintenance expenses based on BNSF's line-item allocations. Using BNSF's approach in this regard, the Board allocated 36 percent of total annual maintenance costs to operating expense.

Id., 1 S.T.B.2d at 697-98, Table C-1. This allocation is far better evidence of what a "comparable" railroad could achieve than the so-called "principled" approach that Defendants use here – namely, assume that the SARR could do no better than the incumbent railroad.

In sum, the Defendants have failed to demonstrate that AEPCO's allocation is not feasible. The benchmarks provided by Defendants, including BNSF's internal allocations, are not comparable and should not be relied upon by the Board as a basis to reject AEPCO's Opening allocation of 26 percent of annual maintenance costs to operating expense. Moreover, the Defendants have not shown that such a comparison is even meaningful.

Lastly, AEPCO notes that, on Supplemental Rebuttal, due its corrections in salary allocations and its revisions to its capital budget due to the transition to wood ties, AEPCO's restated annual maintenance budget is $44.3 million with $12.9 million or 29 percent allocated to operating expense.

e. Maintenance Windows

The Defendants' final effort to undermine AEPCO's MOW plan is based on AEPCO's alleged failure to account for maintenance windows for unplanned outages. In so doing, Defendants acknowledge, as they must, that programmed MOW work can be planned to avoid interference with peak traffic periods. Supp. Reply at III.D-150. Defendants also admit that more regular inspections and planned day-to-day maintenance

can also be worked around train movements in peak traffic periods. Id. Notwithstanding these two critical concessions, Defendants claim that certain unplanned maintenance activities cannot be avoided regardless of traffic levels. Id. Accordingly, Defendants assert that the purported failure to include maintenance windows for these outages suggests that AEPCO's MOW staff is undermanned.

Once again, Defendants have presented an attack that lacks any empirical support. Instead, they again rely upon BNSF's Random Failures reports for the totally unsupported implication that the random failures contained in the reports evidence "outages" that resulted in train operations being "stopped." As demonstrated, supra, there is no basis for such a conclusion from the Random Failures reports. Similarly, Defendants have not demonstrated that the types of activities that they cite could not be accommodated without disrupting train operations.

5. Leased Facilities

AEPCO discusses the trackage rights that the ACE uses to move traffic between Vaughn and El Paso in Part III-B-1, supra.

In their Supplemental Reply, Defendants indicate that they have used a rate of 9.05 mills per GTM to estimate trackage rights payments between Vaughn and El Paso. See Supp. Reply at III-D-153. However, review of Defendants' workpapers reveals that Defendants have accepted AEPCO's use of a rate of 3.2 mills per GTM, which is based on an existing joint facility agreement between BNSF and UP. AEPCO

continues to use the 3.2 mills rate on Supplemental Rebuttal for the reasons described at pp. III-B-3 to 9, supra.

6. Loss and Damage

Defendants have accepted AEPCO's loss and damage costs for the ACE. See Supp. Reply at III.D-153.

7. Insurance

In its evidence in this case, AEPCO calculated insurance costs for the ACE by averaging the 2001 insurance rates paid by BNSF and UP, yielding an insurance cost of 3.36 percent of operating expenses. See AEPCO Op. at III-D-72. In support of that approach, AEPCO noted that the ACE would follow the Class I railroad practice of self-insuring against potential liability except for catastrophic risks.

In their Supplemental Reply evidence, BNSF and UP contend that AEPCO has understated the ACE's insurance costs because the ACE's revenues are not as high as BNSF and UP's revenues. See Supp. Reply at III.D-153 to 154. Based on this premise, Defendants calculate a three-year average ratio of insurance cost to operating expenses less depreciation, casualties and insurance for carriers with revenues less than $1.0

billion.[69] Defendants apply the resulting average of 5.5 percent to its calculation of the ACE's operating expenses to yield an insurance cost of $18.1 million.[70]

Defendants offer no support for their fundamental premise that insurance expenses for a stand-alone railroad should be a direct function of its revenues. In this regard, Defendants merely state that it would be "logical" to "assume" that the ACE would experience the same level of insurance costs as a Class I carrier with the same level of annual revenues as the ACE, rather than the insurance costs of the Class I carriers whose lines are being replicated, which have much higher annual revenues. See Supp. Reply at III.D-154. On the basis of this unsupported assumption, Defendants contend that it would be improper for the Board to rely upon Defendants' own insurance ratios.

Under Defendants' logic, one would expect that insurance would occupy a larger portion of operating expense budgets at smaller railroads. Tiny Providence & Worcester (P&W) with only $22 million in revenues in 2001 should bear a proportionately larger burden than Kansas City Southern (KCS) with $569 million in 2001 freight revenues. Table III-D-5 below reveals this not to be the case. KCS's 2001

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[69] Interestingly, three of the carriers to which Defendants benchmark the ACE do not fit Defendants' own benchmark criteria of revenues of less than $1 billion. The Grand Trunk Western and Illinois Central are U.S. operating subsidiaries of Canadian National, a company with about $3.5 billion (U.S.) in revenues in 2001. The Soo Line is the U.S. operating subsidiary of Canadian Pacific which had about $2 billion (U.S.) in revenues in 2001. See Supp. Reb. Workpapers Vol. 2, pp. 00528-529.

[70] Defendants' analysis contains a technical error, such that KCS 2001 fringe benefits are counted as casualties and insurance, thus overstating the KCS 2001 insurance ratio by almost 3 percent.

insurance was 7.0 percent of operating expenses whereas P&W's was 3.8 percent, nearly the same as BNSF's or UP's. The relationship that Defendants posit between size (revenue) and insurance costs does not exist.

Defendants' argument that a 3.36 percent ratio would be infeasible for the ACE is also invalid. Many other carriers shown in Table III-D-5 below have an insurance ratio of between 3 percent and 4 percent, with some below 3 percent.

TABLE III-D-5
Insurance/Casualty Percentage of
Operating Expense (Excl. Depreciation)

Railroad	Insurance %	Source
1. ACE (BNSF/UP)	5.5 %	BNSF/UP calculation
2. ACE (AEPCO)	3.4 %	BNSF, UP R-1 Sch. 410
3. GTW (2001)	3.1 %	R-1 Sch. 410
4. SOO (2001)[1/]	2.9 %	R-1 Sch. 410
5. IC (2001)	5.8 %	R-1 Sch. 410
6. IC (1998)	2.9 %	R-1 Sch. 410
7. IC (1997)	1.9 %	R-1 Sch. 410
8. KCS (2000)	2.0 %	R-1 Sch. 410
9. KCS (2001)	7.0 %	R-1 Sch. 410
10. KCS (2002)	4.0 %	R-1 Sch. 410
11. WC (2000)	3.6 %	10-K MD&A
12. FECR (2001)	3.8 %	10-K MD&A
13. P&W (2001)	3.8 %	10-K MD&A
14. G&W (2001)	5.6 %	10-K MD&A

See AEPCO Supp. Reb. electronic workpaper files in Section III-D-7 "insurance" folder.

Defendants' strictly revenue-based assumption is incorrect because it ignores the actual risk factors against which insurance is intended to protect a railroad and on which insurance rates are based. The greatest risk against which a railroad seeks to be insured is a catastrophic accident involving a derailment or collision (particularly collisions involving at-grade crossings) or an accident involving hazardous materials. BNSF and UP each face a far greater risk of such incidents than the ACE faces because of the simple, repetitive nature of the ACE's operations. In addition, hazardous materials on the ACE represent only { } of all non-coal traffic, while { } of Defendants' non-coal traffic (i.e., { } times the level of the ACE) was HAZMAT in 2001. See Supp. Reb. electronic workpaper files in III-D-7 "Hazmat" folder and Supp. Reb. Workpapers Vol. 2, pp. 00499-526.

Moreover, the ACE operates in an isolated part of the country (largely a desert region with low population) where the risk of collisions at grade crossings (for example) is significantly reduced compared to the totality of BNSF's and UP's operations which include many large urban areas. The ACE handles intact trains, does not conduct local switching, and does not conduct significant yard operations. In addition, there are no tunnels on the ACE's system.

Finally, Defendants' argument also contradicts considerable rate case precedent in which the Board has accepted insurance ratios far *below* the ACE's ratio of 3.36% for SARR's with revenues that are comparable to the ACE's 2001 revenue of $485.9 million. See, e.g., Duke v. NS at 63, 85 (accepting a 2.5% insurance ratio for a SARR with 2002 revenues of $487 million); Carolina at 53, 72 (accepting a 2.5%

insurance ratio for a SARR with 2002 revenues of $454 million); Duke v. CSXT at 50, 71 (accepting a 2.5% insurance ratio for a SARR with 2002 revenues of $497 million).

8. Ad Valorem Tax

Defendants have accepted AEPCO's calculation of Ad Valorem Tax. See Supp. Reply at III.D-154.

9. Other (Costs Related to Off-SARR Operations at El Paso)

Defendants contend that the residual UP will incur certain additional costs as a result of AEPCO's decision to route the issue and other coal traffic via El Paso, to handle overhead traffic between El Paso and Cochise, and to place the ACE's El Paso yard several miles west of the point in El Paso at which UP trains customarily change crews. Defendants have added { } per year to cover this additional UP expense. See Supp. Reply at III.D-154 to 157.

As AEPCO pointed out with respect to a similar contention involving the residual BNSF's operations at and near Belen, neither SAC theory nor the Board's precedents support a requirement that a SARR compensate a residual incumbent for off-SARR costs incurred to handle cross-over traffic. See pp. III-C-2 to 5, supra. In any event, if the Board were to find that the ACE should bear the additional UP operating costs posited by Defendants, then the Board must also credit the ACE's operating expenses for the substantial savings in crew costs UP would realize as a result of the ACE's presence as an overhead carrier between El Paso and Cochise.

In its original Rebuttal Evidence, AEPCO demonstrated that the ACE's presence would enable UP to rearrange its crews in its present El Paso-Tucson crew

III-E Non-Road
Property Investment

III. E. NON-ROAD PROPERTY INVESTMENT

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111-F Road Property
Investment

III. F. ROAD PROPERTY INVESTMENT

Before turning to the individual items at issue in this Part, AEPCO notes that Defendants' claim that they lacked time to prepare thorough evidence on road property investment issues is disingenuous. Supp. Reply at III.F-3, 15. In this regard, Defendants claim that they only addressed those areas where there were significant shortcomings in AEPCO's Opening Evidence. Supp. Reply at III.F-15. Yet a cursory review of Defendants' Supplemental Reply shows that Defendants disputed almost every cost and quantity posited by AEPCO. Moreover, Defendants have also included large amounts for additional cost items that have never been suggested before in a SAC rate case (e.g., materials testing) or which the Board has rejected in other cases (e.g., undercutting and fine grading). Supp. Reply at III.F-26, 54 and 233. In addition, the narrative portion alone of Part III.F of the Supplemental Reply is 239 pages long.

Although the Defendants could have been preparing reply evidence for nearly a year, they claim they did not do so because of uncertainty as to whether this case might be dismissed or because they could not proceed due to claimed deficiencies in AEPCO's traffic group. Supp. Reply at III.F-3. But the record in this case tells a different story. The Defendants actively began the reply process immediately after AEPCO filed its Opening Evidence more than a year ago. For example, the Defendants promptly sent several follow-up data requests to AEPCO, and, according to the Supplemental Reply workpapers, their witnesses began site visits to the ACE territory.

AEPCO has included a list of the all the relevant workpapers from the Defendants' Supplemental Reply filing that were created before November 2003. See AEPCO Supp. Reb. electronic workpaper file "Supp. Reply Workpapers.xls."

AEPCO's Opening and Supplemental Rebuttal costs for road property investment are compared to Defendants' Supplemental Reply costs in Table III-F-5 below and in Exhibit III-F-14.[1]

TABLE III-F-5
ACE Road Property Investment Costs

	Item	AEPCO Opening	BNSF Supplemental Reply	AEPCO Supplemental Rebuttal
1.	Land	$9,677,146	$13,105,875	$13,105,875
2.	Roadbed Preparation	$176,693,244	$571,033,212	$208,184,148
3.	Bridges	$45,008,516	$148,246,695	$114,550,930
4.	Culverts	$2,823,272	$8,064,373	$3,027,520
5.	Track Construction	$632,035,324	$747,019,032	$563,839,244
6.	Signals and Communications	$48,904,991	$129,191,359	$76,631,817
7.	Buildings and Facilities	$27,040,837	$88,300,464	$35,586,986
8.	Public Improvements	$78,688	$16,005,752	$104,917
9.	Subtotal	**$942,262,017**	**$1,720,966,762**	**$1,015,031,438**
10.	Test Borings and Soil Investigation	$1,325,390		$1,325,390
11.	Mobilization	$2,937,619	$40,988,661	$4,380,863
12.	Engineering	$63,415,771	$193,842,211	$68,130,938
13.	Engineering - Survey, Stake Out, Testing	$0	$38,681,869	$0
14.	Contingency	$74,606,790	$170,786,089	$80,154,045
15.	Other - El Paso Trainway	$0	Defendants Included with Bridges	$2,987,000
16.	TOTAL CONSTRUCTION COSTS	**$1,084,547,587**	**$2,165,265,592**	**$1,172,009,675**

[1] Tables III-F-1 through III-F-4 are contained in Part III-F of AEPCO's Opening Evidence narrative. Exhibits III-F-1 through III-F-13 were contained in AEPCO's Opening Evidence.

1. **Land**

On Opening, AEPCO presented evidence that the cost of acquiring the ACE right-of-way was $9.68 million in 1991 dollars. AEPCO Op. at III-F-11. In their Supplemental Reply, the Defendants assert that the ACE land cost is $13.11 million, or $3.43 million more than AEPCO's estimate. See Table III.F-1 at Supp. Reply III.F-2.

The difference is entirely attributable to the parties' respective valuations of the land needed by the ACE in Texas (the parties agree with respect to land values in New Mexico and Arizona). Id. at III.F-5. To minimize the issues in dispute, in this Supplemental Rebuttal, AEPCO accepts the Defendants' valuation of the Texas land and therefore Defendants' total land acquisition cost of $13.11 million.

2. **Roadbed Preparation**

Roadbed preparation costs for the ACE 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 AEPCO at pages III-F-11 to 44 of its Opening Narrative and by the Defendants at pages III.F-16 through III.F-69 of their Supplemental Reply.

On Opening, AEPCO included $180.56 million for roadbed preparation (including $2.82 million for culverts). AEPCO Op. at III-F-13. The Defendants included $579.09 million (including $8.06 million for culverts), over three times AEPCO's amount. Supp. Reply at III.F-17, 60. This enormous difference in roadbed preparation

investment accounts for over 45% of the total difference in ACE investment costs when combined with the Defendants' additives for mobilization, engineering and contingencies.[2] As discussed infra, the Defendants have significantly overstated roadbed preparation costs by: (1) overstating the earthwork requirements for the ACE's yards due to calculation errors and by overstating yard size; (2) overstating the unit costs for earthwork through the selection of costlier equipment and the addition of unnecessary tasks associated with earthmoving; (3) overstating the cost for water for compaction; (4) including costs for unnecessary items such as yard seeding, undercutting and fine grading; (5) overstating the costs for detour roads during the ACE's construction; and (6) overstating the costs for many other items including sand and drainage berms, land for waste quantities, retaining walls, and yard drainage. Virtually none of Defendants' presentation is based on evidence of construction costs from actual railroad projects or practices. Rather, Defendants' proposed costs are based largely on references to their own "standard" specifications and mere assertions that are either not applicable to the ACE or that refer to unnecessary cost items.

The Defendants suggest that AEPCO's engineering experts have grossly underestimated the costs of grading for the ACE roadbed. Supp. Reply at III.F-17. In particular, the Defendants suggest that the ACE's territory is fraught with difficulties that

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[2] $398.53 million plus $9.56 million for mobilization (2.4%), $45.23 million for engineering (11.35%) and $39.85 million for contingencies (10%) equals $493.17 million of the total difference of $1,084.50 million.

AEPCO's engineering experts underestimated. Id. at 18. Simply put, the Defendants are wrong.

In fact, the territory traversed by the ACE is among the easiest areas of the country in which to build a railroad line. It is largely a flat, desert-like area with little hard rock to be excavated, no tunnels, favorable soil conditions, and favorable weather conditions, particularly in the winter months. It is certainly far more favorable from the standpoint of keeping construction costs low than the mountainous terrain involved in the recent Eastern rate cases.

Table III-F-6 below compares AEPCO's Opening, Defendants' Supplemental Reply and AEPCO's Supplemental Rebuttal investment costs for roadbed preparation for the ACE.

TABLE III-F-6
Comparison of ACE Estimated Roadbed Preparation Investment -
AEPCO Opening, BNSF/UP Supp. Reply and AEPCO Supp. Rebuttal - 1Q01
($ in millions)

Item (1)	AEPCO Opening (2)	BNSF/UP Supp. Reply (3)	AEPCO Supp. Rebuttal 1/ (4)	BNSF/UP Overstatement 2/ (5)
1. Clearing	$1.23	$33.39	$ 1.28	$ 32.11
2. Grubbing	0.00	0.18	0.18	0.00
3. Sand Berm	0.00	18.74	11.57	7.17
4. Drainage Berm	0.00	5.79	3.57	2.22
5. Undercutting	0.00	29.40	0.00	29.40
6. Earthwork				
a. Line Segments	167.01	307.63	173.12	134.51
b. Yards	1.44	87.54	10.87	76.67
7. Fine Grading	0.00	7.95	0.00	7.95
8. Lateral Drainage	0.00	0.00	0.00	0.00
9. Yard Drainage	1.06	15.93	4.44 3/	11.49
10. Culverts	2.82	8.06	3.03 4/	5.03
11. Retaining Walls	0.41	3.88	0.68	3.20
12. Rip Rap	3.33	3.43	3.43	0.00
13. Relocation of Utilities	0.12	0.12	0.12	0.00
14. Topsoil Placement / Seeding	0.00	0.06	0.00	0.06
15. Water for Compaction	2.70	45.92	2.91	43.01
16. Road Surfacing (for detours)	0.21	6.53	0.21	6.32
17. Environmental Compliance	0.16	0.16	0.16	0.00
18. Land for Waste Quantities	0.07	0.14	0.07	0.07
19. Other	0.00	4.24	0.03 5/	4.21
20. Total	$180.56	$579.09	$215.67	$363.42

1/ See Supp. Reb. electronic workpaper file "ACE RR Grading Rebuttal.xls" except where noted.
2/ Column (3) - Column (4)
3/ See Supp. Reb. electronic workpaper file "building sites.xls."
4/ See Supp. Reb. electronic workpaper file "Culvert Inventory and Costing.xls."
5/ See Supp. Reb. electronic workpaper file "iiif3f.xls."

Before discussing the various components of roadbed preparation detailed in the above table, AEPCO notes that the Defendants accepted virtually all of AEPCO's roadbed specifications, including the use of a 24-foot roadbed width (for single track); 100-foot and 75-foot right-of-way widths (despite a few minor protests at page III.F-23);

the use of earthwork quantities from the ICC Engineering Reports (as modified for modern roadbed specifications); the use of CARDS to estimate the earthwork quantities for the Defiance Branch; the earthwork quantities for the Vaughn connecting track; a side slope specification of 1.5:1; side ditch size specifications; use of gabions as retaining walls; use of water for compaction; and assumption of 30% waste. See Supp. Reply at III.F-20 to 24.

The Defendants also criticized AEPCO for failing to include access roads, but Defendants themselves did not include any costs for such roads. Id. at 22-23.

The final item discussed by the Defendants in their preliminary roadbed preparation section pertains to some of the unit costs used by AEPCO. On Opening, AEPCO utilized many unit costs from the RS Means Site Work and Landscape Cost Data for 2001 ("Means Handbook"[3]) and indexed the unit costs from mid-year 2001 to the beginning of 2001. The Defendants reject AEPCO's indexing of the Means Handbook unit costs, arguing that the unit costs represent January 1, 2001 levels. See Supp. Reply at III.F-24. Upon further review, AEPCO agrees with Defendants that the Means Handbook

[3] RS Means publishes many cost data books and AEPCO used more than one in developing its construction costs for the ACE. For purposes of this narrative, they are all collectively referred to as the Means Handbook. The specific pages containing the unit costs used by AEPCO are included in either AEPCO's Opening workpapers or AEPCO's Supplemental Rebuttal workpapers.

unit costs represent beginning year cost levels. Therefore, AEPCO has eliminated all indexing of the 2001 Means Handbook unit costs in this Supplemental Rebuttal filing.[4]

a. Clearing, Grubbing, Undercutting, and Berms

i. Clearing

On Opening, AEPCO included $1.23 million for clearing the ACE right-of-way. In their Supplemental Reply, Defendants included $33.39 million for clearing,[5] or over 27 times the cost included by AEPCO. This disparity in investment is caused by differences in: (1) non-parallel second main track miles; (2) additional siding/main track miles; (3) yard track miles; and (4) unit costs. Each of these differences is discussed below.

As discussed in Part III-B-2-a, supra, AEPCO has accepted Defendants' non-parallel second main track miles, and AEPCO also has accepted one mainline track addition proposed by the Defendants. AEPCO has also included two sidings inadvertently omitted in Opening from its roadbed preparation track miles, and it corrected the milepost for two other sidings. See Supp. Reb. Workpapers Vol. 3, pp. 00532-00538 and Supp. Reb. Exhibit III-B-4. AEPCO has incorporated all of these

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[4] However, any unit costs taken from a Means Handbook for years other than 2001 were indexed to 2001 levels using the Means Handbook index.

[5] Defendants' Supplemental Reply figure of $33.57 million for clearing includes $0.18 million for grubbing. Grubbing is discussed infra.

modifications into its Supplemental Rebuttal calculation of the ACE's required clearing acres.

There are two differences between AEPCO and the Defendants with respect to clearing for the ACE yards. First, as discussed in Part III-B-2-c, supra, the Defendants increased the number of yard tracks in the Vaughn and El Paso yards; for the most part, AEPCO has not accepted those modifications. The modifications that AEPCO has accepted (the addition of lead tracks at Vaughn and El Paso and the addition of one yard track at El Paso) are reflected in AEPCO's Supplemental Rebuttal clearing calculations.

The second difference with respect to yards is caused by Defendants' double-count of clearing costs for the Vaughn and El Paso yards. Acres of clearing are calculated on a track-mile basis (including yard track) from the data contained in the ICC Engineering Reports and applied to the ACE track miles including yard track miles. See AEPCO Op. electronic workpaper "ACE RR GRADING.xls," tab "IIIF_4 Othr EW," Columns S, T and U; see also Defendants' Supp. Reply electronic workpaper "III F 2 ACE Grading," tab "IIIF_4 Othr EW," Columns S, T and U. However, Defendants also included an additional 305 acres of clearing for the El Paso and Vaughn yards, double-counting the clearing required. See Supp. Reply electronic workpaper "III F 2 ACE Grading," tab "IIIF_9 Vaughn," Cell D16, tab "IIIF_9 El Paso," Cell D16 and tab "IIIF_4 Othr EW," Cell U26. Using Defendants' overstated unit cost, discussed below, this double count results in an overstatement of $1.74 million in clearing costs.

The difference in unit cost accounts for the majority of the difference in clearing costs. On Opening, AEPCO used a unit cost of $181 per acre for clearing medium brush by brush rake. See AEPCO Op. Exhibit III-F-4 and electronic workpaper file "ACE RR GRADING.xls," tab "IIIF Unit Costs." The Defendants use a unit cost of $5,711 per acre to "Clear and Grub dense brush including stumps," which is more than 31 times higher than AEPCO's unit cost. See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tab "IIIF Unit Costs." Defendants claim that their higher unit cost is necessary because AEPCO's unit cost "does not include any cost for removal and hauling of the brush pile for disposal." Supp. Reply at III.F-25. They further claim that their unit cost reflects AEPCO's experts' field observations of "dense brush." Id. As shown below, Defendants' unit cost is erroneous and should be rejected.

First, Defendants have not provided any evidence that the brush pile needs to be removed and hauled away for disposal. The ACE 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. Furthermore, even if brush were to be hauled away, such hauling could not possibly increase the costs 31-fold.

Second, Defendants' unit cost is to "Clear and Grub dense brush including stumps" (emphasis added). As the ICC Engineering Reports show, and Defendants agree,

there was no grubbing on the lines replicated by the ACE.[6] Furthermore, the unit cost used by AEPCO reflects the use of a brush rake which works below ground level to take out roots as well as surface material. See Supp. Reb. Workpapers Vol. 3, p. 00540-00541. Therefore, Defendants' use of a unit cost that includes grubbing clearly is improper and results in overstated costs.

Finally, Defendants have misstated AEPCO's engineering experts on the type of brush found on the ACE. AEPCO stated on Opening that "this vegetation consists of nothing more dense than brush." See AEPCO Opening at III-F-15. This is quite different than the Defendants' statement at Supp. Reply III.F-25 that "[t]his unit cost accepts AEPCO's expert field observation that. . . the vegetation that does exist is dense brush. . . ." Obviously, AEPCO's engineering experts did not describe the vegetation as "dense brush."

In light of the above, Defendants' clearing costs are grossly overstated. On Supp. Rebuttal, AEPCO continues to rely on its Opening unit costs from the Means Handbook (with the elimination of the indexing) applied to the slightly increased number of acres, resulting in costs of $1.28 million for clearing. See Exhibit III-F-15.

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[6] The only exception to this is the Defiance Branch, discussed infra, which is a segment not covered by the ICC Engineering Reports.

ii. Grubbing

On Opening, AEPCO did not include any costs for grubbing based on a review of the ICC Engineering Reports, which showed that no grubbing was performed when the lines replicated by the ACE were originally constructed. See AEPCO Op. at III-F-14 and Op. electronic workpaper file "ACE RR GRADING.xls," tab "IIIF_3 ER INPUT," Column AM. Defendants agree with AEPCO's position regarding the ICC Engineering Reports. See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tab "IIIF_3 ER INPUT," Column AM.

Defendants, however, take exception to AEPCO's position that no grubbing was required on the Defiance Branch. Supp. Reply at III.F-26. As AEPCO included costs for clearing trees on the Defiance Branch, Defendants contend that the ACE would also incur costs to grub and remove the stumps associated with the trees being cleared. The Defendants added the Means Handbook cost per acre for grubbing to the cost per acre for clearing trees on the Defiance Branch. AEPCO agrees that the ACE would incur the costs for grubbing the acres associated with clearing trees on the Defiance Branch, and AEPCO also accepts the Defendants' unit cost. Rather than combining the grubbing costs with the clearing costs, however, AEPCO has shown the costs separately. On Supplemental Rebuttal, AEPCO has included $184,073 for grubbing, the same amount posited by the Defendants. AEPCO Supp. Reb. electronic workpaper file "ACE RR Grading Rebuttal.xls," tab "IIIF_15 Othr EW."

iii. Undercutting

The Defendants included $29.4 million for undercutting of the ACE's roadbed (Supp. Reply at III.F-26 to 27) – an activity which the Board has repeatedly rejected. See Duke/NS at 95; Carolina at 82; Duke/CSXT at 80. The Defendants argue that five percent of the roadbed needs undercutting (including solid rock), yet they have not offered any specific analysis justifying this activity anywhere on the lines the ACE is replicating. Rather, the Defendants simply perform the mathematical calculation of multiplying their unsupported five percent times the sum of the common, loose rock and solid rock excavation quantities they develop for the ACE. See Supp. Reply electronic workpaper "III F 2 ACE Grading.xls," tab "IIIF_10 EW Cost," Column P.

Not only is Defendants' position unsupported by any analysis, the ICC Engineering Reports give no indication that undercutting was required for the lines being replicated by the ACE. If undercutting were necessary, however, it is logical to assume, absent supporting documentation stating otherwise (which the Defendants have not provided), that all excavation quantities, including any undercutting, were captured in the earthwork quantities contained in the ICC Engineering Reports.

The Defendants' undercutting claims are also inconsistent with their position elsewhere that excavation must be performed with heavier equipment than was provided by AEPCO because the material is difficult to excavate, indicating that the material is stable and well-suited for a roadbed. Yet, the Defendants argue for

undercutting on the premise that the material is unsuitable for a roadbed, even going so far as to undercut the solid rock.

Simply put, the material encountered during the construction of the ACE will for the most part be sufficiently sound for roadbed construction. In particular, AEPCO's engineering experts have reviewed the soils maps for the ACE route. See Supp. Reb. Workpapers Vol. 4, pp. 01050-1079. The general soils map of the state of New Mexico, with the ACE route superimposed, shows that there are three types of soils that predominate along the route. The three types include aridisols, which cover the largest percentage of the line, entisols and mollisols. The aridisols are not suitable for growing crops as they contain significant amounts of salts, which explains why there is so little brush and grass along the right of way. The description of aridisols is "Coarse-loamy, carbonatic, thermic Ustic Haplocalcid." They are well drained soils and the parent material is mixed alluvium derived from andesite, limestone and quartzite.

Entisols are essentially sandy materials. They are excessively drained and have a slight hazzard of erosion. Their parent material is sandy eolian material.

Mollisols are fine silty soils of moderate permeability used for croplands. Their parent material is loess.

Defendants' unsupported assertions with respect to undercutting constitute yet another example of their persistent efforts to artificially raise the ACE's construction costs. The Board should reject Defendants' unsupported undercutting costs.

iv. Sandberms and Drainage Berms

Defendants included investment costs for sandberms and drainage berms located along various portions of the ACE route. Supp. Reply at III.F-17. Although AEPCO was not aware of the presence and extended length of these berms until the Defendants filed their Supp. Reply evidence,[7] AEPCO has accepted that the ACE may need such roadbed protection. Despite the fact that Defendants have not provided any support for the earthwork quantities for these berms, other than some schematics drawn specifically for this proceeding and some photographs which are useless in determining the size of these berms, AEPCO has accepted Defendants' quantities. However, AEPCO has not accepted Defendants' proposed cost of $24.5 million for the berms.

Defendants' costs for these berms are overstated because they rely on the same overstated unit costs used for common earthwork discussed infra. In particular, the Defendants included the cost for their more expensive scraper, included the costs for a bulldozer to spread the dumped material, and included compaction costs using only a sheepsfoot roller. Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tab "IIIF Unit Costs."

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[7] Defendants did not provide any information on the existence of these berms in discovery in response to AEPCO's Request for Production No. 83, which requested information on all "grading construction activities." See Supp. Rebuttal Workpapers Vol. 3, pp. 00544-00545. Furthermore, AEPCO's engineering experts did not have the same luxury as Defendants' engineering witnesses to travel the entire ACE route by hi-rail vehicle.

As discussed infra, AEPCO's scraper is fully capable of handling the common earthwork required for the ACE roadbed, and therefore it is certainly capable of handling the common earthwork for these berms. A dozer is not necessary to spread the dumped material because the scraper is capable of dumping and spreading the material. Finally, if the ACE roadbed can be compacted in part with a vibrating roller, there is no reason why the berms cannot be compacted (to lesser compaction specifications) with the same equipment.

On Supplemental Rebuttal, AEPCO has included $15.1 million for these berms. See Supp. Reb. electronic workpaper file "ACE RR Grading Rebuttal.xls," tab "IIIF_20 Othr Cst."

b. Earthwork

i. Earthwork Quantities

(a) ACE Line Segments

The Defendants accepted AEPCO's use of the ICC Engineering Reports as the basis for developing the earthwork quantities for most of the ACE line segments. See Supp. Reply at III.F-30. However, Defendants claim that AEPCO's assumptions about the original specifications for cuts and fills on the UP line the ACE is replicating were incorrect. In particular, Defendants argue that the original specifications were 16 feet for fills and 18 feet for cuts – not the 17 feet and 20 feet, respectively, that AEPCO used. Supp. Reply at III.F-31. AEPCO agrees with Defendants on this point, and it has revised

its quantities accordingly. This change increases the per-mile earthwork quantities for the UP valuation section of the ACE by less than seven percent.[8]

As noted supra, AEPCO has also accepted Defendants' calculation of miles for the areas of non-parallel, second main track on the BNSF line between Defiance and Vaughn, which has been replicated by both AEPCO and Defendants, and extended one double-track section by 1.17 miles. As discussed infra, AEPCO has accepted Defendants' inclusion of, and costs for, the El Paso Trainway. Consequently, on Supplemental Rebuttal AEPCO has made the same adjustment that Defendants made on Supplemental Reply. Specifically, AEPCO has excluded the earthwork quantities for the length of the El Paso Trainway from the earthwork quantity calculations (earthwork costs are included in the total cost for the trainway included by both AEPCO and Defendants). These changes, in total, cause a slight increase in earthwork quantities. See Supp. Reb. Exhibit III-F-17 for ACE earthwork quantities by line segment.

(b) Defiance Branch and Vaughn Connecting Track

The Defendants have accepted AEPCO's earthwork quantities for the Defiance Branch and the Vaughn Connecting Track. Supp. Reply at III.F-31.

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[8] Compare the adjusted earthwork quantities per mile shown on AEPCO Op. Exhibit III-F-7 to the adjusted earthwork quantities per mile shown on AEPCO Supp. Reb. Exhibit III-F-16.

(c) Yards and Interchange Tracks

On Opening, AEPCO calculated the earthwork quantities for the ACE's six yards assuming a one-foot fill. The use of a one-foot fill was based on the method by which the ICC Engineering Report earthwork quantities were applied to the ACE's main-track miles (including passing sidings). See AEPCO Op. at III-F-23 to 25. The methodology utilized by AEPCO has been accepted by the Board in other rate cases. See Duke/NS at 91; Carolina at 79; Duke/CSXT at 77; Wisconsin at 81.

In their Supplemental Reply, Defendants accepted AEPCO's use of the ICC Engineering Reports for the calculation of main track earthwork quantities, and also assumed a one-foot fill for yard track in computing those quantities. Supp. Reply at III.F-30 to 33. However, Defendants did not accept AEPCO's methodology for calculating earthwork quantities for any of the ACE's yard tracks. Specifically, Defendants developed yard track earthwork quantities two different ways for the ACE's six yards. For four yards (Belen, Defiance, Dalies and Cochise) located in places where (according to Defendants) yards do not currently exist, Defendants eschewed the one-foot fill and used the main-line calculation for sidings adjacent to the main tracks (also based on the ICC Engineering Reports) to develop their earthwork quantities.

For the Belen, Defiance, Dalies and Cochise Yards, the Defendants' approach is flawed.[9] As discussed at AEPCO Op. III-F-24 to 25, the ICC Engineering Reports do not separately identify earthwork quantities for yard track. Therefore, consistent with past practice in stand-alone rate cases, an amount equal to a one-foot fill for the total amount of yard track in each valuation section was deducted from the total earthwork quantities for each valuation section. The remaining earthwork quantities for each valuation section were then distributed among the miles of main track for that particular valuation section. Stated differently, any earthwork quantities for yard track that may have exceeded those required for a one-foot fill were allocated to the main track. Following this logic, when calculating yard track earthwork requirements for the ACE, a one-foot fill must be assumed for otherwise there will be a double-count in total earthwork quantities. This is a mathematical certainty, as the Board recognized in Wisconsin:

> [I]n using the Engrg Rpts (which contain only the combined grading for yards and lines), the parties agreed to assume that the original rail yards required a minimum amount (1 foot) of fill. This allotted the vast majority of grading work to the roadbed. Given the parties' agreement on yard fill, it would be inappropriate for UP to seek to maximize the amount of grading on the line (by assuming minimum fill in the yards) and then, after the grading requirements are established, to revise upward the amount of grading in the yards.

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[9] As discussed infra, the Defendants' arguments with respect to the ACE's Belen Yard are also misapplied because the yard is located where BNSF's Belen Yard is today.

Wisconsin at 81. As this passage demonstrates, it is improper for Defendants, in developing main-line earthwork quantities, to assume a one-foot fill for the existing yards, while also revising upward the amount of earthwork for other ACE yards.

The Defendants' supposed explanation for deviating from the procedures accepted by the Board is that the earthwork for the yards in "new" locations is not included in the earthwork quantities reflected in the ICC Engineering Reports. Defendants' explanation misses the mark. In developing the main track earthwork quantities, both AEPCO and the Defendants assumed one-foot fills for all the yard track in place when the ICC Engineering Reports were developed. This assumption was made because the ICC Engineering Reports do not separately identify earthwork quantities for yards and main track. However, this does not mean that all yards actually required a one-foot fill. It is likely that at some yard locations, more than a one-foot fill was required and, in fact, some excavation may have been required – but the opposite is also true. The point is that an assumption was made by both parties which "allotted the vast majority of grading work to the roadbed" (id.), and this assumption must also be used when calculating earthwork quantities for the ACE's new yards or an overstatement will result.

The only way that actual earthwork quantities could be used for the ACE yards is if the actual earthwork quantities for Defendants' original yards were calculated and removed from the total earthwork quantities for each valuation section before

distributing the remaining earthwork quantities to the main track. This is not possible because the ICC Engineering Reports do not identify earthwork quantities for yards.

Another measure of the reasonableness of AEPCO's approach is whether the ACE is building more yard tracks than existed when the ICC Engineering Reports were prepared. As long as the ACE is building fewer yard tracks than were included in the ICC Engineering Reports, all yard tracks must be constructed assuming a one-foot fill or else the earthwork quantities will be overstated. For the valuation sections where yards were included on the ACE, the ACE built only 25 percent of the yard tracks that existed for these valuation sections when the ICC Engineering Reports were developed. Even given their overstated yard requirements, Defendants themselves constructed only 27 percent of the yard tracks that originally existed. See Supp. Reb. electronic workpaper "ACE Yard Track Comparison Rebuttal.xls" for a comparison of the yard tracks contained in the ICC Engineering Reports and those constructed by AEPCO and by Defendants. Because neither AEPCO nor the Defendants built more yard tracks than were included in the ICC Engineering Report quantities, the use of anything greater than a one-foot fill for computing yard track earthwork quantities for the ACE results in an overstatement of those quantities. Therefore, the Board should reject Defendants' overstated quantities for yard-related earthwork for the Belen, Dalies, Defiance and Cochise yards and accept AEPCO's quantities. See AEPCO Supp. Reb. Exhibit III-F-18 for the calculation of yard quantities.

Finally, AEPCO notes that the ACE's Belen Yard is located in the same place as BNSF's own, substantially larger, Belen Yard. See Op. Exhibit III-B-1. The Defendants have offered no explanation for their erroneous assumption that the ACE's Belen Yard is in a different location than BNSF's yard. Consequently, Defendants' proposed quantities, over and above the one-foot fill, are even more unjustified for the Belen Yard.

(i) Vaughn Yard

On Opening, AEPCO calculated the earthwork requirements for the Vaughn Yard using the one-foot fill methodology described supra. Defendants disagreed with AEPCO's approach and developed earthwork quantities in excess of 4 million cubic yards for the Vaughn Yard using Topo USA maps and by-hand calculations. Supp. Reply at III.F-34. Defendants' earthwork calculations are overstated and erroneous for several reasons.

First, Defendants have overstated the track requirements, and corresponding size, of the Vaughn Yard. See pp. III-B-19 to 32, supra, for a discussion of the differences between AEPCO's and Defendants' configuration of the Vaughn Yard. Second, as explained infra, Defendants' calculations are hopelessly flawed.

Nevertheless, AEPCO agrees with Defendants that, in this specific instance, the placement of the Vaughn Yard is such that the one-foot fill methodology does not adequately account for all the necessary earthwork. However, as shown above, the

Defendants' calculations are erroneous and overstated. AEPCO's engineering experts have determined a required earthwork quantity of 0.37 million cubic yards (less than 10 percent of Defendants' quantity) using AEPCO's revised Vaughn Yard configuration, computerized U. S. Geological Survey ("USGS") topographic map data and Eagle Point Engineering software, as discussed in greater detail infra. See Supp. Reb. Workpapers Vol. 3, pp. 00553-00564. AEPCO has accepted Defendants' allocation of the excavated materials of 80 percent common and 10 percent each to loose rock and solid rock.

(ii) El Paso Yard

On Opening, AEPCO calculated the earthwork requirements for the El Paso Yard using the one-foot fill methodology described supra. Defendants again disagreed with AEPCO's approach and developed earthwork quantities of nearly six million cubic yards for the El Paso Yard using Topo USA maps and by-hand calculations. Supp. Reply at III.F-34. Defendants' earthwork calculations for this yard also are overstated and erroneous for several reasons.

First, Defendants have overstated the track requirements, and corresponding size, of the El Paso Yard. See Part III-B, supra, for a discussion of the differences between AEPCO's and Defendants' configuration of the El Paso Yard. Second, their El Paso Yard earthwork quantities suffer from the same infirmities as their Vaughn Yard calculations.

Nevertheless, AEPCO agrees with Defendants that, in this specific instance, the placement of the El Paso Yard is such that the one-foot fill methodology does not adequately account for all the necessary earthwork. However, as shown infra, the Defendants' calculations are erroneous and overstated. AEPCO's engineering experts have determined a required earthwork quantity of 1.94 million cubic yards (less than a third of Defendants' quantity) using AEPCO's El Paso Yard configuration, computerized U. S. Geological Survey ("USGS") topographic map data and Eagle Point Engineering software, as discussed infra. See Supp. Reb. Workpapers Vol. 3, pp. 00574-00583. AEPCO has accepted Defendants' allocation of the excavated materials of 80 percent common and 10 percent each to loose rock and solid rock.

(iii) Vaughn and El Paso Yard Calculation Problems

On Supplemental Reply, Defendants have presented alternative grading calculations for the El Paso and Vaughn Yards. See Supp. Reply Workpapers Vol. 2, pp. III.F-0027-0095. AEPCO's engineering experts have reviewed their calculations and determined that they are grossly inaccurate and unreliable.

First, the topographic data Defendants used is problematic. In particular, the Defendants used Delorme's Topo USA 4.0. While this software provides a general picture of the contours and elevations in a given area, it is not suitable for the detailed quantities work that Defendants performed. Indeed, AEPCO's engineers determined that Delorme's other product line, 3-D TopoQuads is more appropriate for this purpose. See

Supp. Reb. Workpapers Vol. 3, pp. 00593-00594. In particular, the 3-D TopoQuads provide a much higher degree of accuracy because they contain scanned raster images of the actual 7.5 minute USGS quadrangle maps produced by the United States Geological Survey that are tiled together to create a map of the entire state.[10] The much greater detail offered by the TopoQuad product is vital when making calculations of this type because even a small variation in the contours and elevations can significantly impact the total quantities of earthwork. Therefore, AEPCO's engineering experts used the more accurate USGS-based maps for their calculations.

Second, Defendants overstated the grading information for the El Paso and Vaughn Yards by including the grading for the existing mainline track, which has already been included in the line segment grading computations. As shown in Figure 1 below (which is a copied page from one of Defendants' workpapers for the El Paso Yard), the ground elevation at station 0+00, which represents the mainline track centerline, is elevation 3800', but the actual elevation of the track is 3782'. Therefore, Defendants' have calculated a cut of 18' where the cut depth at station 0+00 should be 0'.

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[10] The greater degree of detail is reflected in the amount of data that each product offers. For example, TopoQuad's data is stored on 45 CD-ROMs rather than the 7 CD-ROMs for Topo USA.

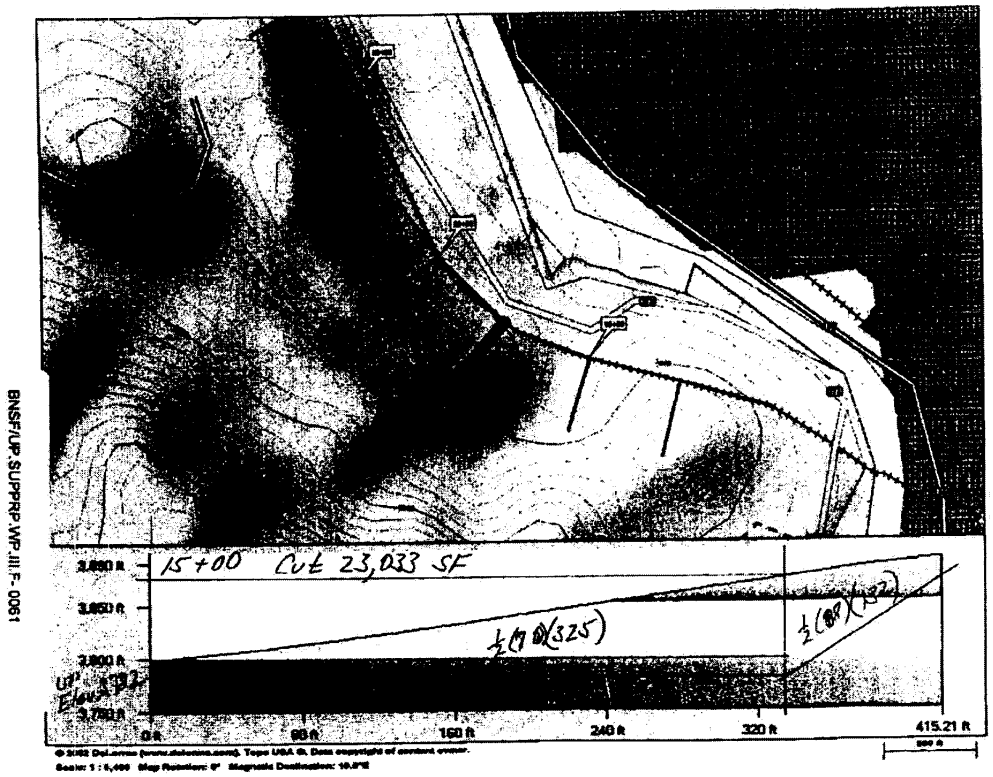


Figure 1. Defendants' El Paso Yard station 15+00.

Figure 2 below shows a similar problem with Defendants' calculations for the Vaughn Yard. In particular, Defendants' workpaper shows another non-existent 26' cut at station 0+00. Again, the elevation at station 0+00 should match the elevation of the existing rail line (6114'), but here it starts 26' higher than the existing railroad grade.

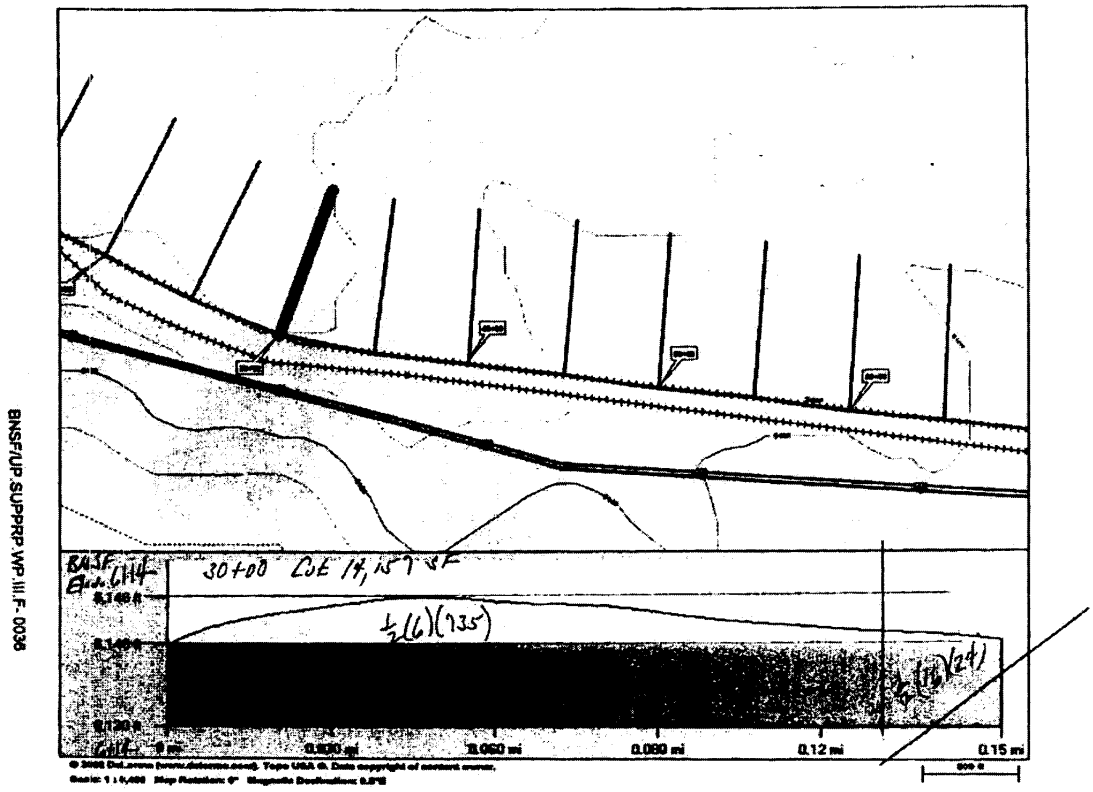


Figure 2. Defendants' Vaughn Yard station 30+00.

Another problem with Defendants' calculations is that they appear to have improperly applied the average end area method for estimating quantities. In particular, the average end area method assumes that if the sections are not an equal size on both ends, the two ends must be averaged together to properly calculate the quantity. In other words, if the section being calculated has a curve in it, the slice of earth being calculated will shift, grow or shrink disproportionally from the other end of the section. Hence the

need to average the two ends together. Since both the El Paso and Vaughn Yards have curves in them, the section ends should be averaged, but Defendants did not do so.

The last problem with the Defendants' calculations is that they were done by hand using a scale to measure the areas. In AEPCO's engineering witnesses' experience, measuring areas with a scale by hand adds additional inconsistencies into the already problematic topographic data. In addition, some of the lines which make up the areas of the section to be calculated are shown running far off the sheet of paper. This problem is symptomatic of the Topo USA data problems discussed supra. The above errors and inaccuracies make the Defendants' earthwork quantity calculations for the El Paso and Vaughn Yards suspect at best.[11]

As noted above, AEPCO's engineering witnesses have corrected the problems they identified with the Defendants' calculations. In particular, AEPCO's engineering witnesses started their calculations with the USGS 7.5 quadrangle maps, which are more accurate because they have a closer interval of contours (1 every 20' of elevation for El Paso and 1 for every 10' in Vaughn) or vertical datum. By comparison, the Topo USA maps use a 50' contour interval.

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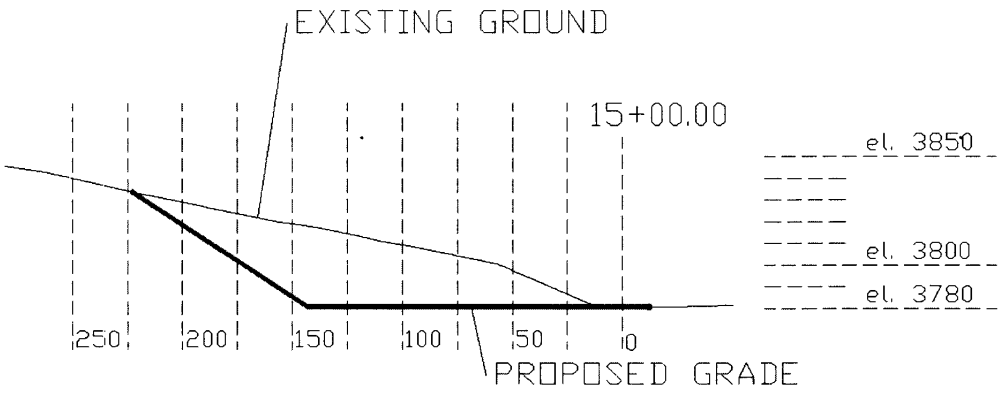
[11] Without conceding that Defendants' designs for the El Paso and Vaughn Yards are appropriate, AEPCO's engineering experts also restated the earthwork quantities for the El Paso and Vaughn Yards, as designed by the Defendants. See Supp. Reb. Workpapers Vol. 3, pp. 00565-00573, 00584-00590.

From there, AEPCO's engineering witnesses input the raster images of the 3-D TopoQuads into Eagle Point 2003 civil engineering software.[12] The contours were then digitized/traced, and the appropriate elevation was applied to each contour. Once the contours were input into the Eagle Point software, the contours in the area of the mainline roadbed centerline were adjusted slightly to match exactly the existing vertical profile of the lines being replicated. This was done for both the El Paso and Vaughn yards by inputting, into Eagle Point, the existing track profile and elevations from the track charts provided in discovery. See Supp. Reb. Workpapers Vol. 3, pp.00555, 00576 for the profile information that was entered into the software.

The result of the proper vertical alignment for the El Paso Yard is shown in Figure 3, and the result for the Vaughn Yard is shown in Figure 4. AEPCO notes that its cross section elevations and the existing roadbed elevations are the same, which results in a much more accurate earthwork quantity for the total yard grading.

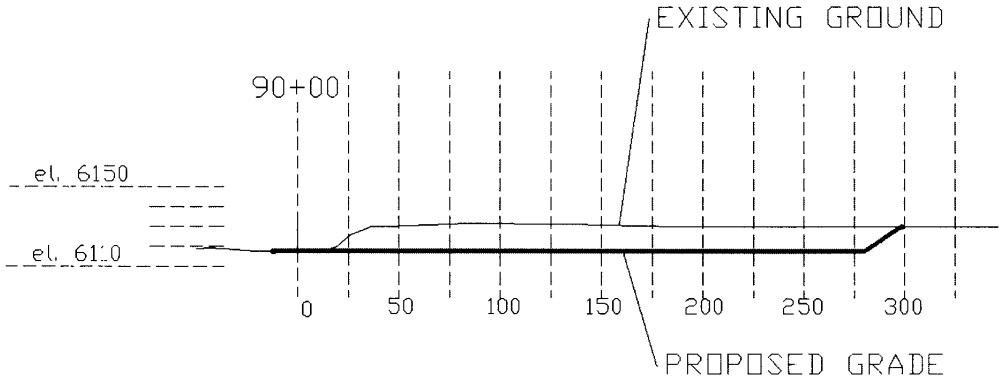
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[12] The Eagle Point software is an add-on product to AutoCAD. The program is used by many engineers. Moreover, BNSF uses the product as well. See Supp. Reb. Workpapers Vol. 3, pp. 00591-00592



VOLUME STATION	CUT AREA (FT^2)	CUT VOLUME (yd^3)	FILL AREA (FT^2)	FILL (yd^3)
15+00.00	4375.93	9085.55	0.49	186.17

Figure 3. AEPCO El Paso Yard station 15+00 elevation is 3,780.77 feet.



STATION	CUT AREA (FT^2)	CUT VOLUME (yd^3)	FILL AREA (FT^2)	FILL VOLUME (yd^3)
90+00.00	3430.27	12103.39	1.79	12.58

elevation
6117.63

Figure 4. AEPCO's Vaughn Yard station 90+00.

Once the roadbed elevations were corrected, a 3-D surface model of the area of the yard was created using the contours and the vertical profile data. The horizontal alignment of the railroad bed was also input into the software along with the proposed roadbed cross section. Next, all of data – vertical alignment, horizontal alignment and proposed roadbed cross sections – were processed together and then applied over the previously created 3-D surface model. The final step was to view and print the processed earthwork quantity. See Supp. Reb. Workpapers Vol.3, pp. 00556-00564, 00577-00583. The foregoing process produces a much more accurate earthwork grading quantity than that employed by the Defendants. As such, AEPCO has restated the quantities for its own yard designs as discussed supra.

ii. Total Earthwork Quantities

The parties' total earthwork quantity differences are attributable to the items discussed above, particularly yard quantities, and minor differences in track miles. The total quantity differences are shown in Table III-F-7 below:

Table III-F-7
Comparison of Cubic Yards of Earthwork -
BNSF/UP Supp. Reply v. AEPCO Supp. Rebuttal

Type	BNSF/UP Supp. Reply	AEPCO Supp. Rebuttal	BNSF/UP Supp. Reply Over/(Under) AEPCO Supp. Rebuttal
(1)	(2)	(3)	(4)
A. Line Segments			
1. Common	28,013,091	27,753,997	259,094
2. Loose Rock	1,702,946	1,678,710	24,236
3. Solid Rock	3,660,970	3,597,299	63,671
4. Borrow	2,675,238	2,640,335	34,883
5. Subtotal	36,052,245	35,670,361	381,884
B. Yards			
6. Common	8,196,308	1,848,581	6,347,727
7. Loose Rock	1,007,601	231,073	776,528
8. Solid Rock	1,018,707	231,073	787,634
9. Borrow	17,758	53,147	(35,389)
10. Subtotal	10,240,374	2,363,874	7,876,500

iii. Earthwork Unit Costs

Consistent with the railroads' approach in other recent SAC rate cases, Defendants have staked the great majority of their roadbed preparation cost increases on raising the unit costs associated with excavating common earth, loose rock and solid rock. To this end, Defendants suggest throughout their Supplemental Reply, as they must, that the territory being traversed by the ACE is tough territory that requires both more equipment and much larger equipment than that proposed by AEPCO, all at much greater cost to the SARR.

The reality is that the ACE is being built in one of the easiest territories for such work in the entire United States. For example, the weather is generally moderate. Average snowfall over the entire line is 12.3" per year or less than 3" per winter month. Average rainfall in the area is 11.6" and average temperature is 55.9 degrees. Moreover, this territory has little tree and other vegetation growth and thus requires little clearing. The relatively flat terrain also has a modest amount of solid rock and loose rock. All these elements demonstrate that the ACE territory is a far cry from being difficult to build a railroad in, as claimed by Defendants.

Perhaps the most telling evidence on this issue is the costs incurred for other recent projects undertaken in the same territory, or similar territory near the ACE route. AEPCO's engineering experts have compiled a list of road projects and BNSF's own rail projects that demonstrate that AEPCO's unit costs are consistent with the costs for similar projects, if not overstated. The data demonstrates that Defendants' proposed unit costs are drastically overstated compared with real-world costs.

Table III-F-7 below demonstrates AEPCO's point:

TABLE III-F-7
Comparison of Actual Bids and AEPCO's Unit Prices

County	Date	Item	Quantity	Units	Unit Price
ACE Rebuttal	**06/01/01**	**Common Excavation**	**>250,000.00**	**CY**	**3.51**
Guadalupe	04/23/99	Unclassified Excavation	277,400.00	CY	$3.00
Torrance	06/18/99	Unclassified Excavation	522,300.00	CY	$2.50
Otero	12/01/00	Unclassified Excavation	709,118.00	CY	$3.25
Dona Ana	03/09/01	Unclassified Excavation	398,226.00	CY	$2.33
Lincoln, Chaves	04/20/01	Unclassified Excavation	313,908.00	CY	$1.22
Dona Ana	09/21/01	Unclassified Excavation	362,603.00	CY	$2.34
Lincoln, Otero	11/22/02	Unclassified Excavation	388,330.00	CY	$2.52
BNSF.SUPPRP.WP.III.F-0389		Excavation	{ }	CY	{ }
BNSF.SUPPRP.WP.III.F-0378	12/19/97	5b Excavation Construction	{ }	CY	{ }
ACE Rebuttal	**06/01/01**	**Solid Rock Excavation**	**>50,000.00**	**CY**	**$11.34**
Lincoln, Chaves	04/20/01	Rock Excavation	78,477.00	CY	$6.06
Lincoln, Otero	07/19/02	Rock Excavation	120,593.00	CY	$7.17
Otero, Lincoln	11/22/02	Rock Excavation	72,722.00	CY	$6.73
Dona Ana	03/19/04	Rock Excavation	57,807.00	CY	$3.50

See Supp. Reb. Workpapers Vol. 3, pp. 00595-00599.

The above table also demonstrates another important point: the Means Handbook, which is the primary cost-estimating tool used by AEPCO's experts, is an ***extremely*** conservative cost guide to use for projects such as the ACE's construction. The Means Handbook bases its prices on an average of costs for projects of all sizes from around the country. As the Means Handbook varies in the size of the projects, it cannot take into consideration the economies of scale that benefitted the rather large projects listed in Table III-F-7 above, and that would certainly benefit the even larger ACE construction project. Moreover, the Means Handbook does not take into account the benefits that the above-listed projects derived from the competitive bidding process. Water

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all, the ACE project is a very large one and would be highly sought after from a contractor perspective.

(a) Common Excavation

On Opening, AEPCO employed a standard package of scrapers (assisted by a bulldozer), rollers and sheepsfoot machines for common excavation. AEPCO's weighted cost for that activity was $3.51 per CY. See AEPCO Op. Exhibit III-F-10. AEPCO's Opening equipment selections have been accepted in past SAC cases, such as TMPA (at 119), and the Defendants have presented no arguments in their Supplemental Reply to justify any additional equipment or costs here.

(i) Scrapers

Despite the fact the AEPCO's proposed equipment has been accepted in past cases, the Defendants have taken issue with several elements of AEPCO's proposal. First, Defendants claim that the elevated scraper cannot excavate the materials in the ACE territory, namely "caliche" or "hardpan" soils – yet Defendants provided no specific evidence as to the extent of such soils. See Supp. Reply at III.F-38. In fact, to the extent that such soils are evident, they are reported separately on the ICC Engineering Reports and AEPCO treated them accordingly. For example, the ICC Engineering Report for valuation section EPNE-1-TX contains quantities for hardpan that AEPCO included in the loose rock quantities. Likewise, the ICC Engineering Report for valuation section ATSF-13-NM contained quantities for "malpais" (rough, cooled and hardened lava) that AEPCO

included in the solid rock quantities. See AEPCO Op. Workpapers Vol. 9, pp. 4405, 4410 and electronic workpaper "ACE RR GRADING.xls," tab "IIIF_3 ER INPUT." AEPCO's allocation of the materials to loose rock or solid rock was based on the earthwork cost appearing in the ICC Engineering Reports. For example, for valuation section EPNE-1-TX, the hardpan soils were shown at $0.36 per CY and loose rock was shown at $0.40 per CY. As such, AEPCO included the quantities for hardpan in its loose rock quantities.

In any event, Defendants' assumption appears to be predicated on the idea that the scraper cannot handle the material without the aid of a bulldozer to push it (Defendants admit that a scraper is adequate in this territory when assisted by a dozer). See Supp. Reply III.F-39. Regardless of whether the scraper can handle the materials unaided, AEPCO's scraper cost includes the cost of 25 percent (one-quarter) of a dozer, just as the Defendants' scraper cost does. See Supp. Reb. Workpapers Vol. 3, pp. 00602-00603. As such, even under Defendants' standard, AEPCO's scraper is adequate.

The Defendants also suggest that AEPCO has somehow erred in selecting the least expensive scraper. Supp. Reply at III.F-37. AEPCO is entirely justified in its selection of the lower priced scraper. Indeed, the Board has specifically addressed this issue in a prior rate case involving one of the Defendants in this case:

> UP has not shown that it would be infeasible to use the equipment selected by FMC. Indeed, FMC's costs are based on a recognized source used by construction companies to estimate project costs. While the equipment UP would have the ORR use could also accomplish the required work, and may be more productive, it has a higher unit cost for moving

> soil than the equipment FMC would have the ORR use. FMC is entitled to have the equipment that results in the overall lowest cost used. Therefore, we use FMC's unit costs for grading to determine earthwork costs.

FMC at 117 (emphasis added). As AEPCO's equipment is feasible, even by Defendants' standards, the Board should accept AEPCO's scraper costs.

(ii) Additional Bulldozers

The Defendants have also attempted to revive another issue the Board recently decided in TMPA, i.e., adding additional bulldozers to spread the excavated soils. See Supp. Reply at III.F-40. As in TMPA, the Defendants' rationale is that the scraper is not capable of unloading and spreading the material with enough precision – citing, in particular, a need to place lifts that do not exceed eight inches. Supp. Reply at III.F-40. The Board should once again reject this argument.

First, in TMPA, the Board noted that the U.S. Army Earthmoving Operations Field Manual ("Army Field Manual") supported the shipper's claim that the scraper alone could spread the excavated materials. Id. at 119. Second, other third-party sources also support the same conclusion. For example, a recent article on scrapers notes that:

> [I]n many situations today, compaction is a very important element of the job. Scrapers have the advantage of being able to lay down very thin lifts, resulting in better compaction. In some cases the scraper can meet compaction specifications by itself, elimination the need for specialized equipment. Most other systems require a loading tool, a hauling machine, and several machines in the fill to spread and compact material.

> All that can often be done by one machine, in the case of the self-loading scraper. Based on the various applications, customers can gain greater efficiency by applying these scraper techniques.

See Supp. Reb. Workpapers Vol. 3, p. 00607 (emphasis added). In other words, a scraper is capable of spreading materials with sufficient precision for compaction, and therefore no additional dozers are necessary.

(iii) Compaction

The Defendants' final argument in the common excavation section of their Supplemental Reply is that AEPCO's use of a combination of a vibratory roller and a sheepsfoot roller for compaction is insufficient, and that sheepsfoot rollers should be used exclusively. Supp. Reply at III.F-40. Evidently, Defendants' engineering experts based this assumptions on their visit to the Hondo Valley highway project in New Mexico where sheepsfoot rollers were used. See Supp. Reply at III.F-40. However, it is unclear whether or not that was the only compaction equipment used on the Hondo Valley project.

The Defendants' engineering experts do not appear to understand the limitations of a sheepsfoot roller, because using their approach would mean the ACE could not reasonably complete all the compaction tasks required. The Army Field Manual provides a spectrum of compaction for which the sheepsfoot can be used. See Supp. Reb. Workpapers Vol. 3, pp. 00610-00612. That spectrum ranges from 100 percent clay to a mix between sand and clay. AEPCO's engineering experts have assumed that the compaction in this territory includes a wide range of soils, including some clay, sand and

typical of that accepted by the Board in recent stand-alone cost rate cases. Moreover, as described infra, AEPCO's costs are quite conservative. The Defendants, however, suggest that AEPCO's Opening costs are nearly $10.00 per CY too low. Defendants' claims are meritless and should be rejected.

(ii) Loose Rock Assumptions

AEPCO developed its Opening costs using a number of assumptions that Defendants have completely ignored in their attempt to increase loose rock costs drastically. First, AEPCO assumed that the ACE would need to excavate loose rock as defined in the ICC Engineering Reports because the Reports are, after all, the source of the quantities that both AEPCO and Defendants 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," 1916, page 10. 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. AEPCO's 200-hp dozer is 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, Defendants concede that modern equipment is far more capable than the equipment available in 1916. See Supp. Reply at III.F-53.

By comparison, Defendants' costs are based on the flawed assumption that the ACE would be required to rip very hard rock formations. Not only is this assumption contrary to the ICC Engineering Report definition, but it skews the loose rock costs far beyond what the market would allow any contractor to charge for such work.

(iii) Ripping Equipment

As discussed above, AEPCO selected its ripping equipment, a 200-hp dozer, on the assumption that the ACE would be ripping loose rock capable of being removed with a pick and bar. Consequently, AEPCO selected the bulldozer and assumed ripping of soft trap rock under ideal conditions.[13]

The Defendants disagree with AEPCO's equipment selection for several meritless reasons. First, Defendants claim that AEPCO has not established that conditions would "consistently be ideal." Supp. Reply at III.F-42. As discussed supra, this territory is not difficult to work in and there is little reason to expect that the conditions would not usually be ideal. Moreover, Defendants have not offered any evidence to suggest that the conditions are adverse. In any event, Defendants' claim is undermined by their development of loose rock costs, which assume ripping under ideal conditions. See Supp. Reply at III.F-48. As such, Defendants' claim is a red herring.

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[13] AEPCO notes that trap rock is classified among the very hard rock types that Defendants suggest the ACE will need to rip (i.e., granite and basalt). See Supp. Reb. Workpapers Vol. 3, p. 00613.

Defendants' second argument is that the dozer selected by AEPCO[14] cannot possibly be equipped with an adjustable parallelogram ripper, which Defendants claim would be needed to rip materials in this territory. Taking the latter point first, AEPCO agrees that an adjustable parallelogram ripper is certainly more useful than a fixed ripper. But as to Defendants' first point, i.e., that the 200 HP dozer (model D7 Caterpillar) cannot be equipped with such a ripper, Defendants are simply wrong. The Caterpillar website has a listing for a D7R dozer (no D7 only was listed), which is a 240 HP dozer. Among the many attachments for the machine is an adjustable parallelogram ripper. See Supp. Reb. Workpapers Vol. 3, pp. 00614-00616.

The final argument raised by Defendants is that the 480 HP dozer they selected was observed at the Hondo Valley highway construction project in New Mexico, and they therefore assume that the ACE must have such equipment. This is yet another example of an unsupported assertion designed solely to drive up costs.

The Hondo Valley Project is a current highway construction project located approximately 22 miles from UP's line that connects Vaughn and El Paso (this line is not among the UP lines being replicated by the ACE). The project involves construction of approximately 38 miles of highway through the Capitan Mountains of New Mexico. In other words, the territory is not necessarily comparable to the geography of the lines being

[14] AEPCO notes that Defendants assumed a specific dozer model, but the Means Handbook does not specify any particular model.

replicated by the ACE (nor have Defendants suggested otherwise). Further, AEPCO notes that, while the project was a design-and-build lump sum project, its engineering experts were able to obtain certain change orders from the State of New Mexico that included unit costs for excavation. In general, the unit costs listed were comparable to AEPCO's unit costs, even though the change orders were for much smaller quantities than AEPCO is excavating. See Supp. Reb. electronic workpaper folder "Hondo Valley."

As AEPCO noted in its Opening Evidence and elsewhere in this Supplemental Rebuttal, construction equipment selections are generally a function of the equipment that the contractor has on hand or can easily rent. Simply showing that a 480 HP dozer was in use on one project in the ACE's territory proves nothing about what the ACE needs, nor does it consider that the contractor's selections might have been overkill. More importantly, the Defendants seem to suggest that the Hondo Valley equipment was being used to rip very hard rock formations. In such circumstances, an extremely large dozer might be a more logical choice, especially when a contractor is trying to minimize the amount of blasting that might be required.

Finally, AEPCO notes that its dozer is a highly capable ripping machine. 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 definitions. See Supp. Reb. Workpapers Vol. 3, p. 00613.

(iv) Excavating Equipment

On Opening AEPCO 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 to 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, Defendants argue against it by claiming that the 3 CY shovel is not a shovel at all, but rather a large crane. The Board will undoubtedly recognize this absurd claim from the recent Carolina case, where it was thoroughly discredited. Nevertheless, in the interest of a complete record, AEPCO addresses this issue in full.

The Defendants claim that AEPCO's unit cost from the Means Handbook (02315-400-3900, Shovel 3 CY capacity) does not actually provide for a shovel at all. Supp. Reply at III.F-44 to 45. Ignoring the specific designation of the equipment in Means, Defendants suggest (Supp. Reply at III.F-44 n.61) that the Board look at the crew costs (crew B-12T) associated with the shovel line item, which references a 75-ton crawler crane and front-end attachment as the two pieces of equipment that theoretically make up part of the cost for a 3 CY shovel. Id. at 44. Based on the crew cost description,

Defendants then groundlessly asserts that the 3 CY shovel is really a huge lattice boom crane (i.e., part of a dragline) that in no way resembles a shovel.

The Defendants have misconstrued the cost computations in the Means Handbook. The equipment type listed, 02315-400-3900, Shovel 3 CY capacity, is the controlling factor in determining what equipment is intended. In other words, when AEPCO selected a power shovel, it meant a shovel. Means often uses one equipment rental reference cost (e.g., 75-ton crawler) to apply to multiple equipment designations (e.g., shovel, dragline).

To demonstrate this point, AEPCO notes that there are several other smaller shovels listed under the same heading as the 3CY shovel.

02315-400-3700	½ CY Shovel
02315-400-3750	¾ CY Shovel
02315-400-3800	1 CY Shovel
02315-400-3850	1 ½ CY Shovel

See Supp. Reb. Workpapers Vol. 3, p. 00619. A review of the Means crew cost details indicates that they look much like the costs for AEPCO's 3 CY Shovel, except that the other shovel entries list a power shovel and front end attachment instead of a crawler crane and front end attachment. See Supp. Reb. Workpapers Vol. 3, p. 00618. For example, the crew cost particulars (bare costs per day) for the 1 ½ CY shovel are as follows:

Crew B-12O	1 Equip. Oper. (crane)[15]	$249.20
	1 Equip. Oper. Oiler	206.00
	1 Power Shovel, 1.5 CY	716.00
	1 F.E. Attachment, 1.5 CY	134.20

Based on Defendants' approach, a 1.5 CY power shovel should be listed in the straight equipment rental section (section 01590) of Means – this is the section that Defendants reference for the "lattice boom" designation – but there are no listings for power shovels in that section. See Supp. Reb. Workpapers Vol. 3, pp. 00621-00629 (a complete listing of items included in section 01590). Instead, Means refers readers looking for shovel rental costs to the cranes section of the equipment rental listing. See section 01590-200-3850 referring to cranes (01590-600) in Supp. Reb. Workpapers Vol. 3, p. 00623.

When the cranes section is examined, all of the power shovel rental costs listed in the crew costs described supra are found under the crane designation, including the crawler crane cost used for the 3 CY shovel selected by AEPCO. For example, the $716.00 figure for the 1.5 CY power shovel listed above is exactly the same as the cost for a 1 ½ CY crawler mounted, lattice boom crane (01590-600-900) – confirming that Means uses such cost equivalents for convenience. See Supp. Reb. Workpapers Vol. 3, p. 00628. In other words, by Defendants' reckoning all of the shovels would actually be cranes – a

[15] The designation of the equipment operator as "crane" is the same designation and cost assigned to the backhoe selected by Defendants (crew B-12D). See Supp. Reb. Workpapers Vol. 3, p. 00620.

result that is both absurd and contrary to Means' clear description of the equipment, in the first instance, as shovels.

Moreover, there is no doubt about what Means considers to be a shovel. As the Board is aware, Means publishes a companion book to the Heavy Construction Cost Data Book, the Heavy Construction Handbook. That book describes the various types of equipment, including shovels. As demonstrated in Supp. Reb. Workpapers Vol. 3, p. 00630-00633, a power shovel is defined by Means as exactly what AEPCO intended to use, and not a lattice crane. Moreover, the shovel's general characteristics are very similar to the hydraulic excavator (backhoe) selected by Defendants (except for the direction the shovel faces), which the Means Heavy Construction Handbook specifically notes 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 Supp. Reb. Workpapers Vol. 3, p. 00632-00633.

The Defendants also ignore the front end attachment included in the 3 CY shovel crew cost. See Supp. Reb. Workpapers Vol. 3, p. 00618. This attachment is a 3 CY bucket that attaches to both shovels and backhoes. See Supp. Reb. Workpapers Vol. 3, p. 00635. In other words, it can be used face-up or face-down. It cannot, however, be used as an attachment to a crane equipped with a cable.

To confirm all of the above evidence, AEPCO's engineering experts also inquired directly with Means on this subject. The Means representative confirmed that the equipment selected is a shovel and not a crane. See Supp. Reb. Workpapers Vol. 3, p. 00634.

Finally, Defendants never dispute that a 3 CY shovel is appropriate. Rather, Defendants rest their arguments entirely on their flawed premise that the shovel designated by AEPCO's engineering experts is not a shovel.

As for the equipment selected by Defendants, a hydraulic backhoe is not as useful for this task as the shovel. In fact, Defendants' own photographs demonstrate AEPCO's point. A photo of a backhoe knocking rocks off a hillside is included in Supp. Reply at III.F-46. When the backhoe performs this action, the rocks are dislodged to the ground. In a separate motion, the backhoe then must scoop the rock off the ground, lift it, and then dump it into a truck. A shovel, on the other hand, can load the bucket right up at the rock face, swivel on its base, and then dump the load directly into the truck thereby eliminating the additional scooping and loading maneuvers.

(v) Hauling Equipment

On Opening, AEPCO included a 42 CY off-highway hauler to handle waste and dump excavated materials. As with virtually every other piece of equipment AEPCO selected, Defendants disagree with this selection. In particular, Defendants argue that the 42 CY hauler cannot turn around on the 100-foot right-of-way available to the ACE. This

claim is based on one off-highway hauler, Caterpillar's 775D Quarry Truck, which has a turning radius of 78 feet 9 inches. It is unclear why Defendants assumed that the ACE would use this particular model since AEPCO never stated it would be used. Nor have Defendants offered any rationale for why the hauler could not simply perform a three-point turn, of the kind an automobile driver makes to reverse direction on a narrow road.

In any event, Defendants' narrow approach to equipment selection ignores similar size haulers that can easily turn within the right-of-way. For example, the Komatsu HD465-7, a 44 CY hauler, has a turning radius of 27 feet 11 inches, which would only require 56 feet to make a complete turn. See Supp. Reb. Workpapers Vol. 3, p. 00636-00637. Accordingly, AEPCO's hauler is feasible and should be accepted.

(vi) Other Unsupported Costs

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

The Defendants claim that a 60 percent additive must be added to shovel costs because the excavation of loose rock is as difficult as moving heavy soils or clay. Defendants offer no support for this claim, nor do they suggest that Means has any such additive for loose rock. Moreover, the additive Defendants refer 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 additive. But here, the ACE has already undergone a substantial cost to rip the rock for the express purpose of making it easier to excavate and load. Defendants' additive is unsupported and unnecessary.

The Defendants have also added a bulldozer to do nothing but push rock into piles for loading. See Supp. Reply at III.F-44. This dozer is totally unnecessary because the shovel is designed to excavate and load at one time. It does not need the materials to be piled before loading. Moreover, Defendants' addition of the dozer is inconsistent with their own text suggesting that before the loose rock can be excavated it has to be piled. This sequence is incorrect. The rock must be excavated first, which the shovel does after ripping, and then placed in piles. But since there is no need for piling in this instance, the dozer is not needed either before or after excavation.

As noted above, Defendants have also included a 15 percent additive for loading the material into trucks, which they claim Means "clearly and unconditionally requires." See Supp. Reply at III.F-47. Interestingly, Defendants' workpaper citation (BNSF/UP.SUPPRP.WP.III.F-0140) does not contain any reference to a 15 percent additive. Nor have Defendants cited any other Means reference for this additive. In any event, Defendants' statement regarding Means' "clear and unconditional" 15 percent additive is incorrect. AEPCO's engineering experts contacted Means regarding the

were costed at $11.34 per CY.[16] As with every other earthwork cost, Defendants disagree with these costs.

(ii) Drilling and Blasting

The Defendants have asserted that AEPCO's drilling and blasting costs should be based on a combination of Drilling and Blasting rock under 1500 CY and Drilling and Blasting Rock Over 1500 CY. Defendants' position is predicated on the argument that the economies for larger-scale blasting will not be available to the ACE because only 3,250 cubic yards per mile require blasting. See Supp. Reply at III.F-50. Defendants' argument is off the mark.

The Defendants' average of 3,250 CY per mile is merely a simple average of the total solid rock quantity for the ACE (3.6 million CY) divided by the 552 (which is really 517) route miles of the ACE (including the non-parallel second main) which is then reduced by 50 percent to reflect the assumption (accepted by Defendants) that only half of the solid rock will require blasting. Defendants' contention that the solid rock is distributed on an even basis along the route of the ACE is unfounded. Nearly 60 percent of the total solid rock encountered on the ACE route (over 2.0 million CY) is located on the 106-mile segment located between Belen and Vaughn, NM which comprises less than

[16] When averaged with AEPCO's Opening unit cost for loose rock, AEPCO's Opening unit cost applied to solid rock was $8.99 per CY. See AEPCO Op. electronic workpaper file "ACE RR GRADING.xls," tab "IIIF Unit Costs." The Defendants accepted AEPCO's averaging of the loose rock and solid rock unit costs. See Supp. Reply at III.F-53.

20 percent of the ACE route miles being constructed. On average this equates to 9,638 CY per mile,[17] nearly 3 times the average shown by Defendants. However, even this is misleading because the solid rock is not evenly distributed throughout the line segment, but located in specific areas. The Defendants' use of an average of 3,250 CY per mile is therefore meaningless. AEPCO's use of drilling and blasting costs applicable to high volumes is, therefore, appropriate. Moreover, the Board has agreed with AEPCO's methodology in its three most recent decisions. See Duke/NS at 95; Carolina at 81; and Duke/CSXT at 79. Consequently, AEPCO has continued to use its Opening blasting costs (excluding the index adjustment).

(iii) Excavating Blasted Rock

On Opening, AEPCO 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/UP attempt to argue that the blasted rock cannot be moved at the specific costs provided by Means and selected by AEPCO. Rather, Defendants suggest that any larger rocks that exist after blasting must be moved using a Means Handbook unit cost to "Excavate and Load Boulders." However, Defendants apply this cost only to waste materials and not those reused for embankment. Again, Defendants have improperly raised the costs for handling such materials.

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[17] 2,052,421 CY (Exhibit III-F-19) ÷ 106.47 route miles (Exhibit III-F-17) x 50% = 9,638 CY per mile.

The first problem with Defendants' approach is that they have selected 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 those 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. AEPCO's engineering experts confirmed this point with Means. See Supp. Reply Workpapers Vol. 3, p. 00640. 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 Defendants claim must be moved.

AEPCO also notes that the Defendants' solid rock excavating costs include several items which they have not even discussed, and which are inconsistent with AEPCO's Opening costs. In particular, when rock is reused for embankment, rather than using AEPCO's costs for handling blasted rock, Defendants have added the cost to bulldoze ripped materials (presumably into their superfluous piles) and excavate them using the same costs and equipment they used for loose rock excavation (the hydraulic backhoe with 60 and 15 percent additives). These costs are completely unexplained. Moreover, the Defendants have not suggested that AEPCO's equipment and costs are improper or infeasible for handling the blasted rock that will be used in embankment. Indeed, AEPCO's costs are clearly supported by Means. As such, AEPCO's costs should be accepted.

In light of the above, AEPCO's experts clearly did not ignore the issues that might arise with handling blasted rock. In addition, Defendants' suggestion that larger pieces of rock are troublesome – so much so that they put a photograph of such rocks in their Supplemental Reply at III.F-51 – is not necessarily accurate either. The Defendants' photo suggests when a larger piece of rock was left over after blasting it was simply pushed out of the way and left at the side of the right-of-way. Indeed, Defendant's photo suggests that the rock probably was not hauled at all.

In any event, AEPCO's rock excavating and loading costs are well supported. Therefore, AEPCO continues to use its Opening costs for excavating and loading blasted rock (adjusted to eliminate indexing).

(iv) Hauling

On Opening, AEPCO used a 42 CY off-road hauler to handle the blasted rock. Defendants have again substituted their own costs without any explanation. In particular, when calculating costs for rock used in embankment, Defendants included the same costs they used for loose rock. Presumably, Defendants' rationale for this selection was their flawed argument that the 42 CY hauler cannot turn around on the ACE's right-of-way. AEPCO previously debunked this claim, and thus continues to use its 42 CY hauler.

AEPCO used the same 42 CY hauler to handle waste rock. Defendants substituted a 25-ton vehicle to dump boulders. Defendants' boulder arguments are

meritless for the reasons indicated above, and their costs for dumping boulders is similarly unwarranted. Moreover, the 42 CY truck can easily accommodate more material, and is, therefore, more efficient. Thus it would be appropriate under any scenario.

(v) Other

The Defendants again assumed compaction with only sheepsfoot rollers. AEPCO 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.

In light of the above, AEPCO has continued to use its Opening solid rock unit cost adjusted to exclude indexing. Specifically, AEPCO's Supplemental Rebuttal unit cost for solid rock is $11.53 per CY. When averaged with AEPCO's Supplemental Rebuttal unit cost for loose rock of $6.75 per CY, AEPCO's Supp. Rebuttal unit cost applied to solid rock is $9.14 per CY. See Supp. Rebuttal electronic workpaper "ACE RR GRADING Rebuttal. xls," tab "IIIF Unit Costs."

(d) Borrow

The parties agree on almost all of the costs associated with borrow. However, Defendants added a bulldozer to spread the borrow. This bulldozer is

unnecessary. Indeed, the Board has specifically rejected such an additional bulldozer in the past. For example, in Wisconsin the Board noted that a dozer was unnecessary because the costs, which were based on Means, "already included loading and/or spreading." Id. at 82. The Means Handbook unit cost here is the same. See AEPCO Op. Workpapers Vol. 10, p. 04554, which notes that the cost is for "Borrow, Loading and/or Spreading." Moreover, a dozer is unnecessary because the material is first spread by the trucks as it is dumped and again as it is compacted. Consequently, AEPCO has continued to use its Opening borrow unit cost (adjusted to exclude indexing).

(e) Fine Grading

The Defendants assert that the ACE would incur a unit cost of $12,182.58 per mile for "fine grading," for a total cost of $7.95 million. This is yet another unsupported and unwarranted additional cost. Moreover, Defendants have neither addressed the Board's recent rulings in the three Eastern rate cases holding that fine grading is unwarranted (See, e.g., Carolina at 82) nor raised any new arguments in support of this costly additive.

In any event, AEPCO submits that fine grading is unwarranted. In particular, the goal of fine grading as expressed by Defendants is to achieve a perfect 40:1 slope on which to place the subballast. This is unnecessary for a railroad project. AEPCO's expert engineering witnesses, who have extensive experience building and maintaining railroads, have never seen nor would they expect any railroad to grade its

roadbed with such precision – and Defendants' engineering witnesses have not demonstrated otherwise. As a practical matter, if the grading is roughly 40:1 it is more than adequate for the laying of subballast. Moreover, in the two grading-related bids that the Defendants included in their Supplemental Reply workpapers, no separate line item exists for fine grading. See Supp. Reply Workpapers Vol. 3, pp. III.F-0378-0382.

The final grading of the ACE roadbed is achieved through the installation of the subballast and the ballast, which has the effect of equalizing any small variations. Thus there is no need for a separate crew to prepare the subgrade. AEPCO therefore submits that no fine grading is necessary.

(f) Summary

On Supplemental Rebuttal, AEPCO has included $183.99 million for earthwork. See Exhibit III-F-19.

c. Drainage

i. Lateral Drainage

On Opening, AEPCO included $524 for lateral drainage based on quantities extracted from the ICC Engineering Reports and unit costs from the Means Handbook indexed from July 2001 to January 2001. Defendants included $533 for lateral drainage, having accepted AEPCO's quantities and the unit costs from the Means Handbook but not AEPCO's indexing. As noted previously, the Means Handbook costs should not be

indexed and AEPCO has corrected this on Supplemental Rebuttal. Therefore, both parties now agree on $533 for lateral drainage costs.

ii. Yard Drainage

On Opening, AEPCO included yard drainage costs in its building and facilities costs. See Op. electronic workpaper file "building sites.xls," tab "lights drainage paving." In reviewing these costs for purposes of preparing this Supplemental Rebuttal, AEPCO's engineering experts found some computational errors in the Opening calculations. These errors understated the cost by over $0.60 per square foot. Consequently, AEPCO has restated its yard drainage costs, and increased them from $1.9 million to $4.4 million.

In their Supplemental Reply, Defendants make a passing reference to their inclusion of yard drainage costs in their workpapers, but they supplied no workpaper references and did not take issue with AEPCO's Opening costs. Supp. Reply at III.F-68. Defendants' lack of specifics is surprising given the $15.9 million they included for yard drainage.

In any event, AEPCO's engineering experts have located Defendants' hardcopy and electronic workpapers on this subject, and they have identified one critical problem with Defendants' calculations that, when corrected, results in an immediate reduction of $8 million to their costs. Beyond that, the difference between AEPCO's and

Defendants' Supplemental Reply costs is attributable solely to the size of the yards that each party has proposed.

The Defendants' calculations for the cost per square foot for yard drainage are located in Supp. Reply Workpapers Vol. 2, pp. III.F-0233 to 0234. First, AEPCO notes that Defendants agree with AEPCO's costs for the individual items that go into the square foot cost. In particular, the parties agree on the cost of 24" and 12" pipe, and the price for catch basins. The parties also agree on the quantities for each item per set of drainage facilities. However, as explained below, Defendants have miscalculated the area that each set of pipes and catch basins can serve.

In particular, a set of pipes normally serves three different tracks. For example, in AEPCO's configuration of the ACE yards, a set of pipes is placed under the center line of a track. The catch basins are placed 15 feet from the centerline of the track, and on each side of the track. As such, there is one catch basin to the left and right of the track, and those catch basins also serve part of the next track to the left and the next track to the right. In other words, the catch basin system effectively serves the distances between three track centers, which in AEPCO's case is 50 feet. Each pipe and catch basin system serves the length of the track, 7,392 feet multiplied by the 50-foot width described above, or 399,600 square feet. To derive the final per square foot cost to be applied, both parties divided the total cost per drainage set by the number of square feet each set covers.

In AEPCO's case, this results in a cost per SF of $0.79. See Supp. Reb. electronic workpaper file "building sites.xls," tab "lights drainage paving," cell E51.

The Defendants followed the same basic approach described above, except they made one critical error. Defendants effectively placed two catch basins right next to each other, even though only one is needed. They did this because they assumed that each drainage set could only cover 30 feet. As Defendants used 30-foot track centers in their yards, the drainage system, as designed by AEPCO and adopted by the Defendants, would actually cover 60 feet. The error described above is more recognizable when demonstrated visually. To that end, AEPCO's engineering witnesses have created a diagram that demonstrates the problem with Defendants' approach. See Supp. Reb. Workpapers Vol. 3, pp. 00642-00643.

As noted above, when Defendants' error is corrected it reduces their yard drainage costs by $8 million due to a reduction in their unit cost for $1.32 per SF to $0.66 per SF.[18] As AEPCO has continued to use 25-foot track centers in its configuration of the El Paso and Vaughn Yards, it has included its corrected costs for yard drainage in its Supplemental Rebuttal restatement.

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[18] This correction can be accomplished by changing the yard drainage unit costs to $0.66 in cell C30 of the "IIIF_9 Vaughn" and "IIIF_9 El Paso" tabs of Defendants' "III F 2 ACE Grading.xls" electronic workpaper file.

d. Culverts

On Opening, AEPCO included $2.8 million in investment for culverts. AEPCO's approach was based on the culvert inventory lists provided in discovery and on the Defendants' track charts. AEPCO also selected standard culvert materials such as CMP and SPP pipes.

The Defendants take issue with four items presented by AEPCO:

1. Missing culverts;
2. AEPCO's approach to determining some culvert lengths;
3. AEPCO's location and period adjustments factors from Means; and
4. AEPCO's pipe materials.

As to the first point, AEPCO agrees with the inventory adjustment proposed by Defendants. AEPCO has added these culverts on Supplemental Rebuttal.

As to the second point, Defendants argue that AEPCO erred when it divided the total culvert length by the original number of tracks to determine a one-track culvert length. AEPCO notes that this only occurred only in certain areas which resulted in 81 of the 676 culverts (less than 12%) being improperly sized.

Nevertheless, AEPCO's calculations have been adjusted as follows to correct the situation. If AEPCO's track quantity matched the original number of tracks, then the original culvert length was used. For example, if AEPCO proposed one track and the original track was one track with a culvert 24' long; then AEPCO used a 24' length for

the culvert. If the original design had a higher number of tracks than the AEPCO design, then AEPCO's culvert length was calculated by starting with the original length shown on the Defendants' inventory spreadsheet and then adding 25' for each additional AEPCO track. If the original design had 7 tracks with a total culvert length of 140' broken down as 30'-70' Extension-40' Extension, and AEPCO proposed to have 3 tracks; then the original length was 30' plus 2 tracks times 25' (or 80'). AEPCO's design is conservative as the "Comparison Chart" shows. See Supp. Reb. electronic workpaper file "Comparison of Culvert worksheets.xls."

As to the third point, the Defendants have identified several errors in AEPCO's indexing of Means Handbook unit costs. AEPCO has accepted Defendants' proposed adjustments.

As to the fourth point, the Defendants argue that the pipe gauge specified by AEPCO was incorrect. In particular, the Defendants argue that the pipes AEPCO selected are outside the diameter-to-gauge range recommendations/requirements for AREMA. The Defendants did not specify where in AREMA the diameter-to-gauge ratio is located, and AEPCO's engineers have been unable to locate any reference such as that for galvanized steel corrugated pipe in AREMA. Moreover, AEPCO's Opening workpapers show that the pipes selected meet E-80 loading requirements, which is the real test of the suitability of the pipe. See Opening Workpapers Vol. 9, p. 04535. Therefore, AEPCO has continued to use the pipes it selected on Opening.

Finally, the Defendants specified a much more expensive culvert pipe than AEPCO did, namely a galvanized, bituminous coated pipe with paved insert. See Supp. Reply Workpapers Vol. 2, pp. III.F-0171. However, AEPCO's photographs of replicated BNSF lines show that the existing culverts do not meet this specification. See Supp. Reb. Workpapers Vol. 3, pp. 00645-00646. The existing culverts are galvanized, uncoated. See AEPCO Op. Workpapers Vol. 9, p. 04534 (Means Section 02630-100-2500 through 2695). Thus, Defendants selected the higher priced pipe even though they do not use this type of culvert in their own construction. Moroever, they have provided no rationale why bituminous coated pipe would be necessary. Finally, the Board recently rejected such pipes in Duke/CSXT at 82; Carolina at 84; and Duke/NS at 97.

With the corrections made by AEPCO on Supplemental Rebuttal, its revised culvert costs have increased from $2.8 million to $3.0 million.

e. Other

i. Sideslopes

Defendants accepted AEPCO's specification of 1.5:1 sideslopes.

ii. Ditches

On Opening, AEPCO 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.

The Defendants have accepted AEPCO's ditch specification, but not without first engaging in gratuitous criticism thereof. In particular, Defendants argue that the ACE must have ditches with a minimum bottom width of three feet based on AREMA specifications or else the ACE roadbed will require an inordinate amount of maintenance due to water damage. See Supp. Reply at III.F-60 and 61.

The Defendants' 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, the ACE is located in arid and semi-arid territory, meaning that precipitation is lower than normal. Fourth, Defendants did not submit any evidence demonstrating that they adhere to the specification they propose. Finally, AEPCO's Opening workpapers show that Defendants do not, in fact, adhere to this specification. AEPCO's engineering witnesses' field trip identified numerous locations where Defendants' side ditches do not meet Defendants' design specifications (but do meet AEPCO's design specifications in terms of width). See AEPCO Op. Workpapers Vol. 9, pp. 04288-04290, 04295-04298, 04302, 04305-04306.

In short, Defendants have no justification whatsoever for their suggestion of increased maintenance costs due to this alleged design deficiency. AEPCO's design is no different than what exists on Defendants' lines today, and Defendants have not suggested (much less presented evidence showing) that their own roadbeds are routinely damaged as a result of inadequate drainage ditch sizes. This is yet another example of Defendants'

attempt to require the ACE either to be constructed to higher standards than Defendants existing Defendants' rail lines, or to incur needless additional costs.

iii. Retaining Walls

On Opening, AEPCO included $0.4 million for retaining wall investment for the ACE. AEPCO's costs were based on quantity information from the ICC Engineering Reports and unit costs from the Means Handbook. See AEPCO Op. at III-F-37 and Op. electronic workpaper file "ACE RR GRADING.xls," tabs "IIIF_4 Othr EW," and "IIIF_Other Retaining."

In their Supplemental Reply, Defendants included $3.88 million for retaining walls. Defendants accepted AEPCO's base use of the quantity information from the ICC Engineering Reports and the use of gabion baskets, but they made three quantity adjustments and three cost adjustments. See Supp. Reply at III.F-61 through 63 and electronic workpaper file "III F 2 ACE Grading.xls," tabs "IIIF_4 Othr EW," and "IIIF_Other Retaining." These adjustments are discussed below.

Defendants adjusted the quantities to account for the additional non-parallel second main track miles on the replicated BNSF mainline line segment, which AEPCO agrees should be included. Second, Defendants adjusted the quantities associated with the crosstie retaining walls shown in the ICC Engineering Reports. On Opening, AEPCO calculated the face area of each of the walls and determined the amount of square yards ("SY") that needed to be replaced with gabions. On Reply, Defendants maintain that

AEPCO has to replace the entire volume of these retaining walls because some of the ties are placed perpendicular to the wall and backfilled with earth for support. Defendants are incorrect.

The gabion baskets are a different type of retaining wall than the crosstie walls and do not have to replace the entire volume of the wall, including the backfilled earth, to provide adequate support. This is especially true since the earth would still be behind the gabions as it would not be moved during the gabion installation process.

Third, Defendants arbitrarily increased the retaining wall quantities by 100 percent to allegedly account for the ACE's wider roadbed compared to the roadbed width of the original line construction, as well as additional retaining walls built since the original construction of the lines replicated by the ACE. See Supp. Reply Workpapers Vol. 2, p. III.F-0181. AEPCO does not agree with Defendants' adjustment to the retaining wall quantities.

Defendants have provided no evidence detailing the construction of any new retaining walls. Second, Defendants have assumed, at every retaining wall location, that 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. Defendants' drawing at page III.F-62 of their Supplemental Reply has 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. Defendants provide no evidence that they 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, Defendants assume that the wider roadbed extends equally on each side of the track centerline and that there are retaining walls located on each side of the roadbed. Defendants have 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, Defendants have 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 Defendants have relied only on unsupported assumptions, AEPCO submits that Defendants' 100 percent adjustment to retaining wall quantities is erroneous and should be rejected.

The Defendants also made three adjustments to unit costs. First, Defendants eliminated the indexing of the Means Handbook unit cost for pilings. As discussed supra, AEPCO agrees that the indexing should be eliminated and has done so in its Supplemental Rebuttal restatement of ACE road property investment costs.

Second, Defendants criticized AEPCO's selection of a cost for gabions from the Erosion and Sediment Control section of the Means Handbook. Instead, Defendants selected gabions from the Retaining Walls section of the Means Handbook. Defendants argue that AEPCO did not explain its selection of its unit cost and did not demonstrate that the gabions it selected would be able to structurally support the earth. AEPCO agrees with Defendants that stronger gabions would provide better support, but AEPCO disagrees with the unit cost selected by Defendants. In particular, Defendants selected the largest possible gabion, at 12 feet in length (Means Handbook item number 02830-100-6080), with a corresponding unit cost of $274 per cubic yard (prior to application of the Means Handbook location factor). However, a review of the Means Handbook shows, a few rows up, costs for gabions that are six feet in length (Means Handbook item number 2380-100-6020) that would be equally capable (i.e., the only difference is in the length), with a unit cost of $162 per cubic yard. Six-foot gabions would be equally effective and, in fact,

easier to manipulate and install. Therefore, AEPCO has used the unit cost for six-foot gabions in its Supplemental Rebuttal calculations.

Finally, Defendants included trenching costs for installation of the gabions. Apparently, Defendants believe that the gabions will be installed after the grading process, whereas AEPCO 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).

In its Supplemental Rebuttal restatement, AEPCO has included $0.68 million for retaining walls which reflects the modifications described above.

iv. Rip Rap

On Opening, AEPCO included $3.33 million for rip rap based on quantities extracted from the ICC Engineering Reports and unit costs from the Means Handbook indexed from July 2001 to January 2001. The Defendants have included $3.43 million for rip rap. The difference between the parties is caused by two factors: (1) a difference in route miles; and (2) a difference in unit cost.

The Defendants accepted AEPCO's use of the ICC Engineering Reports to develop quantities and both parties applied the quantities to the ACE's route miles. As discussed supra, AEPCO and Defendants agree on the route miles for the ACE, but there is a minor difference in the miles for the non-parallel second main between Defiance and

Vaughn. On Supplemental Rebuttal, AEPCO has agreed with Defendants' calculation of the non-parallel second main miles.

The Defendants accepted AEPCO's unit costs from the Means Handbook but not AEPCO's indexing. As noted previously, the Means Handbook costs should not be indexed, and AEPCO has corrected this.

With these two corrections to AEPCO's calculations, the parties now agree on $3.43 million for rip rap costs for the ACE.

v. Relocating and Protecting Utilities

On Opening, AEPCO included $0.12 million for the relocation of utilities on the line segments that replicate Defendants' recently-constructed lines. Despite taking issue with this, Defendants accepted AEPCO's cost figure. See Supp. Reply at III.F-64 and electronic workpaper file "III F 2 ACE Grading.xls."

vi. Seeding/Topsoil Placement

On Opening, AEPCO did not include any costs for placing topsoil or seeding. AEPCO's position was based on a review of the ICC Engineering Reports and information provided by Defendants in discovery, which indicated that no costs were incurred for this particular item when the lines replicated by the ACE were constructed. The Defendants accepted AEPCO's position with the exception of the Vaughn and El Paso Yards, where Defendants included $58,618 for seeding.

The Defendants' inclusion of costs for seeding the Vaughn and El Paso yards is completely unsupported and unwarranted. Defendants offered no rationale for including these costs, merely stating that they were included. Supp. Reply at III.F-64. Furthermore, Defendants' workpapers contain hard-coded formulas calculating the seeding quantities with no explanation as to what the hard-coded numbers in the formulas represent. See Supp. Reply electronic workpapers "III F 2 ACE Grading.xls," tabs "IIIF_9 El Paso" and IIIF-9 Vaughn," cell D28.

Not only are Defendants' costs unsupported, there is simply no justification for including them. The ICC Engineering Reports contain information for both the main lines and the yards in existence when the reports were completed. Therefore, the fact that the ICC Engineering Reports do not show any costs for seeding (or any other method of protecting the roadway with vegetation) indicates that it was not necessary for either the main lines or the yards. In addition, photographs of the El Paso and Vaughn yard areas do not show any evidence of seeding. See Supp. Reply Workpapers Vol. 2, pp. III.F.1-0286, 0287 and 0291.

For the above reasons, Defendants' inclusion of seeding costs for the Vaughn and El Paso Yards is improper. AEPCO continues to exclude any costs for topsoil placement or seeding from the ACE's construction costs.

vii. Water for Compaction

On Opening, AEPCO included $2.71 million for water for compaction. See AEPCO Op. at III-F-39. AEPCO calculated the gallons of water required by applying the water requirements per cubic yard of embankment based on publicly available information for the construction of BNSF's Orin Line in Wyoming to the ACE's earthwork quantities. See AEPCO Op. electronic workpaper file "ACE RR GRADING.xls," tab "IIIF_11Other Cst" and Op. Workpapers Vol. 9, pp. 04543-547 and Vol. 10, pp. 04548-551.

AEPCO utilized the BNSF Orin Line quantities because the Orin Line receives average annual rainfall amounts comparable to the average annual rainfall amounts along the ACE route. See AEPCO Op. Workpapers Vol. 9, pp. 04593 through 04605. AEPCO then applied a unit cost per gallon of water of $0.00883 from the Wyoming Department of Transportation to the cubic yards requiring water. See Op. Workpapers Vol. 10, pp. 04607 through 04614.

The Defendants have included $45.92 million for water for compaction, nearly *17 times* the amount included by AEPCO. Defendants disagree with both AEPCO's method for developing the gallons required and AEPCO's unit cost for the water. Defendants also increased the earthwork quantities requiring water by over 28 percent. See Supp. Reply at III.F-65 and electronic workpaper "III F 2 ACE Grading.xls," tab "IIIf_11Othr Cst." Defendants' overstatement of earthwork quantities, particularly with

regard to yards, has been addressed previously. As shown below, AEPCO's water quantities and costs are appropriate and Defendants' are substantially overstated.

The Defendants argue, in particular, that water is scarce in the region where ACE is located, which increases the price. Rather than developing the costs for wells and pipelines, Defendants "turn[ed] to Means as an unbiased source for the unit price of water." See Supp. Reply at III.F-65. Because the Means Handbook showed the cost as a cost per cubic yard, the Defendants did not rely on AEPCO's calculation of gallons of water per cubic yard, even though the calculation is present in Defendants' Supplemental Reply electronic workpaper "III F 2 ACE Grading.xls," tab "IIIf_11Othr Cst." Instead, Defendants simply multiplied the Means Handbook unit cost times the cubic yards requiring water for compaction.

The Defendants have misapplied the Means Handbook unit cost. When applied properly, it results in a unit cost for water lower than that used by AEPCO. In the Means Handbook, the unit of measure shown for the water cost used by Defendants is CY (cubic yard). Defendants interpreted this to mean a cubic yard of excavation and applied the unit cost of $1.638 ($1.68 times the Means Handbook location factor of 0.975) to each cubic yard of excavation requiring water. See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tabs "IIIf_11Othr Cst" and "IIIF Unit Costs." However, the Means Handbook unit of measure refers to a cubic yard of water and not a cubic yard of excavation. See AEPCO Supp. Reb. Workpapers Vol. 3, p. 00650. Consequently,

Defendants' methodology is erroneous and results in a massive overstatement of costs for water for compaction, as shown below.

One gallon of water equals 0.0049515 cubic yards. See Supp. Reb. Workpapers Vol. 3, p. 00651-00653. Stated differently, one cubic yard of water equals 201.959 gallons (1 ÷ 0.0049515). Based on this, the Means Handbook cost of $1.638 (adjusted for the location factor) equals $0.00811 per gallon. This is, in fact, lower than the $0.00883 per gallon unit cost used by AEPCO.

Despite this disparity, on Supplemental Rebuttal AEPCO continues to rely on its Opening methodology and unit cost to develop the ACE costs for water for compaction. Based on the revised earthwork quantities, the revised cost for water for compaction equals $2.91 million. See Exhibit III-F-20.

viii. Surfacing for Roads

On Opening, AEPCO included $0.21 million in investment for surfacing detour roads for twelve roads during the construction of the ACE. Specifically, AEPCO included the costs associated with only those roads located on the Defiance Branch, the 0.7-mile west leg of the Baca Branch and the 0.85-mile Vaughn Connection, (i.e., the recently constructed line segments being replicated by the ACE). See AEPCO Op. at III-F-41 to 43 and electronic workpaper file "ACE RR GRADING.xls," tab "IIIF_Road Detours." This methodology is consistent with prior Board decisions. See FMC at 120; Wisconsin at 85; PPL at 20; TMPA at 122-123; Duke/NS at 100; Carolina at 86; and

Duke/CSXT at 84. AEPCO's costs for road surfacing for detours are based on unit costs developed from the Means Handbook. See AEPCO Op. electronic workpaper "ACE RR GRADING.xls," tab "IIIF Unit Costs."

Defendants included $6.53 million for surfacing 104 detour roads on the ACE, (i.e., 92 more than AEPCO). See Supp. Reply electronic workpaper file "III F ACE Construction.xls," tab "At Grade - UP." Defendants did not offer any criticism of AEPCO's costs other than to take exception with AEPCO's limitation of costs to those crossings on the recently-constructed line segments replicated by the ACE. See Supp. Reply at III.F-65 to 67.

Despite the fact that Defendants did not critique AEPCO's unit costs, they still developed their own detour costs. Defendants' costs reflect an array of elaborate, expensive and unnecessary detour systems including lane channelization detour systems, temporary detour roads and alternate route detour systems for all the ACE's public crossings. See Supp. Reply electronic workpaper "III F ACE Construction.xls," tab "At Grade - UP" and electronic workpaper "III F 8 Detour Costs."

Defendants' costs are improper because they include road detours outside of the incumbents' recently constructed line segments. Defendants have not shown that they incurred these expenses or that these expenses are necessary. In fact, as noted earlier, the Board has consistently rejected these types of costs because the Board considers them a

barrier to entry. The costs for the 92 crossings on lines other than the recently-constructed lines should again be rejected by the Board for this reason. See also Part III-F-8-3, infra.

The Defendants included $6.10 million for 86 lane channelization detours (over 80% of the detours). Defendants calculated a unit cost of $71,046 per detour based upon nothing more than estimates of the number of signs, number of barrels, number of barricades, yards of asphalt and feet of pavement marking required and unit costs from the Means Handbook. Defendants also included $310,449 for temporary detour roads at two locations. Defendants calculated the unit cost based upon assumptions concerning a typical section of detour road, unsupported estimates of quantities for earthwork, road materials, guard rails, signs and barrels and unit costs from the Means Handbook. Finally, Defendants included $106,056 for alternate route detours at sixteen crossing sites along the ACE. Defendants calculated the unit cost of $6,628 per detour based upon their unsupported estimates of the number and type of signs and barricades required and unit costs from the Means Handbook. See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tab "IIIF_Road Detours." Defendants do not explain why some locations purportedly require the very expensive lane channelization detour while other locations only require the much less expensive alternate route detour.

AEPCO does not believe that any detour system is needed at any of the crossing sites along the ACE other than on the recently-constructed rail lines being replicated. These detours were not needed when Defendants (or their predecessors)

originally constructed the trackage along the ACE right-of-way as vehicular traffic was minimal at best or most likely non-existent. Indeed, Defendants' track charts clearly indicate that the UP line being replicated was built in the 1880s and BNSF's lines were also built in the same era. See Supp. Reb. Workpapers Vol. 3, p. 00745-00748.

However, if the Board determines that a detour system is required for some reason at any of the crossing sites, a least-cost operation would dictate the use of the "alternate route" system. Defendants' alternate route detour system involves a 10-mile detour requiring 20 signs and two barricade systems at each end of the detour. See Supp. Reply electronic workpaper "III F 8 Detour Costs." Assuming that the alternate route detour system requires only 10 signs (every mile rather than every half-mile) and one barricade system at each end of the detour (Defendants never explain why two barricades are needed at each end to block one road), the total cost per alternate route detour system decreases by 50 percent from $6,628 to $3,314. AEPCO does not agree that alternate route detour systems are necessary on the ACE, but if they were to be included, their cost would be much less than what Defendants calculated.

Since detour systems for crossings are not required on those lines that were not constructed recently, the Board should reject Defendants' associated costs. As Defendants did not offer any criticism of AEPCO's costs, AEPCO continues to rely on its Opening methodology and unit costs with the one modification, i.e., the indexing of the

Means Handbook unit costs has been eliminated. On Supplemental Rebuttal, AEPCO includes $0.21 million in investment for surfacing detour roads.

ix. Construction Site Access Roads

Neither AEPCO nor Defendants included any separate costs for construction site access roads. Supp. Reply at III.F-67. As discussed supra, AEPCO included access roads to the extent they were included when the lines of the ACE were originally constructed because AEPCO relied on the earthwork quantities for the original construction.

x. Environmental Compliance

The Defendants have accepted AEPCO's costs for environmental mitigation of $164,114.

xi. Land for Waste Excavation

On Opening, AEPCO assumed that 30 percent of the excavated quantities would be wasted and included $66,133 for land for waste quantities. AEPCO's calculation was based on an assumed depth of 15 feet (24,200 CY per acre),[19] resulting in the need for 408.8 acres, and a land cost of $165 per acre. See AEPCO Op. electronic workpaper file "ACE RR GRADING.xls," tab "IIIF_11Othr Cst."

The Defendants have accepted AEPCO's 30 percent waste estimate and its cost of $165 per acre for land. However, Defendants calculated a need for 872.2 acres for

[19] 43,560 SF per acre x 15-foot depth ÷ 27 CF per CY.

wasted material resulting in a total cost of $143,906. See Supp. Reply electronic workpaper "III F 2 ACE Grading.xls," tab "IIIF_11Othr Cst." Defendants' estimate is overstated.

Part of the parties' difference in the acres required is caused by Defendants' overstatement in the earthwork quantities for yards combined with the earthwork quantities for Defendants' excessive setout track configuration (both of which have been discussed previously). However, the biggest difference is caused by the method by which Defendants calculate the number of CY of waste material per acre of land. In particular, Defendants claim that the ACE would have to build retaining walls 15-feet high around each acre of waste land. Defendants state that, rather than build the costly retaining walls, they adjusted the quantities per acre to reflect a 1.5:1 side slope. Defendants' calculation reduces the number of CY per acre from 24,200 to 14,300, a reduction of over 40%.

Based on a review of Defendants' Supplemental Reply Workpapers Vol. 2, p. III.F-0232, AEPCO determined that Defendants' calculations are erroneous. Defendants assume the waste land is a narrow strip, apparently next to the right-of-way (although Defendants never explain why they made this assumption). Defendants also assume that each acre of waste land is 55 feet wide, 796 feet long and flat. Using a 1.5:1 slope, Defendants assume 22.5 feet on either side are sloped, leaving a distance only 10 feet wide capable of holding waste material 15 feet deep.

Changing Defendants' length and width assumptions in their formula has a considerable impact on the amount of CY that an acre can hold. For example, if the width is doubled to 110 feet and the length is adjusted accordingly to 396 feet, an acre can hold 19,250 CY. If one assumes that the acre is square, the amount increases to 21,858 CY. See Supp. Rebuttal Workpapers Vol. 3, p. 00655.

The Defendants provide no justification for their configuration of long narrow flat waste areas, apparently adjacent to the right-of-way. There is no need for them to be narrow or flat or adjacent to the right-of-way. The unit costs for hauling used by both AEPCO and Defendants include round-trip hauls of at least a half-mile. Furthermore, many of the waste locations would be larger than one acre and would be located where a depression is being filled rather than a pile being made, enabling the location to handle the 24,200 CY per acre used by AEPCO.

Since Defendants' calculations are incorrect and unexplained, AEPCO has continued to rely on its Opening methodology to calculate the cost for land for waste materials. AEPCO's Supplemental Rebuttal cost for this item is $72,288. See Supp. Reb. Exhibit III-F-20.

xii. Other

Although not discussed in their Supplemental Reply, Defendants included two other categories of costs in the Vaughn and El Paso yard costs shown in Supp. Reply electronic workpaper "III F 2 ACE Grading.xls." First, Defendants included $9,904 for

road demolition. Second, the Defendants included $4.23 million for road construction. Each of these items is discussed below.

At MP 129.14, the Mt. Cristo Rey Road[20] crosses ACE's El Paso Yard. Defendants have included $9,904 in costs for demolition of this road. See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls", tab "IIIF_9 El Paso." Defendants must have assumed this road was paved. This is incorrect as the Mt. Cristo Rey Road is a dirt road. See Supp. Reb. Workpapers Vol. 3, pp. 00658-00660. Therefore, no demolition costs are necessary.

The $4.23 million for road construction consists of costs for both Vaughn and El Paso yards. At Vaughn, Defendants included $1.10 million for the "Main Yard Road" and $1.38 million for "Inspection Roads." See Supp. Reply electronic workpaper file "III F 2 ACE Grading.xls," tab "IIIF_9 Vaughn." At El Paso, Defendants included $0.66 million for the "Main Yard Road" and $0.48 million for "Inspection Roads." At El Paso, Defendants also included $103,00 for "concrete panel construction," $38,000 for paving of "Cristo Roy Road," and $474,000 for an underpass for "Cristo Roy Road" consisting of two 12-foot diameter SSP pipes each 500 feet in length. See Supp. Reply

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[20] Defendants' Supplemental Reply workpaper Vol. 2, p. III.F-0066 shows this as the Cristo Roy Road but the correct name, according to the Federal Railroad Administration ("FRA") grade crossing data base, is the Mt. Cristo Rey Road. See Supp. Reb. Workpapers Vol. 3, pp. 00660.

electronic workpaper file "III F 2 ACE Grading.xls", tab "IIIF_9 El Paso." Defendants costs are drastically overstated, and in some cases, unnecessary.

The Defendants' costs for the "Main Yard Road" at Vaughn and El Paso are overstated for several reasons. First, Defendants did not provide any support for their road lengths; the lengths are hard-coded values in their spreadsheet based simply on estimates. Second, Defendants offered no rationale as to why these roads need to be "heavy duty" roads requiring a high unit cost for paving. In fact, Defendants have not explained why the yard roads even need to be paved. AEPCO's experts' field trip revealed that, in several locations, Defendants' existing yards do not have paved roads. See Supp. Reb. Workpapers Vol. 3, pp. 00669-00686. To the extent that the ACE yards need paved parking areas and drives, AEPCO provided them on Opening. See Op. electronic workpaper file "building sites.xls", tab "SITECO~1." As Defendants did not criticize AEPCO's costs for paved roads, and did not explain their Supplemental Reply costs, AEPCO's costs should be accepted.

AEPCO provided for inspection roads on Opening. See AEPCO Op. electronic workpaper file "building sites.xls," tab "SITECO~1." As Defendants did not criticize AEPCO's costs for inspection roads, and did not explain their Supplemental Reply costs, AEPCO's costs should be accepted.

The Defendants also included $103,000 for 224 feet of concrete panel crossings in El Paso Yard comprised of two 48-foot crossings for the "main road and

delivery roads" and eight 16-foot crossings for the "service and inspection roads." See Supp. Reply electronic workpaper file "III F 2 Roadway Construction.xls." These crossings are excessive in number because there are only four tracks that must be crossed and the 48' wide crossings are three times the width of those required. The cost is also overstated as only asphalt with Epflex crossings are necessary. AEPCO has added four at-grade asphalt with Epflex crossings in the El Paso Yard at a cost of $26,000. See Supp. Reb. electronic workpaper file "iiif3.xls."

As to Defendants' treatment of Mt. Cristo Rey Road, first they improperly included $10,000 to demolish a dirt road. Then they compounded their error by including $38,000 to re-pave the same dirt road. Clearly, this is an unnecessary cost. But Defendants did not stop there. They then included $474,000 for two 500-foot underpasses (presumably one for each lane). This is unnecessary for several reasons.

First, this is a one-lane road according to the FRA grade crossing data base, not a two-lane road. At a minimum, this cuts Defendants' cost in half. Second, this dirt road is not a through road. Rather, it leads to the parking lot for a hiking trail, and it currently crosses the UP track and siding via at-grade wood plank crossings. See AEPCO Supp. Reb. Workpapers Vol. 3, p. 00660. As such, the vehicle traffic is minimal. At-grade crossings for the one road over the two main and four yard tracks at this location

should be sufficient.[21] Third, should the volume of vehicular traffic become a problem, the ACE could elect to designate the outer-most 12 feet of its yard property as a dirt road allowing the traffic to skirt the yard as opposed to crossing the yard. As the El Paso Yard would be graded to its outer boundary, this would require no additional earthwork. Defendants' 500-foot underpass is simply overkill and unnecessary.

3. Track Construction

The parties' total costs associated with track construction are nearly the same for every major cost item, except one: the cost to actually lay the track. To be sure, Defendants have included an exhaustive discussion of most of the individual items in the section, but ultimately the cost differences are negligible. As such, AEPCO has organized its narrative to address overall track construction first, which is the principal area of dispute between the parties.

a. Track Labor and Equipment

i. AEPCO's Opening

On Opening, AEPCO developed ACE track construction costs using a quote from Windgate Constructors, a firm that specializes in such activities. The quote covered

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[21] On Supplemental Rebuttal, AEPCO has included $26,000 for the costs for four at-grade asphalt and Epflex crossings on this road over the four yard tracks. AEPCO maintains that the existing at-grade timber crossings over the main and siding should not be included in the ACE investment costs as they were placed after the original lines of the ACE were constructed. This is discussed in detail in Part III-F-8, infra, pertaining to highway crossings.

installation of all materials above the subgrade, including subballast, ballast, ties, rail and other items such as tie plates, spikes and anchors. The quote also covered installation of yard tracks and setout tracks.

The quote was itemized in part. Most importantly, Windgate's bid distinguished between single and double track segments. Not surprisingly, the double track costs reflected a discount versus the cost of doubling the single track unit price. A discount of this type is not unusual given the managerial and logistical benefits that accrue when one management and one delivery system can be utilized for the two tracks. Indeed, Windgate confirmed that its rationale for the discount was based on such factors, as discussed infra. See Supp. Reb. Workpapers Vol. 3, p. 00689.

The Defendants have taken issue with AEPCO's bid on a number of fronts. Defendants' myriad arguments are virtually impossible to decipher, but AEPCO's engineering experts have untangled Defendants' underlying calculations, which reveal that Defendants' attempts to revise the Windgate quote are generally overstated.

ii. Comparison to Other Installation Costs

Taking Defendants' arguments in turn, Defendants first assert that Windgate's quote is unreliable because BNSF's cost for installation on projects where concrete ties (rather than steel ties) are used is much higher. Supp. Reply at III.F-109. Defendants argue that this comparison is valid because the installation process is similar. Id.

AEPCO's engineering experts are puzzled by Defendants' assertions. First, Defendants have installed steel ties on a number of occasions, but they did not offer any costs of installation from those projects. Second, there is no logical way to compare the cost of steel tie installation to that of concrete ties. Steel ties are installed with the same basic equipment as wood ties, weigh the same as a grade 5 wood tie, and are handled by the installers in much the same manner. The requirements for installation of concrete ties are quite different. In particular, concrete ties require special equipment for installation, the materials weigh several times more than steel, and the ties cannot be transported as easily (steel ties can be stacked within one another). Not surprisingly, concrete ties are more expensive to install. See Supp. Reb. Workpapers Vol. 3, pp. 00689-693.

iii. Wider Track Center Spacing

(a) Additional Subballast

Without explanation, Defendants then abandon their comparison, and turn to the particulars of the Windgate quote. The first argument raised is that the Windgate quote assumes a 39-foot roadbed width rather than the 50-foot roadbed width AEPCO actually used, therefore understating the installation costs because additional subballast must be laid between the tracks. Defendants then proportionally increased the Windgate cost to allow for the additional installation of subballast. AEPCO's engineering experts have reviewed the method used by Defendants and agree that it was proper. AEPCO has adjusted its costs accordingly on Supplemental Rebuttal. AEPCO also notes that this

increased cost is the only valid increase for double track construction proposed by the Defendants, as explained infra.

(b) Reduced Pricing for Double Track Versus Single Track

The Defendants then argue that the discount offered by Windgate for double track installation is invalid because AEPCO's bid assumed 15-foot track centers and not the 25-foot track centers AEPCO ultimately used. Defendants' various arguments against a double-track discount essentially boil down to one point – that an additional 11 feet between the tracks somehow vitiates any economies associated with double-track construction. Defendants' argument is without merit.

First, Defendants' argument focuses exclusively on the mechanics of laying the track rather than the elements that really provide the costs savings. For example, Windgate has explained the primary reasons for the discount. They are:

1. Common survey control;
2. Less supervision;
3. Less handling of material; and
4. Use of one track to move material and equipment.

None of the items, with the possible exception of number three, are affected by an additional 11 feet of roadbed. Defendants did not even consider any of the supervisory factors, which are self-evident.

Defendants' argument about the inability to use one track as the "launching pad" for the construction of the other track due to the additional 11 feet is also unfounded. To be sure, the addition of a parallel track does not allow for the use of all types of equipment to work on the opposite track because some items are bound to a single track at a time. In other words, some equipment will only work on one track, whether the tracks are 15 or 25 feet apart.

However, some equipment on one track can reach the other with track centers as wide as those of the ACE. For example, a tie handling crane can move ties and other track materials into place on both tracks because it has a reach of 24'. See Supp. Reb. Workpapers Vol. 3, p. 00694. Similarly, a hi-rail grapple truck is equipped with 25' boom that can handle ties, rail and OTM. See Supp. Reb. Workpapers Vol 3, p. 00695.

The Defendants also ignore the economic benefits of single site mobilization costs. Simply put it is more efficient, and thus less costly, to construct a second track if the equipment has already been mobilized to the project location. Windgate's price break for double track cost reduction is justified on that basis alone. Given the above, the Board should reject Defendants' proposed increase for double track construction.

iv. Increased Costs for Installing Wood Ties

The Defendants then attempt to adjust the Windgate quote to account for the installation of wood ties. AEPCO's engineering witnesses have reviewed Defendants' efforts, and in general they agree with the approach the Defendants have taken. In

particular, AEPCO has accepted the following increases associated with wood tie installation as shown in Table III-F-8:

Table III-F-8
Cost Increases Associated with Wood Tie Installation

	% Based on FMC	Cost Without Additive	Wood Tie Additive %	Discounts	Wood Tie Additive Cost
Pre Plate Ties	3.38%	$3,364.71	123.00%	$4,138.60	$4,138.60
Distribute and Place Otm	2.74%	$2,729.95	0.00%		$2,729.95
Tie Unloading and Distribution	2.65%	$2,644.13	123.00%		$3,252.28
Unload Rail	2.65%	$2,644.13	0.00%		$2,644.13
Place Rail on Plates	4.68%	$4,660.88	0.00%		$4,660.88
Tie Installation and Fasten Rail	28.94%	$28,844.20	123.00%		$35,478.37
Unload Ballast	3.70%	$3,691.71	155.00%		$5,722.16
Ballast Distribution	2.23%	$2,219.47	155.00%	$3,440.18	$3,440.18
Apply Anchors	5.12%	$5,104.78	0.00%		$5,104.78
Surfacing (2 Lifts)	12.35%	$12,310.65	0.00%		$12,310.65
Final Surfacing	6.18%	$6,155.32	0.00%		$6,155.32
Destressing Rail	3.38%	$3,373.59	0.00%		$3,373.59
Total Installation	77.99%	$77,743.52			$89,010.87
Reduction for Not Pre-plating				$4,138.60	
Reduction for Ballast Dist.				$3,440.18	
Total Trans. + Installation	100.74%	$92,836.61		$7,578.77	$114,581.17
Total Cost When FMC Accurately Applied					**$114,581.17**

Cost for preplating ties has been eliminated as the ACE has chosen not to preplate ties, as it is an unnecessary step as the Board found in TMPA

Cost for ballast distribution has been eliminated as the ballast is delivered via rail and unloaded in the required locations.

Total % is slightly high due to rounding.

However, Defendants' analysis has several areas that require correction or supplementation.

The first problem identified by AEPCO's engineering witnesses is that Defendants' recalculation for placing and handling ballast also included additional expenses to distribute the ballast from railheads. This additional cost is unnecessary

because the Windgate quote already includes fees for distributing the ballast from railheads. Consequently, AEPCO eliminated the double count of this costs.

The second problem identified by AEPCO's engineering witnesses is that Defendants included costs for pre-plating ties. As the Board is aware, the standard industry practice is to place plates on the ties during the track construction. Indeed, the Board rejected the unnecessary pre-plating expense in TMPA at 134. Moreover, Defendants did not offer any evidence supporting this cost. As such, AEPCO has reduced Defendants' restated cost accordingly.

AEPCO's engineering experts have also identified a number of problems with Defendants' calculations of wood tie installation costs for triple track and triple track with curves.[22] In particular, Defendants calculated triple track costs in the same manner they calculated double-track costs (i.e., they simply multiplied the single track costs by three). As explained supra, multiple tracks can be constructed for less than double or triple the single track costs. Consequently, AEPCO has used the ratio it applied for double track construction derived from the Windgate quote to triple track construction. The same issue arose with quadruple track construction, and AEPCO applied the same approach.

AEPCO also notes that Defendants' calculations of triple track with curves greater than 5 degrees are the same as the cost for triple track with curves between 3 and 5

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[22] As indicated infra, on Supplemental Rebuttal AEPCO is accepting Defendants' proposal to use wood rather than steel ties in constructing the ACE's track.

degrees. AEPCO has corrected this error using the track elevation factors that BNSF specified, but did not actually use. This increases the costs slightly.

AEPCO's adjustments to Defendants' wood tie installation costs are summarized in Table III-F-9 below:

Table III-F-9
Wood Tie Adjusted Installation Cost

Track Type	Construction	Subballast	Total
Track Construction Single Track Mainline	$92,836.61	$44,602.00	$129,824.51
Track Construction Double Track Mainline	$165,703.96	$92,929.49	$244,305.16
Track Construction Triple Track Mainline	$238,571.31	$137,531.49	$355,266.70
Track Construction Quad Track Mainline	$311,438.66	$185,858.97	$469,747.35
Track Construction Single 3-5 Degree	$97,524.86	$44,602.00	$134,253.03
Track Construction Double 3-5 Degree	$181,495.55	$92,929.49	$259,221.89
Track Construction Triple 3-5 Degree	$265,466.24	$137,531.49	$380,671.65
Track Construction Quad 3-5 Degree	$349,436.93	$185,858.97	$505,640.51
Track Construction Single 5> Degree	$97,524.86	$44,602.00	$134,253.03
Track Construction Double 5> Degree	$181,495.55	$92,929.49	$259,221.89
Track Construction Triple 5> Degree	$265,466.24	$137,531.49	$380,671.65
Track Construction Quad 5> Degree	$349,436.93	$185,858.98	$505,640.51
Track Construction Yard	$114,880.00	$20,751.11	$108,515.65
Track Construction Setout	$114,880.00	$0.00	$128,117.15

Increase for each additional track based on Windgate original Quote to increase from single to double track

Single Track	Double Track
$99,860.00	$178,240.00
Percent of increase	78.49%

Double track subballast based conservatively on original Windgate Quote even though fax statement indicates that installation of subballast would not increase proportionately for the same reasons the track construction did not.

Original 39' Roadbed Quote	Cost per Foot	Cost for 50' Roadbed
$72,485.00	$1,858.59	$92,929.49

Triple track roadbed calculated by adding a single track roadbed plus a double track roadbed.

Quadruple track roadbed calculated by multiplying a double track roadbed by 2.

Superelevated track based on same multiplication factor as applied by BNSF (BNSF/UP WP III.F-0369)

Single 3-5 Degrees	1.0505
Double 3-5 Degrees	1.0953
Single >5 Degrees	1.0505
Double >5 Degrees	1.0953

v. Yard and Setout Track Construction

The Defendants have also raised two issues associated with AEPCO's construction costs for yard and siding track. First, Defendants argue that AEPCO's quote for yard and siding tracks was 119-pound relay joint rail rather than the 132-pound rail AEPCO actually used, and, as a consequence, AEPCO's costs are understated because 132-pound rail weighs more and because it is stiffer and harder to handle. Again, the Defendants' criticisms are unfounded.

In AEPCO's engineering witnesses' experience, there is little difference between laying most rail sizes. Moreover, in their experience, heavier rail can be easier to install, especially where there are no curves, because its stiffness makes it easier to properly align over long distances (i.e., long strands of rail flex and bend less as they are placed. AEPCO also contacted Windgate, which indicated that it charges the same for rail weights between 112 and 136 pounds per yard. See Supp. Reb. Workpapers Vol. 3, p. 00689. On the same grounds, AEPCO submits that Defendants' additional cost for 132-pound turnouts is also unwarranted. Consequently, AEPCO has not added any additional costs for installing 132-pound rail in its Supplemental Rebuttal restatement.

The Defendants have also increased the yard and setout installation costs to account for the additional subballast they argue is required for these tracks. As discussed in the ballast and suballast section, infra, the Board has repeatedly rejected this argument because the one-foot of fill is more than adequate in moderate to non-existent dynamic load conditions. Accordingly, AEPCO has not added any additional construction cost for placing subballast in yards. AEPCO does agree with additional costs for placement of subballast under setout tracks because those tracks did not include an additional foot of fill.

AEPCO's Supplemental Rebuttal unit costs for yard and setout track construction are summarized in Table III-F-9, supra.

vi. Total Track Construction Costs

As described in Part III-B, supra, AEPCO has accepted several modest track additions. AEPCO has therefore adjusted its total track miles of construction. Moreover, as discussed infra, AEPCO has accepted Defendants' use of wood ties for the ACE. AEPCO has therefore adjusted its costs and quantities to reflect this change. However, AEPCO has applied its corrected wood tie installation costs as they more accurately reflect the costs the ACE would incur for the reasons described supra. The total cost for track construction is detailed in Table III-F-10 below:

Table III-F-10
Total Track Construction Costs Comparison
(millions)

Description	AEPCO Opening	BNSF/UP Supp. Reply	BNSF/UP Supp. Reply Over AEPCO Opening	AEPCO Supp. Rebuttal	BNSF/UP Supp. Reply Over AEPCO Supp. Rebuttal
Track Construction Single Track Mainline	$73.1	$40.5	-$32.6	$33.0	$7.5
Track Construction Double Track Mainline	$78.7	$177.7	$99.0	$61.8	$115.9
Track Construction Triple Track Mainline	$0.0	$49.2	$49.2	$11.5	$37.6
Track Construction Quadruple Track Mainline	$0.0	$0.6	$0.6	$0.1	$0.5
Track Construction Single 3-5 Degree	$0.3	$0.5	$0.2	$0.4	$0.1
Track Construction Double 3-5 Degree	$6.5	$8.5	$2.0	$3.0	$5.6
Track Construction Triple 3-5 Degrees	$0.0	$0.5	$0.5	$0.1	$0.3
Track Construction Quadruple 3-5 Degrees	$0.0	$0.0	$0.0	$0.0	$0.0
Track Construction Single 5> Degree	$0.0	$0.5	$0.5	$0.4	$0.1
Track Construction Double 5> Degree	$2.0	$0.5	-$1.5	$0.2	$0.3
Track Construction Triple 5> Degrees	$0.0	$0.5	$0.5	$0.1	$0.4
Track Construction Quadruple 5> Degrees	$0.0	$0.0	$0.0	$0.0	$0.0
Track Construction Yard	$6.0	$9.7	$3.8	$5.1	$4.7
Track Construction Set Out	$0.0	$0.0	$0.0	$1.4	-$1.4
TOTAL	$166.5	$288.6	$122.1	$117.0	$171.6

b. Geotextile Fabric

Consistent with the Board's decisions in recent cases (e.g., TMPA at 125), on Opening, AEPCO did not include any geotextile fabric on the ACE, except under grade crossings. The fabric was included with AEPCO's unit costs for the crossings. Not surprisingly, Defendants take exception to AEPCO's approach. In particular, Defendants devote a page and a half to theorizing on the possible need for geotextiles on the entire system, only to settle for adding geotextiles under turnouts and road crossings.

Taking road crossings first, AEPCO's Opening costs for grade crossings included the cost of geotextile fabric. See AEPCO Op. Workpapers Vol. 10, p. 05103.

The quote AEPCO utilized to calculate the cost for asphalt grade crossings required the contractor to install Class 5 geotextile fabric the full length and width of each crossing. Furthermore, the typical cross section for a crossing, provided by AEPCO, clearly shows Class 5 geotextile beneath the crossing. See AEPCO Op. Workpapers Vol. 10, p. 5104. As such, AEPCO has not included any additional costs for geotextile fabric under grade crossings. However, AEPCO and Defendants disagree as to the number of crossings that the ACE must build.

AEPCO agrees that the Board's recent decisions have included the costs for geotextiles under turnouts. As those decisions were issued after AEPCO's Opening Evidence was filed in this case, AEPCO's Opening presentation does not include this item. Defendants, on the other hand, have included such costs. AEPCO's engineering witnesses take issue with the cost developed by Defendants insofar as Defendants used the smallest width rolls of geotextile thereby wasting more material due to overlapping of additional seams. However, as the difference is not significant here, AEPCO has accepted Defendants' costs.

Thus, on Supplemental Rebuttal, AEPCO has included the cost for geotextiles under turnouts, and excluded $153,951 for geotextiles under crossings as this cost is already included in its crossing costs. The remaining difference in costs between AEPCO and Defendants is a result of their differences in the configuration of the ACE.

c. **Ballast and Subballast**

The parties agree on a number of cost and quantity items in this section. In particular, Defendants agree with AEPCO's use of twelve inches of ballast and eight inches of subballast on mainline and passing siding sections. Defendants agree with AEPCO's unit price for subballast. Defendants also agree with AEPCO's unit cost for ballast, except to the extent that AEPCO indexed the cost downward. AEPCO agrees that the indexing was improper, and it has used the original price from the subject quote, which Defendants also used in their Supplemental Reply. On Supplemental Rebuttal, AEPCO has also adopted Defendants' ballast and subballast quantities per CF/FT on mainline track and passing siding sections, which are predicated on the use of wood ties. AEPCO has also accepted Defendants' inclusion of six inches of subballast on setout tracks because those tracks do not include any additional fill and therefore subballast would be necessary.

Despite these agreements, one item remains in dispute – whether the ACE requires subballast under yard tracks. The disagreement between the parties can be distilled to one critical item: is the compacted one-foot fill used by AEPCO on Opening an acceptable subbase? If it is, then the ACE's yard and set-out tracks are set on 22" of ballast and compacted subbase, more than enough to accommodate the dynamic loads. See Supp. Reb. Workpapers Vol. 3, p. 00697. For example, AEPCO's subbase is more than six inches deeper than the 15.87 inches of material that Defendants argue is required to handle the dynamic loads of a train moving at 10 mph. If the one-foot fill is

insufficient, then the Defendants' calculations regarding the roadbed's inability to withstand even 10 mph speeds are undoubtedly correct. AEPCO submits that the one-foot fill is more than adequate.

First, Defendants argue that the fill for the yards would be unsuitable when applied as subballast. AREMA defines subballast as:

> Material most commonly available for use as suballast 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.

See Defendants' Supp. Reply Workpaper III-F-0273 (emphasis added).

As the fill material used by the ACE 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 AEPCO's approach under similar circumstances. See, e.g., Duke/CSXT at 87.

Second, Defendants argue that AEPCO's calculation of the load bearing capacity of the fill and ballast combination is incorrect, and therefore subballast should be used. AEPCO's engineering experts disagree with Defendants' assertion. They have undertaken a review of the relevant calculations, and determined that AEPCO's Opening assumptions were correct. The detailed calculations are included in AEPCO's workpapers. See Supp. Reb. Workpapers Vol. 3, pp. 00697.

d. Ties

The Defendants have chosen to use wood ties in constructing the ACE rather than the steel ties selected by AEPCO on Opening. As Defendants have reduced the overall cost by utilizing wood ties, AEPCO accepts the Defendants' utilization of wood crossties, and AEPCO has changed its Supplemental Rebuttal costs accordingly.[23]

AEPCO also accepts Defendants' use of 7" x 9" x 8'6" grade 5 crossties for mainline track, and Defendants' proposal to use a 19.5" tie spacing, even though it is standard practice to space mainline ties at 20.5", in order to avoid a charge that AEPCO is engaging in improper rebuttal. Indeed, BNSF has used 20.5" spacing in previous cases, and the Board has accepted it. See West Texas Utilities at 707. AEPCO also accepts the Defendants' grade 5 crosstie unit cost of ${ } including transportation.

AEPCO does note, however, that its engineering witnesses have identified some serious flaws with the Defendants' transition tie specifications. In particular, most crossing designs only require ties of the same size as those being used by Defendants elsewhere on the ACE, as compared to the larger transition ties that AEPCO used on Opening and the Defendants have used in their Supplemental Reply. Those larger transition ties were selected due to AEPCO's Opening selection of steel ties, which because of the rigidity of the substructure, require larger transition ties then those needed

[23] AEPCO was unaware of the problems with using steel ties in heavy-density territory described by Defendants. The Defendants' experience in this regard largely post-dated AEPCO's preparation of its Opening Evidence.

when transferring from a wood tie subbase to a crossing. In any event, however, to avoid a charge of improper rebuttal, AEPCO accepts the transition ties used by the Defendants.

e. Track (Rail)

i. Main Line

The parties agree on the use of 136-pound CWR. The parties also agree on the delivered cost for the rail. However, the parties disagree as to the quantity required due to the slight differences in track miles. Those differences are discussed in Part III-B, supra.

ii. Yard Tracks & Branch Lines

The parties agree on the use of 132-pound rail in yards and on branch lines. The parties also agree on the delivered cost for rail. However, the parties disagree as the quantity required due to the substantial differences in configuration of the Vaughn and El Paso Yards, which are discussed in Part III-B, supra.

iii. Setout Tracks

The parties agree on the rail weight and cost for setout tracks. Again, however, the parties disagree as to quantities. Defendants have included much larger setout tracks to accommodate various MOW equipment and ballast trains. AEPCO's proposed 600-foot, double-ended setout tracks (one on each side of each FED) are sufficient to accommodate MOW equipment at many locations as well as carloads of ballast. See Part III-B-2-d, supra.

iv. Field Welds

On Opening, AEPCO included the field welds required to lay all the track end-to-end. Defendants argue that additional welds would be necessary at access roads, bridges, culverts, turnouts and unspecified other locations. AEPCO agrees that additional welds would be required at turnouts and bridges due to the obvious breaks in the track. AEPCO disagrees that such welds would be needed elsewhere because, for example, track does not normally break over a culvert. Indeed, Defendants appear to agree. A close examination of Defendants' Supplemental Reply electronic workpaper "III F 3 Track.xls," tab "Track Qty Calcs Restated," shows that even though Defendants detailed locations such as culverts in their Narrative, they included extra welds only at turnouts and bridges.

The Defendants also take issue with AEPCO's labor costs for field welds. On Opening, AEPCO's field weld labor costs were included as part of its track construction cost bid from Windgate. Defendants argue that field weld labor must be not be included because it is only mentioned specifically in reference to the installation of insulated joints which require two thermite welds. In other words, Defendants have attempted to narrowly read the Windgate quote so that specific reference in one instance means general exclusion in all other track construction costs. AEPCO disagrees with this interpretation.

The Windgate quote is meant to be all inclusive. After all, there is little point in installing 900 miles of track without any field welds. In any event, AEPCO has

confirmed with Windgate that its quote included the labor for field welds. As such, AEPCO has continued to use its field weld materials costs from Opening, but has adjusted the quantities for bridges and turnout locations.

v. Insulated Joints

Insulated joints are addressed in Part III-F-6, infra.

vi. Compromise Joints

AEPCO agrees that compromise joints are required on the ACE, and AEPCO has accepted Defendants' unit costs for those items. AEPCO's total quantities differ due to the differences in track configuration. See AEPCO Supp. Reb. electronic workpaper file "Track Tabulation.xls."

f. Switches (Turnouts)

The parties agree on the delivered costs of turnouts as specified by AEPCO on Opening. However, Defendants argue that AEPCO's quotes from Railworks for No. 20 powered, No. 20 spring, and No. 24 powered turnouts do not include transportation costs. They have, therefore, added over $2,000 per turnout for delivery. Defendants' argument suggests that because AEPCO's quote states it is for "material only," shipping is not included. See Supp. Reply at III.F-99. However, Defendants have taken that portion of the quote out of context. The entire quote states: "Attached is the list of materials you sent with ballpark figures. These are material prices only and do not reflect construction cost." See AEPCO Op. Workpapers Vol. 10, p. 04704. As the quote refers to construction

cost issues, the Defendants' assumption that transportation was not included is not well-taken. Moreover, AEPCO's engineering witnesses asked all the vendors they contacted, including Railworks, to include shipping in their quote. AEPCO's approach is evident in the other material quotes found in AEPCO's Opening workpapers. See, e.g., AEPCO Op. Workpapers Vol. 10, pp. 04702-04703. As such, AEPCO continues to use its costs for the turnouts listed, supra.

As noted in the track construction subsection, supra, Defendants argue for an increase in the costs for installing turnouts because the weight of rail is 132-pound rail rather than the 119-pound rail costs described in the Windgate quote. For the reasons discussed in the track construction subsection, AEPCO rejects the additional installation costs. In light of the above, AEPCO has continued to use its Opening turnout costs.

g. Other

i. Rail Lubrication

On Opening, AEPCO developed both its costs and quantities for rail lubricators from materials provided by the Defendants in discovery. In particular, AEPCO used Defendants' track charts to determine where rail lubricators are located, and it developed its costs from a materials price list provided by BNSF. Defendants take issue with both the cost and quantities of AEPCO's rail lubricators.

On Opening, AEPCO included 15 rail lubricators on single track segments based on a review of Defendants' track charts. Defendants have argued that there are

actually 19 rail lubricators on the lines being replicated. However, Defendants did not provide any materials supporting their assertion that AEPCO understated the quantity by four. Consequently, AEPCO's engineering witnesses returned to the track charts to recount the single track lubricators, and again found only 17. See Supp. Reb. Workpapers Vol. 3, p. 00699 (listing the locations of single track lubricators). Consequently, AEPCO has continued to provide 17 single track rail lubricators in its Supplemental Rebuttal restatement.

The Defendants also argue that AEPCO's rail lubricator costs, which BNSF produced in discovery, do not include installation. Upon further review, AEPCO agrees that its Opening costs do not include installation. AEPCO therefore has adopted Defendants' installed cost for rail lubricators.

Finally, Defendants assert that the ACE needs environmental mats under all of its rail lubricators. While the cost for these mats is minor, AEPCO's engineering experts disagree that they are necessary. In particular, new rail lubrication materials based on soy oil are rapidly becoming the standard for the industry. For example, Norfolk Southern has converted to soy-based lubricators. Soy-based lubricant lasts longer, has superior resistance to wash off, spreads down the track further, and most of all is environmentally safe and decomposes within six weeks. See Supp. Reb. Workpapers Vol. 3, pp. 00700-00707. Consequently, AEPCO has not included environmental mats in its Supplemental Rebuttal restatement.

ii. Plates, Clips, Spikes and Anchors

The parties agree on the unit costs and placement of all items under this category. Moreover, as AEPCO has adopted Defendants' use of wood ties, it has adjusted its costs accordingly (i.e., it has included the necessary anchors and eliminated the Pandrol clips needed for steel ties). See Supp. Reb. electronic workpaper file "iiif3f.xls." The final cost differences are, therefore, attributable to the differences in the parties' configurations of the ACE system.

iii. Derails and Wheel Stops

AEPCO agrees with Defendants that derails and wheel stops are necessary items. AEPCO also agrees with Defendants' unit costs for those items. However, AEPCO's engineering witnesses do not agree with the quantity proposed by the Defendants. In particular, Defendants argued that "[a]t a minimum, all non-passing siding tracks should have a derail located before the fouling point." Supp. Reply at III.F-105. AEPCO agrees that derails should be located at those limited points, but contrary to their statement, Defendants have apparently added derails to an array of other locations.

Defendants do not identify the exact approach they used in placing the derails. Defendants' supporting Supplemental Reply electronic workpaper file "III.F-3 Counts.xls," tab "Counts" shows the breakdown of the derails per page from the track diagrams, but the spreadsheet offers no additional explanation of the methodology used to place the derails.

Given the problems with Defendants' quantities, AEPCO has chosen to calculate the quantity of derails and wheel stops based on its track configuration and using a well-defined method for determining the locations. In particular, AEPCO has placed hinged type derails at interchange locations and at all yard and setout tracks directly connected to the mainline to prevent cars from rolling out onto the mainline.

AEPCO's engineering experts disagree with Defendants' other arguments in support of additional derails. For example, Defendants' placement of derails is supported only by a manufacturer's statement as to the use of derails. citing FRA safety regulations at 49 C.F.R. § 213.205, they also argue that derails in yards and on setout tracks are an important means of protecting personnel who are working under FRA "Blue Flag" protection on cars and equipment. Defendants' reliance on this regulation is misplaced. The cited regulations are only applicable to inspections of derails by track inspectors.

In contrast, 49 C.F.R. § 214.327 actually covers the proper methods of isolating yard and setout tracks. This FRA regulation lists five different methods of isolating track, and only one involves the use of a derail. Moreover, a derail is an optional step in an instance where a switch cannot be aligned to prevent a train from entering occupied track. Of the five options, the most sensible and easiest way to prevent trains from entering occupied track is the FRA's second method, which states: "A switch or derail aligned to prevent access to the working limits and secured with an effective securing device by the roadway worker in charge of the working limits." All of the ACE's

yard tracks can be isolated by properly aligning and securing the switches leading to the occupied track, and therefore the application of hinged type derails on all yard tracks as suggested by Defendants is unnecessary.

As to wheel stops, the difference between the parties' costs is a result of their differences in yard configuration.

iv. Materials Transportation

All costs for materials transportation are already included under the respective sections for the track materials.

v. Track Labor and Equipment

This item was addressed at the beginning of Part III-F-3, supra.

4. Tunnels

The ACE has no tunnels.

5. Bridges

On Opening, AEPCO designed bridges to handle the myriad traffic on the ACE using basic engineering standards for bridges, such as the E-80 specs. In addition, AEPCO also built the bridges to accommodate single and double track segments as necessary.

Defendants agree with many of the bridge design elements AEPCO submitted, as well as most of the bridge inventory. However, there are a number of areas where Defendants disagree with AEPCO's design, costs or inventory. While most of the

differences are minor, AEPCO addresses the points of disagreement below. In addition, AEPCO addresses a computational error it made on Opening relating to the cost for structural steel.

a. Inventory

The Defendants have noted a number of minor discrepancies in AEPCO's bridge inventory. AEPCO address these points as follows:

- Bridges Omitted from the Inventory: AEPCO agrees with the revisions proposed by Defendants. See Supp. Reply at III.F-122
- Bridges Duplicated in the Inventory: AEPCO agrees with the revisions proposed by Defendants. See Supp. Reply at III.F-123.
- Span Length Criterion: AEPCO agrees that the 210-foot span used on the bridge at MP 1152.16 on the Lordsburg Subdivision exceeds the 125-foot maximum span AEPCO specified on Opening. AEPCO further agrees with Defendants' proposal to create two 105-foot spans. See Supp. Reply at III.F-124.
- Inconsistencies with Track Charts or AEPCO Schematics: AEPCO agrees with Defendants' proposed corrections to multi-track bridges. See Supp. Reply at III.F-124 to 126.
- Bridge Structures Converted to Culverts: AEPCO agrees with the removal of two bridges and their placement in the culvert inventory list. See Supp. Reply at III.F-126 to 127.
- Pier Calculation for Single-Span Multiple Track Bridges: AEPCO agrees with Defendants' removal of an extra 280 piers that AEPCO should not have included on Opening. See Supp. Reply at III.F-127.
- Type II Special Category: AEPCO agrees with the creation of the Type II Special Category bridges. See Supp. Reply at III.F-128 to 131. AEPCO also agrees with the basic design for this category and with the inventory. AEPCO notes Defendants' claim that AEPCO did

not include two track across the Rio Grande River near El Paso (Supp. Reply at III.F-126), but in fact AEPCO did include both tracks on Opening. Indeed, Defendants made no changes in their Supplemental Reply electronic workpapers to the track count that AEPCO used for this bridge on Opening. The only difference is that UP has two crossings of the Rio Grande, which are some distance apart from each other. AEPCO built its two tracks next to each other to simplify the process, and because the only reason that AEPCO could see for the distance between the current crossings is that they were built by two different railroads at different times.

b. Bridge Design Deficiencies

The Defendants have raised a number of criticisms with respect to AEPCO's bridge designs. AEPCO's engineering witnesses have reviewed Defendants' proposed revisions and determined that most of them are minor or do not change the overall costs for the bridges. Accordingly, AEPCO's engineering experts have adopted the proposed design changes.

c. Calculation Errors

As noted by Defendants, AEPCO made several calculation errors in its Opening bridge costs. First, AEPCO failed to multiply the weight of steel per LF by the cost of $1.08/lb to obtain the appropriate LF cost for steel. Correction of this error increases AEPCO's Opening bridge total cost to $94.8 million. Second, AEPCO double counted the volume of concrete required for the abutments, which overstated AEPCO's Opening costs by $11 million. Although AEPCO provided for the materials, its final bridge costs inadvertently omitted the costs for pile bracing materials for Type III and Type IV bridges, which understates investment by approximately $461,000.

d. Additional Bridge Structures

The Defendants have also argued for two additional items that AEPCO did not include on Opening, cofferdams and excavation. AEPCO agrees with the addition of cofferdams as suggested by Defendants. AEPCO also agrees that excavation for the abutment and piers is required. However, as explained infra, Defendants have drastically overstated the unit costs for such excavation.

e. Unit Costs

With the corrections for inventory, design and calculation errors, the difference in costs between the parties is largely attributable to the unit costs applied by AEPCO and Defendants. A summary of the unit cost differences is shown in the Table III-F-11 below:

TABLE III-F-11
Bridge Unit Cost Comparison

ITEM	UNIT	AEPCO Opening	Defendants Supp. Reply	AEPCO Supp. Reb. *
Concrete in place (no reinforcing unless otherwise noted)				
Abutment footings	CY	$ 308.43	$ 231.02	$ { }
Abutment stem	CY	$ 308.43	$ 272.94	$ { }
Backwall and wingwalls	CY	$ 308.43	$ 331.42	$ { }
Pier footings	CY	$ 308.43	$ 195.93	$ { }
Pier columns, 24" (incl. Avg. Reinforcing)	CY	$ 308.43	$ 625.63	$ 308.43
Pier columns, 36" (incl. Avg. Reinforcing)	CY	$ 308.43	$ 498.75	$ 308.43
Pier caps	CY	$ 308.43	$ 570.25	$ { }
Reinforcing in place (uncoated)	LB	**	$ 0.87	$ 0.74
Steel Girders	LB	$ 1.08	$ 1.23	$ 1.23
HP14x89	VLF	$ 25.00	$ 32.66	$ 25.00
Machine Placed Rip Rap	CY	$ 32.91	$ 37.53	$ 37.50
Cofferdams	SF	***	$ 17.74	$ 17.74
Cofferdam Sealer Course	CY	***	$ 18.38	$ 18.38
Structural Excavation	CY	***	$ 35.09	$ { }
Timbers, handrail and walkway	LF	$ 205.89	$ 241.63	$ 205.89
Exposed Pile Bracing	EA	$ 1,890.49	$ 1,890.49	$1,890.49

* Supp. Reply Workpapers Vol. 3, pp. III.F-0378-0382,
Concrete, reinforcing, rip rap,structural excavation from BNSF Bid in 12/97,adjusted for 2001 (1.058 factor)
** Price of concete included reinforcing
*** Items not incuded in opening

As the above table demonstrates, Defendants restated every unit cost, except for one, proposed by AEPCO on Opening. Obviously, AEPCO does not object to Defendants' approach to the extent that the Defendants believe that certain components have a lower cost than what AEPCO had proposed. After all, a stand-alone railroad can assume the least-cost, feasible approach. However, AEPCO takes issue with the lower numbers proposed by Defendants in several instances because they are still too high.

First, Defendants criticize AEPCO for using concrete unit costs from bids on three bridges built in South Dakota, and for selecting the lowest concrete costs in those bids. AEPCO notes that there is no reason to expect that concrete costs would vary widely around the country. Rather, the principal determinant of unit cost levels for concrete used in bridge in construction is the quantities to be used. Given the large amounts of concrete to be used here, AEPCO believes that its Opening costs were reasonable. Second, Defendants have not suggested that the costs are out of line for such projects.

Nevertheless, Defendants restated all the concrete costs, by item, using Means. Defendants' approach, while logical on its face, is disingenuous in practice because Defendants' own workpapers show that BNSF pays far less for concrete in bridge applications than AEPCO used on Opening or that Defendants used in their Supplemental Reply. Indeed, Defendants' workpapers show that BNSF paid only ${ } per CY for

concrete used in abutment footings, abutment stems, back walls, wing walls, pier footings, and pier caps. See Supp. Reply Workpapers Vol. 3, pp. III.F-0379-0380 (AEPCO has included a highlighted version of this workpaper in its Supp. Reb. Workpapers Vol. 3, pp. 00710-00711). As Defendants' own workpapers show that far lower costs are available to the Defendants, AEPCO has adopted their costs on Supplemental Rebuttal and indexed them forward from December 1997, for a final cost of ${ } per CY.

For concrete costs where the Defendants did not include any actual bid costs, AEPCO has continued to use its Opening costs.

The Defendants also disagree with AEPCO's Opening cost of $25.00 per LF for HP14 x 89 steel piles. AEPCO's Opening unit cost for this items was based on a bid from a public project in New Mexico. See AEPCO Op. Workpapers Vol. 10, p. 04798. Defendants suggest that this bid is unrealistic because there were higher bids for the same project and because the Means cost is $33.50 per LF.

The Board must soundly reject these absurd arguments. A bid is a bid. A contractor went on public record offering the materials at $25.00 per LF. By definition, the materials must be available in New Mexico at this cost. In other words, the Board must end the "my bid is better than your bid, even though it is higher" or "my vendor is better than your vendor" arguments that Defendants, and railroads in other recent SAC cases, have been making. The SARR is entitled to the least-cost feasible alternative. A

public bid is a clear demonstration of the feasibility of the costs proposed. Therefore, the Board should accept AEPCO's unit cost of $25.00 per LF for HP14 x 89 steel piles.

The Defendants also take issue with AEPCO's costs for timbers, handrails and walkways. In particular, Defendants argue that they could not determine AEPCO's source for those costs. AEPCO's cost for those materials is derived from two of its Opening workpapers, Vol. 10, pp. 04760 and 04799. These pages have the following costs:

AEP 04760	Deck Timbers w/ adjustment factors	$166.25 / ft
AEP 04799	Walkway and handrailing w/ adjustment factors	$ 39.64 / ft
	Total	$205.89 / ft

Those costs are identical to the costs that AEPCO used on Opening. As such, AEPCO has continued to use these costs on Supplemental Rebuttal.

Finally, AEPCO notes that Defendants' unit costs for excavation are drastically overstated ($35.09 per CY). Much like their concrete costs, Defendants provided unit costs in their Supplemental Reply workpapers that are substantially lower than those Defendants actually selected for application to the ACE project. In particular, Defendants' workpapers show excavation unit costs of only ${ } per CY. See Supp. Reply Workpapers Vol. 3, pp. III.F-0379-380. As Defendants' higher unit costs for the ACE are unjustified, AEPCO has used the ${ } per CY from Defendants' workpapers.

The ultimate bridge cost differences between AEPCO and the Defendants are detailed in the following tables:

TABLE III-F-12
AEPCO's Opening Bridge Costs and Quantities

Item	Quantity	Unit	Total Cost	LF Cost
Type I	1174.00	LF	$1,872,343.70	$1,594.84
Type II	8803.22	LF	$6,726,739.49	$764.12
Type III	15418.07	LF	$27,311,387.22	$1,771.39
Type IV	9376.46	LF	$9,017,837.20	$961.75
Highway Bridge	32.00	LF	$80,208.77	$2,506.52
Total	34803.75		$45,008,516.37	

TABLE III-F-13
Defendants' Supplemental Reply Bridge Costs and Quantities

Item	Quantity	Unit	Total Cost	LF Cost
Type I	4452.24	LF	$19,555,347.02	$4,392.25
Type II	4833.02	LF	$19,494,402.44	$4,033.59
Type II Special	5774.38	LF	$29,261,691.77	$5,067.50
Type III	12171.53	LF	$50,828,627.40	$4,176.03
Type IV	7165.28	LF	$25,804,119.64	$3,601.27
Highway Bridge	32	LF	$80,208.77	$2,506.52
Total	34428.45		$145,024,397.04	

TABLE III-F-14
AEPCO Supplemental Rebuttal Bridge Costs and Quantities

Item	Quantity	Unit	Total Cost	LF Cost
Type I	4452.24	LF	$14,632,776.02	$3,286.61
Type II	4833.02	LF	$16,490,768.95	$3,412.10
Type II Special	5774.38	LF	$24,085,818.85	$4,171.15
Type III	12171.53	LF	$36,010,968.57	$2,958.62
Type IV	7165.28	LF	$21,887,432.65	$3,054.65
Highway Bridge	32.00	LF	$80,208.77	$2,506.52
Total	34428.45		$113,187,973.81	

6. Signals and Communications

a. Centralized Traffic Control

On Opening, AEPCO's experts determined the ACE's traffic control requirements, and then they costed the CTC and related signal system using a combination

of materials quotes from vendors and labor costs from Means. The resulting route mile costs for AEPCO's CTC system were consistent with those the Board has accepted on other occasions. Not surprisingly, Defendants disagree with AEPCO's cost determination.

In particular, Defendants' proposed signals costs are nearly double those presented by AEPCO. As in other areas of road property investment, Defendants arrive at their costs through the methodical inclusion of additional equipment that Defendants never claim they use on their own systems, and without any support as to why such equipment is necessary. Again, Defendants also engage in a battle of "my quote is better than your quote." Moreover, in some areas Defendants insist that state-of-the-art technology must be used (even if Defendants themselves do not currently use this technology), whereas in others, Defendants are not adverse to suggesting decidedly antiquated systems when they are more expensive (i.e., installing utility poles).

To be sure, not all of Defendants' criticisms of AEPCO's signals system are unwarranted. Indeed, AEPCO has made some enhancements to the ACE's signal and communications system based on Defendants' Supplemental Reply, but, as demonstrated infra, Defendants have not demonstrated that AEPCO's Opening signals system is infeasible. Moreover, as AEPCO demonstrates, Defendants' $93 million in signal costs cannot be supported.

i. AEPCO's Opening

As mentioned supra, AEPCO's Opening CTC/signals costs were calculated using a quote for signal materials and Means for the labor costs of installing the materials. Defendants off-handedly dismiss AEPCO's approach, arguing that Means is inapplicable, AEPCO's quote from Alstom is for materials only, and AEPCO's costs omitted several important items. See Supp. Reply at III.F-47. Defendants then simply state that they have used a quote they obtained as the basis for their substantially higher costs. The Board should reject Defendants' cursory dismissal of AEPCO's Opening costs.

Defendants' approach ignores SAC principles and the Board's directive that Defendants should critique a complainant's SAC presentation and not simply devise an entirely new approach. See Ex Parte No. 347 (Sub-No. 3), General Procedures for Presenting Evidence in Stand-alone Cost Rate Cases, STB served March 12, 2001, at 6. Moreover, Defendants' approach certainly does not result in the least cost, feasible alternative.

Turning to the Defendants' various criticisms, Defendants note that AEPCO's materials quote from Alstom Transport Information Solutions did not include installation or engineering. See Supp. Reply at III.F-148. AEPCO never denied this point. Indeed on Opening, AEPCO readily admitted it, which is why AEPCO's engineering experts added labor costs based on electrician crews from Means.

The Defendants also argue that AEPCO's estimate for the cost of the CTC system is inadequate because it relies on installation costs based on average hourly costs from Means for an electrician's crew that is "not specific enough for the signal work involved." Supp. Reply at III.F-147. However, Defendants never explain why the costs from Means are not applicable, except to say that Means should only be used for general building construction.

The Defendants' argument is without merit. AEPCO's reliance on the Means costs for electrical crews is reasonable insofar as the general skills involved in placing signal units are similar to those involved in dealing with electrical systems. Therefore, it is reasonable to expect that the cost for similarly skilled labor would be comparable. Moreover, both AEPCO and Defendants have utilized Means extensively in other areas of their road property investment calculations (such as excavation costs), and, of course, the Board has frequently sanctioned the use of Means in other contexts. See, e.g., Duke/NS at 90 (using RS Means for clearing and grubbing costs); TMPA at 120 (using Means to determine the cost for excavating to install lateral drainage); Carolina at 78 (noting that both parties used Means to determine the cost for clearing and grubbing).

Finally, Defendants did not take issue with the details of AEPCO's installation costs. Briefly summarized, AEPCO's engineering experts selected an appropriately sized crew with the proper equipment for installing the signal system. AEPCO's experts then applied their real-world experience to estimate the time it would

take to install the system components. With this method, AEPCO's experts established a well-documented cost for the installation of off-the-shelf equipment, and Defendants have not suggested that AEPCO's actual labor costs are infeasible. As Defendants have not shown that the labor cost from AEPCO's Opening would be infeasible, AEPCO is entitled to have its costs used, regardless of the feasibility of the Defendants' costs. See Duke/NS at 14; FMC at 117; Guidelines, 1 I.C.C.2d at 543.

The Defendants also argue that AEPCO's quote from Alstom excludes a number of important items that the ACE will require in order for its signals to function properly. First, Defendants argue that Alstom's final bid prices did not include any track circuits for interlockings and that AEPCO used only some of the components of the bid. In fact, the quotes did include those items and they were applied in the original spreadsheet. See AEPCO Op. electronic workpaper file "CTC System and Signals.xls."

The Defendants also attempt to double-count the engineering costs for signals by arguing that the Alstom quote does not include such services. AEPCO has included these engineering costs in its overall engineering costs described in Part III-F-10, supra. As a result, there is no need for any additional engineering services.

In light of the above, AEPCO submits that its quote from Alstom and its labor costs from Means are feasible and well-supported. However, as noted in the next section, Defendants' quote for materials and installation of specific items is very similar to AEPCO's Opening costs – once the double-count of engineering is eliminated. Therefore,

to minimize disputes on the majority of cost items, AEPCO has adopted Defendants' unit costs, but critiques Defendants' inclusion of unnecessary and unsupported items.

ii. Critique of Defendants' Signals Quote

Defendants rely on a quote from Southwest Signal Engineering, Inc. ("Southwest"). See Supp. Reply Workpapers Vol. 3, p. III.F-0561. The quote from Southwest reflects three cost elements for each item: material, labor and "other" (which covers engineering). The heading above the quote states "Request for estimates for Design, Material and Installation for the items listed below." Id. These figures include engineering costs varying from as low as one percent to as high as 27.5 percent. As discussed above, the engineering costs are already included in AEPCO's overall engineering costs, and so, at a minimum, the Southwest quote must be reduced to eliminate the double-count of engineering.

With engineering eliminated from the signal cost estimates, the cost of signals provided by Defendants is remarkably similar to AEPCO's. There is only about a $200,000 difference between the two quotes. See Table III-F-14, below. To reduce conflict in this area, AEPCO has adopted Defendants' quote from Southwest (excluding the double-counted engineering costs).

iii. Signal Control Points

(a) Components

While Defendants criticize AEPCO's cost estimates from Alstom Transportation Information Solutions, the total costs presented by AEPCO and Defendants (engineering removed) are very similar, as shown in Table III-F-15 below.

TABLE III-F-15
Cost Comparison Between AEPCO and Defendants

Description	AEPCO	Defendants
1 Track Automatic Signal	$50,369.58	$68,936.82
2 Track Automatic Signal	$84,991.33	$98,803.58
End of siding control point w/dual control power operated switch	$161,085.55	$240,180.17
Single crossover control point with dual control operated switches	$258,678.32	$351,838.79
Double crossover control point with dual control power operated switches	$522,217.48	$512,311.21
Total	$1,077,342.26	$1,272,070.57

While AEPCO believes that its costs are accurate, the quote from Southwest is more inclusive than that of Alstom. Since the total cost of Defendants' quote (excluding engineering) is similar to AEPCO's, AEPCO has used the Defendants' figures (excluding the costs for engineering).

iv. Control Point Protection

The Defendants maintain that snow melters and weather stations are required for each FED location and spring switch on the ACE's northern line from

Vaughn to Defiance. See Supp. Reply at III.F-151. The Defendants also provide weather stations for all of the ACE control points and FED locations on the entire system.

AEPCO agrees that snow melters and weather stations are necessary at certain points on the replicated BNSF line, which occasionally experiences ice and snow. However, AEPCO's engineering experts do not believe that weather stations are necessary at each ACE control point and FED location. In particular, AEPCO's engineering experts have placed weather stations only at the same points where Defendants' included snow melters – this is necessary because the weather station data prompts the operation of the snow melters when necessary.

The Defendants attempt to support the use of weather stations at other locations, where ice and snow are not a concern, by claiming that the weather stations are necessary to detect windy conditions. Defendants, however, provided no evidence that this area is so windy as to warrant such weather stations, nor do they show that they themselves use weather stations in this territory. Indeed, the only reference that Defendants make to such windy conditions is an unsupported suggestion that the Vaughn Yard would be subject to a constant 30 to 40 mph wind. See Supp. Reply at III.F-34. However, Defendants' claim is totally unfounded.

Climatological data shows that Vaughn, NM is no more windy than most places in America. Vaughn would not even be in the top 25 windiest cities. For example the average wind speed in Vaughn (9.12 mph) is lower than the average wind speed in

Washington, D.C. (9.36 mph). Moreover, if Defendants' claim was correct, Vaughn would be the windiest place in America. In fact, the windiest place in America is Mt. Washington, NH. Mt. Washington has an average wind speed of 35.3 mph and, it is the site of one of the strongest wind gusts ever recorded (234 mph) (as well as incurring annual snowfall of more than 250 inches). See Supp. Reb. Workpapers Vol. 3, pp. 00715-00731. In other words, it is highly unlikely that Vaughn is subject to a persistent 30 to 40 mph wind.

In addition, Defendants assign weather stations to every automatic (powered) turnout on the replicated BNSF mainline. Placement of weather stations at each turnout is excessive and unnecessary. Some of these turnouts are within 500 feet of another turnout, each of which would be equipped with its own weather station under Defendants' absurd scenario. AEPCO has adjusted the placement of weather stations so that none of the weather stations is closer than one mile to another weather station.

The Defendants used a quote for the installed price of snow melters and weather stations from Norfolk Southern. Because AEPCO did not include costs for these on Opening, AEPCO uses Defendants' cost for this equipment.

The Defendants also provided a price quote for the installation of insulated joints from Southwest Signal at $2,220 each. Using the Southwest Signal price quote is yet another attempt to inflate the ACE's construction costs. A signal contractor, such as

Southwest Signal, is much more expensive than a track contractor, who is also capable of installing the insulated joints.

On Opening, AEPCO included a price for the purchase and installation of insulated joint bars from the Windgate quote, which is more cost effective than using Southwest Signal. Defendants even acknowledge AEPCO's quote. Supp. Reply III.F-151 to 152. AEPCO's cost for supplying the insulated joint bars is $330.61 per pair or $165.31 each. Defendants argue that the use of the word "set" is confusing, but later concede that they believe "set" means a set of two or a pair, which is the definition that AEPCO intended. See Supp. Reply at III.F-151. Notwithstanding the fact that AEPCO's costs clearly cover materials and installation, Defendants still argue that AEPCO's costs are too low, but they fail to support this allegation with any proof that the materials used in the quote would be insufficient for the ACE. Moreover, Defendants do not suggest that the Southwest Signal bid covers anything different from AEPCO's bid. See Duke v. NS at 14; FMC at 117; Guidelines, 1 I.C.C.2d at 543. As such, AEPCO has continued to use its Opening costs for insulated joints. However, AEPCO has corrected its spreadsheet so that the labor costs are accurately reflected in AEPCO's final road property investment costs.

AEPCO agrees with Defendants' count of 2,232 insulated joints and has changed its spreadsheets accordingly.

v. Circuitry on Hand Thrown Switches

The Defendants argue that AEPCO does not address the costs of installing normal switch repeater circuits on any of the ACE's hand thrown switches. AEPCO agrees with Defendants that it did not include the cost of installing normal switch repeater circuits on its hand thrown switches and has therefore included these costs in its Supplemental Rebuttal restatement.

The Defendants also argue that AEPCO excluded electric locks on hand-thrown switches along the ACE mainline, and they claim that the FRA regulations require electric locks on turnouts to side tracks. AEPCO disagrees that electric locks are required on all hand thrown switches. FRA regulations provide that side tracks in CTC territory expressly designated for set-out of defective cars are not required to have electric locks. See Supp. Reb. Workpapers Vol. 3, p. 0732. In particular, the regulations states that:

> Each hand-operated switch in main track shall be locked either electrically or mechanically in normal position, except...(2) Where trains are not permitted to clear the main track....

See 49 C.F.R. § 236.410, reproduced at Supp. Reb. Workpapers Vol. 3, p. 0732. The basis for this rule is that while placing a bad order car on the set-out track, the operator leaves the train on the main line, and so the train never clears the main track. As the only hand-thrown switches on the main track in CTC territory are for set-out tracks, where a train cannot clear the main track, the installation of electric locks is not required.

The Defendants claim that this rule does not apply if any locomotive (including helper units or locomotives setting out bad-order cars) enters or leaves these tracks from the mainline. Supp. Reply at III.F-153. Defendants' reading of this rule is so narrow that few carriers would fall under the exception. The Board, however, has held that SARR's do fall under this exception and has excluded the costs of the electric lock. See, e.g., TMPA at 133. Defendants have not offered any rationale for why the Board should not follow its precedent in the instant case. As a result, AEPCO has not included the costs for electric locks.

vi. Power to Signals

The Defendants point out that AEPCO did not provide for power to signals. The Defendants also note that BNSF maintains a pole line from Gallup to Belen and for significant sections from Vaughn to Belen, and that UP maintains a pole line between El Paso and Cochise. Defendants propose to build a 3 phase power line for the entire length of the ACE system at a cost of $15.092 million. In past cases, defendant railroads have tried to saddle the SARR with the cost of installing pole lines but the Board has found that the construction of pole lines is no longer necessary to get power to the signals. See TMPA at 121 (holding that even where the incumbent railroad incurred the costs of providing utility poles, the SARR does not need to include the poles as new technology has rendered them obsolete).

In reviewing maps of the ACE route, AEPCO's engineers determined that large portions of the ACE that are already served by power lines. See Supp. Reb. electronic workpaper file "AEPCO Roads." Consequently, the ACE would not need to construct a $15.092 million, 3 phase power line to feed the limited current demands of the CTC system – instead a power drop would be sufficient. AEPCO also notes that, according to Defendants' Supp. Reply Workpapers Vol. 3, p. III.F-0389, {

}

Where power is not readily available, the ACE will provide a solar power supply. Power lines are rarely used to power signals at remote locations, due to the extremely high cost of building these lines. See, e.g., "Engineering: Strategic infrastructure planning," Railway Age, March 2004, at 34, reproduced at Supp. Reb. Workpapers Vol. 3, p. 00734 (noting that the Norfolk Southern is replacing 47 miles of pole line with data radio). More commonly, solar power is being used to power signals that are not located near power lines. In fact, photographs taken along the lines replicated by the ACE show that both BNSF and UP use solar-powered turnouts and signals where power is not available, rather than installing the extremely costly power lines that they have used in their Supplemental Reply. See Supp. Reb. Workpapers Vol. 3, pp. 00736-00741, which show photographs of BNSF and UP solar-powered signals. As a least-cost most-efficient railroad, there is no reason why the ACE should be forced to install costly

power lines when solar power is available. Accordingly, AEPCO provides for solar power in locations where power lines are not currently available.

AEPCO agrees that transformers and power drops are necessary and has accepted the costs submitted by Defendants' of $2,140.19 for each connection. Although the costs for the solar power supply are significantly less than the cost for the power drop (Supp. Reb. Workpapers Vol. 3, pp. 00743-00744), AEPCO has conservatively used the cost of the power drops for all power connections since it is not known how many of the power connections will be solar powered.

The Defendants have also proposed the use of generators as backup power supplies for the CTC system where power is required. Unfortunately, they have also proposed the use of generators where back-up power is not required (such as on FEDs). AEPCO's engineering experts have removed 25 generators from areas not required to have back-up power by the FRA. Although AEPCO's engineering experts believe the costs presented for the generators are greatly inflated, they have accepted Defendants' costs to minimize areas of difference.

vii. <u>Dispatch Center</u>

The Defendants argue that the quote AEPCO received from Alstom for its dispatching center does not cover the hardware portion of the system or the necessary equipment.

Defendants list four items that total $3.8 million. Those items include:

Dispatch Desk	$115,497
Core Office Unit	$191,995
Mobile Communications Package	$1,943,951
Base Communications Package	$1,511,962

A close look at the origin of these prices (Supp. Reply Workpapers Vol. 3, p. III.F-0576) shows that they come from an email from Paul Bivens of Norfolk Southern Railroad, answering the request "could you break this down as cost for 1 control point, 1 repeater and for material, labor and other cost." Mr. Bivens then provides "signal costs for typical dispatch office." However, some of the costs provided are not for the dispatch office.

The first item on Mr. Bivens' list is $15,000 each to add MCP data radios to existing field locations. Although these items were included in the quotes procured by AEPCO, they were not in the quotes form Southwest Signal; therefore these items have been included in the signal costs.

The second item on Mr. Bivens' list is $45,000 each for repeater, BCP data radio at existing microwave tower – $1,511,962. The cost for these items was included in the costs provided for the microwave tower equipment. See Supp. Reb. electronic workpaper file "AEPCO Microwave and LMR Backbone Network Cost supprebut.xls."

As one of the four items is accounted for in another section and another is really part of the installed CTC System and has nothing to do with the dispatch desk, Defendants are left with the dispatch desk and the core office unit, a total of $307,492, which is less than the Alstom quote of $410,000 noted by Defendants. AEPCO has used BNSF/UP's quote in its Supplemental Rebuttal.

Table III-F-16 below summarizes the differences between AEPCO's signals costs and those of Defendants.

TABLE III-F-16
Comparison of AEPCO and Defendants Estimates for Signal Costs
(Millions)

Item	AEPCO Opening	Defendants Supp. Reply	Difference	AEPCO Supp. Reb.	Difference with Defendants Supp. Reply
CTC	39.332	67.586	28.254	54.710	12.876
Dark Territory Signals	0.068	0.250	0.182	0.216	0.034
Power to Signals	0.000	15.092	15.092	2.729	12.363
Dispatch Center	0.410	3.763	3.353	0.410	3.353
FED's	2.584	1.711	(0.873)	1.689	0.022
Crossing Signals	0.068	1.058	0.990	0.068	0.990
Slide Fence	0.000	0.798	0.798	0.739	0.059
Snow Melters	0.000	0.531	0.531	0.531	0.000
Weather Stations	0.000	2.214	2.214	1.052	1.162
Total	42.462	93.003	50.541	62.144	30.859

b. Detectors

AEPCO notes that the cost of failed equipment detectors (FED's) obtained by the Defendants is less than that obtained by AEPCO. Therefore, AEPCO accepts Defendants' price for detectors installed. Also, to avoid disputes, AEPCO has accepted Defendants' count of 25 detectors instead of the 24 provided by AEPCO on Opening.

The Defendants argue that AEPCO has calculated costs for slide fences but failed to include these costs in the ACE's road property investment costs. Defendants' experts accept AEPCO's calculation of 3,696 feet, but provide for a more recent quote

from Southwest Signal for the installed cost of $215.88 per linear foot. AEPCO has provided for a cost of $200 per foot, which was taken from the FMC decision and indexed to 1Q01. Defendants fail to address why AEPCO's evidence is inadequate or why their quote should be accepted. As a result, AEPCO continues to use costs from the FMC case. AEPCO has corrected the computation omission discussed above.

The Defendants also include generators at all of the FED's. AEPCO's engineering experts disagree with Defendants' proposal. The FRA does not require backup generators at FED locations and the temporary loss of power will not affect the ACE's operations. Temporary loss of power to an FED will not stop a train and therefore will not affect operations. In an instance where there is temporary loss of power, the engineer would radio to the dispatcher that he failed to receive a communication from the FED and would then proceed to the next FED. Therefore, AEPCO has not included the cost of generators.

i. Crossing Signals

The Defendants indicated that with the exception of the crossings on the Defiance Subdivision and one small segment of connecting track for the Baca Branch serving Lee Ranch Mine, AEPCO has not included crossing signals. This exclusion is justified because there is no evidence (short of bare assertions from Defendants) that Defendants or their predecessors paid for the crossings in whole or in part.

The Defendants claim that the Engineering Reports indicate that there were crossings at the time of the original construction of the lines. See Supp. Reply at III.F-158. This is inaccurate. UP's track charts show that many of the lines at issue were constructed between 1880 and 1902. See AEPCO Op. Workpapers Vol. 7, pp. 03498-526VV. As these lines were constructed prior to the creation of the automobile highway, this assertion is manifestly wrong insofar as vehicular crossings are concerned. The BNSF lines were built around the same time. See Supp. Reb. Workpapers Vol. 3, pp. 00745-00748.

The Defendants incorrectly assert that because the crossings were discussed in the ICC Engineering Reports, sufficient proof exists that their predecessors paid for part of the signal costs. See Supp. Reply at III.F-158 to 159. The ICC Engineering Reports, however, do not assist in determining the crossing costs actually borne by Defendants. As the ICC Engineering Reports are designed to determine the value of the railroad property and not necessarily the price paid by the railroad, these reports allow the railroad to include the cost of construction of crossings even if the railroad's contribution to the construction cost was minimal or non-existent. See Texas Midland Railroad, 75 I.C.C. 1, 115 (1918). Therefore, the ICC Engineering Reports provide no support for Defendants' claim that they paid a portion of the costs of the crossings. See also Part III-F-8-3.

The Defendants also claim that they have been responsible for paying a portion (generally 10%) of the crossing signals. See Supp. Reply at III.F-158. The Defendants, however, fail to support this claim with respect to any of the crossing signals on the lines being replicated. As a result, there is no evidence to support Defendants' claim that they paid any portion of the cost of these crossings.

Because Defendants provide no support for their claim that they (or their predecessors) paid for the crossings and because the ICC Engineering Reports do not provide this type of information, the Board should adhere to its precedent that the later entrant pay for the improvement. See Wisconsin at 92; West Texas Utilities at 672, 709. Under this precedent, Defendants would not have incurred any expense for these signals. Therefore, the inclusion of these cost would be a barrier to entry, in violation of the principles of the Coal Rate Guidelines.

In the event that the Board does include such costs, it should use AEPCO's costs. See Supp. Reply at III.F-159. The Defendants argue that they have used their Southwest Signals quote to be consistent, but they never indicate why such consistency is necessary. They also argue that the Southwest Signal quote is necessary because AEPCO's costs for the signals included only one type of crossing signal, as only one of the crossings included in AEPCO's Supplemental Rebuttal requires a signal. Defendants' claim is without merit, because the crossing signal included in this quote contemplates a single-track signal with gates that can be used on all single-track lines. In instances

where there are double tracks (or triple tracks), the Board could conservatively double (or triple) the cost of the single-line signal. BNSF/UP costs for double-track crossing signals with arms are only slightly more expensive than their single-track crossing signals with arms ($195,955 for single track compared to $204,769 for double track). See Supp. Reply Workpapers Vol. 3, p. III.F.-0561. Based on Defendants' estimates for the signal crossings, doubling the costs of AEPCO's single arm crossing signal would be quite conservative.

On Opening, AEPCO included a unit cost for crossing signals of $83,593.00. See AEPCO Op. electronic workpaper file "III-F TRACK QTY.XLS." Without the regard to the question of whether the inclusion of such costs is a barrier to entry, AEPCO submits that its quote for the crossing gate and signal is supported and unchallenged.

AEPCO does note that if the Board finds that the Defendants (or their predecessors) paid for a portion of the signal crossings, ten percent is a reasonable amount.

c. Communications System

On Opening, AEPCO included $6.8 million for the ACE's microwave communications system. See AEPCO Op. at III-F-63 to 64. AEPCO's microwave system is based on a 6 GHz microwave backbone network spanning 26 sites along the ACE route and an 800 MHz Land Mobile Radio ("LMR") that provides communication

access via mobile and portable radios. The costs for the ACE microwave system are based upon publicly available unit cost information from the State of Colorado Department of Transportation ("CDOT").

Defendants included $35.83 million for the ACE's communications system, made up of $15.52 million for the microwave system and $20.30 million for other communications investment. Defendants developed a digital wireless communications system for purposes of this proceeding and based the cost of the system on Defendants' data for the existing communications system on the line segments being replicated by the ACE. See Supp. Reply at III.F-176. The differences between AEPCO's Opening and Defendants' Supplemental Reply in these areas are discussed below.

The Defendants broadly criticize AEPCO's microwave communications system as "simply an amalgamation of information off the Internet that has no relevance to railroads and is completely lacking in design." Id. at III.F-160. Defendants go on to argue that AEPCO's microwave communications system is unable to meet the standards for railroad communications, and lacks any physical architecture or system engineering design documentation. Id. at 161. Beyond this largely unsupported and general criticism, Defendants level several specific criticisms of AEPCO's microwave communication system, including contentions that the system does not provide sufficient reliability and that the tower spacing and height along the ACE right-of-way are incorrect. Id. Defendants use these unsupported and unfounded criticisms as a precursor to their

development of an alternative microwave communications system that costs doubles the cost proposed by AEPCO.

Preliminarily, AEPCO notes that Defendants' general criticism of its microwave communications system is unsupported opinion rather than a critical review of AEPCO's Opening evidence. Defendants' specific criticisms are also unfounded. More importantly, as demonstrated infra, Defendants have not shown that AEPCO's microwave system is infeasible and therefore AEPCO's system should be used. Finally, AEPCO's communications expert, John Mullan, demonstrates that Defendants' alternative microwave communications system is based on inaccurate information and overstated costs.

i. Defendants' Criticism of AEPCO's Microwave Communications System is Flawed

First, Defendants' criticism that AEPCO's microwave system is an amalgamation of Internet information with no relevance to railroads is unfounded and highlights Defendants' failure to grasp the fundamental concepts that underlie the ACE's microwave communications backbone network and LMR system design. The high-level ACE system design, predicated on an all-wireless, all digital platform, complies with the FRA's strategy for Intelligent Railroad Systems. As noted by Steven R. Ditmeyer, the

Director of the Office of Research and Development for the FRA[24] and supported in Chapter 2 of the FRA's Five Year Strategic Plan:[25]

> A theme that cuts across virtually all parts of the Federal Railroad Administration's (FRA's) R&D program is the use of sensors, computers, and digital communications to collect, process, and disseminate information to improve the safety, security, and operational effectiveness of railroads. Intelligent Transportation Systems (ITS) for highways and mass transit are based on these technologies, as are the new air traffic control and maritime vessel tracking systems. Military services, major parcel delivery companies, pipeline operators, and police, fire, and ambulance services also use these technologies. The Federal Railroad Administration and the railroad industry are working on the development of Intelligent Railroad Systems that would incorporate the new sensor, computer, and digital communications technologies into train control, braking systems, grade crossings, and defect detection, and into planning and scheduling systems as well. The FRA believes that these technologies will prevent collisions and overspeed accidents, prevent highjackings and runaways, increase capacity and asset utilization, increase reliability, improve service to customers, improve energy efficiency and emissions, increase economic viability and profits, and enable railroads to measure and control costs and to "manage the unexpected." Intelligent Railroad Systems will enable railroads to respond with flexibility and agility to rapid changes in the transportation marketplace.

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[24] See "A Vision for the Future: Intelligent Railroad Systems" by Steven R. Ditmeyer, Director of Research and Development, FRA, Washington, DC, dated November 19, 2002, reproduced in Supp. Reb. Workpapers Vol. 3, pp. 00750-762.

[25] See Supp. Reb. Workpapers Vol. 3, pp. 00766-00922. The entire FRA report, titled "Five Year Strategic Plan for Railroad Research, Development and Demonstrations," dated March 2002, is available at FRA's Internet site.

The FRA framework for Intelligent Railroad Systems is premised on the same technologies used for Intelligent Transportation Systems. Therefore, the microwave system developed by AEPCO is compatible with FRA standards and represents a "cutting-edge" strategy for reliable and efficient 21st-Century railroad communications.

AEPCO also demonstrated on Opening that the elements that comprise the backbone of the ACE network are fundamentally the same as the elements that make up Defendants' actual networks. These network elements include: microwave towers; microwave tower shed and fence enclosures; microwave base stations; microwave antennas; a microwave network management system; LMR base stations; LMR antennae; and multiplexor equipment. AEPCO's network is based on the same components specified by Defendants. In other words, these are the same items listed on one of the documents used by Defendants to support their microwave costs. See Supp. Reply Workpapers Vol. 3, p. III.F-0666.

The Defendants also argue that "[t]he ACE must replicate a railroad communications system that meets the standards for a Class 1 railroad." Supp. Reply at III.F-161. As explained above, the fundamentals of the ACE's system are the same as those comprising Defendants' existing communication systems and this type of system is supported by the FRA.

AEPCO utilized actual investment costs obtained from various public sources. AEPCO also utilized network components of an all-wireless, all-digital, ITS

commissioned by the CDOT. Both of these sources support AEPCO's calculations for the microwave system it proposed on Opening. This is in stark contrast to the unit costs for Defendants' proposed ACE communications system, which are suspect because they are not adequately supported. For example, the Supplemental Reply workpapers provided by Defendants provided limited support for the various costs they propose because the materials do not provide adequate detail of the specific component elements – examples of such shortcomings are discussed infra. As a result, Defendants' workpapers do not fully support the cost of Defendants' proposal.

Second, Defendants' claim that the ACE's microwave communications system is not relevant to railroads rings especially hollow because Defendants ultimately accept AEPCO's system design and propose a microwave network based on this same design. Thus, it is not the communications system design that Defendants dislike but the cost of the system proposed by AEPCO.

Third, Defendants' criticism that the ACE microwave system is lacking in any physical architecture or system engineering design documentation is patently wrong. In fact, AEPCO is the only party that produced specific evidence on system architecture. For example, on Opening, AEPCO described the inter-connection of OTRR network elements. See AEPCO Op. at III-F-63 to 64. In addition, AEPCO produced the following documentation in support of its microwave backbone system: (1) ACE's

network topology diagram (with frequency coverage) for the entire system;[26] (2) a detailed network element list for the ACE;[27] (3) ACE network element price quotes;[28] (4) ACE network element specifications;[29] and (5) points of contact for verification of all ACE system costs.[30] In addition, in response to Defendants' workpaper requests, AEPCO produced references to detailed microwave engineering guidelines.[31] Thus, AEPCO fully documented the components of the ACE's microwave communications system. By comparison, Defendants did not provide any physical architecture or system engineering design documentation for their proposed microwave communications system.

Fourth, Defendants contend that AEPCO's microwave communications system does not provide sufficient reliability. According to Defendants, AEPCO's system is unreliable for two reasons: (1) UHF bands utilized by the ACE provide insufficient coverage and are susceptible to interference by natural phenomenon; and (2)

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[26] See AEPCO Op. Exhibit III-F-12. The 25 mile radius means that the distance between LMR antennae could be upwards of 40 to 45 miles.

[27] See AEPCO Op. electronic workpaper file "ACE Microwave Network Costs.xls."

[28] See AEPCO Op. Workpapers Vol. 10, pp. 4893-4935.

[29] Id.

[30] Id.

[31] See AEPCO Op. Supp. Workpapers Vol. 11, pp. 5265-5267.

UHF bands are incompatible with other railroad systems. See Supp. Reply at III.F-162 to 163. Each of Defendants' contentions is without merit.

In the ACE Network Topology diagram, LMR base stations and antennae were intentionally co-located with the microwave backbone network site (tower) locations. Average, "line of sight," spacing between network site (tower) locations from system start in Cochise, AZ to system end in Defiance, NM is 25 miles. See AEPCO Op. electronic workpaper file "ACE Microwave Network Costs.xls." Because actual transmission ranges can be maximized to a radius of 50 miles or more by increasing transmitter power, increasing receiver sensitivity and increasing antenna height, effective LMR signal propagation enabled by omni-directional LMR antennae has a coverage radius of 30 miles from origin. The ACE network topology conservatively assumes an LMR signal propagation coverage radius of 25 miles. See AEPCO Op. Exhibit III-F-12. The 25-mile radius means that the distance between LMR antennae could be upwards of 40 to 45 miles. When the area of LMR signal propagation coverage is overlaid onto the microwave backbone network tower locations, signal overlap is maintained for the entire system. Furthermore, during construction of the tower sites, the ACE will perform feasibility and frequency sweep studies to identify any "in-band" frequency interference.[32]

[32] Where necessary, the ACE will obtain the appropriate FCC or state licence to address such in-band interference.

The Defendants offered no evidence, rationale or support as to why this topology would fail to provide anything less than adequate coverage.

The Defendants also never demonstrated how UHF susceptibility to interference by natural phenomenon would prevent ACE's 800 MHz LMR network from providing communication access via mobile and portable radios for operating crews, supervisory personnel, and track maintenance personnel who need to communicate with the ACE's operating headquarters and central dispatching facility at Vaughn, NM. It is interesting to note that in the support information provided by Defendants for their proposed ACE communications system, the following systems are premised on UHF bands: the data radios and base stations used to facilitate communication to control points,[33] LOCOTROL, and End-of-Train devices.[34]

The Defendants also state that VHF communications are preferred for LMR systems but never demonstrate how VHF LMR systems overcome VHF susceptibility to interference by natural phenomenon. VHF bands can also be subject to propagation distortions due to sunspot cycles and aurora borealis, which create ionospheric ionization that can affect propagation in the lower part of the VHF spectrum.

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[33] See Supp. Reply Workpapers Vol. 3, p. III.F-0576; see also, Supp. Reb. Workpapers Vol. 3, pp. 00763-00765, containing MCP and BCP Equipment Specifications.

[34] See Supp. Reply Workpapers Vol. 3, p. III.F-0626.

Contrary to Defendants' view that UHF bands are unacceptable, UHF LMR communications are completely endorsed by both the FRA and the FCC. The following excerpt from the 2002 FRA Five Year Strategic Plan makes this clear:

> Following are descriptions of the components of Intelligent Railroad Systems...Digital data link communications networks provide the means for moving information to and from trains, maintenance-of-way equipment, switches and wayside detectors, control centers, yards, intermodal terminals, passenger stations, maintenance facilities, operating data systems, and customers. Data link communications will replace or supplement many of today's routine voice communications with non-voice digital messages and will effectively increase the capacity of available communications circuits and frequencies. Data link communications will utilize radio frequencies to communicate to and from mobile assets, and between locomotives in a train consist, and can use a variety of transmission media (owned either by railroads or commercial telecommunications carriers) to communicate between fixed facilities. These media include microwave radio, fiber optic cable, buried copper cable, cellular telephones, communications satellites, and even traditional pole lines. With data link communications, the information is digitally coded and messages can be discretely addressed to individual or multiple recipients. The U.S. Government, through the Federal Communications Commission, has assigned to the railroad industry 182 frequencies in the VHF band (160 MHz) and 6 pairs of frequencies in the UHF band (900 MHz). The UHF frequencies are being used for digital communications; and some railroads have converted some of their assigned VHF frequencies from analog to digital communications. The conversion is expected to accelerate during the coming decade.

See Supp. Reb. Workpapers Vol. 3, pp. 00793-00794. The FRA not only endorses an all-wireless, all-digital platform, it states that the FCC has allocated frequencies in both the

VHF and UHF bands for digital communications. It also states that it expects the railroad industry to migrate from VHF to UHF frequencies in the coming decade. The ACE should be prepared to accept this change in technology.

UHF bands are also the preferred choice for public safety infrastructure. It is common knowledge that, under Part 90 of the FCC rules, specific UHF bands of operation have been classified as part of the public service safety pool. The FCC also established the National Frequency Coordination Committee to address operational and technical parameters for public safety systems operating in the 700 MHz band. The FCC has also developed national and regional plans for the 700 and 800 MHz bands. The UHF bands utilized by AEPCO provide sufficient coverage for the ACE and are no more susceptible to interference by natural phenomenon than any other LMR system, including the one proffered by the Defendants in this proceeding.

The Defendants also argue that:

> Because the railroad industry relies on VHF, railroads have equipped their locomotives and control centers with VHF equipment. Thus, an individual railroad that will be interchanging with other railroads or using trackage rights over other railroads cannot unilaterally switch to UHF because UHF is incompatible with other railroad's systems and the railroad's locomotive must be able to communicate with other Defendants' dispatchers and yardmasters using reliable radio equipment with instant response.

Supp. Reply at III.F-164. However, a review of FCC license information for both Defendants shows that the railroad channels have been designated in UHF and that the

Defendants do employ these channels for railroad operations. See Supp. Reb. Workpapers Vol. 3, pp. 00936-00937. Therefore, Defendants' position on UHF incompatibility is inconsistent with their own actual practice.

However, to minimize disputes and because there is no cost difference, AEPCO has agreed to a VHF system. This is not a significant departure from AEPCO's Opening communications system evidence. In particular, the communications base station that AEPCO selected on Opening can be configured for either VHF or UHF operation for the same unit price. See AEPCO Op. Workpapers Vol. 10, p. 4929. The Defendants should have been aware of this as their workpapers identify this same equipment as VHF or UHF capable and actually request unit price information. See Supp. Reply Workpapers Vol. 3, p. III.F-0695. AEPCO assumed a unit cost of $12,000 for LMR base stations which included LMR communications (via fixed radios) with Automatic Equipment Identifier and Defective Equipment Detector systems. The technological decision to implement an LMR system with either VHF or UHF does not influence the system cost.

Fifth, Defendants state that the ACE microwave network does not take into account the proper tower spacing and tower height for the ACE's route. Defendants' assertions in this regard are flawed. On Opening, AEPCO specified the city/town and spacing (in miles) between microwave tower locations. See AEPCO Op. electronic

workpaper file "ACE Microwave Network Cost.xls." Given proper tower height and line of sight, a six GHz microwave base station has a frequency range of up to 60 miles.

The Defendants offer no evidence to suggest that the ACE microwave network, with its specified tower locations and heights, would fail to provide adequate coverage, other than a general discussion of average distances in tower location mileage and height. Defendants offer no support as to how these averages impede the working capabilities of ACE's microwave network.

For example, Defendants argue that "Operating from a 150-foot tower, a digital microwave signal as proposed by AEPCO will travel 17 miles before going into the ground." Supp. Reply at III.F-165. Defendants offer no support for this statement. It can be assumed that this statement was based on a theoretical calculation for determining distance to the horizon on flat land given a certain height, i.e., the example height of a microwave tower, which is 150 feet. This approach completely ignores the physics of signal propagation which are influenced by transmit signal strength, transmit elevation, transmit antennae angle, refraction (Fresnel Zone), receiver antennae angle, receiver elevation and receiver signal strength. As such, Defendants' blanket assertions are unsupported and meaningless.

The Defendants further state that in order to achieve the reliability demanded by the railroad industry the design standard for this type of system requires that the signals meet at 100 feet ground clearance. Id. As stated on Opening, the ACE

microwave backbone network site tower heights were based on tower sizes provided by UP in discovery. See Supp. Reb. electronic workpaper file "AEPCO Sites.xls." Where tower heights were not provided (BNSF tower locations), tower height was over-engineered at 200 feet. See AEPCO Op. at III-F-64.

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See Supp. Reb. Workpapers Vol. 3, pp. 00941-942 (from electronic workpaper file "AEPCO Sites.xls" provided by UP in discovery). Obviously, communications between these two currently operational towers does not achieve Defendants' stated requirement for reliability. This would appear to be a contradiction of principle and practice.[35]

The Defendants believe that the difference between the tower spacing of their proposed system (which is not based on a network design and therefore relies on a theoretical average), and the tower spacing of the AEPCO system (which is based on a network design[36] incorporating BNSF and UP data for the lines being replicated[37]), discredits the operational capability of AEPCO's proposed ACE microwave network.

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[35] In reality, of course, adjacent towers may be located on the tops of hills which effectively increases their height, thus enabling the towers themselves to be shorter. Defendants conveniently overlook this fact in their theoretical calculations.

[36] See AEPCO Op. Exhibit III-F-12. Again, the 25-mile radius means that the distance between LMR antennae could be upwards of 40 to 45 miles.

[37] See Supp. Reb. Workpapers Vol. 3, pp. 00941-00942.

The Defendants are wrong. The average tower spacing of Defendants' proposed system is based on an arbitrary and unsupported requirement of 24.56 miles. When the ACE's total route miles (786.01) are divided by this average tower spacing (24.56 miles), a requirement for 32 towers results. As noted previously, the AEPCO system is based on a network design. The average, "line of sight," spacing between network site (tower) locations from system start in Cochise, AZ to system end in Defiance, NM is 25 miles. See AEPCO Op. electronic workpaper file "ACE Microwave Network Costs.xls." Thus, the AEPCO system only requires 26 network site (tower) locations.

The Defendants also criticize AEPCO's design of the ACE microwave backbone network for its, "simplifying methodology" of utilizing an "average line of sight based on irrelevant information." Supp. Reply at III.F-165. However, Defendants used this exact approach in designing their own system. See Supp. Reply at III.F-167 ("In creating a hypothetical railroad microwave system, some reliance on an average system is necessary to avoid the monumental task of calculating the optimal placement of each tower site using the proper latitude and longitude for each site."). Defendants cannot have it both ways, i.e., criticize AEPCO for using averages and yet base their system on averages as well.

In summary, Defendants have not shown AEPCO's microwave system to be infeasible. Therefore, the Board should accept AEPCO's system as the least-cost, feasible proposal. See Duke/NS at 14; FMC at 117; Guidelines, 1 I.C.C.2d at 543.

ii. Defendants' Proposed Microwave System is Not Adequately Documented and the Costs For Network Elements are Overstated

The Defendants claim that because AEPCO did not provide documents showing the physical architecture to support its microwave communications system, they were forced to independently develop a digital wireless system for the ACE based on actual BNSF and UP data for the ACE line segments. As discussed previously, AEPCO has shown that it provided sufficient architectural and engineering data to support its system. Moreover, Defendants' system is flawed and inadequately supported.

The Defendants' proposed architecture is not based on a documented physical architecture or system engineering design. The architecture makes no reference whatsoever to specifications or railroad standards. Defendants' proposed system is flawed because it is based on inaccurate assumptions, inadequately supported costs, and costs that are significantly higher than market levels.

First, Defendants concluded that the ACE's system-average tower spacing should be 24.56 miles and that the average tower height should be 150 feet. Defendants offer no support to show these specifications are representative of the existing microwave sites along the ACE route. In fact, Defendants' assumptions and resulting calculations bear no resemblance to the existing operating environment. For example, using Defendants' own data, average tower height is 85 feet for all tower locations in Arizona,

99 feet for all tower locations in New Mexico, and 132 feet for all Texas tower locations. See Supp. Reb. electronic workpaper file "AEPCO Sites.xls."

Second, there is no requirement that AEPCO accept the network element costs provided by Defendants in discovery (and relied on, in part, by Defendants in their Reply), if AEPCO can demonstrate lower, market-based network element costs, which it has done.

Third, the Supplemental Reply workpapers provided by Defendants are inadequate and do not support their inflated costs. Moreover, Defendants do not adequately reference the workpapers that support their calculations. As the Board noted in FMC, it should not be necessary to search through reams of un-referenced materials in order to ascertain whether a party's position has support. FMC at 25. As a result, AEPCO was forced to search endlessly through Defendants' hardcopy workpapers in order to identify any documents that support their evidence.

AEPCO's journey through Defendants' workpapers uncovered some highly suspect sources for unit costs. The following example demonstrates the inadequacy of Defendants's support for unit costs. As support for the average unit cost of $45,000 for a BCP data radio, Defendants submit partial text from a string of e-mails between unknown parties. See Supp. Reply Workpapers Vol. 3, p. III.F-0576. The Internet domain source of the e-mail, "nscorp.com," actually refers to Norfolk Southern Corporation. The Defendants apparently characterize this strand of text as a "quote." This text document

(and others) of unknown authorship fall well short of a quote or company proposal to support BCP data radios units cost and should be rejected.

The Defendants arrive at a total investment cost of $15.52 million for their proposed system by submitting untitled documents of unknown origin that show unit prices for BNSF microwave tower sites,[38] and in succeeding pages, identify further unsupported unit prices for UP microwave tower sites.[39] As shown in Table III-F-17 below, the unit prices for BNSF and UP tower sites are summed and averaged to arrive at the proposed microwave system investment cost. Even a cursory review of Defendants' costs demonstrates that there is wide variance in the cost stated, which impacts unit cost averages. Aside from the fact that these amounts do not match, because the author(s) of these documents and sources for these unit prices are unknown, AEPCO is not able to effectively analyze or critique the Defendants' unit costs.

[38] See Supp. Reply Workpapers Vol.3, p. III.F-0666.

[39] See Supp. Reply Workpapers Vol. 3, pp. III.F-0667-0674.

Table III-F-17
Comparison Of BNSF And UP Microwave Network Unit Costs[1]

Network Component	UP Costs	BNSF Costs	BNSF Cost As A Percentage of UP Cost	Average Of Proposed Costs
(1)	(2)	(3)	(4)	(5)
1. Digital Microwave Radios	$50,000	$77,000	154%	$63,500
2. Antenna Material				
a. Microwave	$5,000	$10,439	209%	$7,719
b. LMR	$1,200	$3,200	209%	$2,200
3. Multiplexors	$750	$25,000	3333%	$12,875

[1] See Supp. Reply Workpapers Vol. 3, pp. III.F-0666-0674.

Further, these averages are grossly overstated. As shown in Table III-F-18 below, Defendants' average costs for ordinary network equipment in no way reflect market conditions.

Table III-F-18
Comparison Of AEPCO And Defendants' Microwave Network Costs

Network Component (1)	AEPCO Costs [1] (2)	Defendants Average Costs (3)	Defendants' Cost As A Percentage of AEPCO Cost (4)
1. Digital Microwave Radios	$45,000	$63,500	141%
2. Antenna Material			
a. Microwave	$2,200	$7,719	359%
b. LMR	$600	$2,220	370%
3. Multiplexors	$6,700	$12,875	192%

1 See AEPCO Op. electronic workpaper File "ACE Microwave Network Costs.xls." and AEPCO Op. Workpapers Vol. 10, pp. 4893-4935.

As shown above, the Defendants' inadequately supported unit costs generated a significant overstatement in the ACE's microwave communications system cost. Also, the microwave communications system proposed by Defendants is based on a system design that is flawed.

iii. Other Communications Costs

On Reply, Defendants include $20.31 million for a host of additional costs for the ACE's communications system. Most of these costs are unnecessary or are already addressed in other sections.

(a) Dispatching System and Voice Recording System

The Defendants have argued that AEPCO has not included a Dispatch Voice Recorder System for the ACE. Supp. Reply at III.F-168 to 69. Defendants fail to demonstrate why such equipment is required. Therefore, AEPCO has not included a Dispatch Voice Recorder System for the ACE.

The Defendants also assert that the ACE should have each dispatch district or "desk" use a different two-way radio frequency in order to reduce interference. However, the ACE utilizes a Land Mobile Radio (LMR) system that facilitates two-way radio communications to enable all rail employees to perform their duties safely and properly. The LMR system allows many channels to be assigned to various rail operating functions so that separation between functions is maintained, ensuring safety of personnel and proper handling of loaded and empty cars.

(b) Locomotive Control

As Defendants state, a train must not lose the radio link between the lead and remote unit when using DP equipment. Supp. Reply at III.F-170. AEPCO agrees that DP repeaters are necessary to prevent long-term breaks in the radio link between the lead and remote unit. Defendants, however, fail to show that the ACE's DP equipment would lose its radio link at any point on the ACE route, which generally lies on the high plains where sight lines are not a problem. Defendants merely state that "Mr. Walton estimated locations along the route where loss of DP may occur. . . ." Supp. Reply at

III.F-170 (emphasis added). Defendants have not offered any additional materials as to how their witness Walton conducted his estimation or even why the signal "may" be lost. Mr. Walton merely points out that in his opinion, which is not supported by any theoretical or actual support, the signals may be lost in the trainway at El Paso and at two (unspecified) points along the Defiance Subdivision. While there is a submerged trainway at El Paso, there is no evidence that the signal would be lost or even that the signals would not maintain "line of sight." Defendants fail to cite any workpapers or other materials that indicate where these points may be or why the signal may be lost at these points. Given Defendants' failure to show any inadequacies in the DP system, AEPCO has not included any costs for DP Repeaters.

(c) Data Radio Tower Equipment for FEDs and AEIs

The Defendants included $3.85 million for data radio tower equipment for FED's and AEI's. These components are part of the ACE's FED costs. See AEPCO Op. Workpapers Vol. 10, p. 04889. Communications between AEI systems and the dispatch center at Vaughn are facilitated through telephone lines and the costs are included in the ACE's annual operating expenses. See Supp. Reb. electronic workpaper file "ACE - Operating Budget.xls."

The Defendants also include $13.1 million for data radio tower and equipment control points. Defendants' costs are drastically overstated. They are particularly suspect insofar as Defendants have not cited any sources for their costs,

including data radio tower components concerning control points ($97,104), FEDs-single ($96,083), FEDs-double ($121,368), AEIs-single ($149,804) and AEIs-double ($175,470).[40] Typically, these components would include a VHF or UHF radio, antennae and a ten to 25 foot antennae mounting pole. Defendants list this type of equipment in their break-out of UP microwave site components as CTC MDS Radio ($4,000) and CTC Antenna ($500).[41] From the same workpaper, if these components were mounted on a 200 foot guyed tower ($60,000), which is completely unnecessary, the resulting investment cost would be $64,500, which is substantially less than the stated costs. As noted previously, since the author of these documents and sources for these unit prices are unknown, AEPCO is not able to effectively analyze or critique Defendants' unit costs. However, AEPCO accepts the costs for a data radio ($4,000) and antennae ($500) to enable communications to the ACE's 198 control points.

(d) PBX Telephone Exchanges and Teleconference System

The Defendants have added unnecessary complications and unreasonable costs to the ACE's telephone system. Without showing why the telephone system presented by AEPCO on Opening was insufficient or infeasible, Defendants propose their own high-priced telephone system that adds significant cost, but provides little in the way of benefits for a system such as the ACE.

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[40] See Supp. Reply at III.F-176.

[41] See Supp. Reply Workpapers Vol.3, p. III.F-0673.

The Defendants assert that the telephone system must "rid[e] the digital microwave radio communications system." Supp. Reb. at III.F-172. Defendants cite only one reason to incorporate the telephone system to the microwave system – the ability to use a teleconferencing system. A teleconference system may be justified for a larger railroad that spans many states has a large number of trainmen, supervisors and administrative people in the field, but the same is not true for the ACE. In the real world, many regional railroads do not use this costly system, as it simply is not a cost-effective method of doing business for a geographically smaller railroad. If ACE's T&E crews need to communicate with the ACE's headquarters or other locations, they can use the public telephone system tied into a speaker phone system provided at the headquarters. See AEPCO Op. at III-D-52 to 53. Because the need for teleconferencing is rare, such a system should not be required of a least-cost, most-efficient SARR such as the ACE. There is simply no reason to tie the telephone connect to the microwave system.

In light of the above, AEPCO has continued to use its Opening telephone-related costs from Part III-D-3-d. However, AEPCO has added the cost of nine additional telephone lines for the AEI readers in its IT operating costs in Part III-D-3-d.

d. Summary of Communications Costs

The Defendants' criticisms of the ACE's microwave communications system are unfounded, arbitrary and without merit. The communications system developed by Defendants is flawed, and includes unnecessary and inflated costs. The

ACE's communications system proposed by AEPCO is fully functional, consistent with FRA requirements and standards for railroad communications, and constitutes the best evidence of a least-cost, yet fully feasible communications system for the ACE. On Supplemental Rebuttal, AEPCO continues to include $6.8 million for the ACE's microwave communications system.

At the close of their communications discussion, Defendants provide a table of communications-related costs. See Table III.F.6-3 at Supp. Reply III.F-176. This chart includes a number of costs which AEPCO included in other sections. First, Defendants include the costs for a PBX telephone system. AEPCO included costs for a telephone system in Part III-D-3-d. Second, Defendants include Data Radio Towers for FEDs. As discussed above, the costs for these radio towers are included in the costs for FEDs. See AEPCO Op. Workpapers Vol. 10, p. 04889 and AEPCO Op. electronic workpaper file "CTC System & Signals," tab "Individual Cost Calc." In addition, Defendants include the costs for the data radio towers for AEIs. The AEIs in AEPCO's Supplemental Rebuttal Evidence do not need data radios and towers. They are interconnected by phone lines included in the operating expense section. See Supp. Reb. electronic workpaper file "ACE Operating Budget.xls." Finally, Defendants include the costs for a Mobile Two-way radio system for personnel, which AEPCO included in its Opening operating expenses. See the materials and supplies costs included in AEPCO Op. electronic workpaper file "AEPCO Operating Expenses.123." These costs should not

be double-counted in this section and are therefore excluded from the communication costs summarized in Table III-F-19 below.

TABLE III-F-19
Comparison of AEPCO and Defendants Estimates for Communications Costs

Item	Defendants Supp. Reply	AEPCO Supp. Reb.	Difference
32 Station Digital Microwave System	$15,520,533.28	$7,838,962.00	$7,681,571.28
Microwave Management System	$230,422.13	Included in Microwave System	$230,422.13
Dispatching System (Communication and Signals)	Included in Signals	Included in Signals	Included in Signals
Dispatcher Voice Recording System	$148,943.00	$0	$148,943.00
Dispatcher Equipment Battery & Charger	$13,500.00	$0	$13,500.00
Teleconference System	$300,000.00	$0	$300,000.00
PBX Tel. Exchange & Communications Package for Headquarters – Vaughn	$921,741.00	Included in IT Section	$921,741.00
PBX Tel. Exchange & Communications Package for Field Locations	$831,150.00	Included in IT Section	$831,150.00
Data Radio Tower & Equip Control Points	$13,109,085.80	Included in Microwave System	$13,109,085.80
Data Radio Tower *only* FED, Single	$1,441,245.00	Included in FED Section	$1,441,245.00
Data Radio Tower *only* FED, Double	$1,213,680.00	Included in FED Section	$1,213,680.00
Data Radio Tower & AEI Equipment, Single	$149,804.31	Facilitated by phone lines in operating expenses section.	$149,804.31
Data Radio Tower & AEI Equipment, Double	$1,052,820.76	Facilitated by phone lines in operating expenses section.	$1,052,820.76
DP Tunnel Repeaters > 1000 feet	$375,000.00	$0	$375,000.00
Mobile two-way VHF Radio, Opr. Personnel	$365,101.81	Included in Operating Expenses Section	$365,101.81
Portable (HH) two-way VHF Radio, Personnel	$154,522.50	Included in Operating Expenses Section	$154,522.50
Total	$35,827,549.59	$7,838,962.00	$27,988,587.31

7. Buildings and Facilities

a. Headquarters Building

The Defendants accepted AEPCO's configuration and costs for its headquarters building. However, Defendants have increased their proposed cost for the building to reflect the size of a larger headquarters staff. As AEPCO has continued to use its Opening staff, it has not changed the cost of its headquarters building.

b. Fueling Facilities

i. AEPCO's Opening

On Opening, AEPCO included over $18 million in investment for fueling facilities at the ACE's Vaughn and El Paso Yards. 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. See Supp. Reb. Workpapers Vol. 4, p. 00944. Additional equipment costs, such as storage tanks, were developed from Means and other sources. Of course, the fueling facilities were sized to handle the number of trains and amount of fueling that the ACE would need. As in Part III-B, the Defendants again challenge the sufficiency of the ACE's fueling arrangements.

ii. Basic Cost Elements

On Supplemental Reply, Defendants argue that AEPCO did "not provide specific information with respect to methods and materials to be used in the construction

of these locomotive facilities." As noted above, AEPCO 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 AEPCO Op. Workpapers Vol. 11, p. 04953. 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 ACE will need.

While the Hanson-Wilson quote does not cover "fuel storage/supply pumping costs" within the fueling platform costs, these costs are covered separately in AEPCO Op. electronic workpaper file "Bldcst2.xls." In addition to the unit costs quoted by Hansen-Wilson, AEPCO's engineering witnesses also provided a 500,000 gallon storage tank for fuel, underground fuel piping to the loading racks and other related costs.

Based on the volume of trains and locomotives to be fueled, AEPCO's facilities are more than adequate for the projected fueling needs at both the Vaughn and El Paso Yards, as discussed in detail infra.

iii. Fuel Delivery and Storage

As addressed in full in Part III-B-2-c-ii, supra, AEPCO disagrees with Defendants' arguments that the ACE could not acquire the necessary quantities of diesel fuel at its Vaughn and El Paso yards at a cost as low as BNSF's own system-average cost per gallon for diesel fuel. In fact, fuel would be available at these points via a pipeline lateral at a delivered cost that is below BNSF's system average cost.

iv. Vaughn Yard

On Opening, AEPCO installed four fueling platforms, each with six fueling cranes and three gravity sanders at six spot platforms. Defendants argue that the Vaughn Yard fueling configuration cannot fuel four eastbound and four westbound trains simultaneously, and therefore the Board should accept their proposal for a larger facility capable of providing such service. AEPCO's engineering witnesses agree that the fueling configuration shown on page 13 of Op. Exhibit III-B-1 could not fuel four eastbound and four westbound trains simultaneously. However, as explained in Part III-B-2-c-ii, supra, AEPCO's experts remedied this problem by relocating the fuel racks so as to be to fuel eight trains.

The ACE will fuel maximum of 73 trains per day at Vaughn under AEPCO's operating plan. With proper scheduling and dispatching controls, AEPCO's facilities can actually fuel 164 trains in a day, assuming a fueling rate of 190 gallons per minute. Therefore, even at peak demand, the capacity of the facility, as now laid out by

AEPCO (see Supp. Reb. Exhibit III-B-4, p 13a), can easily accommodate the demand, especially with its changes to the platform layout discussed in Part III-B, supra.

The Defendants also argue that AEPCO's 500,000 gallon tank is inadequate because in their view the ACE must be able to store ten days' of worth fuel, or about five million gallons. AEPCO disagrees with Defendants' proposal, which assumes fuel must be delivered to Vaughn by tank car. As demonstrated in Part III-B-2-c, supra, the ACE receives diesel fuel at Vaughn by pipeline. Modern pipeline fuel delivery systems and just-in-time inventory practices do not favor the kind of massive over-investment in storage facilities proposed by Defendants. Keeping ten days' worth of diesel fuel is simply not necessary with a pipeline available. Moreover, storing less fuel reduces possible environmental hazards. Accordingly, AEPCO has not altered its 500,000 gallons of fuel storage capacity at Vaughn on Supplemental Rebuttal.

(a) Fuel Loading Facility at Belen

As demonstrated in Part III-B-2-c, supra, the ACE is not taking fuel from Belen. Accordingly, AEPCO has not included any costs for a loading facility there.

(b) Fuel Unloading Facility at Vaughn

The ACE receives fuel at Vaughn by pipeline, not by tank car. However, AEPCO inadvertently left out a pump and pump house for pumping fuel from the pipeline into the storage tank and pumping from the storage tank to the fuel racks. AEPCO has

corrected this on Supplemental Rebuttal by using Defendants' pump and pump house costs from their Supplemental Reply electronic workpaper "fuel storage 1.xls."

v. **El Paso**

AEPCO used the same methods and costing for the ACE fueling facility at El Paso. While Defendants do not take exception to the cost or availablity of fuel at El Paso (except for their misplaced argument that the ACE's cost per gallon would have to equal UP's system-average cost per gallon), they do take exception to the number of fuel cranes. AEPCO disagrees.

The El Paso fueling facility, as reconfigured by AEPCO's engineering witnesses on Supplemental Rebuttal, has two platforms with six fuel cranes and gravity sanders. The El Paso facility can fuel four trains simultaneously and it can handle 72 trains per day, more than enough to handle the maximum of 38 trains per day that would require fueling.

AEPCO also included a 500,000-gallon fuel storage tank at El Paso. This enables fuel inventories to be kept to a minimum on account of environmental concerns, but with a safety margin determined by risk management for fluid operations.

c. **Locomotive Shop**

On Opening, AEPCO proposed a 27,400 square-foot locomotive repair facility at the ACE's Vaughn Yard. This facility included, inter alia, a drop table, fire protection and ventilation systems, a wheel turning machine, and an overhead crane. On

Supplemental Reply, Defendants have completely redesigned the facility. As discussed below, AEPCO agrees with certain elements of Defendants' proposal, but it has adjusted Defendants' cost structure to account for the fact that AEPCO's locomotive count is far smaller.

Defendants have proposed a locomotive repair facility that is 56,400 square feet in size. AEPCO agrees with the basic design of the Defendants' building (i.e., ceiling height, materials, etc.), but AEPCO continues to rely on the square footage that it used on Opening, which the Defendants never argued would be inadequate for AEPCO's number of locomotives. In other words, AEPCO used Defendants' square foot cost, $194.56, and applied it to AEPCO's square feet of 27,400. Therefore, the 27,400 square foot locomotive maintenance building is $5,330,912. With the addition of a 7,556 square foot warehouse for parts (proportioned based on the quantities of locomotives and using Defendants cost structure) the facilities cost rises only by an additional $615,723 for a total facility cost of $5,946,635.

Defendants argue that AEPCO's facility is inadequate to handle locomotives that would be repaired at Vaughn, because AEPCO placed the wheel true machine on a separate track from the drop table. The Defendants' approach is reasonable, but AEPCO's design is also feasible. There are several ways to design a locomotive shop depending on the type of work the shop needs to perform. AEPCO chose to place the drop table and wheel true functions on different tracks due to the small fleet size and the

need to multitask during the repair function. In particular, AEPCO's layout will improve shop efficiency as general repair work can all be immersed from one end, and wheel work functions immersed from the other. In either case, most of the work done in the shop will be major overhaul functions, and not drop table work. Therefore, separating the drop table will not impact overall productivity.

AEPCO also notes that general running repair or troubleshooting will be handled out doors or on service tracks as needed.

AEPCO also agrees that additional storage may be needed at Vaughn. Therefore, AEPCO has provided additional space based on the percentage difference of locomotive applied to the storage facility design proposed by Defendants (i.e., 14,000 SF x 53.97%) for a restated storage facility of 7,556 SF.

AEPCO also agrees that a locomotive washhouse will be required to clean its fleet of 102 locomotives. AEPCO has adjusted the Defendants facility to meet the requirements for its locomotive fleet, but it has used Defendants unit cost per square foot for the facility.

AEPCO's restated total for its locomotive shop, including the maintenance repair facility, an office area, a storage warehouse, washhouse and its opening factor of 37.9% for shop equipment is $7,351,329. AEPCO also included its Opening cost for site improvements of $98,802 for a new total of $8,115,750. See Supp. Reb. electronic workpaper file "Bldgcst2.xls."

d. Crew Change Facilities, Yard Office and MOW Buildings

Defendants accepted AEPCO's configuration and costs for crew change, yard office, and MOW buildings. Supp. Reply at III.F-196 to 197. However, the Defendants have increased their proposed cost for these buildings to reflect the size of their staff. As AEPCO has continued to use its Opening staff, it has not changed the size or the costs for these buildings.

Defendants did note an error in AEPCO's calculation of Type 2 MOW garages. Supp. Reply at III.F-197 to 198. AEPCO has corrected this error on Supplemental Rebuttal. See Supp. Reb. electronic workpaper file "Bldgcst2.xls."

e. Waste Water Treatment

On Opening, AEPCO included a variety of waste water treatment facilities designed to meet the ACE's needs. On Supplemental Reply, Defendants claim that "AEPCO gave no support for these costs in either its narrative or workpapers." The Defendants' claim is without merit.

In particular, AEPCO's Opening Workpapers Vol. 11, pp. 05061-05085 and electronic workpaper file "Bldgcst.xls" describe AEPCO's waste water treatment system in detail. For example, pages 05069-05085 include the cost and entire design for the 1,000 gallon septic tank/sand lot filtration system. On pages 05061 to 05068, AEPCO describes the ACE's "Main Yard Sewage Treatment Plant" and those pages include

several Means Handbook excerpts that support the cost of the proposed 5,000 gallon per day systems.

Moreover, the ACE's facilities are adequately sized for each of the seven locations at which they have been placed – to which the Defendants never specifically object. The Defendants' facilities size appears to be based on their larger staffing and infrastructure proposals, which AEPCO has not accepted. Therefore, AEPCO has continued to use its Opening costs for waste water treatment.

f. Yard Air and Yard Lighting

Defendants accepted AEPCO's configuration and costs for yard lighting. Supp. Reply at III.F-198. However, the Defendants have increased their proposed cost for the lighting to reflect the size of their facilities. As AEPCO has not altered its Opening yard sizes, it has not changed the cost for yard lighting.

g. Car Repair Shop

AEPCO 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. AEPCO Op. at III-D-3 to 4. On Supplemental Reply, the Defendants argue that while the contractor may perform the work, AEPCO must provide the facility. Supp. Reply at III.F-194. The Defendants are incorrect in their 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 AEPCO Op. Workpapers Vol. 8, pp. 03772-03801. Consequently, AEPCO has not included any car shop facilities on Supplemental Rebuttal.

8. Public Improvements

a. Fences

On Opening, AEPCO included fences only around yards based on the field observations of one of its engineering witness, Mr. Bastow. On Supplemental Reply, the Defendants argue that their observations suggest that 80-90 percent of the lines being replicated are fenced and have cattle guards where necessary. Defendants also argue that New Mexico, but not Arizona, law requires such fencing. AEPCO disagrees.

In particular, Mr. Bastow observed that fence styles along the right-of-way of the railroad changes from adjacent property to adjacent property. Moreover, at property lines, the fences tended to turn and run perpendicular to the right-of-way. If Defendants had installed the fences, common sense would dictate that they would build a standard fence that was designed to stop the transfer of livestock from one property to another. But, as Mr. Bastow followed the right-of-way, it was not uncommon to see that one property may have a three-strand barbed wire fence with wood fence posts and the next may have four strands of barbed wire and metal tee posts. Moreover, many properties had no fence.

Aside from their field observations, the only evidence that Defendants offer to prove their point is a document that showed that BNSF built a fence on new spur that is not located on the ACE route and a statement that the ICC Engineering Reports indicate that the some of the lines being replicated were fenced. Yet one would expect that if Defendants actually maintained and installed such fences on 90 percent of the line, they could provide an actual inventory of such items – indeed, the ICC accounting system provides such items in a railroad's investment base. However, the Defendants did not do so. Moreover, the ICC Engineering Report data does not indicate (much like crossings) who actually paid for such improvements.

Finally, AEPCO has enclosed three video tapes (two of which were taken from the cab of a locomotive) that show some of the lines being replicated, in particular Defiance to Belen, and selected spots on the UP route. These tapes show the variety of fencing that Mr. Bastow observed, as well as numerous locations where there are no fences. For the Board's reference, AEPCO provides the following table:

Table III-F-20
Fencing Video Tape Data

1st Tape		
Union Pacific Super Railroad, Volume 6, Lordsburg Sub.		
3:30 to 3:52	No Fence	Both Sides
4:20 to 4:35	No Fence	Both Sides
9:10 to 11:00	No Fence	One Side
12:05 to 14:00	No Fence	Both Sides
15:00 to 15:30	No Fence	Both Sides
16:20 to 17:00	No Fence	One Side
19:00 to 20:00	No Fence	Both Sides
21:00 to 21:50	No Fence	One Side
32:40 to 33:30	No Fence	Both Sides
33:40 to 33:37	No Fence	Both Sides

35:37 to 36:20	No Fence	Both Sides
37:40 to 40:00	No Fence	Both Sides
41:40 to 42:25	No Fence	Both Sides
43:57 to 46:34	No Fence	Both Sides
48:10 to 48:40	No Fence	Both Sides
52:15 to 53:14	No Fence	Both Sides
54:20 to 59:40	No Fence	Both Sides
2nd Tape		
Cab Ride Through The Great Southwest, Part 4, Houck to Grants		
2:43 to 2:58	No Fence	Both Sides
3:33 to 3:45	No Fence	Both Sides
5:20 to 6:10	No Fence	Both Sides
6:45 to 7:00	No Fence	Left Side
7:41 to 7:50	No Fence	Right Side
12:15 to 12:25	No Fence	Left Side
12:44 to 13:00	No Fence	Both Sides
13:30 to 16:50	No Fence	Both Sides
17:00 to 17:20	No Fence	Both Sides
17:36 to 20:00	No Fence	Both Sides
20:54 to 21:35	No Fence	Both Sides
22:00 to 22:18	No Fence	Both Sides
22:52 to 24:20	No Fence	Both Sides
24:40 to 26:25	No Fence	Left Side
26:35 to 26:45	No Fence	Both Sides
27:00 to 30:25	No Fence	Both Sides
34:10 to 41:20	No Fence	Both Sides
42:00 to 42:12	No Fence	Both Sides
42:25 to 43:00	No Fence	Both Sides
43:00 to 44:00	No Fence	Right Side
44:45 to 44:57	No Fence	Both Sides
45:06 to 45:12	No Fence	Both Sides
52:47 to 54:41	No Fence	Left Side
56:09 to 57:00	No Fence	Left Side
59: 40 to 1:00:00	No Fence	Both Sides
1:04:10 to 1:05:06	No Fence	Both Sides
1:05:48 to 1:08:35	No Fence	Both Sides
1:08:35 to 1:09:20	No Fence	Right Side
1:11:10 to 1:11:50	No Fence	Both Sides
1:12:10 to 1:22:00	No Fence	Right Side
1:22:00 to 1:23:10	No Fence	Both Sides
1:23:45 to 1:24:35	No Fence	Both Sides
3rd Tape		
Cab Ride Through The Great Southwest, Part 5, Grants to Albuquerque		
1:45 to 3:00	No Fence	Both Sides
3:00 to 3:30	No Fence	Left Side
15:11 to 16:48	No Fence	Both Sides
16:48 to 17:00	No Fence	Left Side
17:06 to 17:22	No Fence	Left Side
17:46 to 18:33	No Fence	Right Side
18:46 to 19:28	No Fence	Left Side
25:57 to 29:00	No Fence	Both Sides
43:06 to 46:14	No Fence	Left Side
50:30 to 1:03:20	No Fence	Left Side, Very Little Right Side
1:03:20 to 1:04:00	No Fence	Right Side

1:14:31 to 1:14:43	No Fence	Both Sides
1:15:02 to 1:18:50	No Fence	Both Sides
1:18:50 to 1:19:12	No Fence	Left Side
1:19:12 to 1:20:30	No Fence	Both Sides

Defendants also argue that New Mexico law requires a railroad to fence its right-of-way. Defendants' characterization is inaccurate. The law states that the only consequence of not fencing the right-of-way is that the railroad can be sued for any damage to livestock. Supp. Reply Workpapers Vol. 4, p. III.F-0901. AEPCO suspects this is why Defendants have not actually built such fences everywhere. Moreover, the original version of the law was passed in 1889, which is several years after Defendants' predecessors built most of the lines being replicated. Id.

In light of the above, AEPCO has continued to include fencing only around its yards. Those costs are included in AEPCO's yard site costs for buildings and facilities.

b. Signs and Road Crossings Devices

On Opening, AEPCO included a standard set of signs that have been accepted by the Board in recent cases, such as milepost, whistle post, and certain advanced warning and crossing signs. Defendants argue for additional signs and also indicate some uncertainty as to how AEPCO calculated its sign quantities.

First, the Defendants indicated that they were unclear as to how AEPCO calculated their milepost signs. Simply put, the number of milepost signs equals the number of digits in all of the ACE's mileposts. Each digit of the milepost is one sign

board. In other words, if the milepost number is "234," three sign boards would be attached to a single signpost. Therefore the quantity of milepost sign boards for each type of milepost is an accumulation of all the digits of each mile along the ACE system. The number of milepost signs was hand-counted from the track charts.

As for additional signs, Defendants first state that 49 C.F.R. § 218.35 mandates the use of yard limit signs in addition to the notification in the timetables. AEPCO agrees with this, and it has placed yard limit signs at its six yards.

The Defendants also assert that the FRA requires "1-800" telephone numbers at crossings. Again AEPCO agrees; however, AEPCO has only placed these signs at the crossings it is constructing. AEPCO has adopted Defendants' unit costs for the signs.

On Opening, AEPCO noted that the NORAC Operating Rules do not require any additional signs, and therefore AEPCO did not include other signs such as advanced warning signs. On Supplemental Reply, Defendants argue that the General Code of Operating Rules ("GCOR"), rather than the NORAC rules, govern their own operations, and that those rules require the use of advance warning signs, speed signs and resume speed signs. Consequently, Defendants added the costs for such signs. AEPCO disagrees with this approach.

In particular, railroads are free to create their own operating rules (if approved by the FRA) or adopt a standard set of rules. AEPCO has chosen to be

governed by the NORAC Operating Rules. As stated on Opening, the NORAC Operating Rules, which govern the locomotive crews' required preparation, indicate that crews must know the various conditions, speeds, etc. before setting out, and therefore additional signs are not required.

The Defendants also added several other signs that are not required by the FRA, including Danger-Keep Off Bridge, Scour Critical, Stop Signs and directional signs. These signs are not required for a least-cost SARR and should be excluded. However, AEPCO's engineering experts also identified several problems with Defendants' calculations for such signs.

First, Defendants argue the FRA requires the use of a "Scour Critical" sign at bridges that are prone to high water damage. However, the "Notice of Safety Advisory 97-1" cited by Defendants nowhere states that the FRA mandates the use of any signs at all. Furthermore, the need for a "Scour Critical" sign is dependant on the particular bridge structure, and certainly not a requirement for a newly-constructed bridge. In any event, Defendants did not actually include these signs in their final calculations, and AEPCO has not either.

The Defendants' calculations also suffer from computational errors. Defendants' Supplemental Reply electronic workpaper file "III-3-Track.xls" cell M192, unduly inflates the cost of their signage by wrongly multiplying the total bridge count by four to obtain a number for "Danger-Keep Off Bridge" signs. If a railroad chose to place

"Danger-Keep Off Bridge" signs, only two signs would be necessary, one at either end of the bridge, not four per bridge.

AEPCO's revised costs for signs is included in its Supplemental Rebuttal electronic workpaper file "signs.xls."

c. Grade Separated and At-Grade Crossings

In Part III-F-8 of its Opening Evidence, AEPCO pointed out that the ACE would not need to construct most public improvements, such as at-grade and grade-separated crossings, because the incumbent carriers preceded the roads in the ACE territory (with the exception of the Defiance Branch where AEPCO did include crossings). See AEPCO Op. at III-F-41 to 42 and 69 to 70. Defendants argue that the ICC Engineering Reports demonstrate that the Defendants' predecessor railroads had crossings on the lines being replicated and that they must have paid at least some of those costs – in this case 10 percent. Supp. Reply at III.F-205 to 206. Defendants also cite recent decisions such as TMPA and the Eastern cases in support of their position. AEPCO disagrees with Defendants' approach.

AEPCO agrees with Defendants' characterization of the Board's recent decisions with respect to the use of the ICC Engineering reports and public improvement cost allocations. However, AEPCO notes that this issue is the subject of a Petition for Reconsideration in the TMPA case, which raises additional arguments that were not raised in the Eastern cases because TMPA was decided after those cases were submitted.

The Defendants' position rests on their suggestion that AEPCO's Opening position simply echoes the same arguments used by the shippers in the TMPA and Eastern cases. This is true. However, AEPCO did fully address the TMPA decision in its original Rebuttal evidence. See AEPCO Orig. Reb. at III-F-3 to 5. Evidently, the Defendants have not read AEPCO's discussion or they have simply ignored it, but AEPCO believes it is dispositive of this issue.

In particular, AEPCO noted that in TMPA, the Board accepted an argument made by BNSF that its predecessor railroads did in fact incur crossing costs based on the ICC Engineering Reports, which allegedly showed that BNSF incurred the cost of installing the facility. Id. at 153 to 154. However, as AEPCO pointed out on Opening, the rules governing the formulation of the Engineering Reports allowed a railroad to include the cost of constructing a crossing even when the railroad's contribution to the construction cost was minimal or non-existent. See AEPCO Op. at III-F-69.

Moreover, it is simply not possible to determine from the Engineering Reports themselves whether a railroad actually paid for the cost of constructing at-grade or grade-separated crossings. The express purpose of the Engineering Reports was to develop the replacement cost of railroad structures at the time of the survey. Texas Midland Railroad, 75 I.C.C. 1, 115 (1918). The Reports have never purported to determine whether a railroad originally paid for a crossing. Given that the Engineering Reports make no determination as to who bore the original cost of public improvements,

and Defendants have not otherwise demonstrated they paid in the first instance, the Board should adhere to its well-established position that the later entrant pays for the improvement. See TMPA at 134; Wisconsin at 92; West Texas Utilities, 1 S.T.B. at 672, 709.

Finally, AEPCO notes that there is little doubt Defendants were the first entrant in this territory. As noted supra, both the BNSF and UP lines being replicated (except for the Defiance Branch) were built in the 1880s. Therefore, AEPCO has continued to use its Opening crossing costs.

9. Mobilization

Mobilization involves the movement of equipment to the construction site, the preparation of the site with necessary facilities to support the work, the obtaining of necessary permits, and other similar pre-construction activities.

On Opening, AEPCO's engineering experts demonstrated that the 1.2 percent mobilization factor adopted in Wisconsin is unduly high. Defendants argue that because the SARR in Wisconsin was a larger project than the ACE, based on AEPCO's theory that the larger the project the lower the mobilization costs, the mobilization factor for the ACE should actually be higher than 1.2 percent. In fact, the SARRs in both Wisconsin and the present case are very large construction projects warranting a significant reduction in mobilization costs. Since, mobilization is a fixed cost for a

project, the magnitude of the ACE construction project moves its mobilization costs down as a percentage. See Supp. Reply at III.F-209.

The Defendants also attack the probity of AEPCO's construction bids. The bids included are accurate and valuable sources from which to derive the ACE's costs. AEPCO has consulted with reputable contractors to develop the cited costs for some of the most costly aspects of the ACE construction project. Those proposals included mobilization for that work. The contractors did not include a line-item for mobilization in the quotations, but instead spread the mobilization cost throughout the unit prices for the work being bid. Contrary to what Defendants would have the Board believe, mobilization is not normally a line-item in a construction contract. It is generally reserved for contracts that have specialized equipment or types of work that are affected significantly by mobilization costs.

The Defendants' argument that the "number of listings in Means is irrelevant to the applicability of the cost of the ACE" is specious as well. Means has developed its costs from averaging bid prices across the country. Many of the unit prices used to develop the Means costs did not include a separately stated mobilization item and almost certainly did not include a demobilization item. Therefore, the unit costs developed in Means include some form of mobilization in the unit costs. In fact, R.S. Means' "2001 Heavy Construction Manual" even states:

> Labor costs reflect productivity based on actual working conditions. These figures include time spent during a normal

> workday on tasks other than installation, such as material receiving and handling, mobilization at site, site movement, breaks, and cleanup.

See Supp. Reb. electronic workpaper file "mobilization.jpg." This explains why there are only five places in the Means Heavy Construction Cost Data where mobilization is broken out as a separate item. See AEPCO Op. Workpapers Vol. 11, pp. 05108-112 and AEPCO Op. at III-F-72.

The Defendants complain that mobilization was applied to some, but not all, of the items in the construction cost estimate in AEPCO's Op. electronic workpaper "Mobilization.xls." See Supp. Reply at III.F-209. In fact, mobilization was included on all items where the unit prices were derived from Means. Mobilization was not included for land, items that were the result of a bid by a reputable contractor that already included mobilization costs in the bid (such as Windgate), or items being furnished by a supplier.

The Defendants also point out that AEPCO did not include performance bonds in its costs. See Supp. Reply at III.F-210. Notwithstanding references to performance bonds in recent cases such as Carolina, performance bonds are either required or not at the pleasure of the project's owner. For projects this large, performance bonds would be at the low end of the Means performance bond costs. Assuming that all of the work can be done with a performance bond cost of 0.5 percent and that only the construction contractors are required to have these bonds, only 72 percent of the total construction cost (not including engineering or related services) actually construction

contracts (28 percent is materials purchased by the ACE). Therefore, the performance bond cost would be 72% x 0.5% or 0.36% of the total construction cost of the project. Likewise, mobilization would only be applied to the construction contracts, or 72 percent of the total construction costs. Adding the 0.72 percent and the 0.36 percent results in 1.08 percent of total construction for mobilization and performance bonds.

As AEPCO pointed out on Opening, most private projects are constructed without requiring the contractors to post performance and payment bonds. Instead, the owner receives a waiver of mechanics lien from all contractors and subcontractors to prohibit them from placing a lien on the owner's holdings if payments are not made to subcontractors by the contractors.

The Defendants assert that AEPCO has failed to make any pricing adjustments to account for a plan to dispose of equipment at the end of a project. See Supp. Reply at III-F-210. According to AEPCO's engineering experts, it is unusual to see a demobilization item in a construction bid or contract. This is simply not a normal function in a construction contract or construction project. Contractors today lease most of their equipment and simply return it to the lessee upon completion of the project. Any cleanup or movement of the equipment is built into the Contractor's overhead and is not part of the unit costs for a project. In reviewing the indices in R.S. Means' "Heavy Construction" and "Building Construction" manuals, AEPCO found no references to

"demobilization." AEPCO submits that there is no cost to the owner for demobilization when a project is completed.

In larger projects such as the ACE project, the cost of demobilization is so small compared to the total amount of the project that it is generally absorbed in the contractor's overhead. Often the contractor already has another project ready to start or underway, and the equipment is moved directly from the completed project to the new project. If another project is not available, the equipment is usually returned to the lessor and is not re-inventoried by the contractor.

The Defendants derive a mobilization factor from an average of mobilization factors from recent STB decisions. See Supp. Reply at III.F-211. This approach leads to an inappropriately high mobilization rate in the present case. It fails to consider the geography and related costs of the ACE or that mobilization has already been added in certain areas.[42] In addition, Defendants do not account for the fact that AEPCO's engineers have broken out materials and installation for many items and that the ACE will be purchasing materials directly from suppliers or manufacturers. No mobilization costs should be associated with those items. Where AEPCO received actual quotes or bids for installed items, such as track construction, no mobilization should be applied since it is already considered in the unit prices by the contractors. Only items that

[42] The Defendants incorrectly note that the mobilization percentage in Wisconsin was 2.4 percent. The percentage should have been cited as 2.6 percent.

were taken from R.S. Means or from the Defendants' own AFE's should have the mobilization factor applied.

Given the above, the 1% factor for mobilization selected by AEPCO more appropriately reflects the economies of scale inherent in construction of the ACE while avoiding the constraint of a barrier to entry that the higher factors proposed by the Defendants represent. Similarly, AEPCO disagrees that a cost for demobilization is required as this is not normally a cost considered in most construction contracts.

10. Engineering

On Opening, AEPCO used a 6.8 percent engineering additive. See AEPCO Op. at III-F-89. On Supplemental Reply, Defendants used 11.35 percent, plus an additional $38.7 million in costs for surveys, construction stakeout, and materials testing. See Supp. Reply at III.F-212 to 233. These numbers represent an unnecessary inflation of costs, the addition of unnecessary categories of costs, and a faulty interpretation of engineering cost source material. AEPCO's Opening engineering additive is entirely appropriate and should be used by the Board.

a. Basic Engineering Services

AEPCO disagrees with Defendants as to the activities encompassed in "basic engineering services." In "A Guide for the Engagement of Engineering Services," revised edition, published by the American Society of Civil Engineers ("Manual 45"),

quoted by Defendants at Supp. Reply III.F-218, six standard phases of a construction project are listed, including:

1. Study and Report Phase
2. Preliminary Design Phase
3. Final Design Phase
4. Bidding or Negotiating Phase
5. Construction Phase
6. Operation Phase

See AEPCO Op. Workpapers Vol. 11, pp. 05147-05148.

Interestingly enough, with the exception of Operation Phase, these are the same basic phases listed in the "Standards of Practice for Consulting Engineers" published by the American Consulting Engineers Council of Pennsylvania (ASCECPa) and the standard Agreement for Engineering Services Form RD 1942-19 printed by the United States Government ("USRD"). The ASCECPa document provides for an engineering cost of 4.5 percent for projects of $40 million without including an "Operation Phase," and the USRD sets Basic Services at 5 percent for projects of $30 million without an "Operation Phase." In contrast, the curve cited by Defendants in Manual 45 shows an engineering fee of 5.63 percent for $100 million projects that are of "above average complexity."

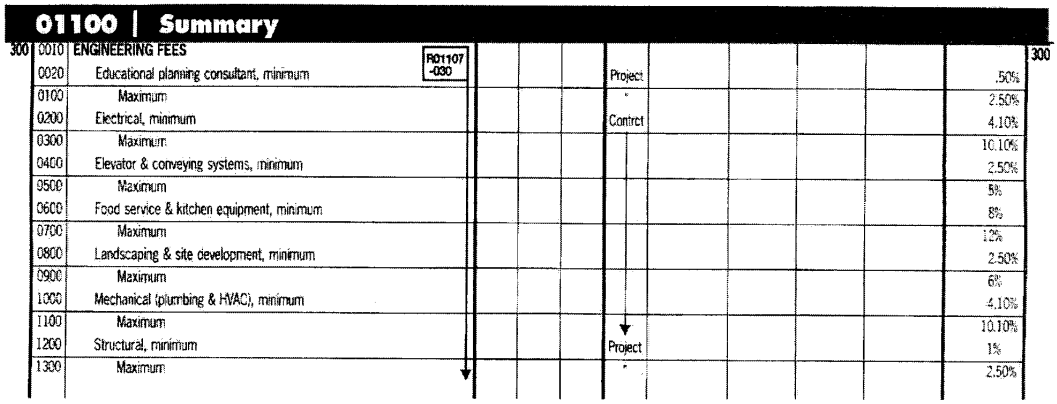
The ACE construction projection is in the $1 billion range, not the $30, $40, or $100 million category. All indications from the various fee curves are that the curve would continue downward to some extent for larger projects. It is important to note, however, that if the "Operations Phase" is removed from the Manual 45 fee curve, the

engineering fee would be in the 5 percent range. As the ASCECPa and USRD curves do not include the "Operations Phase" they are already in the 5 percent range.

The Defendants also argue that some of the fee curves presented by AEPCO were for Pennsylvania projects and therefore have no relationship to the work to be done on the ACE lines. See Supp. Reply at III.F-213 and 215. In fact, it is easier to build a railroad in the flat, relatively open terrain in Arizona, New Mexico, and Texas than in mountainous Pennsylvania. In any event, the basic engineering fees from the curves selected from USRD, ASCECPa, and Manual 45 for a project of this magnitude are all consistently in the 5 percent range.

The Defendants also erroneously assert that the engineering cost curves 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." AEPCO Op. Workpapers Vol. 11, pp. 05147-148. The costs for location and design surveys would be 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 AEPCO Op. Workpapers Vol. 11, p. 05135.

The Defendants further misrepresent that the R.S. Means Building Construction Cost Data is designed to apply only to building projects and is not intended for major transportation projects. See Supp. Reply at III-F-216. In fact, the engineering fee structure in Building Construction Cost Data is the same as that published in R.S. Means' Heavy Construction Cost Data. Thus, the relevant data may legitimately be applied to a major transportation construction project such as the ACE.



01100 | Summary

300	0010	ENGINEERING FEES	R01107 -030		300
	0020	Educational planning consultant, minimum		Project	.50%
	0100	Maximum			2.50%
	0200	Electrical, minimum		Contrct	4.10%
	0300	Maximum			10.10%
	0400	Elevator & conveying systems, minimum			2.50%
	0500	Maximum			5%
	0600	Food service & kitchen equipment, minimum			8%
	0700	Maximum			12%
	0800	Landscaping & site development, minimum			2.50%
	0900	Maximum			6%
	1000	Mechanical (plumbing & HVAC), minimum			4.10%
	1100	Maximum			10.10%
	1200	Structural, minimum		Project	1%
	1300	Maximum			2.50%

The fees in Means are not an additive, as Defendants would have the Board believe. As the ACE is a least-cost stand-alone railroad, it should pay only pay the minimum fees recommended. These include:

1. 4.1% Electrical
2. 2.5% Landscaping and Site Development
3. 1% Structural

As the largest percentage of the design work is site development, Means recommends a range of 2.5 percent to 6 percent for engineering. AEPCO has used 5%.

b. Resident Inspection

AEPCO has provided 1.8% for resident inspection. The Defendants have responded by including individual costs for Construction Stakeout, Construction Management, and Materials Testing. Defendants have erroneously assumed that it was AEPCO's intention to use the resident inspection for construction stakeout, construction management, and materials testing. Supp. Reply at III.F-227. In actuality, AEPCO's resident inspectors are the field construction inspection corps. They report to the project engineers and ensure that the construction methods and practices are in accordance with the specifications and plans. They also provide material inspection in the field. As for the listed items for which Defendants include costs under this category, AEPCO addresses each in turn.

i. Construction Stakeout

The Railroads have included 14 areas of construction stakeout at a total cost of $11.4 million. Costs for construction stakeout or layout are generally included within the construction contract. 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. 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.

ii. Construction Management

The Defendants have included an additional $63.7 million for Construction Management. Supp. Reply at III-F-232. Defendants argue at length that AEPCO should provide a percentage fee for Construction Management. They cite the size of the ACE project, replete with bridges, yards and rail facilities, and the construction schedule as reasons for using a construction management firm.

The history of construction management is a relatively short one. None of the major railroad projects constructed in the 19th and early 20th century used construction management firms. In fact, the very first paragraph of an article that appears on the web site of the "Consultants in Risk Management" entitled New Frontiers: Undertaking Construction Management (http://www.c-risk.com/Articles/sgms_newfrontiers.htm) states: "While the genesis of construction management dates back to the mid-1960s[1], the 1990s will inevitably be viewed as the period when construction management emerged as a frequent alternative to the traditional owner/design professional/contractor model of project delivery." End note number one states:

> Reasons often cited for construction management's origin include inflation, a strong economy with a busy market, larger, more complex projects, increasingly aggressive schedule requirements, the adversarial relationships on

> competitive lump sum projects, greater third party intervention and an increasingly litigious environment.

See AEPCO Op. Workpapers Vol. 11, pp. 05114-05124.

AEPCO notes that some of the main reasons for utilizing a construction manager did not exist when the original railroad lines being replicated were built, including inflation, adversarial relationships on competitive lump sum projects, greater third party intervention, and an increasingly litigious environment. As such, the reasons for using the construction manger would constitute a barrier to entry for a SARR and, therefore, construction management should not be part of the ACE's construction costs.

In any event, if a construction manager is used to replace the General Construction Observation phase of the project engineering, the engineering fee should be reduced accordingly. With 15 percent generally applied to the Construction Observation phase of the engineering fee (see AEPCO Op. Workpapers Vol. 11, p. 05137 section (3)), the basic engineering fee should be reduced to 4 percent to accommodate the reduced scope of engineering services.

iii. Material Testing During Construction

The Defendants have added $24.7 million for verification and monitoring of the quality of construction materials. See Supp. Reply at III.F-233. Here, again, Defendants' experts have padded the tab. Standard procedure is for the construction contractor to be responsible for the material testing at the job site. The railroad's construction inspectors are required to observe the tests and record the results. The

construction contractor is required to furnish the tests. Material testing on a project of this scope would include soil testing for grain size, clay content and optimum water content, compaction testing of the embankment and subgrade, concrete testing for concrete placed on site that would be performed by the contractor, welding testing for welded rail that is performed by the rail welding crew, and the testing of precast concrete members that is done by the precaster. All such testing for the SARR is completed by the contractors or their subcontractors and therefore costs for such work are already included in the construction contract numbers.

iv. Test Borings and Soils Investigation (Geotechnical)

On Opening, AEPCO included $1.34 million for test boring and soil investigation for tests to be conducted at each bridge location. Defendants have responded that they believe subsurface investigations are required in four areas, and have included associated expenses of $14.5 million. See Supp. Reply at III.F-226.

The four areas include bridges, cut slopes, embankment material, and culverts. (See Supp. Reply at III.F-224 to 225.) The ACE 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.

Furthermore, the terrain in New Mexico, Arizona, and Texas where the ACE is being constructed is generally much less severe than that in the East. Very detailed soils mapping and geologic data are available, eliminating the need for additional test borings and soil investigations. The ACE will utilize the test boring program set forth in AEPCO's 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 Defendants. Defendants' proposal to perform test borings and geotechnical investigations for cut slopes, embankment material and culverts, in addition to the borings already proposed by AEPCO for its bridges, would require borings continuously along the entire length of the ACE. Such an extravagant approach is simply not necessary.

Culverts are generally installed at ground level in a stream bed or along a drainage line. No 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. The borings already proposed by AEPCO will provide sufficient information and at frequent enough intervals to determine the types of materials to be encountered along the railroad's route. That information coupled with the readily available soils and geologic data will provide the ACE's engineers with sufficiently detailed soils information in order to design the railroad and its structures.

The Defendants have argued that a test boring quote used by AEPCO for an industrial park site in northwest Pennsylvania is not consistent with the terrain issues that would be encountered for the ACE. The fact is that the terrain in northwestern Pennsylvania is as rugged or more rugged than that along the ACE'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 ACE region.

The Defendants have again tried to argue away actual quotes and use an inflated price from Means. AEPCO has obtained quotes for the type of work required for the ACE. See, e.g., AEPCO Op. Workpapers Vol. 10, pp. 04701-04705. As a stand-alone railroad, the ACE would use the least expensive quotes to design and build its facilities. In addition, Defendants have added costs for testing and analysis, including drilling, sampling, and laboratory testing of the samples. AEPCO's quote from Dr. Cernica already includes all of these costs. See AEPCO Op. Workpapers Vol. 10, pp. 04815-04816.

Regarding the depth of the test borings, Defendants have argued that AEPCO will be required to go to a depth of 55' for each boring. In reviewing the soils maps for New Mexico, Texas, and Arizona 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 Supp. Reb. Workpapers Vol. 4, pp. 00946-01079.

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 AEPCO 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. AEPCO maintains that it has provided sufficient funding for the test borings and that the prices quoted are the best available for its project.

11. Contingencies

On Opening and in Supplemental Rebuttal, AEPCO has adopted an 8 percent contingency factor. On Supplemental Reply, the Defendants have used 10 percent.

AEPCO is aware of the Board's decisions adopting a contingency factor of 10 percent. Nevertheless, AEPCO believes that 10 percent is simply not warranted for the following reasons:

- The ACE territory is among the easiest places to build a railroad in the United States in terms of geography and weather;
- The ACE has very few large bridges, no tunnels, and little curvature, thereby reducing the likelihood of unanticipated problems; and
- The ACE has bid out some of the larger costs, such as track installation thereby reducing the costs items that might fluctuate.

AEPCO's engineering witnesses, also note that contingencies are used by engineers for two purposes: to allow for uncertainties in the bidding and for unforeseen conditions. The normal allowance by engineering firms, such as Mr. Stone's firm, for unforeseen conditions after bids have been received is 5 percent of the construction costs. Moreover, the USDA uses that same 5 percent contingency after bids have been accepted. So while Defendants can demonstrate that some agencies allow a greater degree of fluctuation (Supp. Reply at III.F-236), AEPCO's approach on this issue has a legitimate basis. Moreover, when a range of contingency factors is presented, the ACE should be able to benefit from the lowest reasonable percentage, which is 3 percentage points lower than the 8 percent selected by AEPCO. In light of the above, AEPCO has continued to use an 8 percent contingency factor.

12. Other

a. El Paso Trainway

AEPCO accepts the Defendants' costs of $2.987 million for construction of the El Paso Trainway.

b. Construction Schedule

Defendants accepted AEPCO's proposed construction schedule.

III-G Discounted Cash Flow Analysis

III. G. DISCOUNTED CASH FLOW ANALYSIS

1. Cost of Capital

In their Supplemental Reply at III.G-1, Defendants purport to accept AEPCO's cost of capital calculation. However, their acceptance does not moot the matter.

In particular, Defendants make much in the next portion of their III.G, as well as in Part III.A, of the need to update the July 2001 DRI-WEFA (now Global Insight) RCAF forecast that AEPCO utilized on opening to reflect the December 2003 version for purposes of adjusting both the ACE's operating expenses and portions of its revenues over the DCF period. See Supp. Reply at III.A-42 to 43, III.G-1, and III.G-3.[1] Moreover, Defendants' Table III.A-1 at III.A-43 notes the sharp decline in the rate of increase in the DRI-WEFA projections for the RCAF-U and the RCAF-A forecast between July 2001 and December 2003.

AEPCO has no fundamental objection to the use of more recent data in the Board's analysis, particularly in light of the delays that have occurred in AEPCO's rate

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[1] Defendants' Supplemental Reply refers to the DRI-WEFA forecast that AEPCO included as dating variously from June 2001 (III.A-43), July 2001 (III.A-42) and October 2001 (III.C-1). In fact, it was the July 2001 forecast, as shown on AEPCO Op. Workpapers Vol. 5, pp. 02198-99.

Defendants also chide AEPCO for not having used a more current DRI-WEFA forecast in its Opening Evidence. Supp. Reply at III.A-42 and III.G-1. The fact is that AEPCO used the most recent forecast to which it and its consultants had unrestricted access.

case, but it is important to recognize the need for synchronicity in the various economic data to be utilized in the DCF analysis. Significant mismatches can occur if the inflation forecast is taken from one time frame, and the cost of capital is taken from another. The cost of capital is of particular concern because combining an outdated derivation of a nominal cost of capital with a more recent and substantially lower inflation forecast will cause the SARR to face an artificially overstated real cost of capital that skews the DCF analysis in Defendants' favor. That is precisely what Defendants are seeking to exploit in AEPCO's rate case.

On Opening, AEPCO utilized a cost of capital of 10.74%.[2] The cost of capital in the discounted cash flow analysis reflected the industry cost of capital weighted according to the capital expenditures made in 1998-2000 during the ACE's construction period (as well as use of the 2001 cost of equity for the SARR's cost of equity in 2001, as explained infra). For example, if 20% of construction occurred in 1998, 40% in 1999, and the final 40% in 2000, the cost of capital would reflect the applicable rates on debt, on preferred equity, and on common equity, each weighted by each year's capital structure for the capital components, times 20%, 40%, and 40%, respectively. Because the weighting is tied to the construction costs, any changes in the timing of size of

[2] In light of the limited nature of the Defendants' original SAC Reply filings, AEPCO used the same cost of capital in its original Rebuttal filing. Also, the 2002 cost of capital decision was released shortly before AEPCO's original Rebuttal was due.

construction costs will likely alter the cost of capital in the construction period, and thus the 10.74% is likely to be modified in any event.

During the ACE's construction period, the cost of capital was increasing, as it went from 10.7% in 1998 to 11.0% in 2000. Ex Parte No. 558 (Sub-No. 2), Railroad Cost of Capital - 1998 (STB served May 17, 1999); Ex Parte No. 558 (Sub-No. 3), Railroad Cost of Capital - 1999 (STB served June 12, 2000); Ex Parte No. 558 (Sub-No. 4), Railroad Cost of Capital - 2000 (STB served July 2, 2001). Since the end of the ACE's construction period, the cost of capital has declined significantly. In particular, the Board found the cost of capital was 10.2% in 2001, and 9.8% in 2002. Ex Parte No. 558 (Sub-No. 5), Railroad Cost of Capital - 2001 (STB served June 20, 2001); Ex Parte No. 558 (Sub-No. 6), Railroad Cost of Capital - 2002 (STB served June 19, 2002).[3]

The following table III-G-2 depicts the change in the cost of capital and its constituents over the five-year period 1998-2002:

[3] On March 29, 2004, the AAR, pursuant to Ex Parte No. 558 (Sub-No. 7), Railroad Cost of Capital - 2003 (STB served Dec. 11, 2003), filed its cost of capital calculations for 2003, which shows a further drop in the cost of capital to 9.4%. However, the Board has not ruled on the AAR's filing, and AEPCO has not included the lower 2003 figure in its calculations.

Table III-G-2 Railroad Industry Cost of Capital							
Year	Debt		Common Equity		Preferred Equity		Total Cost of Capital (%)
	% Weight	% Cost	% Weight	% Cost	% Weight	% Cost	
1998	36.0	6.6	62.6	13.1	1.4	6.2	10.7
1999	35.5	7.2	62.7	12.9	1.8	6.25	10.76
2000	45.4	8.0	52.1	13.9	2.5	6.3	11.0
2001	41.8	6.9	56.0	12.8	2.2	6.3	10.2
2002	41.2	6.0	56.7	12.6	2.1	6.3	9.8

The dramatic reduction in the cost of capital, like the reduction in the forecasted growth for the RCAF-U and the RCAF-A, can be understood only in the context of the change in overall economic conditions, particularly inflation perceptions, during the period.

Accordingly, it would be highly inappropriate to adjust the SARR's revenues and operating expenses to reflect a lowered forecast of inflation based on a very recent forecast without also adjusting the SARR's cost of capital. The combination of a very recent (December 2003) inflation forecast with an outdated cost of capital results in a major disparity that would leave the SARR with a real cost of capital that exceeds that of the Class I railroads by a substantial amount.

Even apart from concerns regarding data synchronicity, assigning the SARR a greater burden -- in this case, a higher cost of capital -- than confronts the incumbents constitutes an entry barrier that is impermissible under stand-alone cost theory. Assigning the SARR a higher cost of capital enables the market dominant incumbents to charge the captive traffic more than they require to cover their current cost of capital. Use of the

current cost of debt rather than a cost reflecting the embedded debt rates is normally defended on the grounds that incumbents "need" to earn enough to justify remaining in business and replacing assets on an ongoing basis and recovery of opportunity costs. Such criteria do not justify saddling the SARR with a cost of capital higher than that facing the incumbents.

Under the circumstances, the minimum adjustment that is absolutely required is to apply the 2002 railroad industry cost of equity (12.6%) as the ACE's cost of equity in 2002. Additionally, AEPCO has included the 2002 cost of equity in the simple average of the 1998-2002 cost of equity that is utilized to calculate the cost of equity for the "unknown" years in the DCF model, that is 2003 and beyond. The use of the simple average of known equity years to calculate the cost of equity in later years reflects the approach that the Board followed in cases such as West Texas Utilities v. BNSF, 1 S.T.B. 638, 713 (1996):

> Because equity costs fluctuate from year-to-year, we estimate the cost of equity for future time periods using an average of a known historical period. Absent evidence projecting the cost of equity for the future, the cost of equity over several years provides a more reliable estimate of future equity costs. Using data for a single year increases the risk that the single period is aberrational. Thus, we see no reason to depart from past precedent of using the average for a known historical period.

Id. Because this approach reflects the Board's general practice, AEPCO has designated it as its "base" case.

However, AEPCO does not believe that the Board's standard approach is sound, especially in the present situation. Instead, AEPCO believes that the correct approach is to use the full 2001 industry average cost of capital for the SARR's cost of capital in 2001, and the full 2002 industry average cost of capital for the SARR's cost of capital in 2002 and beyond (except perhaps to the extent that more recent data is available sufficiently in advance of the decision or the decision is subsequently reopened due to material change).

AEPCO has designated this correct approach as its "alternate" case. This alternate approach differs from the Board's standard approach in that (a) the cost of equity in the unknown years is determined by the last known year, as opposed to the average of the known years, (b) the cost of debt is determined in the same manner as the cost of equity (at least so long as post-construction interest rates on railroad debt do not increase), and (c) the components of the cost of capital are reweighted to reflect the industry average. As explained below, all three changes are fully warranted.

The Board's standard approach to calculating the future cost of equity based on a multi-year average of past years may have made some sense when the Board calculated the DCF inflation indexes on the basis of a similar multi-year average of known past values. However, the Board has now expressed a strong preference to use single-point inflation projections for adjusting future road property assets other than land, as noted in the Supp. Reply at III.G-3 to 4, and also future operating expenses. To use a

multi-year historical average to calculate the cost of capital while using a single-point projection for inflation makes no apparent sense and is so inconsistent as to be arbitrary, particularly as the DCF results are driven by the resulting real cost of capital. Additionally, the equity component of the railroad cost of capital inherently reflects a long-term valuation horizon on the part of investors that takes into account the effects of perceived long-term future inflation. There is thus an inherent mismatch in measuring a multi-year and largely outdated average cost of equity in the past against a very recent projection of future inflation.

What is then "aberrational" is to include the cost of capital from the construction period (1998-2000) in the forecast average cost of capital starting only when the actual values become unknown (presently 2003, three years after the end of the construction period). It is also difficult to understand how the 2002 cost of equity (12.6%) could be deemed aberrational when it is just slightly lower than the 2001 cost of equity (12.8%). In contrast, the 2000 cost of equity (13.9%), which is at least a full percentage point higher than the cost of equity in the preceding or following year, does stand out as an aberration. Under the circumstances, the sound approach is to use only the 2001 cost of equity for equity in 2001, and only the 2002 cost of equity for equity in 2002 and beyond.

Similar factors require that the SARR's cost of debt also be adjusted to reflect the substantial fall in interest rates on railroad debt since the end of the

construction period. Failing to also adjust the SARR's cost of debt in the face of falling railroad interest rates leaves the SARR with a heavier debt burden than confronts the incumbents and the industry as a whole, which is inconsistent with the objective of calculating SAC as the lowest rate needed to be charged by a least-cost, most-efficient entity that does not face barriers to entry or exit. So long as the SARR's cost of capital is higher than that of the incumbents, the SARR will confront an impermissible entry barrier relative to incumbents, and that excessive cost of capital will translate into a premium return on the stand-alone traffic group, including the issue traffic, and/or a cross-subsidy for the Defendants' other traffic.

These consequences will persist unless the SARR's cost of debt is allowed to fall to match that of the railroad industry. Accordingly, AEPCO's "alternate" DCF calculation applies the current industry cost of capital (both debt and equity, as currently weighted) to the SARR in full, starting with the SARR's first-year of operation, and recognizing that 2002 is the last year for which the Board has issued a cost of capital decision.

Allowing the SARR to benefit from decreases in interest rate costs in the post-construction period should not entail requiring the SARR to also be burdened by post-construction increases in interest costs. In West Texas Utilities, supra, the Board rejected the defendant's efforts to saddle the SARR with peak-year interest rates on railroad debt, and instead noted that (a) the SARR would be protected from post-

construction increases in the cost of debt, but (b) the SARR would have the ability to refinance its debt so as to take advantage of falling interest rates:

> There is no disagreement that this rate [average rate of debt over the construction period] represents the cost of debt that WTRR would incur when it assembles the railroad. Because this debt would be incurred during the construction period, and because debt financing establishes a set interest rate over a set time period, WTRR would not have to pay prevailing debt rates in periods following construction to prevent the suppliers of capital from withdrawing their investment. Indeed, not only could WTRR continue to pay off its debt at the contracted rate, it could refinance and lower its debt costs if the opportunity provided itself in the future.

1 S.T.B. at 712.

AEPCO adds that the Defendants have demonstrated some ability to take advantage of lower interest rates while minimizing their exposure to potential interest rate increases in the future. For example, the BNSF Railway (that is, the Defendant, as distinguished from the parent holding company) 2003 10-K SEC Report (a) states (at p. 22) that "BNSF Railway enters into various interest rate hedging transactions . . . to convert a portion of its fixed-rate long-term debt to floating-rate debt," (b) shows (at p. 27) how the rate on variable-rate debt is lower than the fixed-rate debt, (c) references (also at p. 27) intercompany notes at a variable interest rate of only 1% above the monthly average of the daily effective Federal Funds rate, and (d) indicates (at p. 28) that the company exercised call options in 2003 on $150 million of 7.5% bonds due 2023 by using

intercompany borrowings.[4] Accordingly, a SARR should have the ability to take advantage of falling interest rates, while, as a least-cost, most-efficient entity, still enjoying some protection from potential future interest rate increases.

AEPCO's alternate analysis also assumes that the SARR reweights its debt-equity ratio to reflect the industry average. Such an assumption is consistent with the Board's general approach to cost of capital. Indeed, the cost of capital reflects flotation costs for debt, and the industry has been able to reduce its debt-equity ratio in recent years without issuing additional equity. In that regard, use of the industry average cost of capital with its embedded flotation cost causes the DCF analysis to reflect the SARR's cost of issuing debt in each year of the model (whether or not the SARR refinances its debt to take advantage of lower interest rates).

AEPCO notes that reopening is available to address any future fluctuations in the cost of capital. However, as explained above, the SARR should be insulated from any future increases in interest rates because it would not be compelled to refinance under such conditions, as the Board found in West Texas Utilities.

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[4] The BNSF Railway SEC Form 10-K is included in Supp. Reb. Workpapers Vol. 4, pp. 01130-1177. All pages references are to the report as filed by BNSF.

2. Inflation Indices

The Railroads agree with AEPCO on the need for the DCF analysis to reflect changes in the prices and/or costs of goods or services (inflation), but disagree as to how to reflect some of those changes, particularly with respect to operating expenses.

a. Operating Expenses

As noted supra, Defendants stress the need to use the most recent DRI-WEFA forecast to adjust the operating expenses. As also explained supra, AEPCO does not object to the use of the more recent data introduced by Defendants, provided the Board also uses synchronic data regarding other inputs into the DCF model, including the cost of capital.

Otherwise, there is sharp disagreement between AEPCO and the Defendants over whether to use the RCAF-A or the RCAF-U to adjust operating expenses. The Defendants assert two primary bases for use of the RCAF-U: (a) the ACE begins as a most-efficient, least-cost railroad and is thus unlikely to achieve future efficiency gains, at least at the rate of productivity reflected in the RCAF-A, and (b) because the ACE begins with new and current technology and long-lived assets, it is unlikely to benefit from the technological improvements that are the source of most productivity gains. The Defendants further fault AEPCO for not having presented evidence as to specific productivity gains, unlike the shipper in Docket No. 42051, Wisconsin Power & Light Co. v. Union Pacific R.R. Co. (STB served Sept. 12, 2001) at

106 ("Wisconsin"). As shown below, the Defendants' claims rest on faulty premises and inferences, and the factors they seek to rely upon, when properly considered, actually support use of the RCAF-A rather than the RCAF-U.

First, despite the Defendants' claims to the contrary, the ACE does not enter its existence as some never-before-seen hyper-modern railroad utilizing all sorts of cutting-edge technology. Instead, it begins its existence as largely a copy of the real-world BNSF and UP in terms of track structure and traffic. In particular, the ACE serves largely as a bridge carrier, handling most of the same trains as the real-world BNSF and UP, utilizing the same alignment and track (with relatively modest changes), and the same locomotive and car/container technology, as Defendants. In fact, Defendants elsewhere (e.g., Supp. Reply at III.C-14) criticize the ACE because of its lack of apparent innovation. Because the ACE's facilities are so duplicative of the real-world BNSF and UP, there is every reason to think that the ACE will be able to achieve at least the same rate of productivity growth as BNSF and UP.

Furthermore, because the ACE serves as a bridge carrier and handles the non-coal trains as they are assembled and delivered by BNSF and UP, the improvements that BNSF and UP achieve on their ends of the movement are likely to flow through to the ACE. For example, if BNSF and UP are able to handle longer or heavier intermodal or other trains, or utilize improved cars, containers, or locomotives, the ACE will benefit

from those efficiencies because it will be handling the same trains.[5] Even if the improvements are confined to the non-ACE segments of the movement, the ACE should still benefit to the extent that the ACE's divisions reflect the sort of supposedly cost-based enhancements sought by the Defendants. For example, if BNSF or UP achieves increased terminal efficiencies, it would be entitled to less of an adjustment under the Defendants' "enhanced" MSP methodology, and so more revenue would be available for allocation on the basis of length of haul, and a proportional part of the savings would flow through to the ACE under the Defendants' "enhanced" MSP methodology.

A productivity adjustment is especially appropriate in light of some of the very conservative modeling assumptions incorporated into the ACE's DCF analysis. In particular, AEPCO has assumed that the ACE's traffic levels will not grow beyond the 2001 level. In fact, there is likely to be substantial volume growth along the ACE's east-west lines (as BNSF and UP project abundant growth in their intermodal traffic in particular), and the ACE would in all likelihood be able to share in that growth with relatively modest and inexpensive capacity upgrades (primarily additional passing sidings and additional double-tracking). The DCF revenue analysis also does not take into account the ACE's ability to continue handling the same total volume of traffic, but substitute higher-yielding (e.g., premium intermodal) traffic for lower-yielding traffic.

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[5] The ACE will utilize the same locomotives under run-through arrangements.

The inherent conservatism of AEPCO's SAC analysis is thus an additional reason to apply the RCAF-A in order to achieve a more accurate result.

AEPCO readily accepts the Defendants' second claim, also articulated by the Board in Wisconsin, that productivity gains are driven in large part by technological advances.[6] However, as explained supra, the ACE begins with technology, such as locomotives and cars, equivalent to that of the real-world BNSF and UP. Accordingly, the ACE should be equally able to take advantage of those innovations, which is a further reason to apply the RCAF-A and not the RCAF-U to the ACE's operating expenses.

Moreover, the Defendants are mistaken in their factual premise that their assets are so much older than those of the ACE. In fact, the BNSF and UP asset bases are far younger than Defendants suggest. Exhibit III-G-1 was prepared by AEPCO Witness William W. Whitehurst, Jr., and calculates the average age of the assets of the Class I railroads as of the end of 2001, the first year of the ACE's operation. The average age is calculated by dividing the accumulated depreciation base from the R-1 by the annual depreciation figure, which is calculated by multiplying the asset base by the annual depreciation rate. The analysis is applied both to total assets and also separately to the asset sub-categories of road, equipment, and computer systems. The analysis of the average age of BNSF's and UP's assets is summarized in Table III-G-3:

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[6] These innovations generally originate with suppliers to the railroads, rather than the railroads themselves. As a result, these innovations are readily available to SARRs.

Table III-G-3 Average Expended Life (in Years) of BNSF and UP Assets		
Category	BNSF	UP
Total Assets	5.3 years	6.4 years
Road Assets	5.8 years	6.2 years
Equipment Assets	4.1 years	6.9 years
Computer Systems	2.0 years	3.4 years

The age of the incumbents' investment is thus not a valid reason for refusing to apply the RCAF-A to the ACE as the incumbents' assets are anything but ancient, less than 6 years, on average, and the incumbents' computer systems, which play a particularly significant role in productivity growth according to Wisconsin are especially recent. The difference in age of assets is hardly a basis for concluding that the ACE will fail to track the Class I change in productivity, particularly as the DCF model reflects the costs of ongoing asset replacement.

Even if the Board were to find the difference in age of assets to be a critical or material factor, the appropriate treatment would not be to jettison the RCAF-A altogether, but instead to phase-in the RCAF-A over time (i.e., use a blend of the RCAF-A and the RCAF-U, with the RCAF-A's share increasing to 100% as the RCAF-U's share decreased). For example, the average age of the computer systems is less than three years, and so one might phase the RCAF-A productivity adjustment in over three years (e.g., 0% in 2001, 50% in 2002, and 100% in 2003).

There is also reason to conclude that the ACE's productivity growth will exceed the industry average. The RCAF productivity adjustment is not limited to productivity advances, but instead measures "total factor productivity," meaning all changes in productivity, both positive and negative. Railroad Cost Recovery Procedures - Productivity Adjustment, 5 I.C.C.2d 434, 465 (1989). The productivity average takes into account all the errors and mistakes that the Class I railroads make (e.g., merger problems, failure to hire or retain sufficient train crew personnel, etc.).[7] These are problems that a SARR avoids because it is a least-cost, most-efficient carrier. The agency found that "it would appear that calculations limited to technological productivity would produce larger adjustments to the inflation index since other components of total factor productivity appear to have fallen during the period under consideration." Id. at 466. In other words, the other productivity factors were negative. Accordingly, the SARR, which starts with technology akin to that in present use, and then, as the Board found in Wisconsin, regularly replaces its assets, is thus well-positioned to match the industry "upside" and

[7] The productivity calculation also takes into account special charges associated with such items as labor buyouts, abandonments, and other costs that the ACE will generally be able to avoid. The ACE will logically elect to replace an asset prematurely when the replacement's productivity offsets the costs of premature replacement. However, the RCAF-A reflects the costs of premature replacements by the incumbents, and the application of the operating expense adjustor to costs that are governed by relatively long-term leases at fixed prices provides an additional cushion for such premature replacements.

avoid its "downside." The SARR should thus be able to at least match, if not exceed, industry average productivity growth.

There are additional reasons for recognizing that the full measure of industry productivity in adjusting the ACE's operating expenses. In particular, unlike the SARR in TMPA and other cases, the ACE is not exclusively, or even primarily, a coal-hauling railroad. Instead, the ACE's traffic group consists of intermodal, manifest, coal, auto, and grain traffic, and is considerably more reflective of BNSF's and UP's overall traffic base. While the ACE's revenues are heavily (64.6%, according to Supp. Reply Exhibit III.A-1) weighted towards intermodal traffic, intermodal traffic is BNSF's largest source of revenue and volume,[8] and intermodal is the fastest growing segment of railroad traffic generally,[9] meaning that its share should continue to increase.

It is then inappropriate to withhold application of the productivity subsumed within the RCAF-A on the grounds that AEPCO did not posit a productivity projection specific to the ACE. As noted supra, the ACE operates primarily as a bridge carrier, and the productivity improvements that BNSF and UP achieve will thus flow through to the

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[8] See http://www.bnsf.com/investors/assets/pdf/4Q_2003_Investors_Report.pdf, p. 15 (included in Supp. Reb. Workpapers Vol.1, pp. 0189-01208).

[9] John Gallagher, "Transloading its Share," in Traffic World (Feb. 16, 2004), at 28, included in Supp. Reb. Workpapers, Vol. 1, pp. 00004-12. Rockey, 1 J.T.L.L.P. at 201, notes that "in 2003 intermodal supplanted coal for the first time as the top rail revenue source for U.S. freight railroads." (The Rockey article is included in the Part III-A Supp. Reb. Workpapers Vol. 1, pp. 00014-18.)

ACE, which handles the same trains, using the same equipment.[10] The industry average productivity gains are thus a particularly apt (albeit conservative) surrogate for the SARR.

Defendants' reliance (Supp. Reply at III.G-3) on Wisconsin for the proposition that the shipper should be required to present a productivity estimate specific to its operations in order to receive the benefit of any productivity gains is thus misdirected. Moreover, in this case, AEPCO did submit an equivalent discovery request to the Defendants. AEPCO received no information from BNSF in response, but UP did produce what appears to be a productivity forecast spreadsheet.[11] UP provided no explanation of how the spreadsheet was prepared or what it purports to represent, but it does show a compound average productivity (total factor productivity, same as is used in the RCAF) increase of { } for the period from 2001 through 2007. It is not clear whether the projected increase is for the Class I railroad industry or UP specifically, and it is also unclear whether this represents a "high," "medium," or "low" case projection (although the fact that AEPCO received only the single forecast suggests that it may represent a "base" case). Nonetheless, the fact that the forecast shows a { } of productivity growth serves to establish the reasonableness of the { }

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[10] AEPCO reiterates that while the ACE should be able to experience the same "upside" as the industry average, it should still be able to avoid or substantially mitigate the "downside" such as labor buyouts.

[11] UP's textual response is included as Supp. Reb. electronic workpaper "AEPCO2.PDF," and the spreadsheet is included as Supp. Reb. electronic workpaper "RCAF_2002_unofficial_5.xls."

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productivity growth projected in the DRI-WEFA forecast.[12] Accordingly, utilizing the DRI-WEFA forecast appears to be very conservative and { } the productivity projected by UP.

> Defendants also make the curious assertion that:
>
> Further, the UP coal specific forecast [in Wisconsin] likely considered the effects of planned short term capital expenditures for the UP system. Such expenditures are not explicitly accounted for in the Board's DCF process.

Id. The statement, assuming it is even admissible,[13] is misleading in at least three basic respects. First, the DCF model does reflect the costs of ongoing asset replacement. Second, the assertion that the SARR, a least-cost, most-efficient entity, would avoid expenditures that serve to increase its productivity directly contravenes stand-alone theory and ignores the regular replacement of assets that occurs under the DCF model. Third, as explained supra, the RCAF-A productivity adjustment reflects not merely productivity gains, but the costs of achieving those gains (as well as the costs of other inefficiencies that the SARR avoids). In other words, the capital expenditures to which Defendants purport to allude are reflected in the RCAF-A's measurement of total factor productivity.

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[12] DRI-WEFA's maximum productivity adjustment in year between 2003 and 2007 is 3.2% under the baseline, 4.1% under the "higher productivity," and 1.5% under the "lower productivity." Supp. Reply Workpapers Vol. I, p. III.A-0008.

[13] The claim that UP "likely considered" a factor represents an effort to hide behind hearsay and/or speculation. In any event, UP should not be able to claim any benefit from a forecast that it no longer produces.

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The factors posited by Defendants are thus reasons to apply the RCAF-A to the ACE, not to refrain from doing so.

Additionally, in considering whether to fault a shipper for supporting use of the RCAF-A, and not developing some SARR-specific forecast, the Board should take into account what data and projections are, and are not, readily available. As noted, the Board's predecessor soundly decided to measure productivity on a total factor basis, as opposed to adopting some more narrow measure(s), e.g., labor productivity, fuel productivity, etc. AEPCO strongly believes that the choice was the right one, especially in that any attempt to measure productivity more narrowly or specifically would involve trade-offs, e.g., a more efficient locomotive might have greater fuel efficiency and be able to support longer trains with less maintenance, but it would likely be at a greater capital cost. However, because the Board publishes only the RCAF-A and the RCAF-U (and also the RCAF-5), those are the indexes that private forecasters, such as DRI-WEFA, seek to publish. To the extent the Board wishes, as it has indicated, to avoid the use of made-for-litigation models and the like (and to the extent the carriers cease producing, in the regular course of business, the sorts of more specific forecasts utilized in Wisconsin), RCAF-A forecasts are the only sort of productivity-adjusted forecasts that will benefit from having an existence independent of litigation exigencies.[14] Practical constraints are

[14] It is also highly doubtful that DRI-WEFA or any other forecaster projects future productivity (the difference between the RCAF-U and the RCAF-A) on the basis of the (continued...)

thus another reason for the Board to accept the use of the RCAF-A to project increases in operating expenses.

Moreover, it is noteworthy that the Board and its predecessor require that other DCF inputs, such as the cost of capital, reflect the overall industry average. See, e.g., Docket No. 38783, Omaha Public Power District v. Burlington Northern Railroad Company, 3 I.C.C.2d 123, 146-48 (1986). Accordingly, coal-only stand-alone railroads have been forced to use the industry average cost of capital, even though the coal operations would appear to be among the most stable of the sectors served by the rail industry. If the Board is going to rely on industry averages for one purpose, and preclude shippers from arguing that a more specific calculation would yield a more accurate and favorable outcome, then symmetry and fairness require that there should be a presumption in favor of using industry averages for other purposes.

To use the RCAF-U is to conclude that the ACE will never (at least in 2001 and the following 19 years) utilize more efficient or reliable locomotives, cars, or containers, that it will never handle longer trains, that BNSF and UP will never

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[14](...continued)
anticipated effect of specific, quantified productivity improvements, e.g., better use of computers will enable an AC locomotive to extract 0.3% more power from a gallon of diesel fuel, and 15% of the locomotive fleet serving intermodal traffic will be replaced or retrofitted so as to incorporate that technology four years from now. Instead, the far more plausible approach is to extract future projections from past trends, perhaps taking into account, at a generalized level, some of the technological innovations that are generally known to be under pursuit.

experience any increased productivity in the cost factors for which they claim enhanced divisions, that the ACE will never benefit from improved computers, software, or communications, that the rail industry will never find a way to make effective use of positive train control, that remote operation of locomotives will not result in more efficient switching operations, that there will never be any further improvements in maintenance of way and other maintenance activities, and that the ACE's operating speeds will never increase, to identify just a few sources of possible productivity improvement.

Few can say when and how such improvements will occur, or what will be the specific mechanisms for such improvements, in large part because the forces of competition and innovation that drive such advances are inherently chaotic. But few, if any, will deny that such changes will occur.

To deny a SARR the benefit of productivity improvements because they cannot be identified in advance with precision, beyond use of an industry average, is so unrealistic as to be nonsensical. Such logic effectively amounts to a Catch-22: future productivity improvements cannot be recognized unless they can be quantified and timed with precision, but if they can be quantified and timed with precision, it is only because they represent past and current productivity improvements, not future ones. Any effort to set the threshold for recognizing future productivity that high represents a substantive

determination that SARRs will not be allowed to reflect productivity improvements over time.

In Carolina at 27, the Board noted that even a SARR that handled coal almost exclusively would likely experience some productivity gains, but concluded that the potential for such improvements was "far less than it would be for existing railroads." There is no basis for making such a finding here. The ACE uses the same technology, its relevant assets are only modestly newer than that of the Defendants, the ACE will regularly replace those assets, and the ACE serves primarily as a bridge carrier for non-coal traffic and it will thus benefit from the productivity increases that BNSF and UP experience. Moreover, the ACE will avoid the problems and costs that routinely plague the Defendants. Accordingly, the RCAF-A, and not the RCAF-U, should be used to project changes in the ACE's future operating expenses.

b. Road Property Assets Other Than Land

Defendants' Supp. Reply at III.G-3 to 4 notes that the Board's decisions have fluctuated in terms of forecasting inflation in road property assets other than land on the basis of future projections or an average of historical rates of railroad inflation. However, Defendants conclude that AEPCO's prior use of DRI-WEFA conforms to the Board's most recent practice and accept AEPCO's method, provided that the most recent (December 2003) DRI-WEFA forecast for rail labor and rail materials is utilized.

AEPCO accepts Defendants' use of the most recent DRI-WEFA forecast, subject to the updating of the cost of capital to conform to the most recent DRI-WEFA forecast.

c. Land

Defendants accept AEPCO's land inflation value based on a composite index of all land owned by the ACE.

3. Asset Lives[15]

Defendants accept AEPCO's use of the BNSF asset lives for all asset accounts except for ties, where Defendants' calculation reflect wood ties instead of steel ties. As AEPCO is accepting the use of wood ties to reduce dispute, AEPCO also accepts Defendants' average 21-year life for the ties.

4. Tax Liability

Defendants appear to have used the same approach as AEPCO for calculating federal and state tax liability.

5. Other

a. Capital Cost Recovery

Defendants utilize the same "time-based" method of capital recovery as AEPCO.

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[15] Defendants inserted this heading in their Supplemental Reply, even though it is not part of the narrative format prescribed by the Board in Ex Parte No. 347 (Sub-No. 3), General Procedures for Presenting Evidence in Stand-Alone Rate Cases (STB served March 12, 2001).

b. Reparations

Defendants assert that the SAC evidence shows that the ACE's costs substantially exceed its revenues and that AEPCO is consequently not entitled to reparations. Defendants are incorrect, as explained in Part III-H.

III-H Results of
SAC Analysis

III. H. RESULTS OF THE DCF ANALYSIS

1. Results of SAC Analysis

The results of AEPCO's SAC calculations are set forth in Supp. Reb. Exhibits III-H-6 and III-H-7. Exhibit III-H-6 incorporates the "base" case, reflecting only changes in the cost of equity after the end of the construction period. Exhibit III-H-7, the "alternate" and preferred case, reflects post-construction changes in the overall cost of capital.

AEPCO's III-H DCF exhibits and those in Defendants' Supplemental Reply generally adhere to the same standard format, and the description in Defendants' Supplemental Reply Narrative is generally consistent with that previously submitted by AEPCO. Nonetheless, AEPCO will, in the interests of completeness, present a brief summary of the tables contained within the III-H DCF exhibits.

a. Road Property Investment Values

Table C summarizes the calculation of road property investment (construction) costs as of 1Q01. The calculation includes hiring and training costs and reflects the amount of investment needed by the ACE. The cost of capital (Table A) and the inflation indices (Table B) utilized in the DCF analysis are addressed in Part III-G, supra.

b. Interest During Construction

Table D presents both the total Interest During Construction ("IDC") that accrues on the ACE's assets during construction and the amount that is debt-related. The IDC is calculated from the composite cost of capital in Table A, the investment values in Table C, and the length of the finance period for each account as described in Part III-F. The debt-related portion of IDC is calculated by multiplying the length of the finance period, the ACE's percentage of debt, and the cost of debt. The debt-related portion is treated as an interest deduction during the construction period for tax purposes.

c. Amortization Schedule of Assets Purchased with Debt Capital

Table E presents the amortization schedule for the portion of the ACE's asset base purchased with debt, i.e., the principal. The principal is developed by multiplying the debt percentage in Table A for the appropriate investment period times the sum of the total investment and the interest during construction. The quarterly annuity payment is then calculated from the principal, the debt rate from Table A, and the DCF model life of 20 years.

The amount of interest included in the quarterly payments is calculated by multiplying the beginning balance (the principal in the first period) by the interest rate.

d. Present Value of Replacement Capital

Table F calculates the additional investment (on a present value basis) that the ACE would require if the hypothetical railroad replaced each asset indefinitely at the

end of each asset's life. This additional investment is added to the initial investment in Table I before determining the quarterly cash flows.

e. Tax Depreciation Schedules

Table G displays the tax depreciation required under MACRS (the Modified Accelerated Cost Recovery System), the applicable Federal Tax Code provision for property placed in served after December 31, 1986. Investments are subject to depreciation (or amortization) as follows:

Table III-H-9
Depreciation Schedule

Account No.	Item	No. of Years	Method
26	Communications	7	200% declining balance depreciation, switching to straight line when larger
8-12	Track		
27	Signals and Interlockers		
6	Bridges and Culverts	15	150% declining balance depreciation, switching to straight line when larger
39	Public Improvements		
13	Fences and Roadway Signs		
17	Roadway Buildings		
19	Fuel Stations		
20	Shops and Enginehouses		
3	Grading	50	Straight line depreciation
1	Engineering	5	Straight line amortization
	Training and Hiring Costs		

f. Average Annual Inflation in Asset Prices

Table H computes the average inflation rate used to index the capital recovery charge in Table I. The weighted average inflation rate is utilized so as to calculate the capital recovery necessary to replace the investment. All road property accounts are indexed at the rates shown in Table B. The weighted average inflation rates are based on the inflation indexes discussing in Part III-G, supra.

g. Discounted Cash Flow

Table I displays the calculation of the capital carrying charge and associated flow of funds required to recover the total road property investment, utilizing inputs from the tables described above, over 20 years (or 80 quarters) after consideration of the tax liability.

The total start-up investment to be recovered from the quarterly capital recovery stream over the ACE's life consists of the road property investment in Table C, the interest during construction calculated in Table D, and the present value of replacement investment calculated in Table F. The quarterly capital recovery stream reflects the tax benefits associated with interest on the investment financed with debt from Table E and the road property tax depreciation from Table G.

The cash flow shown in Column (8) of Table I reflects the amount remaining each quarter after federal and state tax liabilities are paid and constitutes the return on and of total investment in the SARR. The quarterly figure is discounted by the

fourth root of the composite annual cost of capital from Table A, adjusted to midquarter dollars. The present value cash flow is then summed up for each quarter along with the future cash flow to equal the total cost to be recovered. The future cash flow is the residual value of the unconsumed assets of the SARR and reflects the future cash flows for the value of the assets not consumed during the 20-year life of the DCF model.

The quarterly levelized capital carrying charge is the product of the starting capital carrying charge and the quarterly index factor from Table H that recovers the total investment less residual value during the 20-year DCF model period. The starting capital charge requirement that recovers the total investment less residual value is developed through an iterative process. The DCF model begins with a specified amount and then runs through the calculation described above to develop the cumulative value of the cash flow. If this cumulative number does not equal the total costs to be recovered from the quarterly revenue flow (start-up investment plus the present value of the replacement investment), the starting cost is adjusted, the DCF model is rerun, and the process is repeated until the starting quarterly charge yields a cumulative present value flow equal to the required investment to be recovered from the quarterly capital recovery flow.

h. Computation of Tax Liability – Taxable Income

Parts I and II of Table J display the calculation of the ACE federal and state tax liabilities, using the procedures discussed in Part III-G, supra.

i. Operating Expenses

Table K displays the operating expenses the ACE incurs in each year of its operation based on the traffic levels described previously. Table K uses the annual operating costs, states them on a quarterly basis, and indexes them to reflect inflation over the ACE's life based on the inflation rates shown in Table B.

j. Summary of SAC

The total SAC for the ACE based on investment and operating cost is summarized in Table L of Exhibit III-H-6 and Exhibit III-H-7. Table L presents and sums the capital requirement from Table I and the annual operating expenses from Table K for each year of the ACE's operations.

2. Reparations

AEPCO Supplemental Rebuttal Exhibits III-H-6 and 7 show that Defendants' revenues for the issue traffic exceed the stand-alone costs by a significant amount. Accordingly, it is necessary to calculate the reparations and the prescription, which entails consideration of the jurisdictional threshold as well as the SAC analysis. Indeed, AEPCO's SAC analysis yields rates that are below the jurisdictional threshold under both cost of capital approaches addressed in Exhibits III-H-6 and III-H-7.

Accordingly, the jurisdictional threshold, and not the SAC analysis, appears to govern the reparations and prescription, meaning that the analysis of reparations for issue traffic that moved from January 2, 2001 through June 2, 2003 that AEPCO

presented in its original Rebuttal is still applicable. Moreover, as the November 2003 Order limited the parties' supplemental evidence to SAC matters, AEPCO will limit its discussion of the reparations and prescription to a presentation of the results of the revised SAC analysis.

a. Percentage Reduction Calculations

Under Coal Rate Guidelines and its progeny, SAC analysis identifies impermissible cross-subsidies and determines potential rate relief as the amount by which the revenues for the SARR's traffic group exceed the total costs of serving that traffic group by itself.

As demonstrated in Parts III-A through H, the SAC analysis submitted by AEPCO shows that the SARR's traffic group heavily cross-subsidizes other BNSF and UP traffic. The total annual revenues actually received by Defendants beginning January 2, 2001, greatly exceed the SAC of serving the SARR's traffic, including the issue traffic. Table III-H-10 below summarizes the aggregate savings associated with constructing and operating the ACE, i.e., the amount that actual revenues exceed stand-alone costs throughout the DCF analysis, under AEPCO's "base" case analysis (Supp. Reb. Exhibit III-H-6):

Table III-H-10
Aggregate ACE Base Case DCF Savings, Exhibit III-H-6 ($ stated in Millions)

Quarter/Year	Aggregate Revenues [1]	Aggregate Stand-Alone Costs [1]	Aggregate Overpayments [2]	Percentage Reduction [3]
(1)	(2)	(3)	(4)	(5)
1Q01	$121.5	$84.9	$36.6	30.1%
2Q01	121.5	84.4	37.1	30.5
3Q01	121.5	84.3	37.2	30.6
4Q01	121.5	84.0	37.5	30.9
1Q02	121.6	83.2	38.4	31.6
2Q02	121.6	82.0	39.6	32.6
3Q02	121.6	81.2	40.4	33.2
4Q02	121.6	82.3	39.3	32.3
1Q03	121.9	81.8	40.1	32.9
2003	487.6	333.6	154.0	31.6
2004	489.6	339.9	149.7	30.6
2005	495.8	341.9	153.9	31.0
2010	532.5	357.1	175.4	32.9
2015	555.5	377.9	177.6	32.0
2020	580.8	400.8	180.0	31.0

[1] Source: Exhibit III-H-6, Page 26.
[2] Column (2) minus Column (3)
[3] Column (4) divided by Column (2).

Table III-H-11 below shows the equivalent calculations under AEPCO's alternate analysis (Supp. Reb. Exhibit III-H-7):

Table III-H-11
Aggregate ACE Alternate Case DCF Savings, Exhibit III-H-7 ($ stated in Millions)

Quarter/Year	Aggregate Revenues [1]	Aggregate Stand-Alone Costs [1]	Aggregate Overpayments [2]	Percentage Reduction [3]
(1)	(2)	(3)	(4)	(5)
1Q01	$121.5	$82.9	$38.6	31.8%
2Q01	121.5	82.4	39.1	32.2
3Q01	121.5	82.3	39.2	32.3
4Q01	121.5	81.9	39.6	32.6
1Q02	121.6	81.1	40.5	33.3
2Q02	121.6	79.9	41.7	34.3
3Q02	121.6	79.1	42.5	35.0
4Q02	121.6	80.3	41.3	34.0
1Q03	121.9	79.7	42.2	34.6
2003	487.6	325.2	162.4	33.3
2004	489.6	331.1	158.5	32.4
2005	495.8	333.0	162.8	32.8
2010	532.5	347.2	185.3	34.8
2015	555.5	366.9	188.6	34.0
2020	580.8	388.5	192.3	33.1

[1] Source: Exhibit III-H-6, Page 26.
[2] Column (2) minus Column (3)
[3] Column (4) divided by Column (2).

The following Table III-H-12 shows the impact of the SAC relief on the common carrier rates during the periods addressed in AEPCO's prior evidence:

TABLE III-H-12 Summary of SAC Relief for Issue Traffic						
Quarter	Rate Type	Rate per Ton	Base Case		Alternate Case	
			Pct. Red.	Rate	Pct. Red.	Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)
1Q01	Low Capacity	9.35	30.1%	$6.53	31.8%	$6.38
2Q01	Low Capacity	9.35	30.5	6.50	32.2	6.34
3Q01	Low Capacity	9.35	30.6	6.49	32.3	6.33
4Q01	Low Capacity	9.35	30.9	6.46	32.6	6.30
1Q02	Low Capacity	9.54	31.6	6.53	33.3	6.36
2Q02	Low Capacity	9.54	32.6	6.43	34.3	6.27
3Q02	Low Capacity	9.54	33.2	6.37	35.0	6.21
	High Capacity	9.23		6.16		6.01
4Q02	High Capacity	9.23	32.3	$6.25	34.0	6.09
1Q03	High Capacity	9.41	32.9	$6.31	34.6	6.16

b. Additional Matters

AEPCO previously explained that interest on reparations should be awarded at a rate higher than that specified in 49 C.F.R. § 1141.1 and that AEPCO should be reimbursed for its filing fee. Defendants did not address AEPCO's two contentions in either their original Reply Evidence or in their Supplemental Reply Evidence. Therefore, the two matters should be resolved in AEPCO's favor.

IV Witness Qualifications and Verifications

IV. WITNESS QUALIFICATIONS AND VERIFICATION

This Part contains the Statement of Qualifications and Verifications of four additional witnesses who have not previously sponsored evidence on behalf of AEPCO in this proceeding. It also contains the Verifications of AEPCO's other witnesses, whose Statements of Qualifications appear in Part IV of AEPCO's Opening Narrative or AEPCO's Rebuttal Narrative.

1. FRANK R. HARDER

Mr. Harder is a Principal of The Tioga Group, Inc. ("Tioga"), a transportation logistics and consulting group. His offices are located at 1617 JFK Boulevard, Suite 1252, Philadelphia, PA 19103. Mr. Harder is co-sponsoring (along with Mr. Stephen C. Nieman) evidence related to the intermodal traffic in Part III-A.

At Tioga, Mr. Harder specializes in surface freight transportation markets, operations, economics, and technologies with an emphasis on intermodal applications. Mr. Harder has been a transportation consultant since 1992, when he founded Intermodal Management, Inc., one of Tioga's predecessor firms.

Mr. Harder's activities include marketing new intermodal applications, supporting Class I rail intermodal operations and creating private/public partnerships to develop large freight infrastructure projects.

Mr. Harder is involved in the New York City Economic Development Corporation's project to reactivate the New York City-owned Staten Island Railway. Mr.

Harder specifically works on the portion of this project related to the Staten Island rail market, the prospective operations and the financing of the Staten Island Railway.

Some of Mr. Harder's prior clients for intermodal consulting include the Association of American Railroads, CSX, BNSF, CN, FEC, and Emons. Mr. Harder has consulted these entities on topics such as terminal efficiency and cost, intermodal yield management, new terminal development, emergency terminal management service, and the sale of Conrail. In addition, Mr. Harder has worked with an intermodal unit of the South African Railway, as well as industry suppliers and government agencies.

Mr. Harder evaluated the business processes in six marine communities for the Federal Highway Administration and the Office of Intermodalism. This evaluation required the identification of the critical operation problems and existing data systems in use by ocean shipping lines, motor carriers, railroads, ports, intermodal terminals and highway providers. In addition, Mr. Harder assessed the feasibility of applying advanced technologies including ITS technologies to address the critical operating problems.

Mr. Harder has been in the transportation business since 1979. He began his transportation career working for Conrail, where his initial title was Manager of Field Studies. His responsibilities included rail and motor carrier intermodal operations, intermodal terminal design, terminal network planning and intermodal capital budgeting.

In 1980, Mr. Harder joined Pennsylvania Truck Lines, a large U.S. intermodal motor carrier and terminal operator. Pennsylvania Truck Lines was a

subsidiary of Conrail and functioned as the railroad's intermodal operation department until it was spun off and acquired by its management team (which included Mr. Harder) in 1990. After the company was spun off and renamed PTL, Mr. Harder served as Vice President of Marketing and was a minority owner.

Mr. Harder is a member and former chairman of the Transportation Research Board's Committee on Intermodal Freight Transport. He is a former member of Association of American Railroads' Intermodal Productivity Task Force, the Transportation Research Board's Study Committee on Landside Access to U.S. Ports, and the American Transportation Association's Marketing and Sales Council.

Mr. Harder has authored and co-authored a number of articles related to transportation, including:

- "MPOs and Railroad Intermodal Terminals: Successful Development Strategies," Eno Transportation Foundation Transportation Quarterly Volume 53, No. 2, Spring 1999, at 31 to 44. This paper documents factors that drive private-sector decisions regarding the location and placement of intermodal freight transportation facilities for the benefit of public sector planners and decision-makers.

- "A Clear Track for Double-Stack," Railway Age, April 1994, at 45 to 47. This article, co-authored with R. Blanchard, discusses the public/private partnership of PennDOT, shippers, the Port of Philadelphia, and two Class I railroads that brought Pennsylvania into the continental double-stack network.

- "Intermodal Terminal Capacity and Outlook," AAR Intermodal Trends, Volume V, Numbers 4, 6, and 9. This series of articles, co-authored with D. Smith, compared anticipated growth in the intermodal industry with existing terminal capacity in ten key metropolitan regions. The articles estimated the magnitude of the

year 2000 capacity shortfall and prescribed methods for developing the required capacity, such as efficient means for development of new infrastructure and opportunities for increased operation productivity.

- Mr. Harder assisted Gerhard Muller with preparation of sections for the most recent edition of the intermodal industry's handbook, Intermodal Freight Transportation, Third Edition, 1995.

Mr. Harder received a Bachelors of Science degree and a Masters of Business Administration with a concentration in Transportation and Logistics from the University of Minnesota.

VERIFICATION

I, Frank R. Harder, verify under penalty of perjury that I have read the Supplemental Rebuttal Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Frank R. Harder

Executed on March 29, 2004

2. STEPHEN C. NIEMAN

Mr. Nieman is a Principal at Tioga, a transportation logistics and consulting group. His offices are located at 3283 Surmont Drive, Lafayette, CA 94549. Mr. Nieman is co-sponsoring (along with Mr. Harder) evidence relating to intermodal traffic in Part III-A.

Mr. Nieman has a wealth of experience in general management, strategic planning and marketing for international and North American transportation and distribution clients.

Prior to joining Tioga in 1997, Mr. Nieman headed the motor carrier, logistics service provider and intermodal practices of Mercer Management Consulting for six years. In this position, Mr. Nieman served as the primary author of a number of marketing and strategic plans. He sponsored and created strategies for two railroad intermodal divisions and for the domestic strategy for a major containership line. Mr. Nieman has been involved in strategic planning for the international division of a major containership line. He has either managed or participated in market strategy development for over 30 new freight services. As a consultant, Mr. Nieman has participated in freight strategy formulation for shippers, domestic container providers and international containership lines.

As a profit center general manager, Mr. Nieman has a history of successful implementation in a full range of business circumstances, ranging from start-ups through

growth and maturity to orderly disposition of selected businesses. His strategic planning and business development activities have included trucking, freight forwarding, airfreight, ocean shipping, bulk commodities and transloading.

Mr. Nieman has commissioned, conducted and supervised numerous qualitative and quantitative market research studies. A key ingredient in the success of these studies has been a careful pairing of research method and technology with critical business questions. Mr. Nieman is familiar with the methodologies used in both strategy formulation and market segmentation. He has employed these methods as the client, the project manger or a consultant team member.

Over the last 30 years, Mr. Nieman has held senior-level positions with major companies in the truck, intermodal and railroad industries, including American President, Burlington Northern, Consolidate Frieghtways, IU International, and Leaseway Transportation. He has served as Chief Executive Officer, Chief Operating Officer or General Manager of five companies or divisions.

Mr. Nieman started his intermodal career in 1963 as Director of Transportation for Consolidated Freightways. In this capacity, he directed all of CF's line haul planning. As a part of those responsibilities, he purchased intermodal services for CF, and he opened two new intermodal lanes, Chicago to Salt Lake City and Chicago to Oakland.

Mr. Nieman also served as Group Vice President of the Burlington Northern Railroad ("BN") from 1986 to 1988. Mr. Nieman managed BN's intermodal international and automotive business units. While at BN, Nieman was the first "trucker" to head up an intermodal unit at the railroad. He created three new domestic intermodal services for the company. Significantly, BNSF/UP witness Berry reported to Mr. Nieman when the two worked together at BN.

In addition, Mr. Nieman served as Vice President of Planning and Marketing at American President Lines ("APL") from 1988 to 1991. While at APL, which is an intermodal transportation company and one of the largest users of U.S. rail intermodal services, Mr. Nieman led the design and implementation plan for the first U.S. domestic container service.

Mr. Nieman is a member of Council of Logistics Management and the Association of Transportation Law, Logistics and Policy. Mr. Nieman has served as an officer or director of six industry associations, including National Tank Truck Carriers, Equipment Interchange Association and the National Rail Intermodal Association (both now combined to be the Intermodal Association of North America), two policy committees of the American Trucking Associations, and Montana Trucking Association.

Mr. Nieman holds a Bachelor of Arts degree in mathematics and economics from Beloit College and a Masters of Business Administration from Stanford University.

VERIFICATION

I, Stephen C. Nieman, verify under penalty of perjury that I have read the Supplemental Rebuttal Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Stephen C. Nieman

Executed on March 27, 2004

3. GEORGE L. DONKIN

Mr. Donkin is an economist and Vice President of J.W. Wilson & Associates, an economic consulting firm specializing in energy economics, public utility regulation, antitrust, business and property valuation, telecommunications and other topics in the field of economics. His offices are located at Rosslyn Plaza C, Suite 1104, 1601 North Kent Street, Arlington, VA 22209. The specific evidence that Mr. Donkin is sponsoring relates to the availability and cost of diesel fuel to the SARR at Vaughn, NM, and El Paso, TX, in Parts III-B-2-c-ii and III-D-1-d-ii.

From the summer of 1971 through February of 1974, Mr. Donkin was employed as an industry economist at the Federal Power Commission ("FPC") (the predecessor of the Federal Energy Regulatory Commission). Since 1974, Mr. Donkin has worked as a consulting economist specializing in oil and natural gas economics, public utility regulation and antitrust economics, with a particular focus on economic and competitive issues in the petroleum natural gas industries. Mr. Donkin has consulted for a wide range of clients including federal and state government agencies, state utility commissions, public and private gas and electric utilities, gas pipelines, oil and gas producers, gas marketers, industrial firms and non-profit organizations. Mr. Donkin has performed numerous economic analyses of the cost of constructing pipelines to transport natural gas and petroleum products, as well as the cost of delivering commodities via such pipelines.

Mr. Donkin has appeared as an expert witness on energy, regulatory and antitrust matters on over 100 occasions, in federal and state courts, before regulatory commissions and arbitration panels, and before the United States Congress.

Mr. Donkin holds a Bachelor of Arts degree and a Masters degree in economics from the University of Maryland. His major fields of study were industrial organization, antitrust economics, and institutional economics.

VERIFICATION

I, George L. Donkin, verify under penalty of perjury that I have read the Supplemental Rebuttal Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

George L. Donkin

Executed on March 26, 2004

4. **DOUGLAS J. ELLISON**

Mr. Ellison is Vice President, Strategic Rail Projects at Stone Consulting & Design, Inc., with offices at 324 Pennsylvania Avenue West, Warren, PA 16365. Stone Consulting & Design is a consulting firm providing comprehensive engineering design services to railroads and other industries on a nationwide basis. Mr. Ellison is sponsoring the evidence that relates to fueling and locomotive shops in Part III-F-7.

Mr. Ellison has over twenty years of experience with the railroad industry in mechanical, operations, maintenance-of-way and management. Prior to joining Stone Consulting & Design in 2003, Mr. Ellison was Director of Strategic Rail Projects for OmniTRAX in Denver, Colorado. At OmniTRAX, Mr. Ellison was responsible for strategic financial planning initiatives related to all functional areas of internal rail operations as well as analysis and development of new acquisitions.

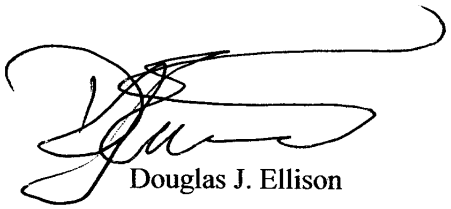
Before working at OmniTRAX, Mr. Ellison was the Executive Director and General Manager of the Adirondack Railway Preservation Society. In this position, Mr. Ellison was responsible for management of all departments and functions, including operations, planning scheduling, financial, human resources, staffing, safety and training programs, and government compliance. Mr. Ellison's duties included marketing studies and forecasting, resource planning and allocation, capital projects financing and management, and government liaison.

As Managing Partner at Freight Management System, Mr. Ellison was responsible for freight and product scheduling, rate negotiations, sales and marketing, and technical consulting for transportation equipment, common carriers and international and domestic routings. Mr. Ellison spent several more years in the railroad industry working as Vice President Administration at Rome Locomotive Works.

In these positions, Mr. Ellison performed studies involving rail operations feasibility, profitability and marketing analysis. He was involved in the conceptual planning of transportation systems and intermodal interfacing. Mr. Ellison developed business plans for technical projects, mechanical studies and engineering applications for user specific motive power for freight, commuter and transit applications. In addition, Mr. Ellison's experience includes working directly with vendors and suppliers and performing equipment inspections and appraisals. Mr. Ellison was also involved in writing FRA-approved engineer training programs and operational rulebooks, as well as supervised construction and engineering projects.

VERIFICATION

I, Douglas J. Ellison, verify under penalty of perjury that I have read the Supplemental Rebuttal Evidence in this proceeding that I have sponsored, as described in the foregoing Statement of Qualifications, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.



Douglas J. Ellison

Executed on March 24, 2004

VERIFICATION

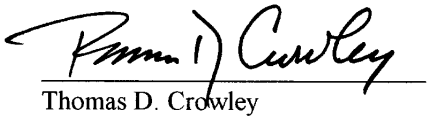
I, Mark W. Schwirtz, verify under penalty of perjury that I am the same Mark W. Schwirtz whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am responsible for the portion of AEPCO's Supplemental Rebuttal in this proceeding related to hypothetical increased cycle times for stand-alone railroad coal trains from the new Mexico origins, in Supplemental Rebuttal Narrative Part III-C-4, that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Mark W. Schwirtz

Executed on March 26, 2004

VERIFICATION

I, Thomas D. Crowley, verify under penalty of perjury that I am the same Thomas D. Crowley whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am responsible for the portions of AEPCO's Supplemental Rebuttal Evidence in this proceeding related to the stand-alone traffic group and volumes in Parts III-A-1 and 2; stand-alone traffic group revenues (except for intermodal lift and sales evidence which is sponsored by Messrs. Harder and Nieman, derivation of variable line-haul costs for non-coal traffic samples and limitations on use of automotive and manifest traffic samples which is sponsored by Mr. Whitehurst, joint sponsorship with Dr. Borts regarding the error in using a cost-based approach to calculate cross-over divisions) in Part III-A-3; the operation of the string program in Part III-C-2; stand-alone railroad operating expenses for locomotives, railcars, personnel compensation, loss and damage, insurance and ad valorem taxes, and leased facilities in Part III-D-1, 2, 3, 5, 6, 7 and 8; DCF analysis in Part III-G (jointly with Dr. Borts and except for derivation of age of class I railroad assets in Part III-G-2-a which is sponsored by Mr. Whitehurst); and the results of the DCF analysis in Part III-H; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

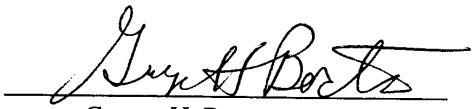


Thomas D. Crowley

Executed on March 30, 2004

Verification

I, George H. Borts, verify under penalty of perjury that I am the same George H. Borts whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am responsible for the portion of AEPCO's Supplemental Rebuttal Evidence in this proceeding related to the cost of capital and productivity in Part III-G and the infirmities of cost based divisions in Part III-A; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.



George H. Borts

Executed on March 25, 2004

VERIFICATION

I, Frederic W. Yocum, verify under penalty of perjury that I am the same Frederic W. Yocum whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am responsible for Parts III-B, III-C (except for the discussion of the string diagram model which is sponsored by Mr. Crowley) and III-D (except for IT and MOW, other than the discussion of random failures in Part III-D-4-d which I am sponsoring jointly with Harvey Stone) in AEPCO's Supplemental Rebuttal Evidence; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Frederic W. Yocum

Executed on March 29, 2004

VERIFICATION

I, Joseph A. Kruzich, verify under penalty of perjury that I am responsible for the portion of Arizona Electric Power Cooperative, Inc. Rebuttal Evidence in this proceeding related to the information technology, personnel requirements, and other expenses for the stand-along railroad, designated as Rebuttal Evidence Narrative part * ; that I know the content thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Joseph A. Kruzich

Executed on: February 24, 2004

* III-D-3-d, III-F-6-c-3-(d), III-F-6-d

VERIFICATION

I, William L. Krestinski, verify under penalty of perjury that I am the same William L. Krestinski whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I have read the portion of AEPCO's Supplemental Rebuttal Evidence of Arizona Electric Power Cooperative, Inc. in this proceeding related to the Stand-alone Railroad's annual maintenance of way costs, designated as Supplemental Rebuttal Narrative Part III-D-4; and that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

William L. Krestinski

Executed on March 23rd, 2004

VERIFICATION

I, Robert K. Pattison, verify under penalty of perjury that I am the same Robert K. Pattison whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am jointly responsible (with Harvey Stone, William Krestinski, Doug Ellison, and Charles Stedman) for the portion of AEPCO's Supplemental Rebuttal Evidence in this proceeding related to the basic engineering data concerning rail lines and facilities replicated by AEPCO's stand-alone railroad and the maintenance of way of those lines, designated as Supplemental Rebuttal Narrative Parts III-B-2, III-B-3, III-D-4 and III-F, except Subpart III-F-1; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Robert K Pattison

Robert K. Pattison

Executed on March 31, 2004

VERIFICATION

I, Harvey H. Stone, verify under penalty of perjury that I am the same Harvey H. Stone whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am jointly responsible (with William Krestinski, Doug Ellison, Charles Stedman, and Robert Pattison) for the portion of AEPCO's Supplemental Rebuttal Evidence in this proceeding related to the basic engineering data concerning rail lines and facilities replicated by AEPCO's stand-alone railroad and the maintenance of way of those lines, designated as Supplemental Rebuttal Narrative Parts III-B-2, III-B-3, III-D-4 and III-F, except for Subpart III-F-1 ; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Harvey H. Stone

Executed on March 31, 2004

VERIFICATION

I, Charles A. Stedman, verify under penalty of perjury that I am the same Charles A. Stedman whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I am jointly responsible (with Harvey Stone) for the portions of AEPCO's Supplemental Rebuttal Evidence related to roadbed preparation/earthworks component of the road property investment cost of the SARR, exclusive of culverts, roadbed specifications and yard drainage (Part III-F-2); that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

Charles A. Stedman

Executed on March 26, 2004

VERIFICATION

I, John A. Mullan, verify under penalty of perjury that I am the same John A. Mullan whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Opening Evidence in this proceeding; that I have read the portion of AEPCO's Supplemental Rebuttal Evidence of Arizona Electric Power Cooperative, Inc. in this proceeding related to the SARR microwave and radio systems in Part III-F-6; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

John A. Mullan

Executed on March 25, 2004

VERIFICATION

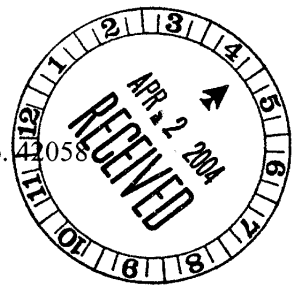
I, William W. Whitehurst, Jr., verify under penalty of perjury that I am the same William W. Whitehurst, Jr. whose Statement of Qualifications appears in Part IV of the Narrative portion of Arizona Electric Power Cooperative, Inc.'s Rebuttal Evidence in this proceeding; that I have read the portion of AEPCO's Supplemental Rebuttal Evidence of Arizona Electric Power Cooperative, Inc. in this proceeding related to divisions on non-coal cross-over traffic in Part III-A and the adjustment of future operating expenses in Part III-G; that I know the contents thereof, and that the same are true and correct. Further, I certify that I am qualified and authorized to file this statement.

William W. Whitehurst, Jr.

Executed on March 30, 2004

BEFORE THE
SURFACE TRANSPORTATION BOARD

ARIZONA ELECTRIC POWER COOPERATIVE, INC., Complainant, v. THE BURLINGTON NORTHERN AND SANTA FE RAILWAY COMPANY and UNION PACIFIC RAILROAD COMPANY, Defendants.	Docket No. 42058



COMPLAINANT ARIZONA ELECTRIC POWER COOPERATIVE, INC.'S SUPPLEMENTAL REBUTTAL EVIDENCE

EXHIBITS

PUBLIC VERSION – INFORMATION SUBJECT TO PROTECTIVE ORDER HAS BEEN REDACTED

ENTERED
Office of Proceedings
APR - 5 2004
Part of
Public Record

ARIZONA ELECTRIC POWER COOPERATIVE, INC.

By: Patricia E. Cooper
Chief Legal Officer
Arizona Electric Power Cooperative, Inc.
1000 S. Highway 80
Benson, AZ 85602

William L. Slover
Robert D. Rosenberg
Christopher A. Mills
Andrew B. Kolesar III
Daniel M. Jaffe
1224 Seventeenth Street, N.W.
Washington, D.C. 20036
(202) 347-7170

Attorneys for Complainant

OF COUNSEL:

Slover & Loftus
1224 Seventeenth St., N.W.
Washington, D.C. 20036

Dated: April 2, 2004

TABLE OF EXHIBITS

III-A

III-A-16 Technical Restatement of BNSF/UP Cost Matrix for Intermodal Terminal, Interchange and En Route Switching Events

III-A-17 Substantive Restatement of BNSF/UP Cost Matrix for Intermodal Terminal, Interchange and En Route Switching Events

III-A-18 BNSF I&I Switches Per Car – Sampled Automotive and Manifest Trains

III-A-19 ACE 2001-2020 Coal Traffic and Revenues

III-A-20 ACE 2001-2020 Non-Coal Traffic and Revenues

III-A-21 AEPCO's Supplemental Rebuttal Traffic and Revenue Forecast

III-B

III-B-4 Track Diagrams

III-B-5 Costs of Delivering Diesel Fuel by Pipeline to Vaughn, NM

III-B-6 Costs of Delivering Diesel Fuel by Pipeline to Vaughn, NM

III-C

III-C-4 Apache, Cochise & Eastern Railroad Service Units – 2001

III-C-5 ACE String Diagrams

III-D

III-D-1 Conductors and Engineers That Worked on AEPCO Trains - 2001 Wages vs. Number of Shifts Worked Per Year

III-F

III-F-14 Construction Costs

III-F-15 Development of Supp. Rebuttal Clearing, Grubbing, Lateral Drainage, Rip Rap and Retaining Wall Quantities and Costs for the ACE Railroad

III-F-16 ICC Engineering Report Supp. Rebuttal Quantities Adjusted to Reflect Apache, Cochise & Eastern Railroad Design Specifications

III-A Stand-Alone
Traffic Group

Exhibit III-A-16
Redacted

Exhibit III-A-17
Redacted

Exhibit III-A-18
Redacted

Exhibit III-A-19
Redacted

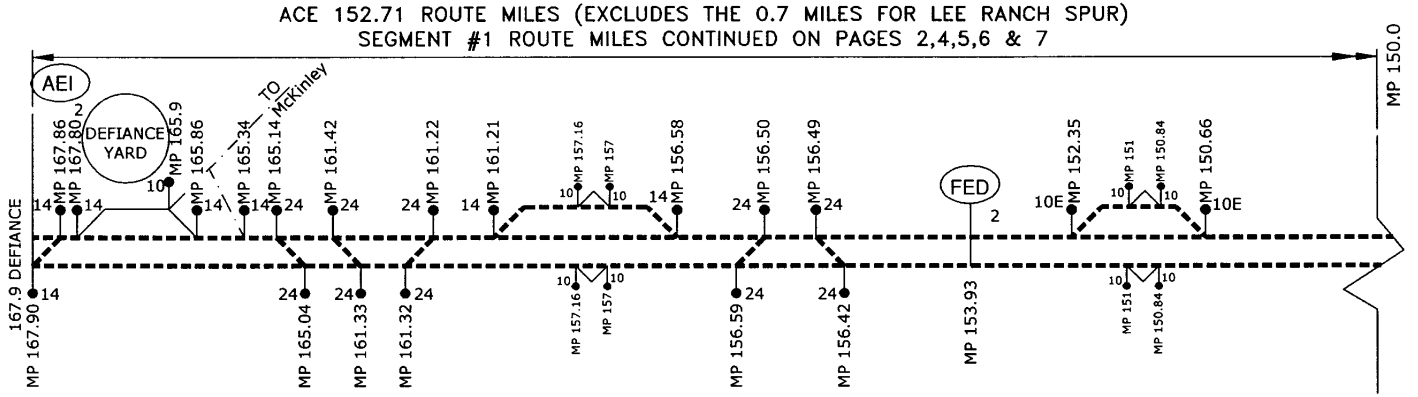
Exhibit III-A-20
Redacted

AEPCO's Supplemental Rebuttal Traffic and Revenue Forecast

	Coal Traffic		Non-Coal Traffic		Total	
	Revenue	Tons	Revenues	Tons	Revenues	Tons
2001	$41,718,003	13,033,818	$444,218,641	70,883,787	$485,936,644	83,917,605
2002	$39,073,997	11,453,759	$447,290,470	70,883,787	$486,364,467	82,337,546
2003	$38,109,248	11,789,000	$449,519,829	70,883,787	$487,629,077	82,672,787
2004	$35,306,917	12,605,000	$454,281,547	70,883,787	$489,588,464	83,488,787
2005	$36,098,081	12,608,619	$459,719,126	70,883,787	$495,817,206	83,492,406
2006	$35,907,307	12,611,721	$465,375,500	70,883,787	$501,282,807	83,495,508
2007	$38,454,511	13,033,818	$470,977,361	70,883,787	$509,431,872	83,917,605
2008	$43,603,865	12,624,645	$474,157,005	70,883,787	$517,760,870	83,508,432
2009	$50,866,714	13,033,818	$477,401,262	70,883,787	$528,267,976	83,917,605
2010	$51,833,146	13,033,818	$480,711,483	70,883,787	$532,544,629	83,917,605
2011	$52,859,985	13,033,818	$484,089,051	70,883,787	$536,949,036	83,917,605
2012	$53,894,358	13,033,818	$487,535,380	70,883,787	$541,429,738	83,917,605
2013	$54,999,202	13,033,818	$491,051,916	70,883,787	$546,051,119	83,917,605
2014	$56,076,990	13,033,818	$494,640,139	70,883,787	$550,717,130	83,917,605
2015	$57,178,172	13,033,818	$498,301,562	70,883,787	$555,479,734	83,917,605
2016	$58,315,615	13,033,818	$502,037,732	70,883,787	$560,353,347	83,917,605
2017	$59,472,778	13,033,818	$505,850,233	70,883,787	$565,323,011	83,917,605
2018	$60,653,056	13,033,818	$509,740,684	70,883,787	$570,393,740	83,917,605
2019	$61,856,914	13,033,818	$513,710,741	70,883,787	$575,567,655	83,917,605
2020	$63,084,826	13,033,818	$517,762,099	70,883,787	$580,846,925	83,917,605

III-B Stand-Alone
Railroad System

ACE 152.71 ROUTE MILES (EXCLUDES THE 0.7 MILES FOR LEE RANCH SPUR)
SEGMENT #1 ROUTE MILES CONTINUED ON PAGES 2,4,5,6 & 7



SEGMENT # 1
PAGE 1 OF 26

AEPCO REBUTTAL CHANGES ARE SHOWN IN RED

DIVISION: **SOUTHWEST**
SUBDIVISION: **GALLUP**
FROM: **DEFIANCE** MP: **167.9**
TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

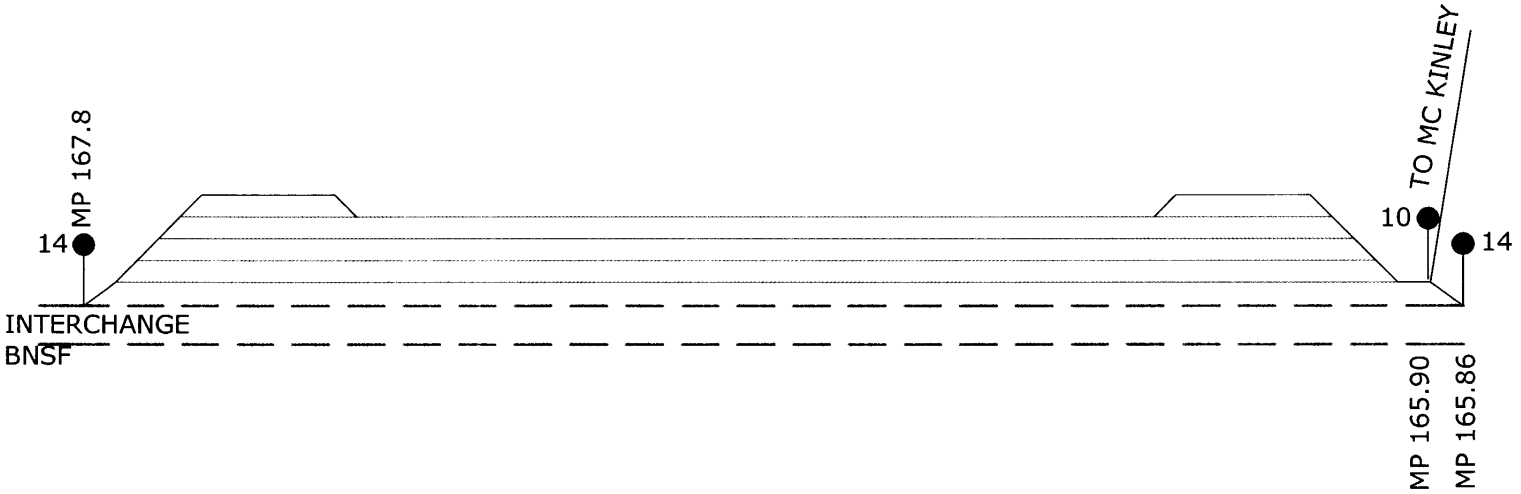
AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: III-B-4

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #1
PAGE 1a OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

YARD: **DEFIANCE YARD**

MP: **167.8**

MP: **166.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- - - - - - 136# RAIL STANDARD CWR
——— 132# CLASS 1 RELAY JOINTED
— · — 132# CLASS 1 RELAY CWR

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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HW= HOT WHEEL DETECTOR

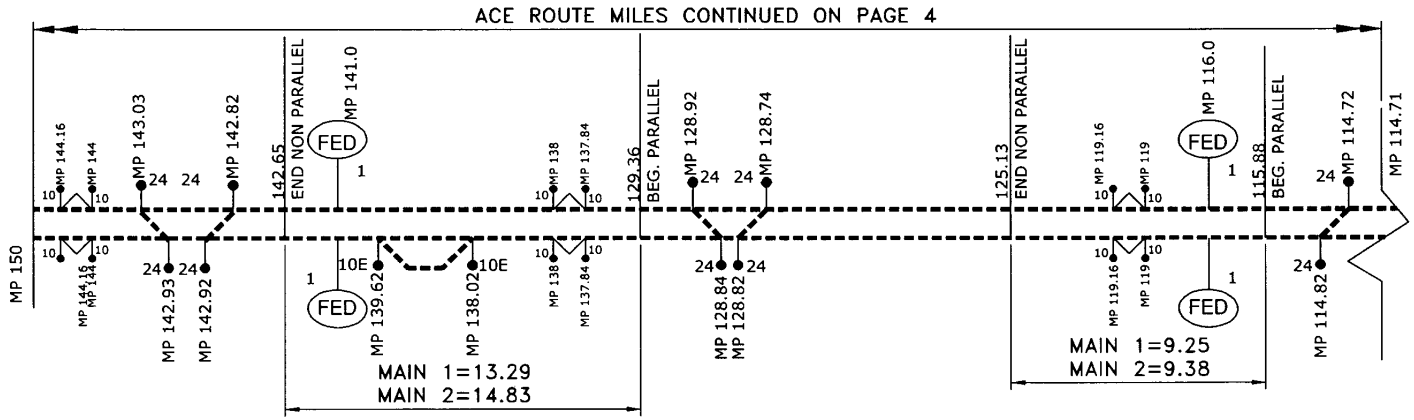
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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*TURNOUT TYPES
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10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 1
PAGE 2 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

FROM: **DEFIANCE** MP: **167.9**

TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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HW= HOT WHEEL DETECTOR

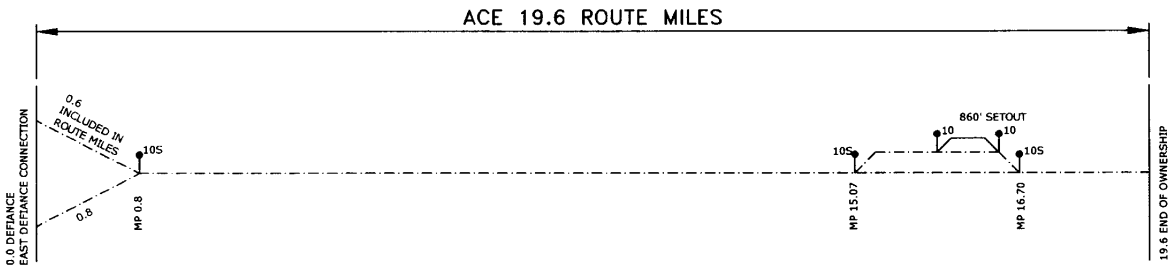
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT #1 B

PAGE 3 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **DEFIANCE**

FROM: **DEFIANCE** MP: **0.00**

TO: **P & M NORTH** MP: **19.6**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

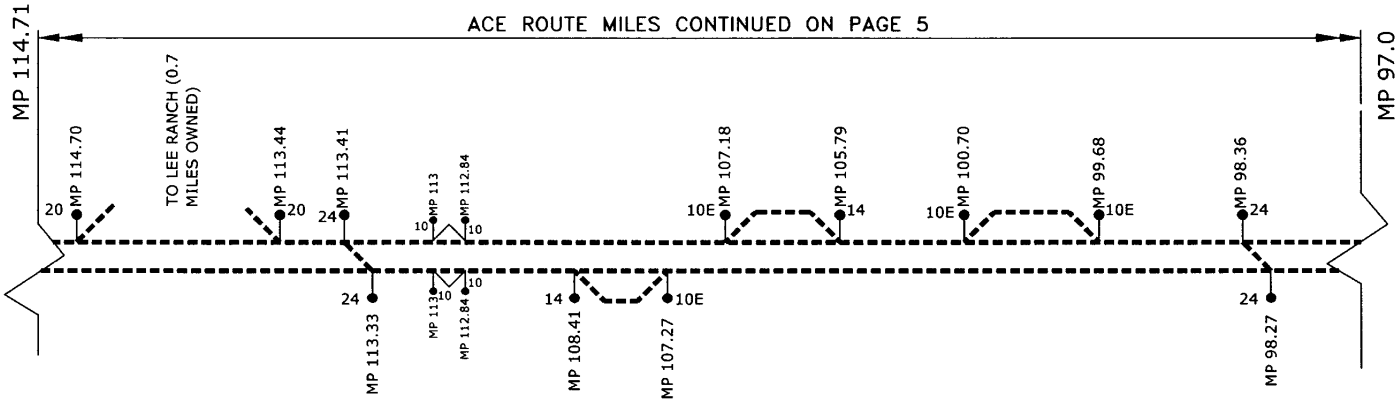
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
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20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

III-B-4

NOTE



SEGMENT # 1
PAGE 4 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

FROM: **DEFIANCE** MP: **167.9**

TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

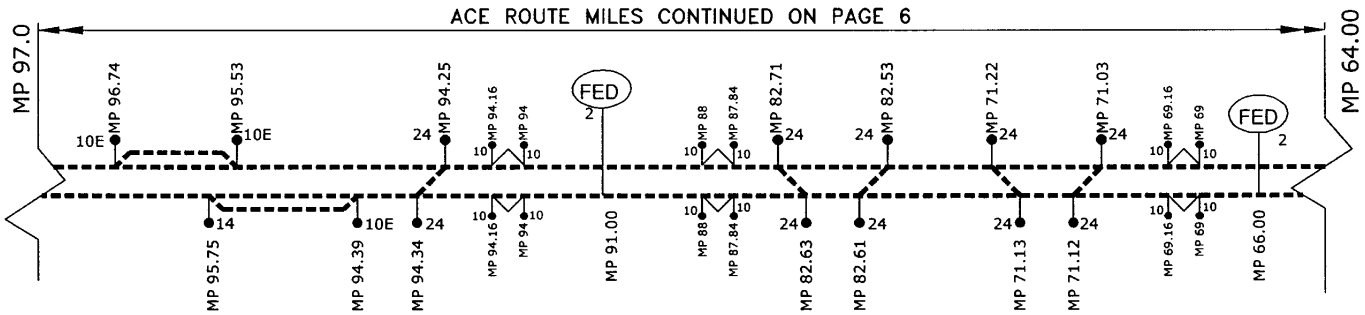
AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 1
PAGE 5 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

FROM: **DEFIANCE** MP: **167.9**

TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

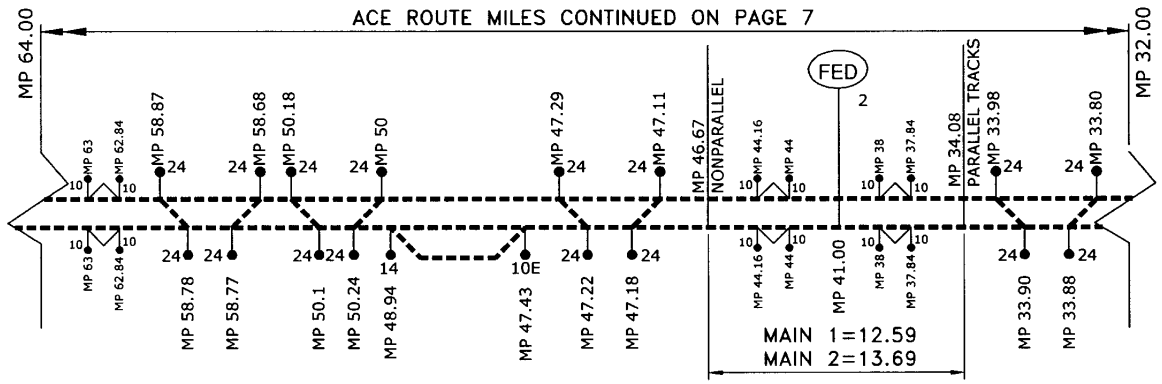
AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 1
PAGE 6 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

FROM: **DEFIANCE** MP: **167.9**

TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- - - - - - 136# RAIL STANDARD CWR
——— 132# CLASS 1 RELAY JOINTED
— · — 132# CLASS 1 RELAY CWR

(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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HW= HOT WHEEL DETECTOR

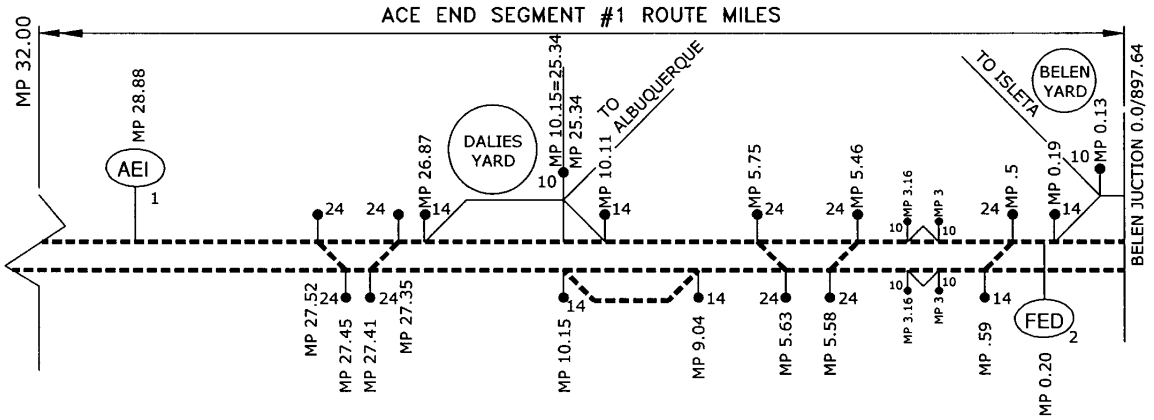
(AEI)$_1$ AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 1
PAGE 7 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

FROM: **DEFIANCE** MP: **167.9**

TO: **BELEN JUNCTION** MP: **0.0**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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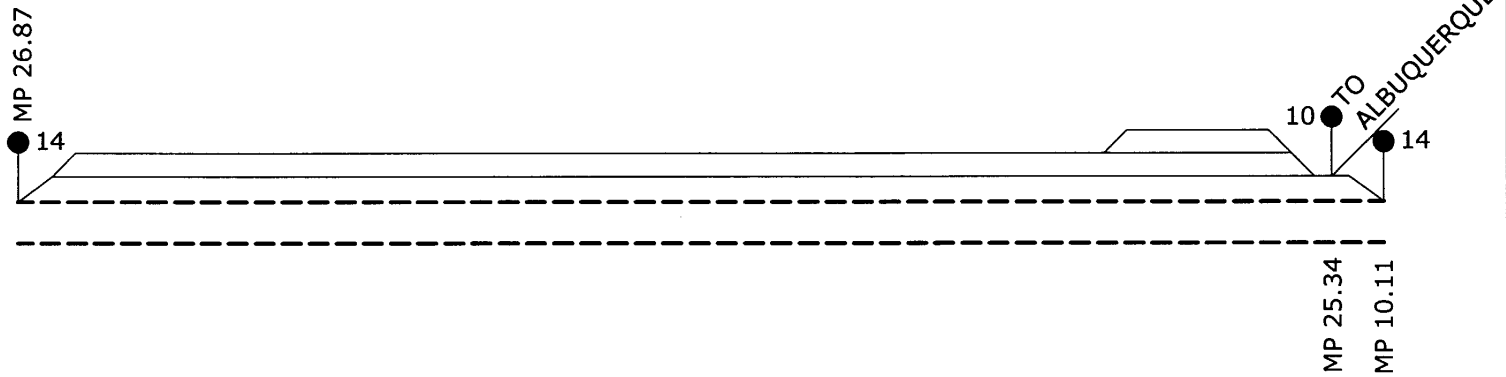
AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
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14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #1C

DIVISION: **SOUTHWEST**

SUBDIVISION: **GALLUP**

YARD: **DALIES YARD**

MP: **28.87**

MP: **10.11**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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HW= HOT WHEEL DETECTOR

AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

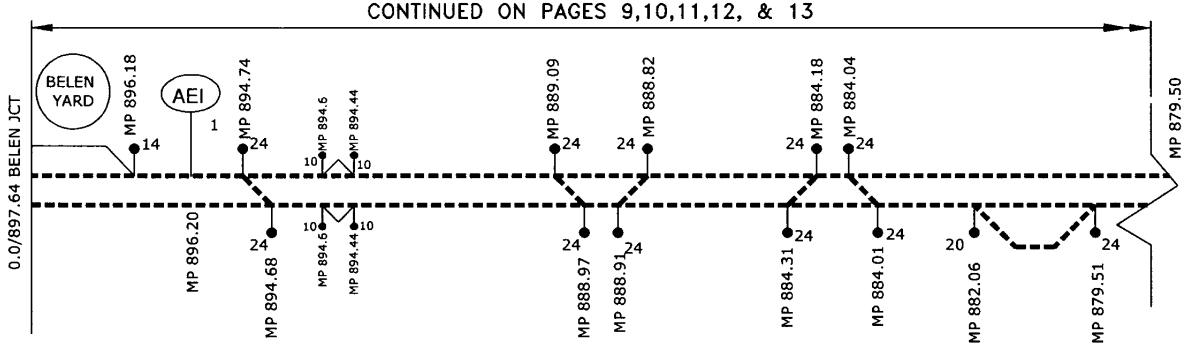
*TURNOUT TYPES
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20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE

ACE 106.47 ROUTE MILES (EXCLUDING VAUGHN CONNECTION TRACK) SEGMENT #2 ROUTE MILES

CONTINUED ON PAGES 9,10,11,12, & 13



SEGMENT # 2

PAGE 8 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **897.6**

TO: **VAUGHN CONNECTION** MP: **791.13**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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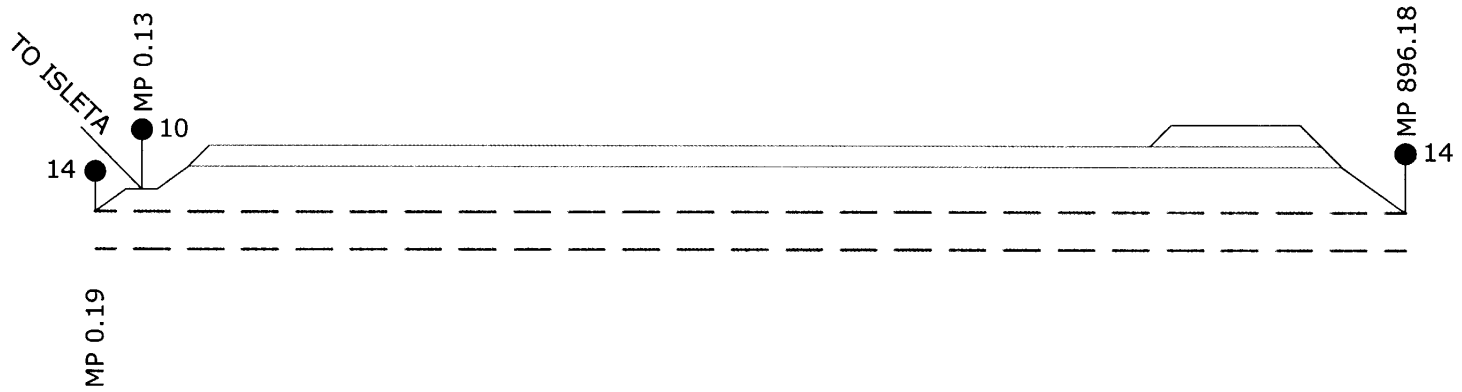
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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*TURNOUT TYPES
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10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #2A
PAGE 8a OF 26

DIVISION: **SOUTHWEST**
SUBDIVISION: **CLOVIS**
YARD: **BELEN YARD**

DATE: 03/24/04

MP: 0.19
MP: 896.18

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

20 = TYPE* - TURNOUT

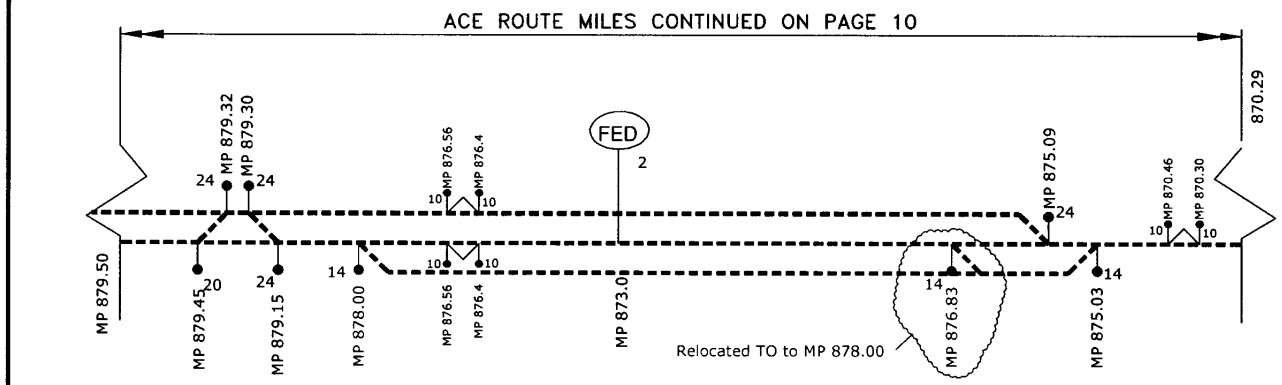
*TURNOUT TYPES
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14- #14 ELECTRIC
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AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 2

PAGE 9 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **897.6**

TO: **VAUGHN CONNECTION** MP: **791.13**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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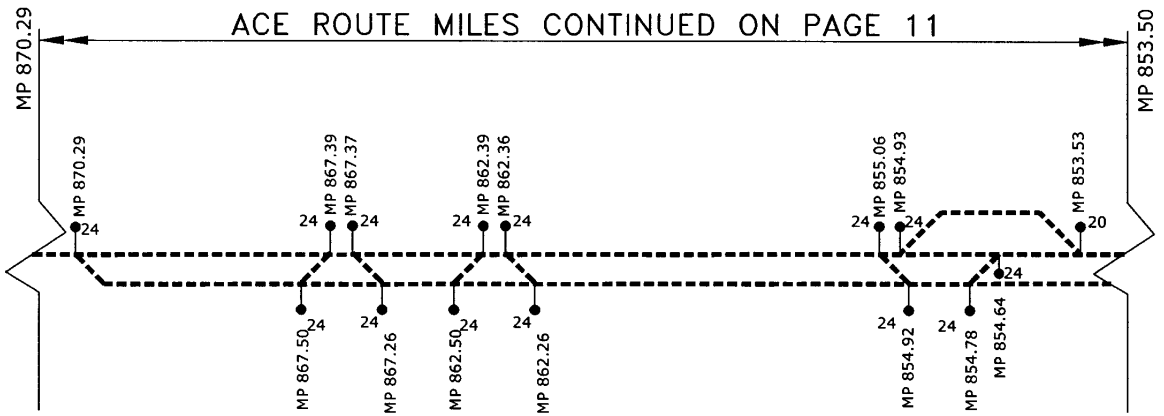
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*TURNOUT TYPES
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10S- #10 SPRING
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10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 2

PAGE 10 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **897.6**

TO: **VAUGHN CONNECTION** MP: **791.13**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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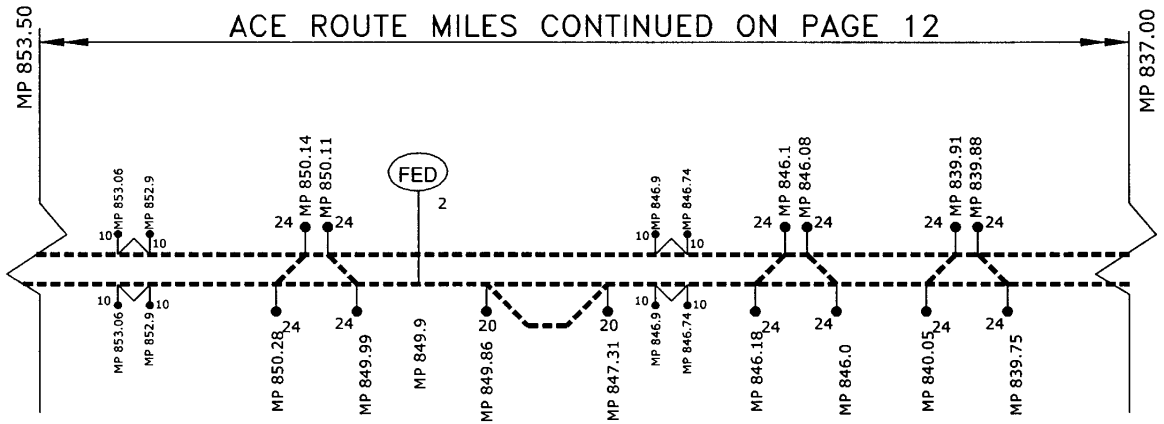
AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

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10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

NOTE

EXHIBIT: **III-B-4**



SEGMENT # 2

PAGE 11 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **897.6**

TO: **VAUGHN CONNECTION** MI

DATE: 03/24/04

NOT TO SCALE

NOTE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

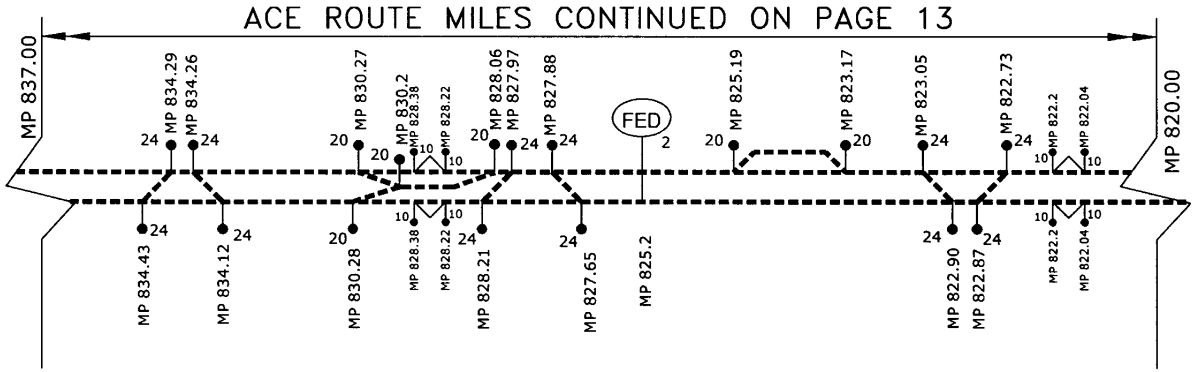
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
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AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
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14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**



SEGMENT # 2

PAGE 12 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **89[illegible].6**

TO: **VAUGHN CONNECTION** MP: **791.13**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

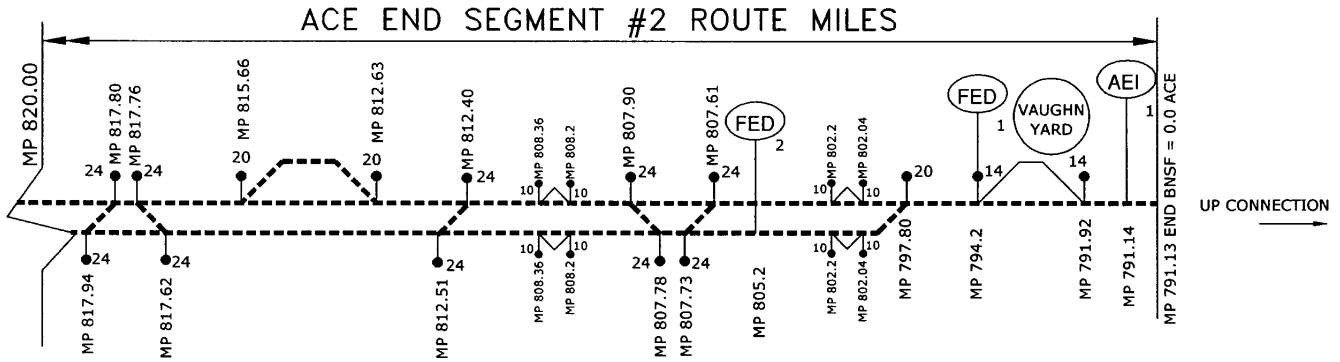
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 2

PAGE 13 OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

FROM: **BELEN JCT.** MP: **897.6**

TO: **VAUGHN CONNECTION** MP: **791.13**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

20 = TYPE* - TURNOUT

*TURNOUT TYPES

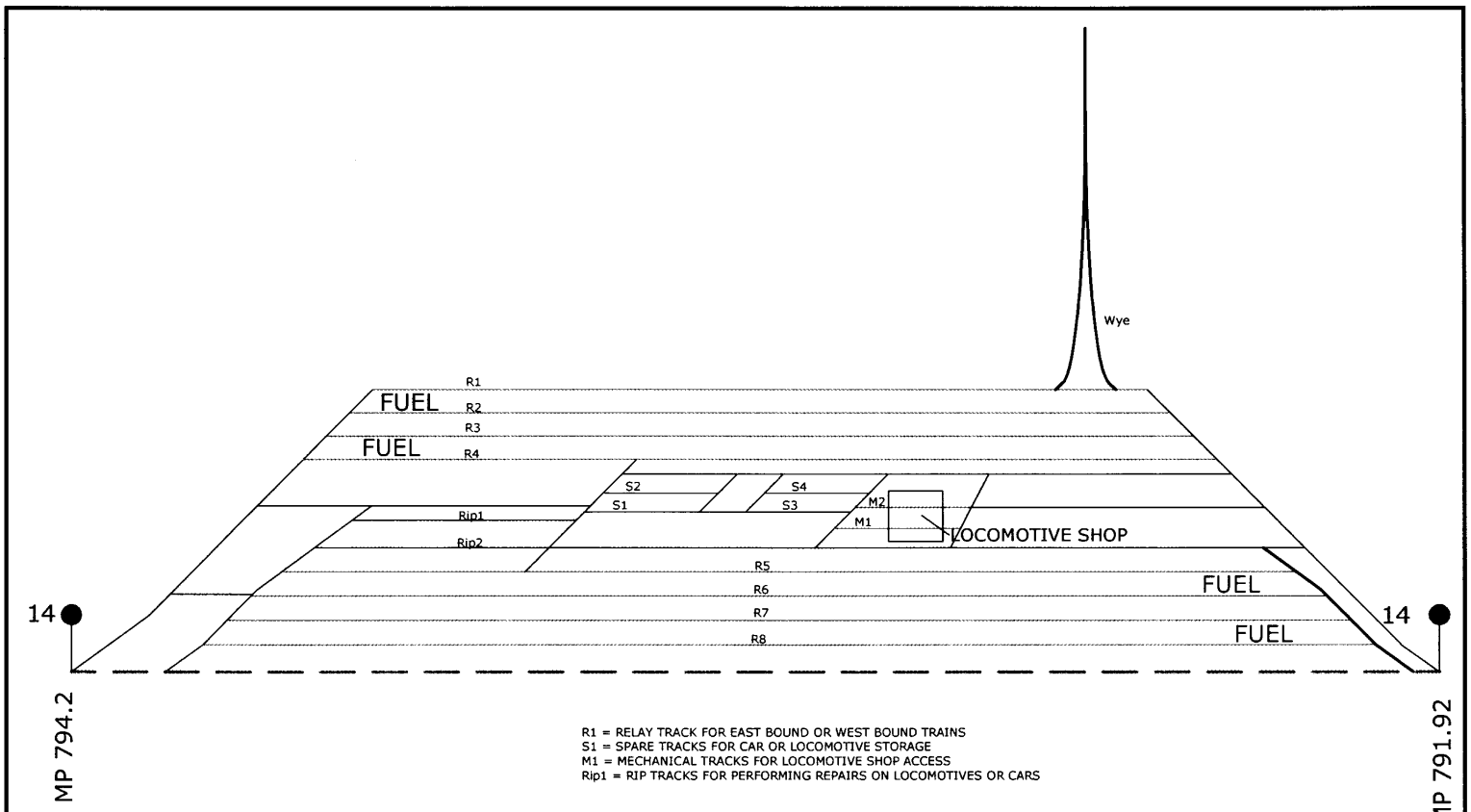
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
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HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

EXHIBIT: **III-B-4**

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #2B

PAGE 13a OF 26

DIVISION: **SOUTHWEST**

SUBDIVISION: **CLOVIS**

YARD: **VAUGHN YARD**

MP: **791.92**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

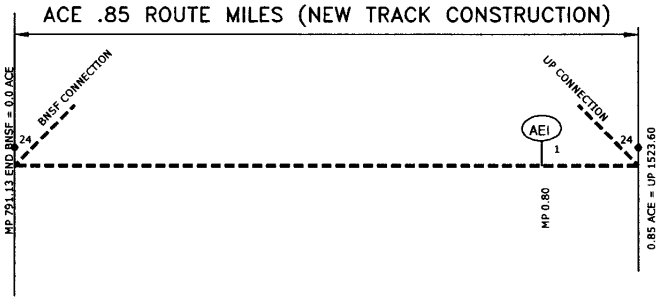
AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 2C

DIVISION: **SOUTHWEST**

DATE: 03/24/04

SUBDIVISION: **VAUGHN CONNECTOR**

FROM: **BNSF JCT** MP: **0.0**

TO: **UP JCT** MP: **0.85**

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED 1 — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

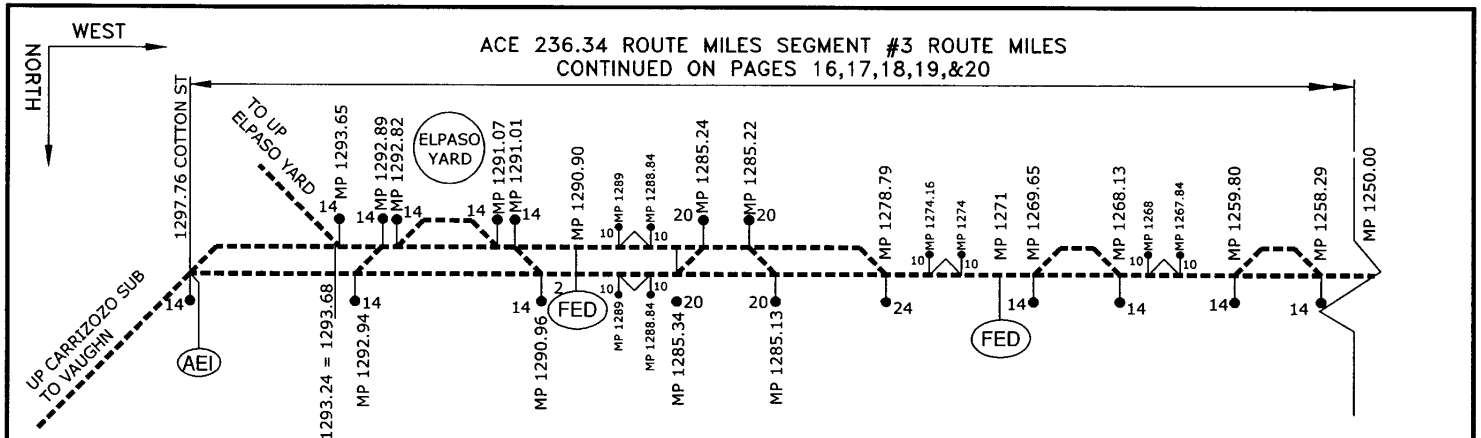
AEI 1 — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 3

PAGE 15 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

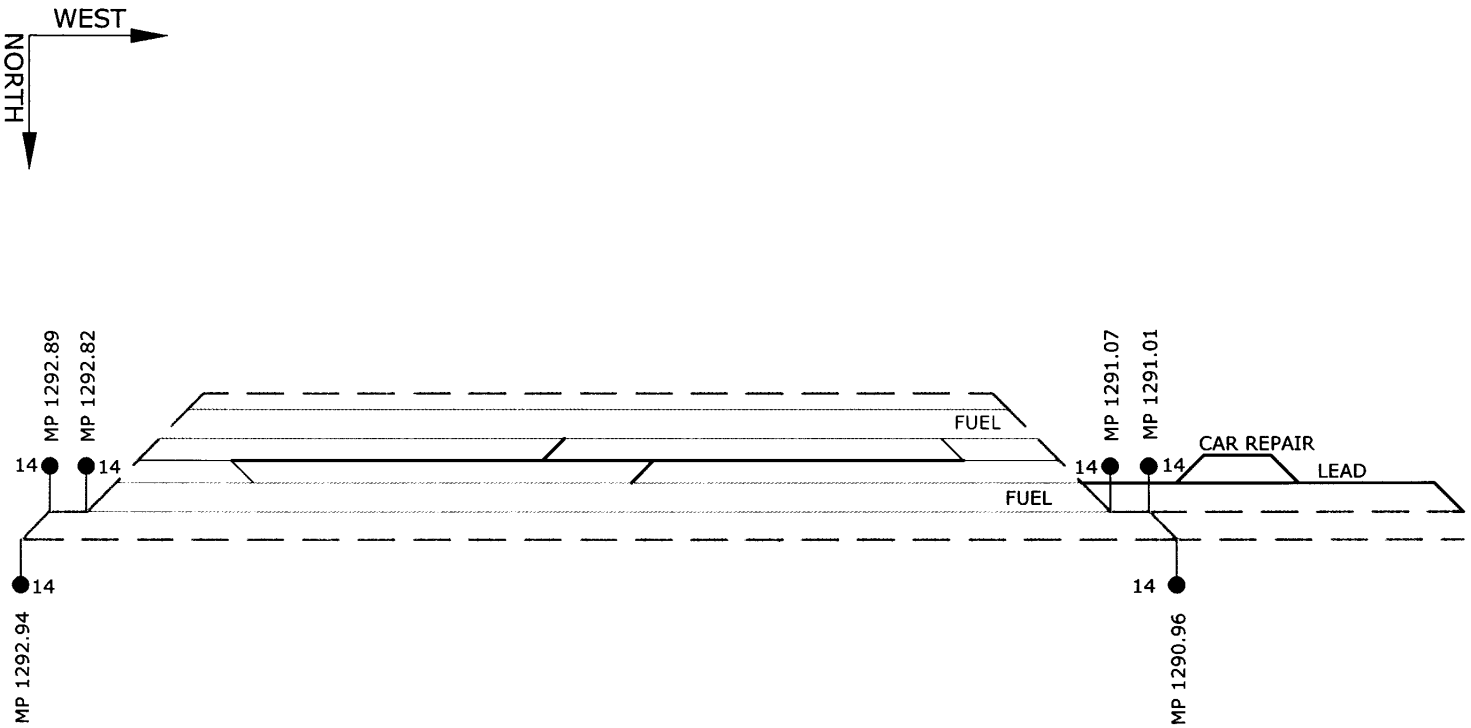
AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
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10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #3A
PAGE 15a OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

YARD: **EL PASO YARD**

DATE: 03/24/04

MP: **1292.94**

90.96

NOT TO SCALE

NOTE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

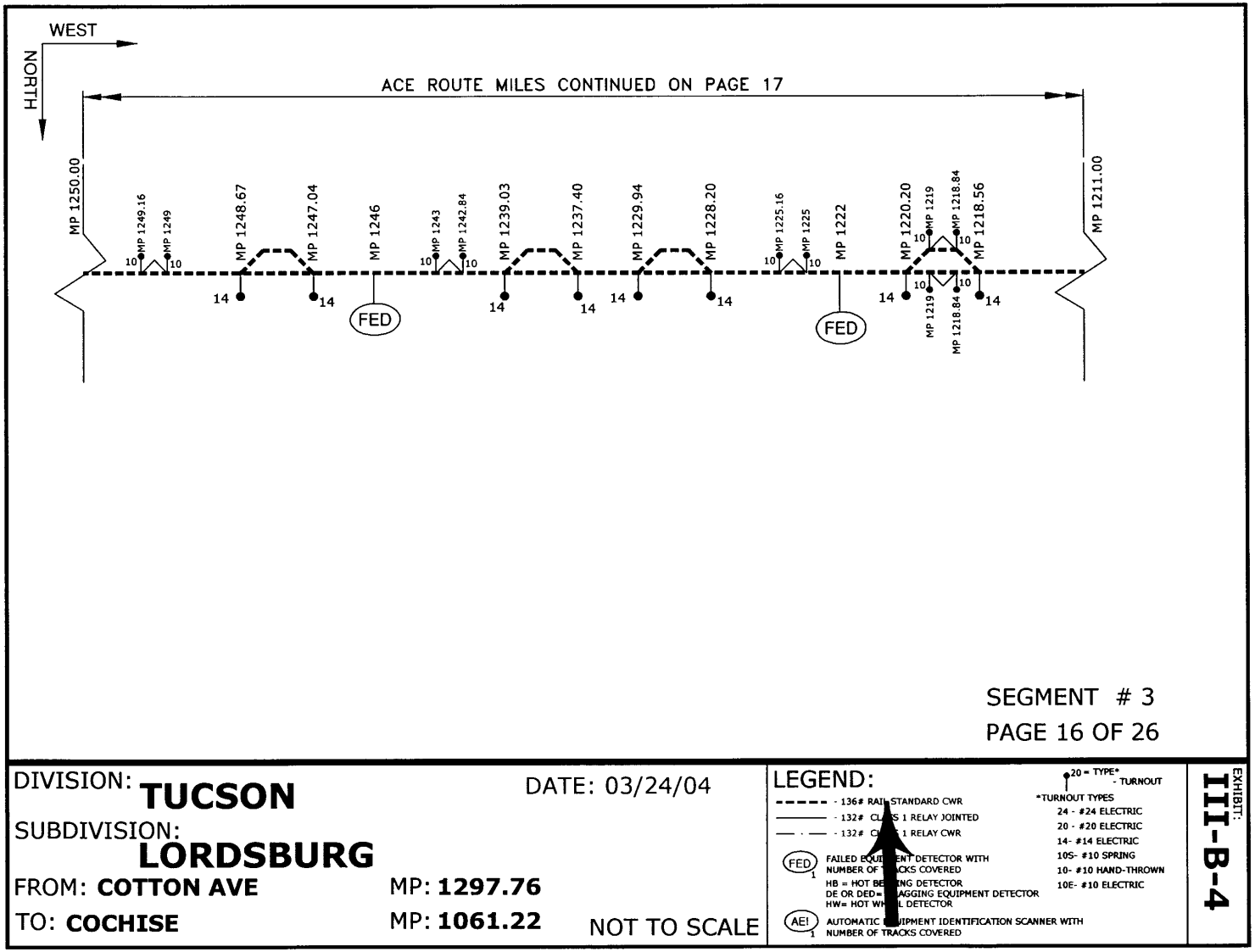
FED (1) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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AEI (1) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
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20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**



SEGMENT # 3

PAGE 16 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

FED — FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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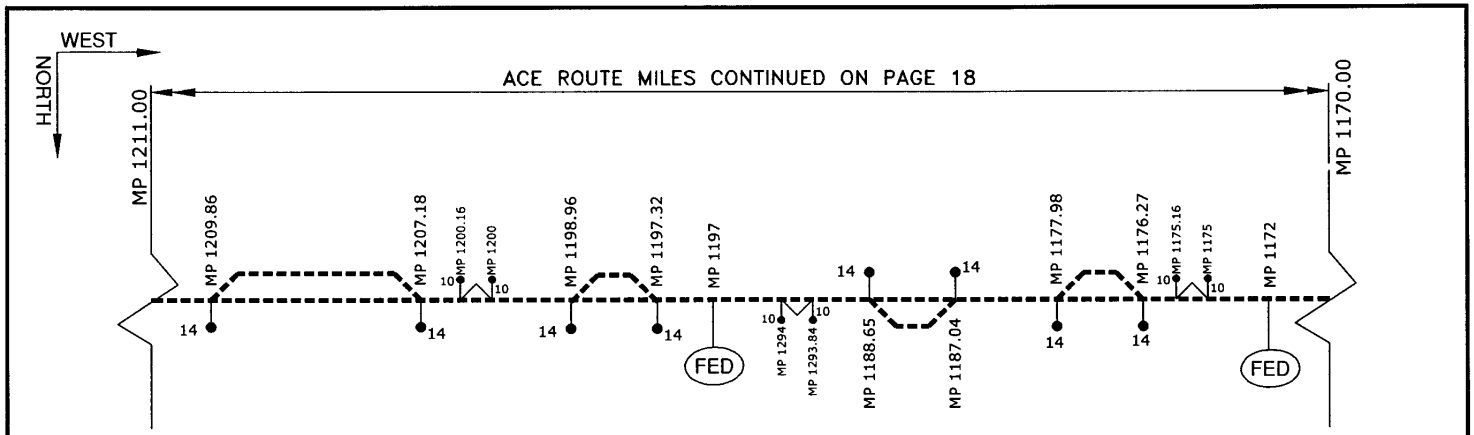
AEI — AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

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10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: III-B-4

NOTE



SEGMENT # 3

PAGE 17 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
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(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
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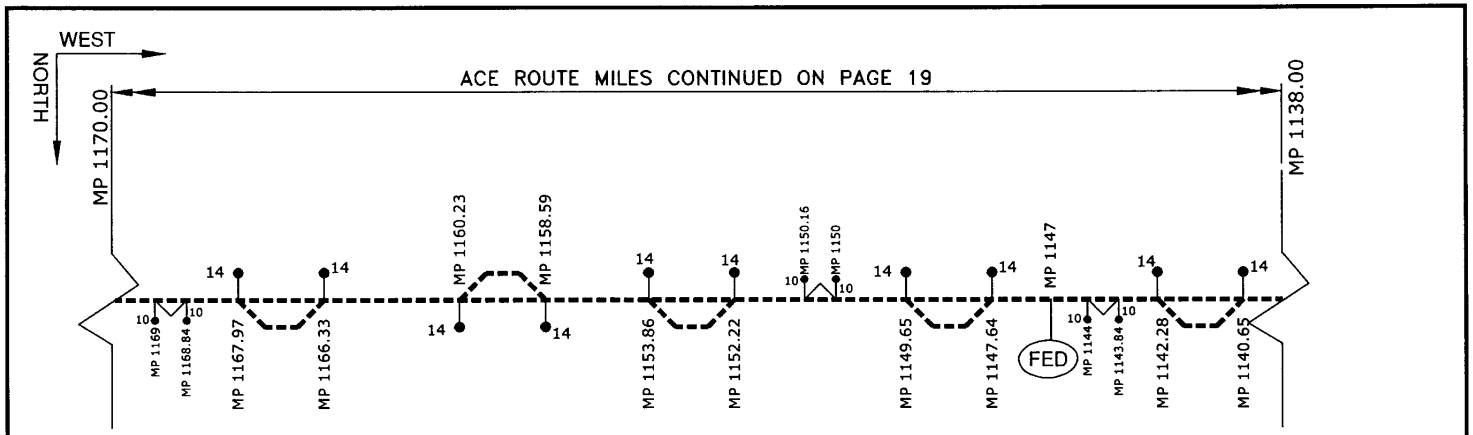
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24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 3

PAGE 18 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

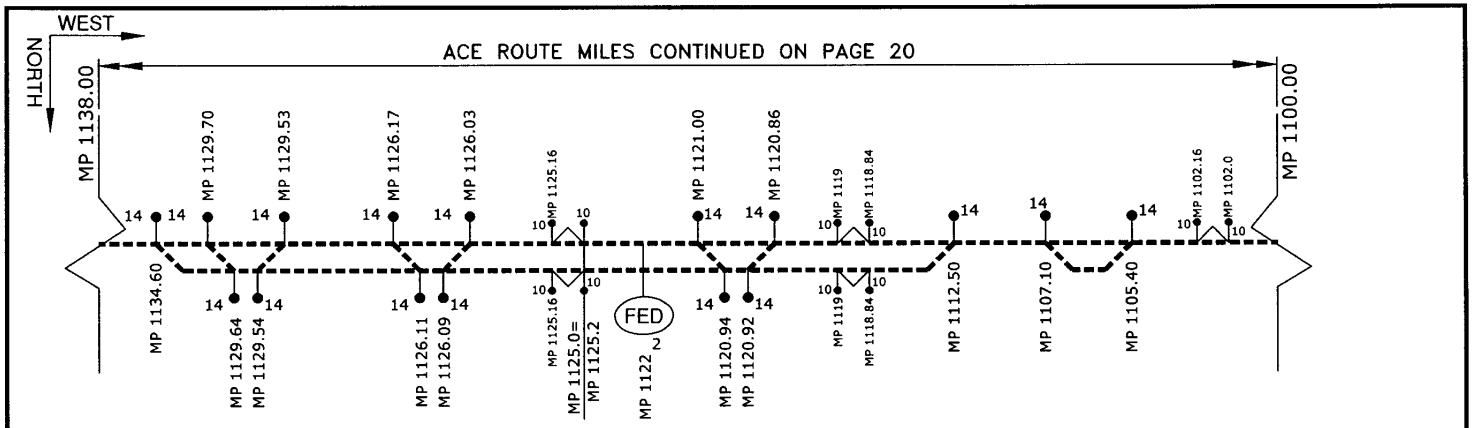
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



SEGMENT # 3

PAGE 19 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

NOTE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

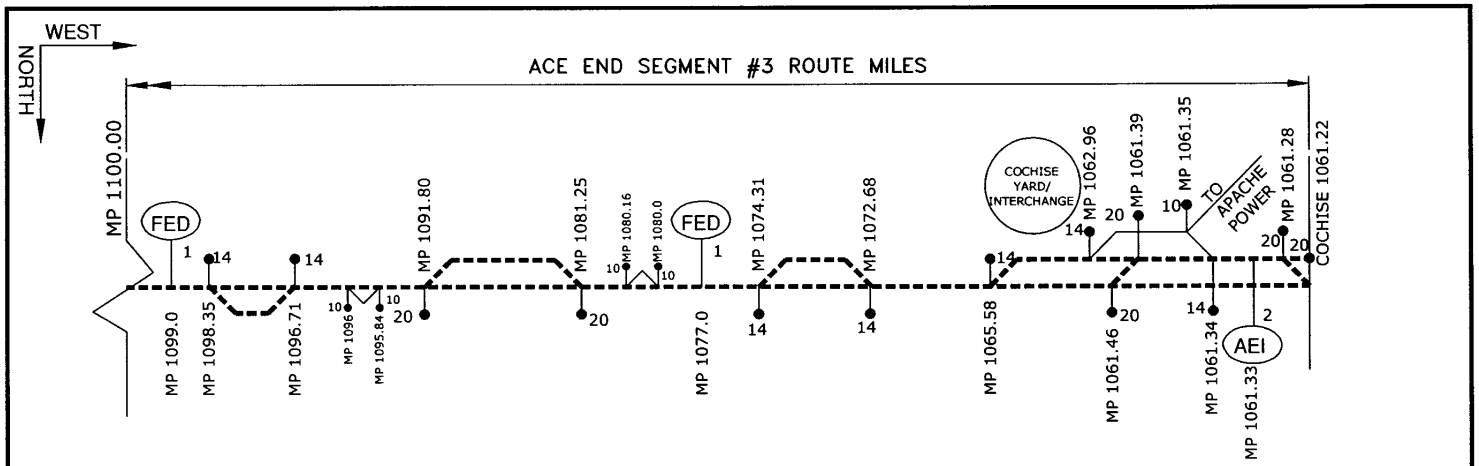
FED 1 FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

AEI 1 AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**



SEGMENT # 3

PAGE 20 OF 26

DIVISION: **TUCSON**

SUBDIVISION: **LORDSBURG**

FROM: **COTTON AVE** MP: **1297.76**

TO: **COCHISE** MP: **1061.22**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- 136# RAIL STANDARD CWR
- 132# CLASS 1 RELAY JOINTED
- 132# CLASS 1 RELAY CWR

(FED) FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

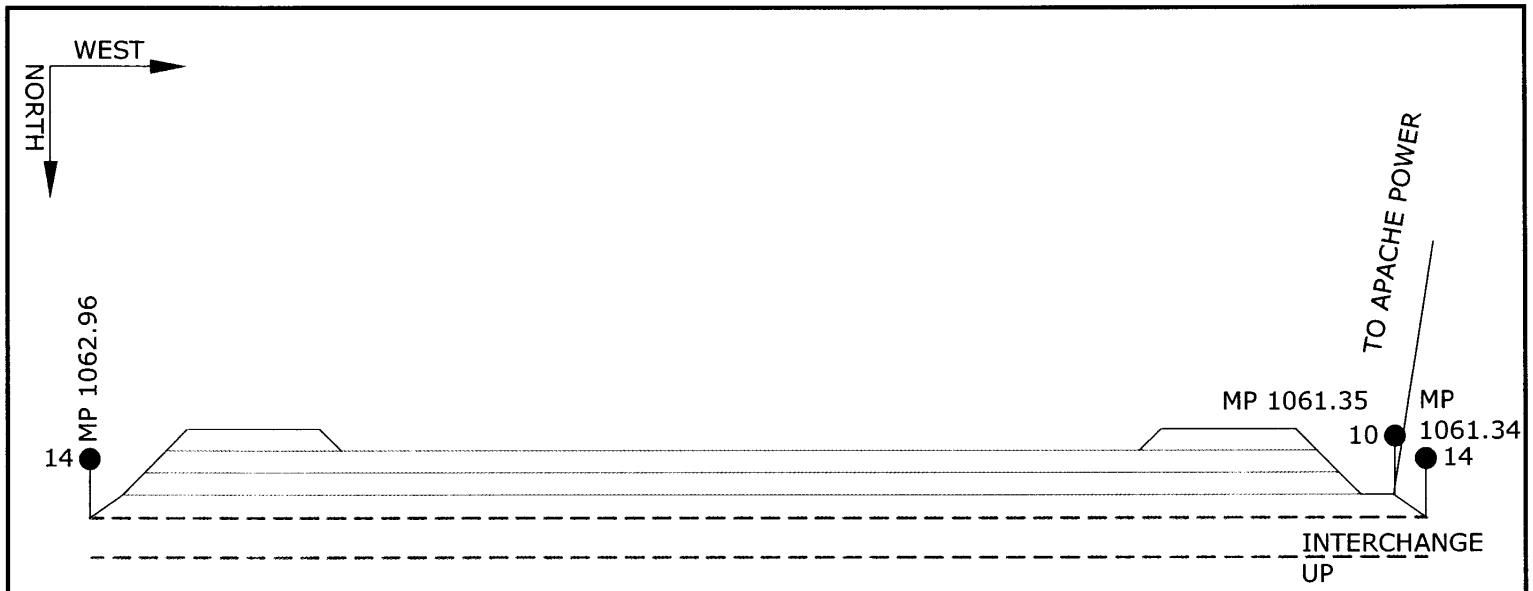
(AEI) AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE



ALL TURNOUTS ARE # 14
UNLESS OTHERWISE STATED

SEGMENT #3B

DIVISION: **TUSCON**

SUBDIVISION: **LORDSBURG**

YARD: **COCHISE YARD**

MP: **1062.96**

MP: **1061.34**

DATE: 03/24/04

NOT TO SCALE

LEGEND:

- ---------- - 136# RAIL STANDARD CWR
- ——— - 132# CLASS 1 RELAY JOINTED
- -·-·-·- - 132# CLASS 1 RELAY CWR

(FED)$_1$ FAILED EQUIPMENT DETECTOR WITH NUMBER OF TRACKS COVERED
HB = HOT BEARING DETECTOR
DE OR DED= DRAGGING EQUIPMENT DETECTOR
HW= HOT WHEEL DETECTOR

(AEI)$_1$ AUTOMATIC EQUIPMENT IDENTIFICATION SCANNER WITH NUMBER OF TRACKS COVERED

20 = TYPE* - TURNOUT

*TURNOUT TYPES
24 - #24 ELECTRIC
20 - #20 ELECTRIC
14- #14 ELECTRIC
10S- #10 SPRING
10- #10 HAND-THROWN
10E- #10 ELECTRIC

EXHIBIT: **III-B-4**

NOTE

Exhibit III-B-5

Estimated Impact On First Year Annual Cost Of Service Of Valero Logistics Operations, L.P.
If ACE's Vaughn Yard Requirements Are A New Load On the Valero Pipeline System
Calendar Year 2001

Line No.	Description	Actual Operations	Increase Due To New Supply Lateral	Adjusted After New Supply Lateral
1	**Low End Of Range - Construction Cost = $160,000/Mile**			
2	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
3	Depreciation Expense	$ 7,342,006	$ 184,526	$ 7,526,532
4	AFUDC Depreciation	$ 20,877		$ 20,877
5	Amortization of Deferred Earnings	$ 81,454		$ 81,454
6	Rate Base	$ 190,984,644	$ 4,800,000	$ 195,784,644
7	Rate of Return	9.28%	9.28%	9.28%
8	Return on Rate Base	$ 17,723,374	$ 445,440	$ 18,168,814
9	Income Tax Allowance	$ 6,738,157	$ 169,350	$ 6,907,507
10	Total Cost of Service	$ 61,552,985	$ 799,315	$ 62,352,300
11	Throughput in Barrels	139,580,609		139,580,609
12	Throughput in Gallons	5,862,385,578	177,025,000	6,039,410,578
13	Cost of Service per Gallon	$ 0.0105	$ (0.0002)	$ 0.0103
14				
15	**Mid Point Of Range - Construction Cost = $200,000/Mile**			
16	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
17	Depreciation Expense	$ 7,342,006	$ 230,657	$ 7,572,663
18	AFUDC Depreciation	$ 20,877		$ 20,877
19	Amortization of Deferred Earnings	$ 81,454		$ 81,454
20	Rate Base	$ 190,984,644	$ 6,000,000	$ 196,984,644
21	Rate of Return	9.28%	9.28%	9.28%
22	Return on Rate Base	$ 17,723,374	$ 556,800	$ 18,280,174
23	Income Tax Allowance	$ 6,738,157	$ 211,687	$ 6,949,844
24	Total Cost of Service	$ 61,552,985	$ 999,144	$ 62,552,129
25	Throughput in Barrels	139,580,609		139,580,609
26	Throughput in Gallons	5,862,385,578	177,025,000	6,039,410,578
27	Cost of Service per Gallon	$ 0.0105	$ (0.0001)	$ 0.0104
28				
29	**High End Of Range - Construction Cost = $240,000/Mile**			
30	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
31	Depreciation Expense	$ 7,342,006	$ 276,789	$ 7,618,795
32	AFUDC Depreciation	$ 20,877		$ 20,877
33	Amortization of Deferred Earnings	$ 81,454		$ 81,454
34	Rate Base	$ 190,984,644	$ 7,200,000	$ 198,184,644
35	Rate of Return	9.28%	9.28%	9.28%
36	Return on Rate Base	$ 17,723,374	$ 668,160	$ 18,391,534
37	Income Tax Allowance	$ 6,738,157	$ 254,024	$ 6,992,181
38	Total Cost of Service	$ 61,552,985	$ 1,198,973	$ 62,751,958
39	Throughput in Barrels	139,580,609		139,580,609
40	Throughput in Gallons	5,862,385,578	177,025,000	6,039,410,578
41	Cost of Service per Gallon	$ 0.0105	$ (0.0001)	$ 0.0104
42				
43	*Source: Actual Operations, Valero Logistics Operations, L.P., 2001 FERC Form 6, p. 700.*			

Exhibit III-B-6

Estimated Impact On First Year Annual Cost Of Service Of Valero Logistics Operations, L.P.
If ACE's Vaughn Yard Requirements Are Not A New Load On the Valero Pipeline System
Calendar Year 2001

Line No.	Description	Actual Operations	Increase Due To New Supply Lateral	Adjusted After New Supply Lateral
1	**Low End Of Range - Construction Cost = $160,000/Mile**			
2	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
3	Depreciation Expense	$ 7,342,006	$ 184,526	$ 7,526,532
4	AFUDC Depreciation	$ 20,877		$ 20,877
5	Amortization of Deferred Earnings	$ 81,454		$ 81,454
6	Rate Base	$ 190,984,644	$ 4,800,000	$ 195,784,644
7	Rate of Return	9.28%	9.28%	9.28%
8	Return on Rate Base	$ 17,723,374	$ 445,440	$ 18,168,814
9	Income Tax Allowance	$ 6,738,157	$ 169,350	$ 6,907,507
10	Total Cost of Service	$ 61,552,985	$ 799,315	$ 62,352,300
11	Throughput in Barrels	139,580,609		139,580,609
12	Throughput in Gallons	5,862,385,578	-	5,862,385,578
13	Cost of Service per Gallon	$ 0.0105	$ 0.0001	$ 0.0106
14				
15	**Mid Point Of Range - Construction Cost = $200,000/Mile**			
16	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
17	Depreciation Expense	$ 7,342,006	$ 230,657	$ 7,572,663
18	AFUDC Depreciation	$ 20,877		$ 20,877
19	Amortization of Deferred Earnings	$ 81,454		$ 81,454
20	Rate Base	$ 190,984,644	$ 6,000,000	$ 196,984,644
21	Rate of Return	9.28%	9.28%	9.28%
22	Return on Rate Base	$ 17,723,374	$ 556,800	$ 18,280,174
23	Income Tax Allowance	$ 6,738,157	$ 211,687	$ 6,949,844
24	Total Cost of Service	$ 61,552,985	$ 999,144	$ 62,552,129
25	Throughput in Barrels	139,580,609		139,580,609
26	Throughput in Gallons	5,862,385,578	-	5,862,385,578
27	Cost of Service per Gallon	$ 0.0105	$ 0.0002	$ 0.0107
28				
29	**High End Of Range - Construction Cost = $240,000/Mile**			
30	Operation & Maintenance Expenses	$ 29,647,117		$ 29,647,117
31	Depreciation Expense	$ 7,342,006	$ 276,789	$ 7,618,795
32	AFUDC Depreciation	$ 20,877		$ 20,877
33	Amortization of Deferred Earnings	$ 81,454		$ 81,454
34	Rate Base	$ 190,984,644	$ 7,200,000	$ 198,184,644
35	Rate of Return	9.28%	9.28%	9.28%
36	Return on Rate Base	$ 17,723,374	$ 668,160	$ 18,391,534
37	Income Tax Allowance	$ 6,738,157	$ 254,024	$ 6,992,181
38	Total Cost of Service	$ 61,552,985	$ 1,198,973	$ 62,751,958
39	Throughput in Barrels	139,580,609		139,580,609
40	Throughput in Gallons	5,862,385,578	-	5,862,385,578
41	Cost of Service per Gallon	$ 0.0105	$ 0.0002	$ 0.0107
42				
43	*Source: Actual Operations, Valero Logistics Operations, L.P., 2001 FERC Form 6, p. 700.*			

APACHE, COCHISE & EASTERN RAILROAD SERVICE UNITS - 2001

Item (1)	Locomotive Unit Miles (2)	Locomotive Hours (3)	Road Train Crew Starts (4)	Road Train Crew Overnight Stays (5)
1. Railroad Service Units 1/	669,738	16,348	780	781
2. 2001 Annual Service Units 2/	34,826,398	850,090	40,560	40,612
3. Annual Volume Based on Peak Week 2001 3/	91,475,277	91,475,277	91,475,277	91,475,277
4. 2001 Traffic Volume 4/	83,917,605	83,917,605	83,917,605	83,917,605
5. 2001 Service Units 5/	31,949,047	779,856	37,209	37,257
Crew and Equipment Requirements				
6. Peak Locomotive, Car and Crew Requirements 6/	xxx	100	276	xxx
7. Fixed SD40-2 Switch Locomotive and Crew Requirements 7/	210,310	5	26	xxx
8. Total Locomotive, Car and Crew Requirements 8/	32,159,357	105	302	xxx

1/ Service units for September 12-18, 2001.

2/ Line 1 x 52 weeks.

3/ C:\aepcosupreb\III-A\III-A-3\ACE Non-Coal Traffic and Revenue Forecast-RR Revised-asr_(Exh III-A-20).xls

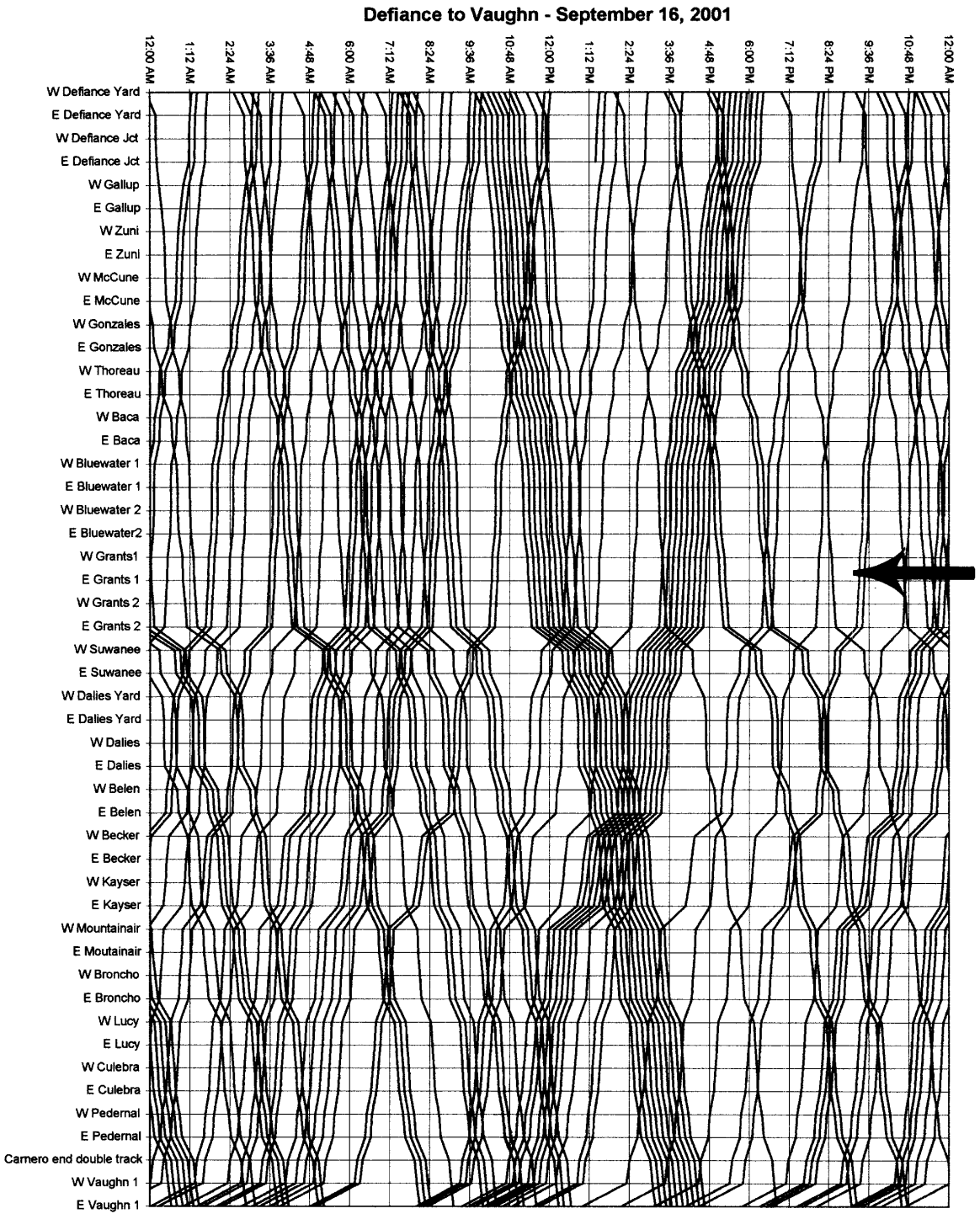
4/ C:\aepcosupreb\III-A\III-A-3\Restated Traffic and Revenue Summary-asr_(Exh III-A-21).xls

5/ Line 2 x Line 4 ÷ Line 3.

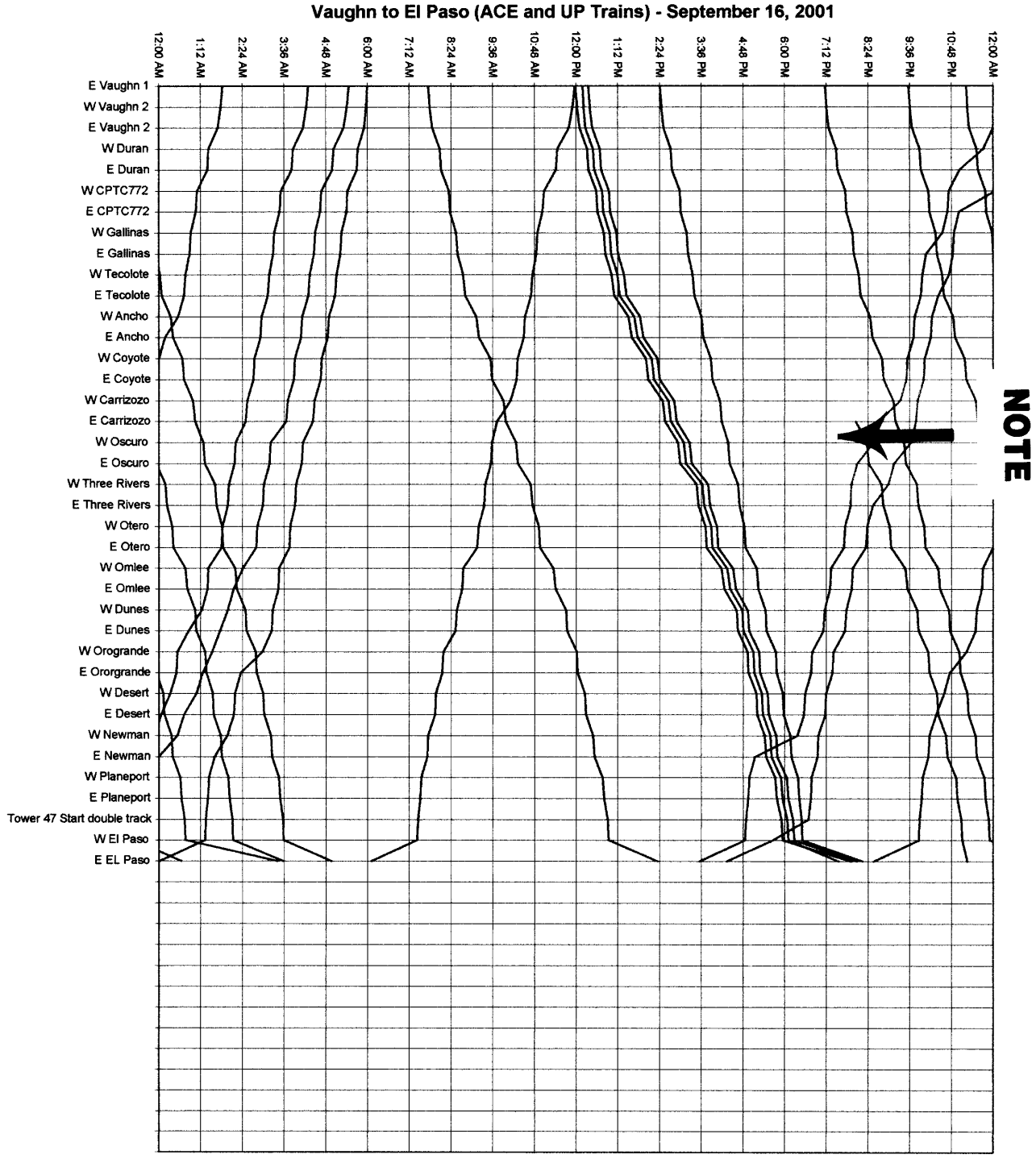
6/ Column (3) = Line 5 ÷ 8,760 hours per year x 1.05 x 1.062 (5% spare margin, 6.2% peaking factor).
Column (4) = Line 5 ÷ 270 starts per year per crew x 2 crew members.

7/ Column (2) = 2 locomotives at Vaughn and 2 locomotives at El Paso x 8,760 hours per year x 6 MPH plus 70 miles for ballastundercutting per year (spot maintainance.xls).
Column (3) = 2 switch locomotives required at Vaughn, 2 switch locomotives required at El Paso and 1 worktrain locomotive.
Column (4) = two - 2 man crews at Vaughn and one - 2 man crew at El Paso around the clock -- 3 crews x 2 men x 3 shifts x 365 days ÷ 270 starts per year per crew.

8/ Line 5 + Line 6 + Line 7.


Defiance to Vaughn - September 16, 2001
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
8:24 AM
9:36 AM
10:48 AM
12:00 PM
1:12 PM
2:24 PM
3:36 PM
4:48 PM
6:00 PM
7:12 PM
8:24 PM
9:36 PM
10:48 PM
12:00 AM
W Defiance Yard
E Defiance Yard
W Defiance Jct
E Defiance Jct
W Gallup
E Gallup
W Zuni
E Zuni
W McCune
E McCune
W Gonzales
E Gonzales
W Thoreau
E Thoreau
W Baca
E Baca
W Bluewater 1
E Bluewater 1
W Bluewater 2
E Bluewater2
W Grants1
E Grants 1
W Grants 2
E Grants 2
W Suwanee
E Suwanee
W Dalies Yard
E Dalies Yard
W Dalies
E Dalies
W Belen
E Belen
W Becker
E Becker
W Kayser
E Kayser
W Mountainair
E Moutainair
W Broncho
E Broncho
W Lucy
E Lucy
W Culebra
E Culebra
W Pedernal
E Pedernal
Carnero end double track
W Vaughn 1
E Vaughn 1

NOTE


Vaughn to El Paso (ACE and UP Trains) - September 16, 2001
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
8:24 AM
9:36 AM
10:48 AM
12:00 PM
1:12 PM
2:24 PM
3:36 PM
4:48 PM
6:00 PM
7:12 PM
8:24 PM
9:36 PM
10:48 PM
12:00 AM
E Vaughn 1
W Vaughn 2
E Vaughn 2
W Duran
E Duran
W CPTC772
E CPTC772
W Gallinas
E Gallinas
W Tecolote
E Tecolote
W Ancho
E Ancho
W Coyote
E Coyote
W Carrizozo
E Carrizozo
W Oscuro
E Oscuro
W Three Rivers
E Three Rivers
W Otero
E Otero
W Omlee
E Omlee
W Dunes
E Dunes
W Orogrande
E Ororgrande
W Desert
E Desert
W Newman
E Newman
W Planeport
E Planeport
Tower 47 Start double track
W El Paso
E EL Paso
NOTE

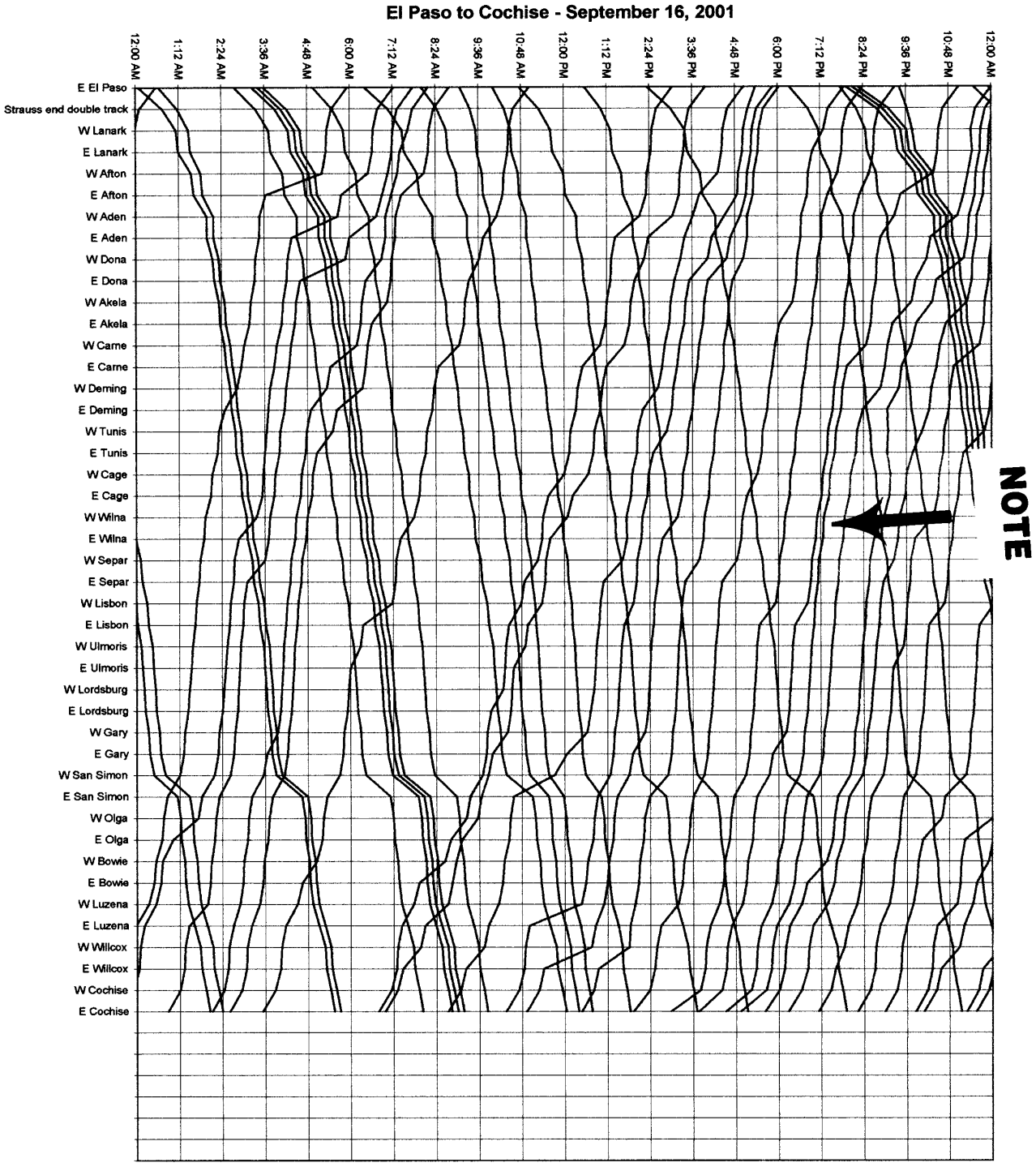

El Paso to Cochise - September 16, 2001
12:00 AM
1:12 AM
2:24 AM
3:36 AM
4:48 AM
6:00 AM
7:12 AM
8:24 AM
9:36 AM
10:48 AM
12:00 PM
1:12 PM
2:24 PM
3:36 PM
4:48 PM
6:00 PM
7:12 PM
8:24 PM
9:36 PM
10:48 PM
12:00 AM
E El Paso
Strauss end double track
W Lanark
E Lanark
W Afton
E Afton
W Aden
E Aden
W Dona
E Dona
W Akela
E Akela
W Carne
E Carne
W Deming
E Deming
W Tunis
E Tunis
W Cage
E Cage
W Wilna
E Wilna
W Separ
E Separ
W Lisbon
E Lisbon
W Ulmoris
E Ulmoris
W Lordsburg
E Lordsburg
W Gary
E Gary
W San Simon
E San Simon
W Olga
E Olga
W Bowie
E Bowie
W Luzena
E Luzena
W Willcox
E Willcox
W Cochise
E Cochise
NOTE

Exhibit III-D-1
Redacted

III-F Road Property
Investment

Exhibit III-F-14
Redacted

DEVELOPMENT OF SUPP. REBUTTAL CLEARING, GRUBBING, LATERAL DRAINAGE, RIP RAP AND RETAINING WALL QUANTITIES AND COSTS FOR THE ACE RAILROAD

	Segment From (1)	Segment To (2)	Valuation Section (3)	Route Miles 1/ (4)	Add. Track 2/ (5)	Yard Track 3/ (6)	Track Miles (7)	Rip Rap Cubic Yards: Per Main Line Miles 4/ (8)	Rip Rap Cubic Yards: Total 5/ (9)	Retaining Walls CY of Masonry: Per Main Line Miles 4/ (10)	Retaining Walls CY of Masonry: Total 6/ (11)	Lateral Drainage LF of Pipe: Per Main Line Miles 4/ (12)	Lateral Drainage LF of Pipe: Total 7/ (13)	Clearing (acres): Per Track Miles 4/ (14)	Clearing (acres): Historic to New Ratio (15)	Clearing (acres): Total 8/ (16)	Grubbing (acres): Per Track Miles 2/ (17)	Grubbing (acres): Historic to New Ratio (18)	Grubbing (acres): Total 9/ (19)
1.	Defiance Yard	W. Defiance	ATSF-NM-13,13A	2.00	0.00	6.63	8.63	369.12	738.25	11.28	22.57	0.00	0.00	2.63	1.2991	29.47	0.00	1.2991	0.00
2.	W. Defiance	West Baca	ATSF-NM-13,13A	75.41	40.21		115.62	369.12	27837.37	11.28	850.87	0.00	0.00	2.63	1.2991	394.84	0.00	1.2991	0.00
3.	West Baca	Belen Jct	ATSF-NM-13,13A	113.90	98.27	3.15	215.32	369.12	42043.44	11.28	1285.10	0.00	0.00	2.63	1.2991	735.28	0.00	1.2991	0.00
4.	Belen Jct	Vaughn	ATSF-NM-9	106.47	114.47	22.74	243.68	56.75	6042.25	0.00	0.00	0.00	0.00	3.62	1.2523	1105.16	0.00	1.2523	0.00
5.	Vaughn Connection		ATSF-NM-9	0.85	0.00		0.85	56.75	48.24	0.00	0.00	0.00	0.00	3.62	1.2523	3.86	0.00	1.2523	0.00
6.	El Paso	TX/NM State Line	EPNE-TX-1	4.80	4.80		9.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.4852	0.00	0.00	1.4852	0.00
7.	El Paso	AZ/NM Line	SP-NM-1	167.68	52.33	9.29	229.30	1.79	299.60	0.21	35.95	0.00	0.00	3.67	1.4951	1256.52	0.00	1.4951	0.00
8.	AZ/NM Line	Cochise	SP-AZ-5	63.86	33.47	5.02	102.35	210.14	13419.45	0.00	0.00	0.00	0.00	12.38	1.4681	1860.27	0.00	1.4681	0.00
9.	Defiance	McKinley	10/	20.40	1.79		22.19		885.00		0.00		39.00			62.50			62.50
10.	Subtotal Line Segment Earthwork Quantities:			555.38	345.34	46.83	947.54		91313.59		2194.49		39.00			5447.90			62.50
11.	Unit Cost 11/								$37.53		$157.91		$13.67			$184.14			$0.00
12.	Clearing Unit Cost for Defiance Spur															$4,679.25			$2,945.18
13.	Subtotal Cost 12/			$5,242,203					$3,426,908		$346,541		$533			$1,284,147 14/			$184,073
14.	Additional Retaining Walls 13/			$337,856							$337,856								
15.	Total Cost 15/			$5,580,059					$3,426,908		$684,397		$533			$1,284,147			$184,073

1/ Column (4) - Supp. Rebuttal Exhibit III-F-17, Column (8) + Column (9), (route miles plus miles of non-parallel second main)
2/ Supp. Rebuttal Exhibit III-F-17, Column (10) + Column (11), (miles of parallel second main and passing sidings)
3/ Supp. Rebuttal Exhibit III-F-18
4/ Opening Exhibit III-F-3
5/ Column (4) x Column (5)
6/ Column (4) x Column (7)
7/ Column (4) x Column (9)
8/ Column (7) x Column (11) x Column (12)
9/ Column (7) x Column (14) x Column (15)
10/ Actual quantities for Defiance Branch - See Opening Workpaper Vol. 9, pages 4420 to 4422.
11/ See "ACE RR Grading Rebuttal.xls" sheet:IIIF Unit Costs
12/ Line 10 x Line 11
13/ See "ACE RR Grading Rebuttal.xls" sheet:IIIF_Other Retaining
14/ Line 9 * Line 12 + sum of lines 1 through 8 * Line 11
15/ Line 13 + Line 14

ICC ENGINEERING REPORT SUPP. REBUTTAL QUANTITIES ADJUSTED TO REFLECT APACHE, COCHISE & EASTERN RAILROAD DESIGN SPECIFICATIONS

Valuation Section (1)	ICC Engineering Report Data: Miles Main Line 1/ (2)	ICC Engineering Report Data: Total Earthwork Quantities (CY) 2/ (3)	ICC Engineering Report Data: Earthwork Per Main Line Mile (CY) 3/ (4)	Restated Adjusted Earthwork Quantities Per Mile 15' Track Center (24' Roadbed) 4/: Single Track (CY) (5)	Restated Adjusted Earthwork Quantities Per Mile 15' Track Center (24' Roadbed) 4/: Double Track (CY) (6)	Restated Adjusted Earthwork Quantities Per Mile 15' Track Center (24' Roadbed) 4/: Additional Track (CY) 5/ (7)	Restated Adjusted Earthwork Quantities Per Mile 25' Track Center (24' Roadbed) 4/: Single Track (CY) (5)	Restated Adjusted Earthwork Quantities Per Mile 25' Track Center (24' Roadbed) 4/: Double Track (CY) (6)	Restated Adjusted Earthwork Quantities Per Mile 25' Track Center (24' Roadbed) 4/: Additional Track (CY) 5/ (7)
ATSF-NM-13,13A	214.224	8,499,139	39,674	56,988	72,238	15,250	56,988	82,405	25,417
ATSF-NM-9	108.492	6,248,574	57,595	79,776	99,717	19,942	79,776	113,012	33,236
EPNE-TX-1	19.943	212,003	10,630	11,434	17,452	6,017	11,434	21,463	10,029
SP-NM-1	167.902	2,689,032	16,015	29,842	38,528	8,686	29,842	44,319	14,476
SP-AZ-5	91.611	1,687,329	18,418	33,761	43,494	9,733	33,761	49,983	16,222

1/ Opening Exhibit III-F-3, page 1 of 1, column (4) (note: Miles main line for ATSF-NM-13,13A includes 35.13 miles of non-parallel senond main.)
2/ Opening Exhibit III-F-6, column (6)
3/ Column (3) ÷ Column (2)
4/ Reflects adjustment to ICC Engineering Report quantities to account for the ACE Railroad roadbed width requirements.
5/ Column (6) - Column (5)
6/ Column (9) - Column (8)

Total Supp. Rebuttal Earthwork Quantities by Line Segment for the Apache, Cochise & Eastern Railroad

	Segment From (1)	Segment To (2)	Valuation Section (3)	Roadbed Width (4)	Adjusted Cubic Yards per Mile 1/ Single Track (5)	Second Main (6)	Additional Track (7)	Route Miles 2/ (8)	Non-Parallel 2nd Main 3/ (9)	Parallel 2nd Main 4/ (10)	Additional Track 4/ (11)	Total Earthwork (CY) 5/ (12)
1.	Defiance Yard	W. Defiance	ATSF-NM-13,13A	24	56,988	25,417	15,250	2.00	0.00	0.00	0.00	113,976
2.	W. Defiance	West Baca	ATSF-NM-13,13A	24	56,988	25,417	15,250	51.20	24.21	30.66	9.55	5,222,632
3.	West Baca	Belen Jct	ATSF-NM-13,13A	24	56,988	25,417	15,250	100.21	13.69	86.92	11.35	8,873,231
4.	Belen Jct	Vaughn	ATSF-NM-9	24	79,776	33,236	19,942	106.47	0.00	95.04	19.43	12,039,928
5.	Vaughn Connection		ATSF-NM-9	24				0.85	0.00	0.00	0.00	17,400 6/
6.	El Paso	TX/NM State Line	EPNE-TX-1	24	11,434	10,029	6,017	4.80	0.00	4.80	0.00	103,022
7.	El Paso	AZ/NM Line	SP-NM-1	24	29,842	14,476	8,686	167.68	0.00	23.69	28.64	5,595,665
7A.	Remove El Paso Trainway Excavation		SP-NM-1	24	29,842	14,476	8,686					(27,699) 7/
8.	AZ/NM Line	Cochise	SP-AZ-5	24	33,761	16,222	9,733	63.86	0.00	23.33	10.14	2,633,162
9.	Defiance	McKinley	CARDS	24				20.40	0.00	0.00	1.79	1,099,044 8/
10.	Total							517.47	37.91	264.44	80.90	35,670,361

1/ Supp. Rebuttal Exhibit III-F-16, Columns (5) and (7)
2/ AEPCO Opening workpapers, electronic file "ACE RR Miles.xls"
3/ Miles of non-parallel track from identified BNSF trackcharts, Opening Workpaper Vol.9, pages 4494 to 4502.
4/ Based on double track, passing sidings and set-out track locations and lengths shown in Supp. Rebuttal Exhibit III-B-4
5/ (Column (5) x (Column (8)+ Column (9)) + (Column (6) x Column (10)) + (Column (7) x Column (11))
6/ Total cubic yards of earthwork for connection at Vaughn, Opening Workpaper Vol. 9, pages 4445 to 4493.
7/ Excavation is included in the total construction costs for the 3300 foot El Paso Trainway used by both Defendants and AEPCO.
8/ Grading for Defiance Branch based on CARDS analysis (see Opening Workpaper Vol. 9, pages 4423 to 4444 and electronic workpaper folder "CARDS")

SUPP. REBUTTAL EARTHWORK QUANTITIES FOR THE YARDS OF THE APACHE, COCHISE & EASTERN RAILROAD

Item (1)	Track Feet 1/ (2)	Track Mile (3)	Cubic Yard Calculation (4)	Cubic Yards of Earthwork: Common (5)	Loose Rock (6)	Solid Rock (7)	Borrow (8)	Total (9)
1. Yard Locations								
a. Defiance	35,006	6.63	column (2) x 1' fill x 15' spacing /27				19,448	19,448
b. Dalies	16,626	3.15	column (2) x 1' fill x 15' spacing /27				9,237	9,237
c. Belen	17,539	3.32	column (2) x 1' fill x 15' spacing /27				9,744	9,744
d. Vaughn	102,513	19.42	Supp. Reb. Workpaper 00564 2/	297,617	37,202	37,202	0	372,021
e. El Paso	49,062	9.29	Supp. Reb. Workpaper 00583 2/	1,550,964	193,871	193,871	0	1,938,705
f. Cochise	26,493	5.02	column (2) x 1' fill x 15' spacing /27				14,718	14,718
2. Total for all ACE yards	247,239	46.83	Sum of Lines 1a - 1f	1,848,581	231,073	231,073	53,147	2,363,873

1/ Supp. Rebuttal Electronic workpaper "Yardcomputations.xls"

2/	Common	80.00%
	Loose rock	10.00%
	Solid Rock	10.00%
	Total	100.00%

DEVELOPMENT OF TOTAL SUPP. REBUTTAL EARTHWORK QUANTITIES AND COSTS
BY TYPE OF MATERIAL MOVED FOR THE APACHE, COCHISE & EASTERN RAILROAD

	Segment From (1)	Segment To (2)	Valuation Section (3)	Total Earthwork (CY) 1/ (4)	DISTRIBUTION PERCENT 2/ Common (5)	Loose Rock (6)	Solid Rock (7)	Borrow (8)	EARTHWORK QUANTITIES (CY) Common 3/ (9)	Loose Rock 4/ (10)	Solid Rock 5/ (11)	Borrow 6/ (12)
1.	Defiance Yard	W. Defiance	ATSF-NM-13,13A	113,976	85.44%	1.62%	5.40%	7.54%	97,384	1,843	6,152	8,598
2.	W. Defiance	West Baca	ATSF-NM-13,13A	5,222,632	85.44%	1.62%	5.40%	7.54%	4,462,337	84,429	281,904	393,961
3.	West Baca	Belen Jct	ATSF-NM-13,13A	8,873,231	85.44%	1.62%	5.40%	7.54%	7,581,493	143,445	478,955	669,339
4.	Belen Jct	Vaughn	ATSF-NM-9	12,039,928	66.89%	6.82%	17.05%	9.25%	8,053,341	820,960	2,052,421	1,113,206
5.	Vaughn Connection		ATSF-NM-9	17,400	100.00%				17,400	0	0	0
6.	El Paso	TX/NM State Line	EPNE-TX-1	103,022	13.08%	11.46%	0.13%	75.33%	13,474	11,808	136	77,603
7.	El Paso	AZ/NM Line	SP-NM-1	5,595,665	80.55%	8.11%	10.71%	0.63%	4,507,328	453,653	599,291	35,392
7A.	Remove El Paso Trainway Excavation		SP-NM-1	(27,699)	80.55%	8.11%	10.71%	0.63%	(22,312)	(2,246)	(2,967)	(175)
8.	AZ/NM Line	Cochise	SP-AZ-5	2,633,162	89.37%	6.26%	3.57%	0.79%	2,353,377	164,818	94,037	20,931
9.	Defiance	McKinley	CARDS 7/	1,099,044	62.80%	0.00%	7.95%	29.25%	690,174	0	87,370	321,500
10.	Subtotal Line Segment Earthwork Quantities:			35,670,361					27,753,997	1,678,710	3,597,299	2,640,355
11.	Cubic yard of earthwork for Yards 8/			2,363,873					1,848,581	231,073	231,073	53,147
12.	Total Earthwork Quantities 9/			38,034,234					29,602,578	1,909,782	3,828,372	2,693,502
13.	Cost per cubic yard 10/			xxx					$3.57	$6.75	$9.14	$11.31
14.	Total Earthwork Costs 11/			$183,987,670					$105,655,899	$12,888,960	$34,990,908	$30,451,903

1/ Supp. Rebuttal Exhibit III-F-17, Column (12)
2/ Opening Exhibit III-F-6, Columns (7) through (10)
3/ Column (4) x Column (5)
4/ Column (4) x Column (6)
5/ Column (4) x Column (7)
6/ Column (4) x Column (8)
7/ Grading for Defiance Branch based on CARDS analysis (see Opening Workpaper Vol.9, pages 4419 to 4444 and Opening electronic workpaper folder "CARDS")
8/ Supp. Rebuttal Exhibit III-F-18
9/ Line 10 + Line 11
10/ See "ACE RR Grading Rebuttal.xls"
11/ Column (9) through Column (12), Line 12 x Line 13; Column (4), sum of Column (9) through Column (12)

Exhibit III-F-20
Redacted

III-G Discounted Cash Flow Analysis

W. W. Whitehurst & Associates, Inc.

Exhibit III-G-1
Page 1 of 2

Calculation of Average Age of Railroad-Owned and Used Assets - 2001

Line No.	Description (1)	Source or Computation (2)	BNSF (3)	CSXT (4)	NS (5)	GTW (6)	IC (7)	KCS (8)	SOO (9)	UP (10)	Total or Composite (11)
	Annual Composite Depr Rate										
1	Total Assets	Note 1	3.65%	3.37%	3.18%	2.50%	2.91%	3.17%	3.29%	3.74%	3.52%
2	Road	Sch 332, L.30(d)	3.12%	2.90% [2]	2.71%	1.73%	2.49%	3.11%	3.37%	3.52%	3.14% [3]
3	Equipment	Sch 332, L.39(d)	6.04%	4.32% [2]	3.96%	4.11%	5.29%	3.48%	3.15%	4.39%	4.57% [3]
4	Computer Systems	Sch 332, L.38(d)	16.24%	14.29%	16.67%	11.88%	14.52%	13.10%	14.98%	15.45%	15.87% [3]
	Average Life of Assets (Years)										
5	Total Assets	1 / L.1	27.4	29.7	31.5	40.1	34.4	31.6	30.4	26.8	28.4
6	Road	1 / L.2	32.1	34.5	36.9	57.8	40.2	32.2	29.7	28.4	31.8
7	Equipment	1 / L.3	16.6	23.2	25.3	24.3	18.9	28.7	31.7	22.8	21.9
8	Computer Systems	1 / L.4	6.2	7.0	6.0	8.4	6.9	7.6	6.7	6.5	6.3
	Depreciation Base (at 12/31)										
9	Total Assets	L.10 + L.11	25,557,966	16,276,021	14,588,590	749,609	1,581,672	1,694,075	1,320,802	29,879,057	91,647,792
10	Road	Sch 332, L.30(c)	20,917,225	10,832,980	9,115,017	508,185	1,346,153	1,422,738	862,050	22,451,572	67,455,920
11	Equipment	Sch 332, L.39(c)	4,640,741	5,443,041	5,473,573	241,424	235,519	271,337	458,752	7,427,485	24,191,872
12	Computer Systems	Sch 332, L.38(c)	279,249	39,603	266,536	8,283	36,533	19,179	5,600	261,977	916,960
	Average Annual Depreciation										
13	Total Assets	L.9 * L.1	932,918	548,904	463,770	18,714	45,978	53,690	43,502	1,116,362	3,223,838
14	Road	L.10 * L.2	652,617	313,872	247,017	8,792	33,519	44,247	29,051	790,295	2,119,410
15	Equipment	L.11 * L.3	280,301	235,032	216,753	9,923	12,459	9,443	14,451	326,067	1,104,428
16	Computer Systems	L.12 * L.4	45,350	5,659	44,432	984	5,305	2,512	839	40,475	145,556
	Accumulated Depreciation (at 12/31)										
17	Total Assets	L.18 + L.19	4,930,158	4,419,645	5,124,449	301,634	119,305	602,663	387,384	7,119,367	23,004,605
18	Road	Sch 335, L.30(g)	3,793,229	2,330,920	2,806,867	218,154	79,352	471,839	205,110	4,862,222	14,767,693
19	Equipment	Sch 335, L.40(g)	1,136,929	2,088,725	2,317,582	83,480	39,953	130,824	182,274	2,257,145	8,236,912
20	Computer Systems	Sch 335, L.38(g)	90,129	38,821	152,844	8,863	28,400	18,695	1,891	138,052	477,695
	Average Life Expended (Years)										
21	Total Assets	L.17 / L.13	5.3	8.1	11.0	16.1	2.6	11.2	8.9	6.4	7.1
22	Road	L.18 / L.14	5.8	7.4	11.4	24.8	2.4	10.7	7.1	6.2	7.0
23	Equipment	L.19 / L.15	4.1	8.9	10.7	8.4	3.2	13.9	12.6	6.9	7.5
24	Computer Systems	L.20 / L.16	2.0	6.9	3.4	9.0	5.4	7.4	2.3	3.4	3.3

III-H Results of SAC Analysis

ACE DISCOUNTED CASH FLOW MODEL

TABLE A: ACE ANNUAL COST OF CAPITAL

Year (1)	Industry Cost of Capital (2)	Industry Cost of Debt (3)	Industry Cost of Preferred Equity (4)	Industry Cost of Equity (5)	ACE's Cost of Debt (6)	ACE's Cost of Preferred Equity (7)	ACE's Cost of Equity (8)	Debt as a Percent of Total Investment (9)	Preferred Equity as a Percent of Total Investment (10)	Equity as a Percent of Total Investment (11)	Composite Cost of Capital (12)	1 + Cost of Capital (13)	STB Prescribed Debt as a % of Capital (14)	STB Prescribed Preferred Equity as a % of Capital (15)
1998	1/ 10.67%	6.60%	6.20%	13.10%	6.60%	6.20%	13.10%	36.00%	1.35%	62.65%	10.67%	1.1067	36.00%	1.35%
1999	2/ 10.76%	7.20%	6.30%	12.90%	7.20%	6.30%	12.90%	35.50%	1.80%	62.70%	10.76%	1.1076	35.50%	1.80%
2000	3/ 11.03%	8.00%	6.30%	13.90%	8.00%	6.30%	13.90%	45.40%	2.50%	52.10%	11.03%	1.1103	45.40%	2.50%
2001	4/ 10.20%	6.90%	6.30%	12.80%	7.65%	6.30%	12.80%	41.23%	2.20%	56.57%	10.54%	1.1054	41.80%	2.25%
2002	5/ 9.80%	6.00%	6.30%	12.60%	7.65%	6.30%	12.60%	41.23%	2.20%	56.57%	10.42%	1.1042	41.20%	2.10%
2003					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2004					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2005					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2006					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2007					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2008					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2009					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2010					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2011					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2012					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2013					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2014					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2015					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2016					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2017					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2018					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2019					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		
2020					7.65%	6.30%	13.06%	41.23%	2.20%	56.57%	10.68%	1.1068		

Base Case

1/ Decision in ICC Ex Parte No. 558 (Sub No. 2) - Railroad Cost of Capital - 1998.
2/ Decision in ICC Ex Parte No. 558 (Sub No. 3) - Railroad Cost of Capital - 1999.
3/ Decision in ICC Ex Parte No. 558 (Sub No. 4) - Railroad Cost of Capital - 2000.
4/ Decision in ICC Ex Parte No. 558 (Sub No. 5) - Railroad Cost of Capital - 2001.
5/ Decision in ICC Ex Parte No. 558 (Sub No. 6) - Railroad Cost of Capital - 2002.

TABLE B: ACE INFLATION INDEXES

		Percent Change					
1. Material prices, wages, and supplements, combined (excl. fuel) 1/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		0.0%	1.7%	3.8%	4.0%	1.7%	
	Year	2003	2004	2005	2006	2007	
		4.5%	2.7%	3.0%	2.9%	2.9%	
	Year	2008	2009	2010	2011	2012	2013-2020
		2.7%	2.8%	2.7%	2.8%	2.8%	2.8%
2. Materials and supplies 2/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		1.1%	-0.1%	-0.4%	2.9%	-0.6%	
	Year	2003	2004	2005	2006	2007	
		0.0%	4.1%	-0.6%	0.5%	0.7%	
	Year	2008	2009	2010	2011	2012	2013-2020
		1.0%	0.9%	0.9%	1.0%	1.1%	1.0%
3. Wages and supplements 3/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		-0.1%	2.0%	4.4%	4.2%	2.0%	
	Year	2003	2004	2005	2006	2007	
		5.1%	2.5%	3.5%	3.2%	3.2%	
	Year	2008	2009	2010	2011	2012	2013-2020
		2.9%	3.1%	2.9%	3.1%	3.0%	3.1%
4. Land 4/	Year	2001-2020					
		1.88%					

		Percent Change				
5. Railroad Cost Adjustment Factor						
	Year	2001	2002	2003	2004	2005
Index		(1)	(2)	(3)	(4)	(5)
Unadjusted 5/		2.7%	-0.2%	4.4%	1.0%	2.5%
	Year	2006	2007	2008	2009	2010
Unadjusted 5/		2.3%	2.5%	2.2%	2.3%	2.3%
	Year	2011	2012	2013-2020		
Unadjusted 5/		2.4%	2.4%	2.4%		
	Year	2001	2002	2003	2004	2005
Index		(1)	(2)	(3)	(4)	(5)
Adjusted 6/		-0.6%	-3.4%	1.0%	-1.1%	-0.2%
	Year	2006	2007	2008	2009	2010
Adjusted 6/		-0.8%	0.0%	0.4%	0.3%	0.3%
	Year	2011	2012	2013-2020		
Adjusted 6/		0.5%	0.3%	0.3%		

1/ Used to index Road Property Accounts 3, 5, 6, 13, 16, 17, 19, 20, 26, 27, and 39.
2/ Used to index Road Property Accounts 8, 9, and 11.
3/ Used to index Road Property Accounts 1, and 12.
4/ Used to index Road Property Account 2.
5/ Used to index revenues in Table L.
6/ Used to index operating expenses in Table K.

TABLE C: ACE ROAD PROPERTY INVESTMENT VALUES

Construction of the ACE occurs over a three year period,
Investments are assumed to be in January 1, 2001 dollars.

Road Property Account (1)	Road Property Component (2)	Service Life In Years 1/ (3)	Investment In 7/1/1998 Dollars 2/ (4)	Investment In 7/1/1999 Dollars 3/ (5)	Investment In 7/1/2000 Dollars 4/ (6)	1998 Investment Value 5/ (7)	1999 Investment Value 6/ (8)	2000 Investment Value 7/ (9)	Total Property Investment 1Q2001 8/ (10)
1	Engineering	NA	$61,353,917	$64,053,489	$66,743,735	$14,158,596	$49,271,914	$0	$63,430,511
2	Land	NA	12,508,318	12,744,000	12,984,122	$0	$12,744,000	$0	12,744,000
3	Grading	83	215,481,425	223,700,749	232,741,391	$0	$186,417,291	$38,790,232	225,207,523
5	Tunnels	88	0	0	0	$0	$0	$0	0
6	Bridges & Culverts	74	116,328,828	120,766,074	125,646,714	$0	$43,130,741	$80,772,888	123,903,629
8	Ties	21	102,272,238	101,863,150	104,817,181	$0	$25,465,787	$78,612,886	104,078,673
9	Rails and OTM	28	205,905,692	205,082,069	211,029,449	$0	$51,270,517	$158,272,087	209,542,604
11	Ballast	25	156,041,270	155,417,105	159,924,201	$0	$38,854,276	$119,943,151	158,797,427
12	Labor	26	113,760,445	118,765,905	123,754,073	$0	$29,691,476	$92,815,555	122,507,031
13	Fences and Roadway Signs	81	162,372	68,851	71,634	$0	$17,213	$53,725	70,938
1A	Training Costs	NA	5,215,204	5,414,133	5,632,940	$0	$0	$5,632,940	5,632,940
17	Roadway Buildings	26	3,004,768	3,119,382	3,245,449	$0	$779,846	$2,434,087	3,213,932
19	Fuel Stations	30	18,578,920	19,287,594	20,067,083	$0	$4,821,898	$15,050,312	19,872,210
20	Shops and Enginehouses	48	8,029,496	8,335,773	8,672,655	$0	$2,083,943	$6,504,492	8,588,435
26	Communications Systems	23	9,426,733	9,786,306	10,181,810	$0	$2,446,577	$7,636,357	10,082,934
27	Signals and interlockers	31	66,324,321	68,854,196	71,636,869	$0	$17,213,549	$53,727,652	70,941,201
39	Public improvements	53	103,802	107,762	112,117	$0	$26,940	$84,088	111,028
	Total		$1,094,497,750	$1,117,366,538	$1,157,261,423	$14,158,596	$464,235,969	$660,330,450	$1,138,725,015

1/ 1 + Depreciation Rate in Schedule 332 of BNSF's 2001 Annual Report R-1.
2/ 1/1/2001 (Column (6)), indexed to 1998 dollars; Column (5) + (1 + Annual Inflation Rate from Table B, Column (3)).
3/ 1/1/2001 (Column (6)), indexed to 1999 dollars; Column (6) + (1 + Annual Inflation Rate from Table B, Column (4)).
4/ 1/1/2001 (Column (6)), indexed to 2000 dollars; Column (6) + (1 + Annual Inflation Rate from Table B, Column (5)^0.5).
5/ Column (4) x Percent constructed in 1998.
6/ Column (5) x Percent constructed in 1999.
7/ Column (6) x Percent constructed in 2000.
8/ Sum of Column's (7) through (9).

TABLE D: INTEREST DURING CONSTRUCTION

Month of Installation (1)	Cost of Funds 1/ (2)	Timing of Account 1 Invesment 2/ (3)	Timing of Account 2 Invesment 2/ (4)	Timing of Accounts 3 and 13 Invesment 2/ (5)	Timing of Accounts 5 and 6 Invesment 2/ (6)	Timing of Accounts 8 Through 39 Invesment 2/ (7)	Total Investment by Month 3/ (8)	Interest During Construction 4/ (9)	Cost of Debt 5/ (10)	Deductible Interest During Construction 6/ (11)
Jul 98	0.85%	$2,359,766					$2,359,766		0.53%	
Aug 98	0.85%	2,359,766					2,359,766	$20,015	0.53%	$4,537
Sep 98	0.85%	2,359,766					2,359,766	40,201	0.53%	9,112
Oct 98	0.85%	2,359,766					2,359,766	60,557	0.53%	13,726
Nov 98	0.85%	2,359,766					2,359,766	81,086	0.53%	18,379
Dec 98	0.85%	2,359,766					2,359,766	101,789	0.53%	23,072
Jan 99	0.86%	4,927,191	$1,593,000				6,520,191	123,665	0.58%	29,832
Feb 99	0.86%	4,927,191	1,593,000				6,520,191	180,476	0.58%	43,537
Mar 99	0.86%	4,927,191	1,593,000				6,520,191	237,773	0.58%	57,359
Apr 99	0.86%	4,927,191	1,593,000				6,520,191	295,560	0.58%	71,300
May 99	0.86%	4,927,191	1,593,000				6,520,191	353,841	0.58%	85,359
Jun 99	0.86%	4,927,191	1,593,000				6,520,191	412,620	0.58%	99,539
Jul 99	0.86%	4,927,191	1,593,000				6,520,191	471,902	0.58%	113,839
Aug 99	0.86%	4,927,191	1,593,000	$37,286,901	$8,626,148		52,433,240	531,691	0.58%	128,263
Sep 99	0.86%	4,927,191	0	37,286,901	8,626,148		50,840,240	984,589	0.58%	237,518
Oct 99	0.86%	4,927,191	0	37,286,901	8,626,148	$57,551,603	108,391,844	1,427,739	0.58%	344,421
Nov 99	0.86%	0	0	37,286,901	8,626,148	57,551,603	103,464,652	2,366,797	0.58%	570,955
Dec 99	0.86%	0	0	37,286,901	8,626,148	57,551,603	103,464,652	3,271,753	0.58%	789,262
Jan 00	0.88%	0	0	38,843,957	8,974,765	59,453,407	107,272,130	4,285,966	0.64%	1,429,435
Feb 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	5,263,034	0.64%	1,755,302
Mar 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	5,908,448	0.64%	1,970,557
Apr 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	6,559,516	0.64%	2,187,698
May 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	7,216,286	0.64%	2,406,741
Jun 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	7,878,808	0.64%	2,627,702
Jul 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	8,547,133	0.64%	2,850,599
Aug 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	9,221,311	0.64%	3,075,448
Sep 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	9,901,394	0.64%	3,302,266
Oct 00	0.88%	0	0	0	0	0	0	10,587,433	0.64%	3,531,070
Nov 00	0.88%	0	0	0	0	0	0	10,680,162	0.64%	3,561,997
Dec 00	0.88%	0	0	0	0	0	0	10,773,703	0.64%	3,593,194
Total		$63,430,511	$12,744,000	$225,278,461	$123,903,629	$707,735,475	$1,133,092,075	$107,785,252		$34,932,018

1/ ((1 + Cost of Capital from Table A for the applicable year)^(1/12) - 1) x 100.
2/ Applicable account value from Table C for the applicable investment period.
3/ Sum of Columns (3) through (7).
4/ Aug 98 equals Column (2) x prior Column (8), all other periods equal Column (2) x ((Sum of Column (8) for all prior periods) + (Sum of Column (9) for all prior periods)).
5/ ((1 + Cost of Debt from Table A for the applicable year)^(1/12) - 1) x 100.
6/ Aug 98 equals prior Column (8) x Column (10) x Table A, Column (9) for 1998, all other periods equal Column (10) x ((Sum of Column (8) for all prior periods) + (Sum of Column (9) for all prior periods)) x Table A, Column (9) for the applicable year.

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.6%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$116,230	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
1	$5,206,408	$5,174,036	$116,230	$32,372	$83,858
2	5,174,036	5,141,142	116,230	32,894	83,336
3	5,141,142	5,107,718	116,230	33,424	82,807
4	5,107,718	5,073,756	116,230	33,962	82,268
5	5,073,756	5,039,247	116,230	34,509	81,721
6	5,039,247	5,004,182	116,230	35,065	81,165
7	5,004,182	4,968,553	116,230	35,630	80,601
8	4,968,553	4,932,349	116,230	36,203	80,027
9	4,932,349	4,895,563	116,230	36,787	79,444
10	4,895,563	4,858,183	116,230	37,379	78,851
11	4,858,183	4,820,202	116,230	37,981	78,249
12	4,820,202	4,781,609	116,230	38,593	77,637
13	4,781,609	4,742,395	116,230	39,215	77,016
14	4,742,395	4,702,549	116,230	39,846	76,384
15	4,702,549	4,662,061	116,230	40,488	75,742
16	4,662,061	4,620,921	116,230	41,140	75,090
17	4,620,921	4,579,118	116,230	41,803	74,428
18	4,579,118	4,536,642	116,230	42,476	73,754
19	4,536,642	4,493,482	116,230	43,160	73,070
20	4,493,482	4,449,627	116,230	43,855	72,375

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	7.2%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,935,695	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(7)	(8)	(9)	(10)	(11)
1	$168,587,504	$167,607,730	$3,935,695	$979,773	$2,955,921
2	167,607,730	166,610,778	3,935,695	996,952	2,938,742
3	166,610,778	165,596,346	3,935,695	1,014,432	2,921,262
4	165,596,346	164,564,127	3,935,695	1,032,219	2,903,476
5	164,564,127	163,513,810	3,935,695	1,050,317	2,885,377
6	163,513,810	162,445,077	3,935,695	1,068,733	2,866,962
7	162,445,077	161,357,605	3,935,695	1,087,471	2,848,223
8	161,357,605	160,251,067	3,935,695	1,106,539	2,829,156
9	160,251,067	159,125,127	3,935,695	1,125,940	2,809,755
10	159,125,127	157,979,445	3,935,695	1,145,682	2,790,013
11	157,979,445	156,813,676	3,935,695	1,165,769	2,769,925
12	156,813,676	155,627,466	3,935,695	1,186,209	2,749,485
13	155,627,466	154,420,459	3,935,695	1,207,008	2,728,687
14	154,420,459	153,192,288	3,935,695	1,228,171	2,707,524
15	153,192,288	151,942,583	3,935,695	1,249,705	2,685,990
16	151,942,583	150,670,967	3,935,695	1,271,616	2,664,078
17	150,670,967	149,377,055	3,935,695	1,293,912	2,641,782
18	149,377,055	148,060,456	3,935,695	1,316,599	2,619,096
19	148,060,456	146,720,772	3,935,695	1,339,684	2,596,011
20	146,720,772	145,357,599	3,935,695	1,363,173	2,572,522

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	8.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$8,438,648	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(12)	(13)	(14)	(15)	(16)
1	$341,190,400	$339,379,903	$8,438,648	$1,810,497	$6,628,151
2	339,379,903	337,534,235	8,438,648	1,845,669	6,592,980
3	337,534,235	335,652,711	8,438,648	1,881,524	6,557,125
4	335,652,711	333,734,636	8,438,648	1,918,075	6,520,573
5	333,734,636	331,779,300	8,438,648	1,955,337	6,483,312
6	331,779,300	329,785,978	8,438,648	1,993,322	6,445,326
7	329,785,978	327,753,932	8,438,648	2,032,045	6,406,603
8	327,753,932	325,682,411	8,438,648	2,071,521	6,367,127
9	325,682,411	323,570,648	8,438,648	2,111,764	6,326,885
10	323,570,648	321,417,860	8,438,648	2,152,788	6,285,860
11	321,417,860	319,223,251	8,438,648	2,194,609	6,244,039
12	319,223,251	316,986,008	8,438,648	2,237,243	6,201,405
13	316,986,008	314,705,304	8,438,648	2,280,705	6,157,944
14	314,705,304	312,380,293	8,438,648	2,325,011	6,113,637
15	312,380,293	310,010,115	8,438,648	2,370,178	6,068,470
16	310,010,115	307,593,893	8,438,648	2,416,222	6,022,426
17	307,593,893	305,130,732	8,438,648	2,463,161	5,975,487
18	305,130,732	302,619,721	8,438,648	2,511,012	5,927,636
19	302,619,721	300,059,929	8,438,648	2,559,792	5,878,856
20	300,059,929	297,450,409	8,438,648	2,609,520	5,829,128

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.6%	4/
5. TERM	80	Quarters 5/
6. PAYMENT =====>>	$116,230	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
21	$4,449,627	$4,405,065	$116,230	$44,562	$71,669
22	4,405,065	4,359,786	116,230	45,279	70,951
23	4,359,786	4,313,777	116,230	46,009	70,222
24	4,313,777	4,267,027	116,230	46,750	69,481
25	4,267,027	4,219,524	116,230	47,503	68,728
26	4,219,524	4,171,257	116,230	48,268	67,962
27	4,171,257	4,122,211	116,230	49,045	67,185
28	4,122,211	4,072,376	116,230	49,835	66,395
29	4,072,376	4,021,738	116,230	50,638	65,592
30	4,021,738	3,970,285	116,230	51,454	64,777
31	3,970,285	3,918,002	116,230	52,282	63,948
32	3,918,002	3,864,878	116,230	53,124	63,106
33	3,864,878	3,810,898	116,230	53,980	62,250
34	3,810,898	3,756,049	116,230	54,849	61,381
35	3,756,049	3,700,316	116,230	55,733	60,497
36	3,700,316	3,643,685	116,230	56,631	59,600
37	3,643,685	3,586,142	116,230	57,543	58,688
38	3,586,142	3,527,673	116,230	58,470	57,761
39	3,527,673	3,468,262	116,230	59,411	56,819
40	3,468,262	3,407,893	116,230	60,368	55,862

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	7.2%	4/
5. TERM	80	Quarters 5/
6. PAYMENT =====>>	$3,935,695	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(7)	(8)	(9)	(10)	(11)
21	$145,357,599	$143,970,525	$3,935,695	$1,387,074	$2,548,621
22	143,970,525	142,559,131	3,935,695	1,411,394	2,524,300
23	142,559,131	141,122,990	3,935,695	1,436,141	2,499,554
24	141,122,990	139,661,669	3,935,695	1,461,321	2,474,373
25	139,661,669	138,174,726	3,935,695	1,486,943	2,448,751
26	138,174,726	136,661,711	3,935,695	1,513,015	2,422,680
27	136,661,711	135,122,169	3,935,695	1,539,543	2,396,152
28	135,122,169	133,555,632	3,935,695	1,566,536	2,369,158
29	133,555,632	131,961,629	3,935,695	1,594,003	2,341,691
30	131,961,629	130,339,677	3,935,695	1,621,952	2,313,743
31	130,339,677	128,689,287	3,935,695	1,650,390	2,285,305
32	128,689,287	127,009,960	3,935,695	1,679,327	2,256,368
33	127,009,960	125,301,189	3,935,695	1,708,771	2,226,923
34	125,301,189	123,562,457	3,935,695	1,738,732	2,196,963
35	123,562,457	121,793,239	3,935,695	1,769,218	2,166,477
36	121,793,239	119,993,000	3,935,695	1,800,239	2,135,456
37	119,993,000	118,161,197	3,935,695	1,831,803	2,103,892
38	118,161,197	116,297,277	3,935,695	1,863,921	2,071,774
39	116,297,277	114,400,675	3,935,695	1,896,602	2,039,093
40	114,400,675	112,470,819	3,935,695	1,929,856	2,005,839

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	8.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT =====>>	$8,438,648	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(12)	(13)	(14)	(15)	(16)
21	$297,450,409	$294,790,195	$8,438,648	$2,660,214	$5,778,434
22	294,790,195	292,078,302	8,438,648	2,711,893	5,726,756
23	292,078,302	289,313,727	8,438,648	2,764,575	5,674,073
24	289,313,727	286,495,446	8,438,648	2,818,281	5,620,367
25	286,495,446	283,622,415	8,438,648	2,873,031	5,565,617
26	283,622,415	280,693,571	8,438,648	2,928,844	5,509,804
27	280,693,571	277,707,829	8,438,648	2,985,741	5,452,907
28	277,707,829	274,664,085	8,438,648	3,043,744	5,394,904
29	274,664,085	271,561,212	8,438,648	3,102,873	5,335,775
30	271,561,212	268,398,060	8,438,648	3,163,152	5,275,497
31	268,398,060	265,173,460	8,438,648	3,224,601	5,214,048
32	265,173,460	261,886,216	8,438,648	3,287,243	5,151,405
33	261,886,216	258,535,113	8,438,648	3,351,103	5,087,545
34	258,535,113	255,118,909	8,438,648	3,416,204	5,022,444
35	255,118,909	251,636,341	8,438,648	3,482,569	4,956,079
36	251,636,341	248,086,118	8,438,648	3,550,223	4,888,425
37	248,086,118	244,466,926	8,438,648	3,619,192	4,819,457
38	244,466,926	240,777,426	8,438,648	3,689,500	4,749,148
39	240,777,426	237,016,252	8,438,648	3,761,174	4,677,474
40	237,016,252	233,182,011	8,438,648	3,834,241	4,604,407

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (8) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.6%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$116,230	Per Quarter 6/

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	7.2%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,935,695	Per Quarter 6/

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	8.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$8,438,648	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
41	$3,407,893	$3,346,553	$116,230	$61,341	$54,890	$112,470,819	$110,507,126	$3,935,695	$1,963,693	$1,972,002	$233,182,011	$229,273,284	$8,438,648	$3,908,727	$4,529,921
42	3,346,553	3,284,224	116,230	62,328	53,902	110,507,126	108,509,003	3,935,695	1,998,123	1,937,572	229,273,284	225,288,624	8,438,648	3,984,660	4,453,988
43	3,284,224	3,220,892	116,230	63,332	52,898	108,509,003	106,475,846	3,935,695	2,033,157	1,902,538	225,288,624	221,226,556	8,438,648	4,062,068	4,376,580
44	3,220,892	3,156,540	116,230	64,352	51,878	106,475,846	104,407,041	3,935,695	2,068,805	1,866,889	221,226,556	217,085,576	8,438,648	4,140,980	4,297,668
45	3,156,540	3,091,151	116,230	65,389	50,841	104,407,041	102,301,962	3,935,695	2,105,079	1,830,616	217,085,576	212,864,151	8,438,648	4,221,425	4,217,223
46	3,091,151	3,024,708	116,230	66,442	49,788	102,301,962	100,159,974	3,935,695	2,141,988	1,793,707	212,864,151	208,560,718	8,438,648	4,303,433	4,135,215
47	3,024,708	2,957,196	116,230	67,512	48,718	100,159,974	97,980,430	3,935,695	2,179,544	1,756,150	208,560,718	204,173,685	8,438,648	4,387,034	4,051,615
48	2,957,196	2,888,596	116,230	68,600	47,631	97,980,430	95,762,671	3,935,695	2,217,759	1,717,935	204,173,685	199,701,426	8,438,648	4,472,258	3,966,390
49	2,888,596	2,818,892	116,230	69,705	46,526	95,762,671	93,506,026	3,935,695	2,256,644	1,679,050	199,701,426	195,142,287	8,438,648	4,559,139	3,879,509
50	2,818,892	2,748,064	116,230	70,827	45,403	93,506,026	91,209,815	3,935,695	2,296,211	1,639,484	195,142,287	190,494,580	8,438,648	4,647,707	3,790,941
51	2,748,064	2,676,096	116,230	71,968	44,262	91,209,815	88,873,344	3,935,695	2,336,472	1,599,223	190,494,580	185,756,584	8,438,648	4,737,996	3,700,652
52	2,676,096	2,602,969	116,230	73,127	43,103	88,873,344	86,495,906	3,935,695	2,377,438	1,558,257	185,756,584	180,926,545	8,438,648	4,830,039	3,608,609
53	2,602,969	2,528,664	116,230	74,305	41,925	86,495,906	84,076,783	3,935,695	2,419,123	1,516,572	180,926,545	176,002,674	8,438,648	4,923,870	3,514,778
54	2,528,664	2,453,162	116,230	75,502	40,728	84,076,783	81,615,245	3,935,695	2,461,538	1,474,156	176,002,674	170,983,150	8,438,648	5,019,524	3,419,124
55	2,453,162	2,376,444	116,230	76,718	39,512	81,615,245	79,110,547	3,935,695	2,504,698	1,430,997	170,983,150	165,866,115	8,438,648	5,117,036	3,321,612
56	2,376,444	2,298,490	116,230	77,954	38,277	79,110,547	76,561,934	3,935,695	2,548,614	1,387,081	165,866,115	160,649,672	8,438,648	5,216,442	3,222,206
57	2,298,490	2,219,281	116,230	79,209	37,021	76,561,934	73,968,634	3,935,695	2,593,300	1,342,395	160,649,672	155,331,892	8,438,648	5,317,780	3,120,868
58	2,219,281	2,138,795	116,230	80,485	35,745	73,968,634	71,329,865	3,935,695	2,638,769	1,296,926	155,331,892	149,910,807	8,438,648	5,421,086	3,017,562
59	2,138,795	2,057,014	116,230	81,781	34,449	71,329,865	68,644,830	3,935,695	2,685,036	1,250,659	149,910,807	144,384,408	8,438,648	5,526,399	2,912,249
60	2,057,014	1,973,915	116,230	83,099	33,132	68,644,830	65,912,716	3,935,695	2,732,114	1,203,581	144,384,408	138,750,650	8,438,648	5,633,758	2,804,890

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.6%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$116,230	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
61	$1,973,915	$1,889,478	$116,230	$84,437	$31,793
62	1,889,478	1,803,681	116,230	85,797	30,433
63	1,803,681	1,716,502	116,230	87,179	29,051
64	1,716,502	1,627,919	116,230	88,583	27,647
65	1,627,919	1,537,909	116,230	90,010	26,220
66	1,537,909	1,446,449	116,230	91,460	24,771
67	1,446,449	1,353,516	116,230	92,933	23,297
68	1,353,516	1,259,087	116,230	94,430	21,801
69	1,259,087	1,163,136	116,230	95,951	20,280
70	1,163,136	1,065,640	116,230	97,496	18,734
71	1,065,640	966,574	116,230	99,066	17,164
72	966,574	865,912	116,230	100,662	15,568
73	865,912	763,628	116,230	102,283	13,947
74	763,628	659,697	116,230	103,931	12,300
75	659,697	554,093	116,230	105,605	10,626
76	554,093	446,787	116,230	107,306	8,925
77	446,787	337,753	116,230	109,034	7,196
78	337,753	226,963	116,230	110,790	5,440
79	226,963	114,388	116,230	112,575	3,656
80	114,388	(0)	116,230	114,388	1,842

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	7.2%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,935,695	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(7)	(8)	(9)	(10)	(11)
61	$65,912,716	$63,132,699	$3,935,695	$2,780,017	$1,155,678
62	63,132,699	60,303,938	3,935,695	2,828,760	1,106,934
63	60,303,938	57,425,580	3,935,695	2,878,358	1,057,336
64	57,425,580	54,496,754	3,935,695	2,928,826	1,006,869
65	54,496,754	51,516,576	3,935,695	2,980,178	955,516
66	51,516,576	48,484,145	3,935,695	3,032,431	903,263
67	48,484,145	45,398,545	3,935,695	3,085,600	850,094
68	45,398,545	42,258,843	3,935,695	3,139,701	795,993
69	42,258,843	39,064,092	3,935,695	3,194,751	740,943
70	39,064,092	35,813,326	3,935,695	3,250,766	684,928
71	35,813,326	32,505,563	3,935,695	3,307,763	627,931
72	32,505,563	29,139,803	3,935,695	3,365,760	569,935
73	29,139,803	25,715,030	3,935,695	3,424,773	510,921
74	25,715,030	22,230,208	3,935,695	3,484,821	450,873
75	22,230,208	18,684,286	3,935,695	3,545,922	389,772
76	18,684,286	15,076,191	3,935,695	3,608,095	327,600
77	15,076,191	11,404,835	3,935,695	3,671,357	264,338
78	11,404,835	7,669,106	3,935,695	3,735,728	199,966
79	7,669,106	3,867,877	3,935,695	3,801,229	134,466
80	3,867,877	0	3,935,695	3,867,877	67,817

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	8.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$8,438,648	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(12)	(13)	(14)	(15)	(16)
61	$138,750,650	$133,007,448	$8,438,648	$5,743,202	$2,695,446
62	133,007,448	127,152,675	8,438,648	5,854,773	2,583,875
63	127,152,675	121,184,165	8,438,648	5,968,511	2,470,137
64	121,184,165	115,099,706	8,438,648	6,084,458	2,354,190
65	115,099,706	108,897,048	8,438,648	6,202,658	2,235,990
66	108,897,048	102,573,893	8,438,648	6,323,155	2,115,494
67	102,573,893	96,127,902	8,438,648	6,445,992	1,992,657
68	96,127,902	89,556,687	8,438,648	6,571,215	1,867,433
69	89,556,687	82,857,816	8,438,648	6,698,871	1,739,777
70	82,857,816	76,028,809	8,438,648	6,829,007	1,609,641
71	76,028,809	69,067,138	8,438,648	6,961,671	1,476,977
72	69,067,138	61,970,226	8,438,648	7,096,912	1,341,736
73	61,970,226	54,735,445	8,438,648	7,234,781	1,203,867
74	54,735,445	47,360,118	8,438,648	7,375,327	1,063,321
75	47,360,118	39,841,513	8,438,648	7,518,605	920,044
76	39,841,513	32,176,848	8,438,648	7,664,665	773,983
77	32,176,848	24,363,285	8,438,648	7,813,563	625,085
78	24,363,285	16,397,931	8,438,648	7,965,354	473,294
79	16,397,931	8,277,838	8,438,648	8,120,093	318,555
80	8,277,838	0	8,438,648	8,277,838	160,810

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE F: ACE PRESENT VALUE OF REPLACEMENT COST

Road Property Account (1)	Road Property Component (2)	Service Life In Years 1/ (3)	Investment 2/ (4)	Salvage 3/ (5)	Replacement Year Asset Net Cost 4/ (6)	Replacement Cost Adjusted To Reflect An Infinite Life 5/ (7)	Present Value Of Replacement Cost Adjusted To Reflect An Infinite Life (2001 Dollars) 6/ (8)
3	Grading	83	$2,445,196,778	$0	$2,248,803,321	$2,252,426,152	$552,094
5	Tunnels	88	0	0	0	0	0
6	Bridges & Culverts	74	1,038,799,368	0	728,039,800	730,440,748	450,951
8	Ties	21	133,508,996	0	81,507,415	100,981,707	12,034,061
9	Rails and OTM	28	286,005,098	26,362,136	159,204,426	179,483,106	10,717,133
11	Ballast	25	210,643,426	0	128,598,084	150,316,343	12,333,893
12	Labor	26	284,085,736	0	173,434,710	201,214,754	15,568,012
13	Fences and Roadway Signs	81	727,719	0	510,020	510,981	153
1A	Training Costs	NA	0	0	0	0	0
17	Roadway Buildings	26	7,087,637	0	5,662,384	6,522,460	475,557
19	Fuel Stations	30	48,829,974	0	44,908,046	49,775,225	2,465,832
20	Shops and Enginehouses	48	35,068,830	0	32,252,169	33,045,834	266,682
26	Communications Systems	23	20,454,186	0	12,487,307	14,974,726	1,471,428
27	Signals and interlockers	31	177,974,421	7,099,751	104,875,414	115,543,268	5,314,611
39	Public improvements	53	519,572	0	364,141	370,241	1,836
	Total		$4,688,901,741	$33,461,887	$3,720,647,238	$3,835,605,544	$61,652,242

1/ From Table C, Column (3).

2/ (Table C, Column (10) after allocation of Engineering) x (Table B, Inflation Index)^(Column (3)).

3/ [(Column (4) x Estimated Salvage %) - (Table C, Column (10) after allocation of Engineering x Salvage %)] x (1 - Current Federal Tax Rate) + (Table C, Column (10) after allocation of Engineering x Salvage %).

4/ Column (4) - (Present Value of the remaining tax deductions for depreciation, interest expense and the Present Value of any salvage).

5/ Column (6) + [(Column (6) / ((1 + Real Cost of Capital)^Column (3) - 1)].

6/ Column (7) / ((1 + Nominal Cost of Capital)^Column (3)).

TABLE G: ACE TAX DEPRECIATION SCHEDULES

Depreciation of Start-up investment for tax purposes using
accounting lives from Modified Accelerated Cost Recovery System (MACRS) 1/

Road Property Account (1)	Road Property Component (2)	Asset Lives Per MACRS (3)	Total 1/1/2001 Investment (4)	Depreciable Base (5)
1	Engineering	2/	$63,430,511	$63,430,511
2	Land	N/A	12,744,000	0
3	Grading	50	225,207,523	225,207,523
5	Tunnels	50	0	0
6	Bridges & Culverts	15	123,903,629	123,903,629
8	Ties	7	104,078,673	104,078,673
9	Rails and OTM	7	209,542,604	209,542,604
11	Ballast	7	158,797,427	158,797,427
12	Labor	7	122,507,031	122,507,031
13	Fences and Roadway Signs	15	70,938	70,938
1A	Training Costs	2/	5,632,940	5,632,940
17	Roadway Buildings	15	3,213,932	3,213,932
19	Fuel Stations	15	19,872,210	19,872,210
20	Shops and Enginehouses	15	8,588,435	8,588,435
26	Communications Systems	7	10,082,934	10,082,934
27	Signals and interlockers	7	70,941,201	70,941,201
39	Public improvements	15	111,028	111,028
	Total		$1,138,725,015	$1,125,981,015

1/ Applicable Depreciation Method: 200 or 150 percent
Declining Balance Switching to Straight Line
Applicable Recovery Periods: 7, 15 and 50 a/ years
Applicable Convention: Mid-quarter(property placed in service in first quarter)
The Depreciation Rates are as follows for the corresponding
Recovery Period and Recovery year:

Recovery	--- Recovery Period ---				Recovery	--- Recovery Period ---		
Year	5-Year	7-year	15-year	50-year	Year	7-year	15-year	50-year
1	20.00%	25.00%	8.750%	2.00%	10	0.00%	5.910%	2.00%
2	20.00%	21.43%	9.130%	2.00%	11	0.00%	5.900%	2.00%
3	20.00%	15.31%	8.210%	2.00%	12	0.00%	5.910%	2.00%
4	20.00%	10.93%	7.390%	2.00%	13	0.00%	5.900%	2.00%
5	20.00%	8.75%	6.650%	2.00%	14	0.00%	5.910%	2.00%
6		8.74%	5.990%	2.00%	15	0.00%	5.900%	2.00%
7		8.75%	5.900%	2.00%	16	0.00%	0.740%	2.00%
8		1.09%	5.910%	2.00%	17	0.00%	0.000%	2.00%
9		0.00%	5.900%	2.00%	18	0.00%	0.000%	2.00%
					19-50	0.00%	0.000%	2.00%

a/ 50 year property uses the Straight Line Method for all time periods

2/ Applicable Recovery Period of 5 years for amortization of business start-up costs.

TABLE G: ACE TAX DEPRECIATION SCHEDULES
(Continued)

	Amortization - 5 Years			Depreciation - MACRS 7 Years			Depreciation - MACRS 15 Years			Depreciation - MACRS 50 Years			
Year	Unamortized Investment 1/	Rate 2/	Annual Amort. 3/	Undepreciated Investment 4/	Rate 2/	Annual Amount 5/	Undepreciated Investment 6/	Rate 2/	Annual Amount 7/	Unamortized Investment 8/	Rate 2/	Annual Amount 9/	Total Annual Depreciation 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	$69,063,451	20.00%	$13,812,690	$675,949,870	25.00%	$168,987,467	$155,760,172	8.75%	$13,629,015	$225,207,523	2%	$4,504,150	$200,933,323
2	55,250,760	20.00%	13,812,690	506,962,402	21.43%	144,856,057	142,131,157	9.13%	14,220,904	220,703,372	2%	4,504,150	177,393,801
3	41,438,070	20.00%	13,812,690	362,106,345	15.31%	103,487,925	127,910,254	8.21%	12,787,910	216,199,222	2%	4,504,150	134,592,676
4	27,625,380	20.00%	13,812,690	258,618,420	10.93%	73,881,321	115,122,343	7.39%	11,510,677	211,695,071	2%	4,504,150	103,708,838
5	13,812,690	20.00%	13,812,690	184,737,099	8.75%	59,145,614	103,611,667	6.65%	10,358,051	207,190,921	2%	4,504,150	87,820,506
6				125,591,486	8.74%	59,078,019	93,253,615	5.99%	9,330,034	202,686,770	2%	4,504,150	72,912,203
7				66,513,467	8.75%	59,145,614	83,923,581	5.90%	9,189,850	198,182,620	2%	4,504,150	72,839,614
8				7,367,854	1.09%	7,367,854	74,733,731	5.91%	9,205,426	193,678,469	2%	4,504,150	21,077,430
9							65,528,305	5.90%	9,189,850	189,174,319	2%	4,504,150	13,694,001
10							56,338,454	5.91%	9,205,426	184,670,168	2%	4,504,150	13,709,577
11							47,133,028	5.90%	9,189,850	180,166,018	2%	4,504,150	13,694,001
12							37,943,178	5.91%	9,205,426	175,661,868	2%	4,504,150	13,709,577
13							28,737,752	5.90%	9,189,850	171,157,717	2%	4,504,150	13,694,001
14							19,547,902	5.91%	9,205,426	166,653,567	2%	4,504,150	13,709,577
15							10,342,475	5.90%	9,189,850	162,149,416	2%	4,504,150	13,694,001
16							1,152,625	0.74%	1,152,625	157,645,266	2%	4,504,150	5,656,776
17										153,141,115	2%	4,504,150	4,504,150
18										148,636,965	2%	4,504,150	4,504,150
19										144,132,814	2%	4,504,150	4,504,150
20										139,628,664	2%	4,504,150	4,504,150
										135,124,514			

1/ From Table G, Page 10, Column (5), Road Property Account 1 and 1A.
2/ From Table G, Footnote 1/, Page 10.
3/ Column (2), Year 1 x Column (3).
4/ From Table G, Page 10, Column (5), Road Property Accounts 8, 9, 11, 12, 26, and 27.
5/ Column (5), Year 1 x Column (6).
6/ From Table G, Page 10, Column (5), Road Property Accounts 6, 13, 16, 17, 19, 20 and 39.
7/ Column (8), Year 1 x Column (9).
8/ From Table G, Page 10, Column (5), Road Property Accounts 3 and 5.
9/ Column (11), Year 1 x Column (12).
10/ Column (4) + Column (7) + Column (10) + Column (13).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0		1.000	1.000	1.000	1.000	$12,744,000	$1,125,981,015	1.000
1	2001 1 Qtr	1.005	1.024	1.000	1.028	12,803,611	1,142,283,889	1.014
2	2001 2 Qtr	1.009	1.029	1.021	1.030	12,863,501	1,155,325,665	1.026
3	2001 3 Qtr	1.014	1.037	1.024	1.039	12,923,671	1,161,734,739	1.032
4	2001 4 Qtr	1.019	1.037	1.024	1.039	12,984,122	1,161,940,139	1.032
5	2002 1 Qtr	1.024	1.067	1.020	1.074	13,044,857	1,180,647,161	1.048
6	2002 2 Qtr	1.028	1.067	1.015	1.073	13,105,875	1,178,179,431	1.046
7	2002 3 Qtr	1.033	1.074	0.984	1.085	13,167,179	1,168,825,426	1.038
8	2002 4 Qtr	1.038	1.070	0.948	1.086	13,228,769	1,150,250,918	1.022
9	2003 1 Qtr	1.043	1.084	0.927	1.104	13,290,648	1,149,937,281	1.022
10	2003 2 Qtr	1.048	1.097	1.023	1.107	13,352,816	1,202,340,339	1.068
11	2003 3 Qtr	1.053	1.110	1.009	1.124	13,415,275	1,204,722,741	1.070
12	2003 4 Qtr	1.058	1.111	1.024	1.123	13,478,026	1,212,388,894	1.077
13	2004 1 Qtr	1.063	1.119	1.035	1.130	13,541,070	1,222,031,219	1.085
14	2004 2 Qtr	1.068	1.126	1.045	1.137	13,604,410	1,231,753,963	1.094
15	2004 3 Qtr	1.073	1.134	1.056	1.144	13,668,045	1,241,557,829	1.102
16	2004 4 Qtr	1.078	1.141	1.066	1.151	13,731,979	1,251,443,525	1.111
17	2005 1 Qtr	1.083	1.150	1.065	1.161	13,796,211	1,256,500,542	1.116
18	2005 2 Qtr	1.088	1.158	1.063	1.171	13,860,744	1,261,604,146	1.120
19	2005 3 Qtr	1.093	1.167	1.062	1.181	13,925,579	1,266,754,691	1.125
20	2005 4 Qtr	1.098	1.175	1.060	1.191	13,990,717	1,271,952,535	1.129

1/ Table C, Page 3, Column (10).
2/ Previous Column (3) x (1 + Inflation Rate from Table B on a Quarterly Basis).
3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
4/ Previous Column (5) x (1 + Inflation Rate from Table B on a Quarterly Basis).
5/ Previous Column (6) x (1 + Inflation Rate from Table B on a Quarterly Basis).
6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
21	2006 1 Qtr	1.103	1.184	1.061	1.200	14,056,159	1,278,237,018	1.135
22	2006 2 Qtr	1.108	1.192	1.063	1.210	14,121,908	1,284,563,919	1.140
23	2006 3 Qtr	1.113	1.201	1.064	1.219	14,187,964	1,290,933,548	1.146
24	2006 4 Qtr	1.119	1.209	1.065	1.229	14,254,330	1,297,346,213	1.152
25	2007 1 Qtr	1.124	1.218	1.067	1.239	14,321,005	1,304,086,083	1.158
26	2007 2 Qtr	1.129	1.227	1.069	1.249	14,387,993	1,310,870,844	1.164
27	2007 3 Qtr	1.134	1.235	1.071	1.258	14,455,294	1,317,700,819	1.170
28	2007 4 Qtr	1.140	1.244	1.073	1.268	14,522,910	1,324,576,336	1.176
29	2008 1 Qtr	1.145	1.252	1.075	1.277	14,590,842	1,331,377,924	1.182
30	2008 2 Qtr	1.150	1.261	1.078	1.287	14,659,092	1,338,220,233	1.188
31	2008 3 Qtr	1.156	1.269	1.081	1.296	14,727,661	1,345,103,524	1.194
32	2008 4 Qtr	1.161	1.277	1.083	1.305	14,796,550	1,352,028,062	1.200
33	2009 1 Qtr	1.166	1.286	1.086	1.315	14,865,762	1,359,225,562	1.207
34	2009 2 Qtr	1.172	1.295	1.088	1.325	14,935,298	1,366,469,272	1.213
35	2009 3 Qtr	1.177	1.304	1.091	1.335	15,005,159	1,373,759,513	1.220
36	2009 4 Qtr	1.183	1.314	1.093	1.346	15,075,347	1,381,096,609	1.226
37	2010 1 Qtr	1.188	1.322	1.096	1.355	15,145,863	1,388,093,755	1.232
38	2010 2 Qtr	1.194	1.331	1.098	1.365	15,216,709	1,395,132,994	1.239
39	2010 3 Qtr	1.200	1.340	1.101	1.375	15,287,886	1,402,214,600	1.245
40	2010 4 Qtr	1.205	1.348	1.103	1.385	15,359,397	1,409,338,848	1.251

1/ Table C, Page 3, Column (10).
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3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
4/ Previous Column (5) x (1 + Inflation Rate from Table B on a Quarterly Basis).
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6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
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Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
41	2011 1 Qtr	1.211	1.358	1.106	1.395	$15,431,242	$1,417,051,691	1.258
42	2011 2 Qtr	1.217	1.368	1.109	1.406	15,503,422	1,424,814,169	1.265
43	2011 3 Qtr	1.222	1.377	1.111	1.417	15,575,941	1,432,626,626	1.272
44	2011 4 Qtr	1.228	1.387	1.114	1.428	15,648,799	1,440,489,409	1.279
45	2012 1 Qtr	1.234	1.396	1.117	1.438	15,721,997	1,448,347,960	1.286
46	2012 2 Qtr	1.239	1.406	1.120	1.449	15,795,538	1,456,255,567	1.293
47	2012 3 Qtr	1.245	1.416	1.123	1.460	15,869,423	1,464,212,556	1.300
48	2012 4 Qtr	1.251	1.425	1.126	1.470	15,943,653	1,472,219,259	1.307
49	2013 1 Qtr	1.257	1.435	1.129	1.482	16,018,231	1,480,334,766	1.314
50	2013 2 Qtr	1.263	1.445	1.132	1.493	16,093,157	1,488,502,696	1.321
51	2013 3 Qtr	1.269	1.456	1.135	1.504	16,168,434	1,496,723,411	1.329
52	2013 4 Qtr	1.275	1.466	1.138	1.516	16,244,063	1,504,997,279	1.336
53	2014 1 Qtr	1.281	1.476	1.140	1.528	16,320,046	1,513,324,670	1.343
54	2014 2 Qtr	1.287	1.486	1.143	1.539	16,396,385	1,521,705,954	1.351
55	2014 3 Qtr	1.293	1.497	1.146	1.551	16,473,080	1,530,141,508	1.358
56	2014 4 Qtr	1.299	1.507	1.149	1.563	16,550,134	1,538,631,707	1.366
57	2015 1 Qtr	1.305	1.518	1.152	1.575	16,627,549	1,547,176,933	1.373
58	2015 2 Qtr	1.311	1.529	1.155	1.587	16,705,325	1,555,777,568	1.381
59	2015 3 Qtr	1.317	1.539	1.158	1.599	16,783,466	1,564,433,997	1.389
60	2015 4 Qtr	1.323	1.550	1.160	1.611	16,861,972	1,573,146,609	1.396

1/ Table C, Page 3, Column (10).
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TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
61	2016 1 Qtr	1.329	1.561	1.163	1.624	16,940,845	1,581,915,795	1.404
62	2016 2 Qtr	1.336	1.572	1.166	1.636	17,020,087	1,590,741,949	1.412
63	2016 3 Qtr	1.342	1.583	1.169	1.649	17,099,700	1,599,625,467	1.420
64	2016 4 Qtr	1.348	1.594	1.172	1.661	17,179,685	1,608,566,749	1.428
65	2017 1 Qtr	1.354	1.606	1.175	1.674	17,260,044	1,617,566,197	1.436
66	2017 2 Qtr	1.361	1.617	1.178	1.687	17,340,780	1,626,624,217	1.444
67	2017 3 Qtr	1.367	1.628	1.181	1.700	17,421,892	1,635,741,216	1.452
68	2017 4 Qtr	1.373	1.640	1.184	1.713	17,503,385	1,644,917,605	1.460
69	2018 1 Qtr	1.380	1.651	1.187	1.726	17,585,258	1,654,153,800	1.468
70	2018 2 Qtr	1.386	1.663	1.190	1.739	17,667,515	1,663,450,216	1.476
71	2018 3 Qtr	1.393	1.675	1.193	1.753	17,750,156	1,672,807,273	1.485
72	2018 4 Qtr	1.399	1.686	1.196	1.766	17,833,183	1,682,225,396	1.493
73	2019 1 Qtr	1.406	1.698	1.199	1.780	17,916,600	1,691,705,008	1.501
74	2019 2 Qtr	1.412	1.710	1.202	1.793	18,000,406	1,701,246,541	1.510
75	2019 3 Qtr	1.419	1.722	1.205	1.807	18,084,604	1,710,850,425	1.518
76	2019 4 Qtr	1.426	1.734	1.208	1.821	18,169,196	1,720,517,096	1.527
77	2020 1 Qtr	1.432	1.747	1.211	1.835	18,254,184	1,730,246,992	1.535
78	2020 2 Qtr	1.439	1.759	1.214	1.849	18,339,569	1,740,040,555	1.544
79	2020 3 Qtr	1.446	1.771	1.217	1.863	18,425,354	1,749,898,230	1.553
80	2020 4 Qtr	1.453	1.784	1.220	1.877	18,511,540	1,759,820,463	1.562
Annual Average								2.28%

1/ Table C, Page 3, Column (10).
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8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE I: ACE DISCOUNTED CASH FLOW

Discounted Cash Flow
Present Value of the Cash Flow Discounted at the Cost of Capital in Table A
Inflation In Asset Values From Table H

1. 1Q2001 Road Property Investment	$1,138,725,015	1/	
2. Interest During Construction (1Q2001 Invest.)	$107,785,252	2/	
3. Total 1Q2001 Investment	$1,246,510,267	3/	
4. Present Value Of Replacement Cost for the ACE	$61,652,242	4/	
5. Total Cost Recovered From Quarterly Revenue Flow	$1,308,162,509	5/	

Fed. Tax Rate	35.0%
Weighted Average State Tax Rate	7.5% 6/

Period (1)	Quarter (2)	Quarterly Levelized Capital Carrying Charge Requirement 7/ (3)	Interest on Investment Financed With Debt 8/ (4)	Tax Depreciation 9/ (5)	Actual Federal Tax Payments 10/ (6)	Actual State Tax Payments 11/ (7)	Cash Flow 12/ (8)	Present Value Cash Flow 13/ (9)	Cumulative Present Value 14/ (10)
1	2001 1 Qtr	$30,568,618	$9,667,930	$50,233,331	$0	$0	30,568,618	$30,188,248	$30,188,248
2	2001 2 Qtr	30,915,344	9,615,058	50,233,331	0	0	30,915,344	29,775,593	59,963,841
3	2001 3 Qtr	31,086,549	9,561,194	50,233,331	0	0	31,086,549	29,200,014	89,163,855
4	2001 4 Qtr	31,093,584	9,506,317	50,233,331	0	0	31,093,584	28,484,300	117,648,155
5	2002 1 Qtr	31,590,260	9,450,410	44,348,450	0	0	31,590,260	28,227,200	145,875,355
6	2002 2 Qtr	31,526,568	9,393,453	44,348,450	0	0	31,526,568	27,480,631	173,355,986
7	2002 3 Qtr	31,280,643	9,335,427	44,348,450	0	0	31,280,643	26,598,742	199,954,728
8	2002 4 Qtr	30,790,711	9,276,310	44,348,450	0	0	30,790,711	25,541,157	225,495,885
9	2003 1 Qtr	30,784,049	9,216,083	33,648,169	0	0	30,784,049	24,903,145	250,399,031
10	2003 2 Qtr	32,172,506	9,154,725	33,648,169	0	0	32,172,506	25,374,248	275,773,279
11	2003 3 Qtr	32,237,207	9,092,213	33,648,169	0	0	32,237,207	24,788,232	300,561,511
12	2003 4 Qtr	32,441,748	9,028,528	33,648,169	0	0	32,441,748	24,320,484	324,881,994
13	2004 1 Qtr	32,698,594	8,963,646	25,927,210	0	0	32,698,594	23,898,843	348,780,837
14	2004 2 Qtr	32,957,576	8,897,545	25,927,210	0	0	32,957,576	23,484,585	372,265,423
15	2004 3 Qtr	33,218,713	8,830,203	25,927,210	0	0	33,218,713	23,077,580	395,343,003
16	2004 4 Qtr	33,482,023	8,761,594	25,927,210	0	0	33,482,023	22,677,699	418,020,702
17	2005 1 Qtr	33,617,553	8,691,697	21,955,126	0	0	33,617,553	22,198,991	440,219,693
18	2005 2 Qtr	33,754,325	8,620,486	21,955,126	0	0	33,754,325	21,730,834	461,950,527
19	2005 3 Qtr	33,892,346	8,547,937	21,955,126	0	0	33,892,346	21,272,985	483,223,512
20	2005 4 Qtr	34,031,627	8,474,025	21,955,126	0	0	34,031,627	20,825,208	504,048,720
21	2006 1 Qtr	34,199,674	8,398,724	18,228,051	0	0	34,199,674	20,403,677	524,452,396
22	2006 2 Qtr	34,368,851	8,322,007	18,228,051	0	0	34,368,851	19,990,853	544,443,249
23	2006 3 Qtr	34,539,167	8,243,848	18,228,051	0	0	34,539,167	19,586,552	564,029,801
24	2006 4 Qtr	34,710,631	8,164,221	18,228,051	0	0	34,710,631	19,190,596	583,220,397
25	2007 1 Qtr	34,890,761	8,083,096	18,209,904	0	0	34,890,761	18,806,858	602,027,255

TABLE I: ACE DISCOUNTED CASH FLOW
(Continued)

Period	Quarter	Quarterly Levelized Capital Carrying Charge Requirement 7/	Interest on Investment Financed With Debt 8/	Tax Depreciation 9/	Actual Federal Tax Payments 10/	Actual State Tax Payments 11/	Cash Flow 12/	Present Value Cash Flow 13/	Cumulative Present Value 14/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
26	2007 2 Qtr	$35,072,088	$8,000,447	$18,209,904	$0	$0	$35,072,088	$18,430,930	$620,458,186
27	2007 3 Qtr	35,254,620	7,916,244	18,209,904	0	0	35,254,620	18,062,651	638,520,837
28	2007 4 Qtr	35,438,365	7,830,457	18,209,904	0	0	35,438,365	17,701,863	656,222,700
29	2008 1 Qtr	35,620,163	7,743,059	5,269,358	0	0	35,620,163	17,346,866	673,569,566
30	2008 2 Qtr	35,803,046	7,654,016	5,269,358	0	0	35,803,046	16,999,061	690,568,628
31	2008 3 Qtr	35,987,022	7,563,300	5,269,358	0	0	35,987,022	16,658,301	707,226,929
32	2008 4 Qtr	36,172,099	7,470,878	5,269,358	0	0	36,172,099	16,324,442	723,551,370
33	2009 1 Qtr	36,364,407	7,376,718	3,423,500	0	0	36,364,407	16,000,037	739,551,407
34	2009 2 Qtr	36,557,947	7,280,788	3,423,500	0	0	36,557,947	15,682,168	755,233,575
35	2009 3 Qtr	36,752,728	7,183,053	3,423,500	0	0	36,752,728	15,370,702	770,604,277
36	2009 4 Qtr	36,948,756	7,083,481	3,423,500	0	0	36,948,756	15,065,508	785,669,785
37	2010 1 Qtr	37,135,797	6,982,036	3,427,394	4,595,437	113,884	32,426,476	12,890,316	798,560,101
38	2010 2 Qtr	37,323,961	6,878,683	3,427,394	9,374,944	232,329	27,716,688	10,741,995	809,302,096
39	2010 3 Qtr	37,513,255	6,773,386	3,427,394	9,477,164	234,862	27,801,228	10,504,792	819,806,888
40	2010 4 Qtr	37,703,685	6,666,108	3,427,394	9,494,626	482,680	27,726,380	10,214,014	830,020,902
41	2011 1 Qtr	37,909,702	6,556,813	3,423,500	9,604,918	486,765	27,818,019	9,991,008	840,011,911
42	2011 2 Qtr	38,117,041	6,445,462	3,423,500	9,715,029	490,854	27,911,158	9,773,291	849,785,201
43	2011 3 Qtr	38,325,712	6,332,015	3,423,500	9,826,325	494,981	28,004,405	9,560,248	859,345,449
44	2011 4 Qtr	38,535,723	6,216,435	3,423,500	9,938,824	499,147	28,097,752	9,351,778	868,697,228
45	2012 1 Qtr	38,745,632	6,098,680	3,427,394	10,050,691	503,297	28,191,644	9,147,931	877,845,158
46	2012 2 Qtr	38,956,847	5,978,710	3,427,394	10,165,129	507,518	28,284,200	8,948,005	886,793,163
47	2012 3 Qtr	39,169,379	5,856,483	3,427,394	10,280,803	511,779	28,376,797	8,752,366	895,545,529
48	2012 4 Qtr	39,383,235	5,731,956	3,427,394	10,397,732	516,080	28,469,423	8,560,924	904,106,453
49	2013 1 Qtr	39,599,981	5,605,085	3,423,500	10,517,821	520,479	28,561,681	8,373,472	912,479,925
50	2013 2 Qtr	39,818,122	5,475,827	3,423,500	10,637,868	524,885	28,655,369	8,190,447	920,670,372
51	2013 3 Qtr	40,037,670	5,344,137	3,423,500	10,759,245	529,333	28,749,092	8,011,348	928,681,720
52	2013 4 Qtr	40,258,634	5,209,969	3,423,500	10,881,969	533,824	28,842,840	7,836,088	936,517,808
53	2014 1 Qtr	40,481,024	5,073,275	3,427,394	11,004,710	538,325	28,937,988	7,664,952	944,182,761
54	2014 2 Qtr	40,704,849	4,934,009	3,427,394	11,130,190	542,904	29,031,756	7,497,116	951,679,877
55	2014 3 Qtr	40,930,120	4,792,122	3,427,394	11,257,077	547,526	29,125,516	7,332,877	959,012,755
56	2014 4 Qtr	41,156,847	4,647,564	3,427,394	11,385,393	552,194	29,219,260	7,172,158	966,184,912
57	2015 1 Qtr	41,385,039	4,500,284	3,423,500	11,516,510	556,940	29,311,589	7,014,550	973,199,462
58	2015 2 Qtr	41,614,707	4,350,233	3,423,500	11,647,746	561,699	29,405,262	6,860,651	980,060,114
59	2015 3 Qtr	41,845,862	4,197,357	3,423,500	11,780,475	566,505	29,498,882	6,710,049	986,770,162
60	2015 4 Qtr	42,078,513	4,041,603	3,423,500	11,914,718	571,359	29,592,436	6,562,672	993,332,834

TABLE I: ACE DISCOUNTED CASH FLOW
(Continued)

Period	Quarter	Quarterly Levelized Capital Carrying Charge Requirement 7/	Interest on Investment Financed With Debt 8/	Tax Depreciation 9/	Actual Federal Tax Payments 10/	Actual State Tax Payments 11/	Cash Flow 12/	Present Value Cash Flow 13/	Cumulative Present Value 14/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
61	2016 1 Qtr	$42,312,671	$3,882,917	$1,414,194	$12,747,708	$593,538	$28,971,425	$6,263,970	$999,596,804
62	2016 2 Qtr	42,548,346	3,721,243	1,414,194	12,885,048	598,488	29,064,811	6,126,707	1,005,723,511
63	2016 3 Qtr	42,785,549	3,556,525	1,414,194	13,023,970	603,487	29,158,092	5,992,369	1,011,715,880
64	2016 4 Qtr	43,024,291	3,388,706	1,414,194	13,164,499	608,536	29,251,256	5,860,893	1,017,576,773
65	2017 1 Qtr	43,264,582	3,217,726	1,126,038	13,406,647	616,114	29,241,822	5,712,202	1,023,288,975
66	2017 2 Qtr	43,506,433	3,043,528	1,126,038	13,550,461	621,264	29,334,708	5,586,769	1,028,875,744
67	2017 3 Qtr	43,749,855	2,866,049	1,126,038	13,695,956	626,467	29,427,432	5,464,006	1,034,339,750
68	2017 4 Qtr	43,994,859	2,685,227	1,126,038	13,843,155	631,723	29,519,981	5,343,855	1,039,683,606
69	2018 1 Qtr	44,241,455	2,501,000	1,126,038	13,992,085	637,031	29,612,339	5,226,262	1,044,909,867
70	2018 2 Qtr	44,489,656	2,313,304	1,126,038	14,142,772	642,394	29,704,489	5,111,171	1,050,021,038
71	2018 3 Qtr	44,739,471	2,122,072	1,126,038	14,295,242	647,812	29,796,417	4,998,528	1,055,019,566
72	2018 4 Qtr	44,990,912	1,927,239	1,126,038	14,449,523	653,285	29,888,105	4,888,283	1,059,907,849
73	2019 1 Qtr	45,243,992	1,728,736	1,126,038	14,605,641	658,814	29,979,536	4,780,383	1,064,688,232
74	2019 2 Qtr	45,498,720	1,526,493	1,126,038	14,763,626	664,401	30,070,693	4,674,779	1,069,363,011
75	2019 3 Qtr	45,755,108	1,320,441	1,126,038	14,923,504	670,045	30,161,559	4,571,421	1,073,934,432
76	2019 4 Qtr	46,013,169	1,110,508	1,126,038	15,085,306	675,748	30,252,114	4,470,262	1,078,404,695
77	2020 1 Qtr	46,272,913	896,619	1,126,038	15,249,061	681,511	30,342,342	4,371,256	1,082,775,950
78	2020 2 Qtr	46,534,353	678,701	1,126,038	15,414,799	687,333	30,432,221	4,274,355	1,087,050,306
79	2020 3 Qtr	46,797,500	456,677	1,126,038	15,582,549	693,217	30,521,734	4,179,516	1,091,229,822
80	2020 4 Qtr	47,062,366	230,469	1,126,038	15,752,344	699,163	30,610,860	4,086,694	1,095,316,516
Future		2,415,322,126		135,124,514	785,707,531	35,318,953	1,594,295,642	212,845,993	1,308,162,509

1/ From Table C, Column (10).
2/ From Table D, Column (9).
3/ Line 1 + Line 2.
4/ Table F Column (8).
5/ Line 3 + Line 4.
6/ Weighted average state tax rates for New Mexico, Texas, and Arizona.
7/ Quarterly carrying costs needed to recover the total investment over 80 quarters after consideration of the applicable interest payments, tax depreciation and tax liability. The Future value is an estimate of a perpetual income stream for the ACE and is calculated by taking the Period 80, Column (3) value and dividing it by the ACE's estimated quarterly Real Cost of Capital.
8/ Value from Table E.
9/ Value from Table G, Page 11, Column (14) divided by 4 quarters.
10/ Table J: Part 1 Pages 19, 20 of 27.
11/ Table J: Part 2 Pages 21, 22 of 27.
12/ (Column (3) - Column (6) - Column (7)).
13/ Column (8) discounted by the fourth root of the annual Cost of Capital adjusted to midquarter dollars from Table A.
14/ Cumulative total of Column (9).

TABLE J - PART 1: COMPUTATION OF FEDERAL TAX LIABILITY - TAXABLE INCOME

Time Period (1)	Taxable Income B/4 NOL's ACE1/ (2)	Net Operating Losses Generated 2/ (3)	NOL's Generated Plus Carryforward 3/ (4)	Carryfoward Utilized 4/ (5)	Carryfoward Remaining 5/ (6)	Carryback Available 6/ (7)	Carryback Utilized 7/ (8)	Carryback Remaining 8/ (9)	Annual Taxable Income 9/ (10)	Annual Tax Liability 10/ (11)
1998	($68,825)	($68,825)	($68,825)	$0	($68,825)	($68,825)	$0	($68,825)	$0	$0
1999	(2,571,185)	(2,571,185)	(2,640,009)	0	(2,640,009)	(2,640,009)	0	(2,640,009)	0	0
2000	(32,292,008)	(32,292,008)	(34,932,018)	0	(34,932,018)	(34,932,018)	0	(34,932,018)	0	0
2001 1 Qtr	(29,332,643)	(29,332,643)	(64,264,661)	0	(64,264,661)	(64,264,661)	0	(64,264,661)	0	0
2001 2 Qtr	(28,933,045)	(28,933,045)	(93,197,706)	0	(93,197,706)	(93,197,706)	0	(93,197,706)	0	0
2001 3 Qtr	(28,707,976)	(28,707,976)	(121,905,682)	0	(121,905,682)	(121,905,682)	0	(121,905,682)	0	0
2001 4 Qtr	(28,646,064)	(28,646,064)	(150,551,745)	0	(150,551,745)	(150,551,745)	0	(150,551,745)	0	0
2002 1 Qtr	(22,208,600)	(22,208,600)	(172,760,346)	0	(172,760,346)	(172,760,346)	0	(172,760,346)	0	0
2002 2 Qtr	(22,215,335)	(22,215,335)	(194,975,681)	0	(194,975,681)	(194,975,681)	0	(194,975,681)	0	0
2002 3 Qtr	(22,403,234)	(22,403,234)	(217,378,915)	0	(217,378,915)	(217,378,915)	0	(217,378,915)	0	0
2002 4 Qtr	(22,834,049)	(22,834,049)	(240,212,964)	0	(240,212,964)	(240,212,964)	0	(240,212,964)	0	0
2003 1 Qtr	(12,080,203)	(12,080,203)	(252,293,167)	0	(252,293,167)	(252,293,167)	0	(252,293,167)	0	0
2003 2 Qtr	(10,630,388)	(10,630,388)	(262,923,555)	0	(262,923,555)	(262,923,555)	0	(262,923,555)	0	0
2003 3 Qtr	(10,503,175)	(10,503,175)	(273,426,730)	0	(273,426,730)	(273,426,730)	0	(273,426,730)	0	0
2003 4 Qtr	(10,234,949)	(10,234,949)	(283,661,680)	0	(283,661,680)	(283,661,680)	0	(283,661,680)	0	0
2004 1 Qtr	(2,192,262)	(2,192,262)	(285,853,942)	0	(285,853,942)	(285,853,942)	0	(285,853,942)	0	0
2004 2 Qtr	(1,867,179)	(1,867,179)	(287,721,121)	0	(287,721,121)	(287,721,121)	0	(287,721,121)	0	0
2004 3 Qtr	(1,538,699)	(1,538,699)	(289,259,821)	0	(289,259,821)	(289,259,821)	0	(289,259,821)	0	0
2004 4 Qtr	(1,206,781)	(1,206,781)	(290,466,602)	0	(290,466,602)	(290,466,602)	0	(290,466,602)	0	0
2005 1 Qtr	2,970,730	0	(290,466,602)	2,970,730	(287,495,872)	(287,495,872)	0	(287,495,872)	0	0
2005 2 Qtr	3,178,712	0	(287,495,872)	3,178,712	(284,317,160)	(284,317,160)	0	(284,317,160)	0	0
2005 3 Qtr	3,389,282	0	(284,317,160)	3,389,282	(280,927,878)	(280,927,878)	0	(280,927,878)	0	0
2005 4 Qtr	3,602,476	0	(280,927,878)	3,602,476	(277,325,402)	(277,325,402)	0	(277,325,402)	0	0
2006 1 Qtr	7,572,900	0	(277,325,402)	7,572,900	(269,752,502)	(269,752,502)	0	(269,752,502)	0	0
2006 2 Qtr	7,818,793	0	(269,752,502)	7,818,793	(261,933,709)	(261,933,709)	0	(261,933,709)	0	0
2006 3 Qtr	8,067,268	0	(261,933,709)	8,067,268	(253,866,441)	(253,866,441)	0	(253,866,441)	0	0
2006 4 Qtr	8,318,359	0	(253,866,441)	8,318,359	(245,548,082)	(245,548,082)	0	(245,548,082)	0	0
2007 1 Qtr	8,597,761	0	(245,548,082)	8,597,761	(236,950,320)	(236,950,320)	0	(236,950,320)	0	0
2007 2 Qtr	8,861,738	0	(236,950,320)	8,861,738	(228,088,582)	(228,088,582)	0	(228,088,582)	0	0
2007 3 Qtr	9,128,473	0	(228,088,582)	9,128,473	(218,960,110)	(218,960,110)	0	(218,960,110)	0	0
2007 4 Qtr	9,398,004	0	(218,960,110)	9,398,004	(209,562,105)	(209,562,105)	0	(209,562,105)	0	0
2008 1 Qtr	22,607,746	0	(209,562,105)	22,607,746	(186,954,359)	(186,954,359)	0	(186,954,359)	0	0
2008 2 Qtr	22,879,672	0	(186,954,359)	22,879,672	(164,074,687)	(164,074,687)	0	(164,074,687)	0	0
2008 3 Qtr	23,154,364	0	(164,074,687)	23,154,364	(140,920,323)	(140,920,323)	0	(140,920,323)	0	0
2008 4 Qtr	23,431,863	0	(140,920,323)	23,431,863	(117,488,460)	(117,488,460)	0	(117,488,460)	0	0
2009 1 Qtr	25,564,189	0	(117,488,460)	25,564,189	(91,924,271)	(91,924,271)	0	(91,924,271)	0	0
2009 2 Qtr	25,853,659	0	(91,924,271)	25,853,659	(66,070,612)	(66,070,612)	0	(66,070,612)	0	0
2009 3 Qtr	26,146,174	0	(66,070,612)	26,146,174	(39,924,438)	(39,924,438)	0	(39,924,438)	0	0
2009 4 Qtr	26,441,775	0	(39,924,438)	26,441,775	(13,482,663)	(13,482,663)	0	(13,482,663)	0	0
2010 1 Qtr	26,612,484	0	(13,482,663)	13,482,663	0	0	0	0	13,129,821	4,595,437
2010 2 Qtr	26,785,555	0	0	0	0	0	0	0	26,785,555	9,374,944
2010 3 Qtr	27,077,612	0	0	0	0	0	0	0	27,077,612	9,477,164
2010 4 Qtr	27,127,503	0	0	0	0	0	0	0	27,127,503	9,494,626

TABLE J - PART 1: COMPUTATION OF FEDERAL TAX LIABILITY - TAXABLE INCOME
(Continued)

Time Period	Taxable Income B/4 NOL's DRR 1/	Net Operating Losses Generated 2/	NOL's Generated Plus Carryforward 3/	Carryfoward Utilized 4/	Carryfoward Remaining 5/	Carryback Available 6/	Carryback Utilized 7/	Carryback Remaining 8/	Annual Taxable Income 9/	Annual Tax Liability 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2011 1 Qtr	$27,442,624	$0	$0	$0	$0	$0	$-0	$0	$27,442,624	$9,604,918
2011 2 Qtr	27,757,225	0	0	0	0	0	0	0	27,757,225	9,715,029
2011 3 Qtr	28,075,215	0	0	0	0	0	0	0	28,075,215	9,826,325
2011 4 Qtr	28,396,641	0	0	0	0	0	0	0	28,396,641	9,938,824
2012 1 Qtr	28,716,260	0	0	0	0	0	0	0	28,716,260	10,050,691
2012 2 Qtr	29,043,224	0	0	0	0	0	0	0	29,043,224	10,165,129
2012 3 Qtr	29,373,723	0	0	0	0	0	0	0	29,373,723	10,280,803
2012 4 Qtr	29,707,805	0	0	0	0	0	0	0	29,707,805	10,397,732
2013 1 Qtr	30,050,917	0	0	0	0	0	0	0	30,050,917	10,517,821
2013 2 Qtr	30,393,910	0	0	0	0	0	0	0	30,393,910	10,637,868
2013 3 Qtr	30,740,700	0	0	0	0	0	0	0	30,740,700	10,759,245
2013 4 Qtr	31,091,341	0	0	0	0	0	0	0	31,091,341	10,881,969
2014 1 Qtr	31,442,029	0	0	0	0	0	0	0	31,442,029	11,004,710
2014 2 Qtr	31,800,542	0	0	0	0	0	0	0	31,800,542	11,130,190
2014 3 Qtr	32,163,078	0	0	0	0	0	0	0	32,163,078	11,257,077
2014 4 Qtr	32,529,695	0	0	0	0	0	0	0	32,529,695	11,385,393
2015 1 Qtr	32,904,314	0	0	0	0	0	0	0	32,904,314	11,516,510
2015 2 Qtr	33,279,275	0	0	0	0	0	0	0	33,279,275	11,647,746
2015 3 Qtr	33,658,499	0	0	0	0	0	0	0	33,658,499	11,780,475
2015 4 Qtr	34,042,051	0	0	0	0	0	0	0	34,042,051	11,914,718
2016 1 Qtr	36,422,022	0	0	0	0	0	0	0	36,422,022	12,747,708
2016 2 Qtr	36,814,421	0	0	0	0	0	0	0	36,814,421	12,885,048
2016 3 Qtr	37,211,343	0	0	0	0	0	0	0	37,211,343	13,023,970
2016 4 Qtr	37,612,855	0	0	0	0	0	0	0	37,612,855	13,164,499
2017 1 Qtr	38,304,705	0	0	0	0	0	0	0	38,304,705	13,406,647
2017 2 Qtr	38,715,604	0	0	0	0	0	0	0	38,715,604	13,550,461
2017 3 Qtr	39,131,302	0	0	0	0	0	0	0	39,131,302	13,695,956
2017 4 Qtr	39,551,871	0	0	0	0	0	0	0	39,551,871	13,843,155
2018 1 Qtr	39,977,386	0	0	0	0	0	0	0	39,977,386	13,992,085
2018 2 Qtr	40,407,920	0	0	0	0	0	0	0	40,407,920	14,142,772
2018 3 Qtr	40,843,549	0	0	0	0	0	0	0	40,843,549	14,295,242
2018 4 Qtr	41,284,351	0	0	0	0	0	0	0	41,284,351	14,449,523
2019 1 Qtr	41,730,404	0	0	0	0	0	0	0	41,730,404	14,605,641
2019 2 Qtr	42,181,788	0	0	0	0	0	0	0	42,181,788	14,763,626
2019 3 Qtr	42,638,584	0	0	0	0	0	0	0	42,638,584	14,923,504
2019 4 Qtr	43,100,875	0	0	0	0	0	0	0	43,100,875	15,085,306
2020 1 Qtr	43,568,746	0	0	0	0	0	0	0	43,568,746	15,249,061
2020 2 Qtr	44,042,281	0	0	0	0	0	0	0	44,042,281	15,414,799
2020 3 Qtr	44,521,569	0	0	0	0	0	0	0	44,521,569	15,582,549
2020 4 Qtr	45,006,696	0	0	0	0	0	0	0	45,006,696	15,752,344
Future	2,244,878,660	0	0	0	0	0	0	0	2,244,878,660	785,707,531

1/ Table I, Column (3) - Table E, Columns ((6),(11) & (16)) - Table G, Column (14) / 4 - Table J Part 2, Column (11).
Values for 1998-2000 from Table D, Sum of Column (11).
2/ Column (2) if less than zero, otherwise zero.
3/ Cumulative total of Column (2).
4/ If Column (2) is greater than zero, and (Column (2) + Column (4) is less than zero, than Column (2), otherwise Column (4).
5/ Column (4) + Column (5) + Column (8).
6/ Previous period Column (9) + current period Column (3) - current period Column (5).
7/ If previous Column (10) is greater than zero, and previous Column (10) is less than current Column (7), then previous Column (10), otherwise zero.
8/ Column (7) + Column (8).
9/ If Column (2) is greater than zero, then Column (2) - Column (5) - Column (8), otherwise zero.
10/ Column (10) times applicable maximum Federal Statutory Tax Rate.

TABLE J - PART 2: COMPUTATION OF STATE TAX LIABILITY - TAXABLE INCOME

Time Period (1)	Taxable Income B/4 NOL's ACE 1/ (2)	Net Operating Losses Generated 2/ (3)	NOL's Generated Plus Carryforward 3/ (4)	Carryfoward Utilized 4/ (5)	Carryfoward Remaining 5/ (6)	Carryback Available 6/ (7)	Carryback Utilized 7/ (8)	Carryback Remaining 8/ (9)	Annual Taxable Income 9/ (10)	Annual Tax Liability 10/ (11)
1998	($68,825)	($68,825)	($68,825)	$0	($68,825)	($68,825)	$0	($68,825)	$0	$0
1999	(2,571,185)	(2,571,185)	(2,640,009)	0	(2,640,009)	(2,640,009)	0	(2,640,009)	0	0
2000	(32,292,008)	(32,292,008)	(34,932,018)	0	(34,932,018)	(34,932,018)	0	(34,932,018)	0	0
2001 1 Qtr	(29,332,643)	(29,332,643)	(64,264,661)	0	(64,264,661)	(64,264,661)	0	(64,264,661)	0	0
2001 2 Qtr	(28,933,045)	(28,933,045)	(93,197,706)	0	(93,197,706)	(93,197,706)	0	(93,197,706)	0	0
2001 3 Qtr	(28,707,976)	(28,707,976)	(121,905,682)	0	(121,905,682)	(121,905,682)	0	(121,905,682)	0	0
2001 4 Qtr	(28,646,064)	(28,646,064)	(150,551,745)	0	(150,551,745)	(150,551,745)	0	(150,551,745)	0	0
2002 1 Qtr	(22,208,600)	(22,208,600)	(172,760,346)	0	(172,760,346)	(172,760,346)	0	(172,760,346)	0	0
2002 2 Qtr	(22,215,335)	(22,215,335)	(194,975,681)	0	(194,975,681)	(194,975,681)	0	(194,975,681)	0	0
2002 3 Qtr	(22,403,234)	(22,403,234)	(217,378,915)	0	(217,378,915)	(217,378,915)	0	(217,378,915)	0	0
2002 4 Qtr	(22,834,049)	(22,834,049)	(240,212,964)	0	(240,212,964)	(240,212,964)	0	(240,212,964)	0	0
2003 1 Qtr	(12,080,203)	(12,080,203)	(252,293,167)	0	(252,293,167)	(252,293,167)	0	(252,293,167)	0	0
2003 2 Qtr	(10,630,388)	(10,630,388)	(262,923,555)	0	(262,923,555)	(262,923,555)	0	(262,923,555)	0	0
2003 3 Qtr	(10,503,175)	(10,503,175)	(273,426,730)	0	(273,426,730)	(273,426,730)	0	(273,426,730)	0	0
2003 4 Qtr	(10,234,949)	(10,234,949)	(283,661,680)	0	(283,661,680)	(283,661,680)	0	(283,661,680)	0	0
2004 1 Qtr	(2,192,262)	(2,192,262)	(285,853,942)	0	(285,853,942)	(285,853,942)	0	(285,853,942)	0	0
2004 2 Qtr	(1,867,179)	(1,867,179)	(287,721,121)	0	(287,721,121)	(287,721,121)	0	(287,721,121)	0	0
2004 3 Qtr	(1,538,699)	(1,538,699)	(289,259,821)	0	(289,259,821)	(289,259,821)	0	(289,259,821)	0	0
2004 4 Qtr	(1,206,781)	(1,206,781)	(290,466,602)	0	(290,466,602)	(290,466,602)	0	(290,466,602)	0	0
2005 1 Qtr	2,970,730	0	(290,466,602)	2,970,730	(287,495,872)	(287,495,872)	0	(287,495,872)	0	0
2005 2 Qtr	3,178,712	0	(287,495,872)	3,178,712	(284,317,160)	(284,317,160)	0	(284,317,160)	0	0
2005 3 Qtr	3,389,282	0	(284,317,160)	3,389,282	(280,927,878)	(280,927,878)	0	(280,927,878)	0	0
2005 4 Qtr	3,602,476	0	(280,927,878)	3,602,476	(277,325,402)	(277,325,402)	0	(277,325,402)	0	0
2006 1 Qtr	7,572,900	0	(277,325,402)	7,572,900	(269,752,502)	(269,752,502)	0	(269,752,502)	0	0
2006 2 Qtr	7,818,793	0	(269,752,502)	7,818,793	(261,933,709)	(261,933,709)	0	(261,933,709)	0	0
2006 3 Qtr	8,067,268	0	(261,933,709)	8,067,268	(253,866,441)	(253,866,441)	0	(253,866,441)	0	0
2006 4 Qtr	8,318,359	0	(253,866,441)	8,318,359	(245,548,082)	(245,548,082)	0	(245,548,082)	0	0
2007 1 Qtr	8,597,761	0	(245,548,082)	8,597,761	(236,950,320)	(236,950,320)	0	(236,950,320)	0	0
2007 2 Qtr	8,861,738	0	(236,950,320)	8,861,738	(228,088,582)	(228,088,582)	0	(228,088,582)	0	0
2007 3 Qtr	9,128,473	0	(228,088,582)	9,128,473	(218,960,110)	(218,960,110)	0	(218,960,110)	0	0
2007 4 Qtr	9,398,004	0	(218,960,110)	9,398,004	(209,562,105)	(209,562,105)	0	(209,562,105)	0	0
2008 1 Qtr	22,607,746	0	(209,562,105)	22,607,746	(186,954,359)	(186,954,359)	0	(186,954,359)	0	0
2008 2 Qtr	22,879,672	0	(186,954,359)	22,879,672	(164,074,687)	(164,074,687)	0	(164,074,687)	0	0
2008 3 Qtr	23,154,364	0	(164,074,687)	23,154,364	(140,920,323)	(140,920,323)	0	(140,920,323)	0	0
2008 4 Qtr	23,431,863	0	(140,920,323)	23,431,863	(117,488,460)	(117,488,460)	0	(117,488,460)	0	0
2009 1 Qtr	25,564,189	0	(117,488,460)	25,564,189	(91,924,271)	(91,924,271)	0	(91,924,271)	0	0
2009 2 Qtr	25,853,659	0	(91,924,271)	25,853,659	(66,070,612)	(66,070,612)	0	(66,070,612)	0	0
2009 3 Qtr	26,146,174	0	(66,070,612)	26,146,174	(39,924,438)	(39,924,438)	0	(39,924,438)	0	0
2009 4 Qtr	26,441,775	0	(39,924,438)	26,441,775	(13,482,663)	(13,482,663)	0	(13,482,663)	0	0
2010 1 Qtr	26,726,367	0	(13,482,663)	13,482,663	0	0	0	0	13,243,704	113,884
2010 2 Qtr	27,017,884	0	0	0	0	0	0	0	27,017,884	232,329
2010 3 Qtr	27,312,475	0	0	0	0	0	0	0	27,312,475	234,862
2010 4 Qtr	27,610,183	0	0	0	0	0	0	0	27,610,183	482,680

TABLE J - PART 2: COMPUTATION OF STATE TAX LIABILITY - TAXABLE INCOME
(Continued)

Time Period	Taxable Income B/4 NOL's DRR 1/	Net Operating Losses Generated 2/	NOL's Generated Plus Carryforward 3/	Carryfoward Utilized 4/	Carryfoward Remaining 5/	Carryback Available 6/	Carryback Utilized 7/	Carryback Remaining 8/	Annual Taxable Income Before Income 9/	Annual Tax Liability 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2011 1 Qtr	$27,929,389	$0	$0	$0	$0	$0	$-0	$0	$27,929,389	$486,765
2011 2 Qtr	28,248,079	0	0	0	0	0	0	0	28,248,079	490,854
2011 3 Qtr	28,570,196	0	0	0	0	0	0	0	28,570,196	494,981
2011 4 Qtr	28,895,788	0	0	0	0	0	0	0	28,895,788	499,147
2012 1 Qtr	29,219,557	0	0	0	0	0	0	0	29,219,557	503,297
2012 2 Qtr	29,550,743	0	0	0	0	0	0	0	29,550,743	507,518
2012 3 Qtr	29,885,502	0	0	0	0	0	0	0	29,885,502	511,779
2012 4 Qtr	30,223,886	0	0	0	0	0	0	0	30,223,886	516,080
2013 1 Qtr	30,571,395	0	0	0	0	0	0	0	30,571,395	520,479
2013 2 Qtr	30,918,795	0	0	0	0	0	0	0	30,918,795	524,885
2013 3 Qtr	31,270,033	0	0	0	0	0	0	0	31,270,033	529,333
2013 4 Qtr	31,625,165	0	0	0	0	0	0	0	31,625,165	533,824
2014 1 Qtr	31,980,354	0	0	0	0	0	0	0	31,980,354	538,325
2014 2 Qtr	32,343,446	0	0	0	0	0	0	0	32,343,446	542,904
2014 3 Qtr	32,710,604	0	0	0	0	0	0	0	32,710,604	547,526
2014 4 Qtr	33,081,889	0	0	0	0	0	0	0	33,081,889	552,194
2015 1 Qtr	33,461,254	0	0	0	0	0	0	0	33,461,254	556,940
2015 2 Qtr	33,840,974	0	0	0	0	0	0	0	33,840,974	561,699
2015 3 Qtr	34,225,005	0	0	0	0	0	0	0	34,225,005	566,505
2015 4 Qtr	34,613,410	0	0	0	0	0	0	0	34,613,410	571,359
2016 1 Qtr	37,015,560	0	0	0	0	0	0	0	37,015,560	593,538
2016 2 Qtr	37,412,909	0	0	0	0	0	0	0	37,412,909	598,488
2016 3 Qtr	37,814,831	0	0	0	0	0	0	0	37,814,831	603,487
2016 4 Qtr	38,221,392	0	0	0	0	0	0	0	38,221,392	608,536
2017 1 Qtr	38,920,818	0	0	0	0	0	0	0	38,920,818	616,114
2017 2 Qtr	39,336,868	0	0	0	0	0	0	0	39,336,868	621,264
2017 3 Qtr	39,757,769	0	0	0	0	0	0	0	39,757,769	626,467
2017 4 Qtr	40,183,594	0	0	0	0	0	0	0	40,183,594	631,723
2018 1 Qtr	40,614,417	0	0	0	0	0	0	0	40,614,417	637,031
2018 2 Qtr	41,050,314	0	0	0	0	0	0	0	41,050,314	642,394
2018 3 Qtr	41,491,361	0	0	0	0	0	0	0	41,491,361	647,812
2018 4 Qtr	41,937,636	0	0	0	0	0	0	0	41,937,636	653,285
2019 1 Qtr	42,389,218	0	0	0	0	0	0	0	42,389,218	658,814
2019 2 Qtr	42,846,189	0	0	0	0	0	0	0	42,846,189	664,401
2019 3 Qtr	43,308,629	0	0	0	0	0	0	0	43,308,629	670,045
2019 4 Qtr	43,776,624	0	0	0	0	0	0	0	43,776,624	675,748
2020 1 Qtr	44,250,257	0	0	0	0	0	0	0	44,250,257	681,511
2020 2 Qtr	44,729,615	0	0	0	0	0	0	0	44,729,615	687,333
2020 3 Qtr	45,214,786	0	0	0	0	0	0	0	45,214,786	693,217
2020 4 Qtr	45,705,859	0	0	0	0	0	0	0	45,705,859	699,163
Future	2,280,197,612	0	0	0	0	0	0	0	2,280,197,612	35,318,953

1/ Table I, Column (3) -Table E, Columns ((6),(11) & (16)) - Table G, Column (14) / 4. Values for 1998-2000 from Table D, Sum of Column (11).
2/ Column (2) if less than zero, otherwise zero.
3/ Cumulative total of Column (2).
4/ If Column (2) is greater than zero, and (Column (2) + Column (4) is less than zero, than Column (2), otherwise Column (4).
5/ Column (4) + Column (5) + Column (8).
6/ Previous period Column (9) + current period Column (3) - current period Column (5).
7/ If previous Column (10) is greater than zero, and previous Column (10) is less than current Column (7), then previous Column (10), otherwise zero.
8/ Column (7) + Column (8).
9/ If Column (2) is greater than zero, then Column (2) - Column (5) - Column (8), otherwise zero.
10/ Column (10) times applicable maximum State Statutory Tax Rate.

TABLE K: ACE OPERATING EXPENSES

Item (1)		2001 (2)	2002 (3)	2003 (4)	2004 (5)	2005 (6)	2006 (7)	2007 (8)	2008 (9)	2009 (10)	2010 (11)
1. Train & Engine Personnel		$26,120,653	$25,628,835	$25,733,184	$25,987,176	$25,988,303	$25,989,268	$26,120,653	$25,993,291	$26,120,653	$26,120,653
2. Locomotive Lease Expense		7,374,179	7,235,333	7,264,792	7,336,497	7,336,815	7,337,088	7,374,179	7,338,224	7,374,179	7,374,179
3. Locomotive Maintennce Expense		17,053,105	16,732,018	16,800,143	16,965,964	16,966,700	16,967,330	17,053,105	16,884,599	16,967,330	16,967,330
4. Locomotive Operating Expense		64,987,156	63,763,533	64,023,149	64,655,073	64,657,875	64,660,278	64,987,156	64,670,286	64,987,156	64,987,156
5. Railcar Expense		55,412,947	54,369,594	54,590,962	55,129,787	55,132,177	55,134,226	55,412,947	55,142,760	55,412,947	55,412,947
6. Material & Supply Operating		623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022
7. Ad Valorem Tax		1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952
8. Operating Managers		6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723
9. General & Administration		13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963
10. Trackage Rights Vaughn - El Paso		1,655,335	1,624,167	1,630,780	1,646,876	1,646,948	1,647,009	1,655,335	1,638,978	1,647,009	1,647,009
11. Loss and Damage		2,470,240	2,423,729	2,433,597	2,457,617	2,457,724	2,457,815	2,470,240	2,458,195	2,470,240	2,470,240
12. Insurance	3.36%	7,065,472	6,954,712	6,978,212	7,035,412	7,035,666	7,035,883	7,065,472	7,033,643	7,062,310	7,062,310
13. Maintenance of Way		12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809
14. Total Annual Costs		$217,346,556	$213,939,389	$214,662,287	$216,421,873	$216,429,676	$216,436,365	$217,346,556	$216,367,445	$217,249,293	$217,249,293
15. Total Quarterly Cost		$54,336,639	$53,484,847	$53,665,572	$54,105,468	$54,107,419	$54,109,091	$54,336,639	$54,091,861	$54,312,323	$54,312,323

TABLE K: ACE OPERATING EXPENSES
(Continued)

Item (1)		2011 (2)	2012 (3)	2013 (4)	2014 (5)	2015 (6)	2016 (7)	2017 (8)	2018 (9)	2019 (10)	2020 (11)
1. Train & Engine Personnel		$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653	$26,120,653
2. Locomotive Lease Expense		7,374,179	7,374,179	7,374,179	7,374,179	7,374,179	7,374,179	7,374,179	7,374,179	7,374,179	7,374,179
3. Locomotive Maintennce Expense		16,967,330	16,967,330	16,967,330	16,967,330	16,967,330	16,967,330	16,967,330	16,967,330	16,967,330	16,967,330
4. Locomotive Operating Expense		64,987,156	64,987,156	64,987,156	64,987,156	64,987,156	64,987,156	64,987,156	64,987,156	64,987,156	64,987,156
5. Railcar Expense		55,412,947	55,412,947	55,412,947	55,412,947	55,412,947	55,412,947	55,412,947	55,412,947	55,412,947	55,412,947
6. Material & Supply Operating		623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022	623,022
7. Ad Valorem Tax		1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952	1,302,952
8. Operating Managers		6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723	6,648,723
9. General & Administration		13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963	13,685,963
10. Trackage Rights Vaughn - El Paso		1,647,009	1,647,009	1,647,009	1,647,009	1,647,009	1,647,009	1,647,009	1,647,009	1,647,009	1,647,009
11. Loss and Damage		2,470,240	2,470,240	2,470,240	2,470,240	2,470,240	2,470,240	2,470,240	2,470,240	2,470,240	2,470,240
12. Insurance	3.36%	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310	7,062,310
13. Maintenance of Way		12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809	12,946,809
14. Total Annual Costs		$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293	$217,249,293
15. Total Quarterly Cost		$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323	$54,312,323

TABLE K: ACE OPERATING EXPENSES, INDEXED
(Continued)

Period (1)	Quarter (2)	Rail Cost Adjustment Factor Index 1/ (3)	Operating Expense Indexed For Inflation 2/ (4)	Period (5)	Quarter (6)	Rail Cost Adjustment Factor Index 1/ (7)	Operating Expense Indexed For Inflation 2/ (8)	Period (9)	Quarter (10)	Rail Cost Adjustment Factor Index 1/ (11)	Operating Expense Indexed For Inflation 2/ (12)
NA	2000 2 Qtr	100.0	NA	27	2007 3 Qtr	95.3	51,426,746	56	2014 4 Qtr	97.6	52,650,087
NA	2000 3 Qtr	99.2	NA	28	2007 4 Qtr	95.3	51,426,746	57	2015 1 Qtr	97.7	52,689,530
NA	2000 4 Qtr	99.3	NA	29	2008 1 Qtr	95.4	51,246,195	58	2015 2 Qtr	97.7	52,729,003
1	2001 1 Qtr	100.7	54,336,639	30	2008 2 Qtr	95.5	51,297,365	59	2015 3 Qtr	97.8	52,768,505
2	2001 2 Qtr	99.2	53,517,494	31	2008 3 Qtr	95.6	51,348,586	60	2015 4 Qtr	97.9	52,808,037
3	2001 3 Qtr	98.7	53,244,445	32	2008 4 Qtr	95.7	51,399,857	61	2016 1 Qtr	98.0	52,847,599
4	2001 4 Qtr	98.0	52,880,381	33	2009 1 Qtr	95.7	51,648,011	62	2016 2 Qtr	98.0	52,887,190
5	2002 1 Qtr	97.1	51,603,471	34	2009 2 Qtr	95.8	51,686,703	63	2016 3 Qtr	98.1	52,926,811
6	2002 2 Qtr	94.9	50,438,809	35	2009 3 Qtr	95.9	51,725,425	64	2016 4 Qtr	98.2	52,966,462
7	2002 3 Qtr	93.9	49,901,273	36	2009 4 Qtr	96.0	51,764,175	65	2017 1 Qtr	98.3	53,006,142
8	2002 4 Qtr	97.0	51,513,881	37	2010 1 Qtr	96.0	51,802,955	66	2017 2 Qtr	98.3	53,045,852
9	2003 1 Qtr	95.7	50,990,806	38	2010 2 Qtr	96.1	51,841,764	67	2017 3 Qtr	98.4	53,085,591
10	2003 2 Qtr	97.5	51,986,720	39	2010 3 Qtr	96.2	51,880,601	68	2017 4 Qtr	98.5	53,125,361
11	2003 3 Qtr	97.0	51,687,946	40	2010 4 Qtr	96.2	51,919,468	69	2018 1 Qtr	98.5	53,165,160
12	2003 4 Qtr	96.2	51,289,580	41	2011 1 Qtr	96.4	51,984,246	70	2018 2 Qtr	98.6	53,204,989
13	2004 1 Qtr	96.6	51,910,816	42	2011 2 Qtr	96.5	52,049,105	71	2018 3 Qtr	98.7	53,244,848
14	2004 2 Qtr	96.8	52,011,224	43	2011 3 Qtr	96.6	52,114,045	72	2018 4 Qtr	98.8	53,284,737
15	2004 3 Qtr	96.5	51,867,599	44	2011 4 Qtr	96.7	52,179,065	73	2019 1 Qtr	98.8	53,324,656
16	2004 4 Qtr	96.2	51,724,371	45	2012 1 Qtr	96.8	52,218,156	74	2019 2 Qtr	98.9	53,364,604
17	2005 1 Qtr	96.2	51,700,354	46	2012 2 Qtr	96.9	52,257,275	75	2019 3 Qtr	99.0	53,404,583
18	2005 2 Qtr	96.1	51,674,484	47	2012 3 Qtr	96.9	52,296,424	76	2019 4 Qtr	99.1	53,444,591
19	2005 3 Qtr	96.1	51,648,628	48	2012 4 Qtr	97.0	52,335,603	77	2020 1 Qtr	99.1	53,484,630
20	2005 4 Qtr	96.1	51,622,784	49	2013 1 Qtr	97.1	52,374,810	78	2020 2 Qtr	99.2	53,524,698
21	2006 1 Qtr	95.9	51,520,819	50	2013 2 Qtr	97.2	52,414,047	79	2020 3 Qtr	99.3	53,564,797
22	2006 2 Qtr	95.7	51,417,467	51	2013 3 Qtr	97.2	52,453,314	80	2020 4 Qtr	99.4	53,604,925
23	2006 3 Qtr	95.5	51,314,322	52	2013 4 Qtr	97.3	52,492,609				
24	2006 4 Qtr	95.3	51,211,384	53	2014 1 Qtr	97.4	52,531,935				
25	2007 1 Qtr	95.3	51,426,746	54	2014 2 Qtr	97.4	52,571,289				
26	2007 2 Qtr	95.3	51,426,746	55	2014 3 Qtr	97.5	52,610,673				

1/ 2Q00 equals 100.0, all other quarters equal previous quarter x (1 + Inflation Rate for the RCAF-A from Table B on a Quarterly Basis).

2/ (Quarterly expense from Table K, Pages 23 and 24, for the applicable time period x Column (3), Column (7) or Column (11) / 1Q01 Column (3).

ACE - Stand-Alone Costs and Revenues

Quarterly Revenue Requirements to Cover Total Stand-Alone

Period	Quarter	Quarterly Capital Requirement Road Property	Quarterly Operating Expense	Annual Stand-Alone Requirement	Quarterly Stand-Alone Revenues	Annual Stand-Alone Revenues	Overpayments In Revenues	PV Difference	Cumulative PV Difference	PV Required Reduction In Revenues	Percent Reduction In Rates 1/	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	
1	2001 1 Qtr	$30,568,618	$54,336,639	$84,905,257	$121,484,161	$121,484,161	$36,578,904	$37,506,494	$37,506,494	$37,506,494	30.11%	
2	2001 2 Qtr	30,915,344	53,517,494	84,432,838	121,484,161	121,484,161	37,051,323	37,051,323	74,557,817	37,051,323	30.50%	
3	2001 3 Qtr	31,086,549	53,244,445	84,330,994	121,484,161	121,484,161	37,153,167	36,234,315	110,792,133	36,234,315	30.58%	
4	2001 4 Qtr	31,093,584	52,880,381	83,973,965	121,484,161	121,484,161	37,510,196	35,677,776	146,469,909	35,677,776	30.88%	
5	2002 1 Qtr	31,590,260	51,603,471	83,193,731	121,591,117	121,591,117	38,397,386	35,618,393	182,088,301	35,618,393	31.58%	
6	2002 2 Qtr	31,526,568	50,438,809	81,965,377	121,591,117	121,591,117	39,625,739	35,848,770	217,937,071	35,848,770	32.59%	
7	2002 3 Qtr	31,280,643	49,901,273	81,181,916	121,591,117	121,591,117	40,409,201	35,653,434	253,590,505	35,653,434	33.23%	
8	2002 4 Qtr	30,790,711	51,513,881	82,304,593	121,591,117	121,591,117	39,286,524	33,805,622	287,396,127	33,805,622	32.31%	
9	2003 1 Qtr	30,784,049	50,990,806	81,774,855	121,907,269	121,907,269	40,132,415	33,679,438	321,075,564	33,679,438	32.92%	
10	2003 2 Qtr	32,172,506	51,986,720		121,907,269							30.96%
11	2003 3 Qtr	32,237,207	51,687,946		121,907,269							
12	2003 4 Qtr	32,441,748	51,289,580	$333,590,562	121,907,269	$487,629,077	$154,038,515	$119,914,451	$440,990,016	$119,914,451	31.59%	
13	2004 1 Qtr	32,698,594	51,910,816		122,397,116							
14	2004 2 Qtr	32,957,576	52,011,224		122,397,116							
15	2004 3 Qtr	33,218,713	51,867,599		122,397,116							
16	2004 4 Qtr	33,482,023	51,724,371	$339,870,916	122,397,116	$489,588,464	$149,717,548	$105,441,552	$546,431,567	$105,441,552	30.58%	
17	2005 1 Qtr	33,617,553	51,700,354		123,954,302							
18	2005 2 Qtr	33,754,325	51,674,484		123,954,302							
19	2005 3 Qtr	33,892,346	51,648,628		123,954,302							
20	2005 4 Qtr	34,031,627	51,622,784	$341,942,101	123,954,302	$495,817,207	$153,875,106	$98,040,231	$644,471,799	$98,040,231	31.03%	
21	2006 1 Qtr	34,199,674	51,520,819		125,320,702							
22	2006 2 Qtr	34,368,851	51,417,467		125,320,702							
23	2006 3 Qtr	34,539,167	51,314,322		125,320,702							
24	2006 4 Qtr	34,710,631	51,211,384	$343,282,316	125,320,702	$501,282,807	$158,000,491	$91,073,343	$735,545,142	$91,073,343	31.52%	
25	2007 1 Qtr	34,890,761	51,426,746		127,357,968							
26	2007 2 Qtr	35,072,088	51,426,746		127,357,968							
27	2007 3 Qtr	35,254,620	51,426,746		127,357,968							
28	2007 4 Qtr	35,438,365	51,426,746	$346,362,819	127,357,968	$509,431,872	$163,069,053	$85,035,696	$820,580,838	$85,035,696	32.01%	
29	2008 1 Qtr	35,620,163	51,246,195		129,440,218							
30	2008 2 Qtr	35,803,046	51,297,365		129,440,218							
31	2008 3 Qtr	35,987,022	51,348,586		129,440,218							
32	2008 4 Qtr	36,172,099	51,399,857	$348,874,332	129,440,218	$517,760,870	$168,886,538	$79,674,920	$900,255,758	$79,674,920	32.62%	
33	2009 1 Qtr	36,364,407	51,648,011		132,066,994							
34	2009 2 Qtr	36,557,947	51,686,703		132,066,994							
35	2009 3 Qtr	36,752,728	51,725,425		132,066,994							
36	2009 4 Qtr	36,948,756	51,764,175	$353,448,153	132,066,994	$528,267,976	$174,819,823	$74,612,941	$974,868,700	$74,612,941	33.09%	
37	2010 1 Qtr	37,135,797	51,802,955		133,136,157							
38	2010 2 Qtr	37,323,961	51,841,764		133,136,157							
39	2010 3 Qtr	37,513,255	51,880,601		133,136,157							
40	2010 4 Qtr	37,703,685	51,919,468	$357,121,486	133,136,157	$532,544,629	$175,423,143	$67,734,083	$1,042,602,782	$67,734,083	32.94%	

1/ Calculated on West Texas Procedures: Column (8) divided by Column (7).

ACE - Stand-Alone Costs and Revenues

Quarterly Revenue Requirements to Cover Total Stand-Alone

Period (1)	Quarter (2)	Quarterly Capital Requirement Road Property (3)	Quarterly Operating Expense (4)	Annual Stand-Alone Requirement (5)	Quarterly Stand-Alone Revenues (6)	Annual Stand-Alone Revenues (7)	Overpayments In Revenues (8)	PV Difference (9)	Cumulative PV Difference (10)	PV Required Reduction In Revenues (11)	Percent Reduction In Rates 1/ (12)
41	2011 1 Qtr	$37,909,702	$51,984,246		$134,237,259						
42	2011 2 Qtr	38,117,041	52,049,105		134,237,259						
43	2011 3 Qtr	38,325,712	52,114,045		134,237,259						
44	2011 4 Qtr	38,535,723	52,179,065	$361,214,638	134,237,259	$536,949,036	$175,734,398	$61,386,663	$1,103,989,445	$61,386,663	32.73%
45	2012 1 Qtr	38,745,632	52,218,156		135,357,435						
46	2012 2 Qtr	38,956,847	52,257,275		135,357,435						
47	2012 3 Qtr	39,169,379	52,296,424		135,357,435						
48	2012 4 Qtr	39,383,235	52,335,603	$365,362,551	135,357,435	$541,429,738	$176,067,187	$55,640,696	$1,159,630,141	$55,640,696	32.52%
49	2013 1 Qtr	39,599,981	52,374,810		136,512,780						
50	2013 2 Qtr	39,818,122	52,414,047		136,512,780						
51	2013 3 Qtr	40,037,670	52,453,314		136,512,780						
52	2013 4 Qtr	40,258,634	52,492,609	$369,449,187	136,512,780	$546,051,118	$176,601,931	$50,490,126	$1,210,120,267	$50,490,126	32.34%
53	2014 1 Qtr	40,481,024	52,531,935		137,679,282						
54	2014 2 Qtr	40,704,849	52,571,289		137,679,282						
55	2014 3 Qtr	40,930,120	52,610,673		137,679,282						
56	2014 4 Qtr	41,156,847	52,650,087	$373,636,824	137,679,282	$550,717,129	$177,080,305	$45,801,336	$1,255,921,603	$45,801,336	32.15%
57	2015 1 Qtr	41,385,039	52,689,530		138,869,934						
58	2015 2 Qtr	41,614,707	52,729,003		138,869,934						
59	2015 3 Qtr	41,845,862	52,768,505		138,869,934						
60	2015 4 Qtr	42,078,513	52,808,037	$377,919,197	138,869,934	$555,479,734	$177,560,537	$41,548,105	$1,297,469,708	$41,548,105	31.97%
61	2016 1 Qtr	42,312,671	52,847,599		140,088,337						
62	2016 2 Qtr	42,548,346	52,887,190		140,088,337						
63	2016 3 Qtr	42,785,549	52,926,811		140,088,337						
64	2016 4 Qtr	43,024,291	52,966,462	$382,298,919	140,088,337	$560,353,347	$178,054,428	$37,692,455	$1,335,162,163	$37,692,455	31.78%
65	2017 1 Qtr	43,264,582	53,006,142		141,330,753						
66	2017 2 Qtr	43,506,433	53,045,852		141,330,753						
67	2017 3 Qtr	43,749,855	53,085,591		141,330,753						
68	2017 4 Qtr	43,994,859	53,125,361	$386,778,675	141,330,753	$565,323,011	$178,544,336	$34,193,583	$1,369,355,746	$34,193,583	31.58%
69	2018 1 Qtr	44,241,455	53,165,160		142,598,435						
70	2018 2 Qtr	44,489,656	53,204,989		142,598,435						
71	2018 3 Qtr	44,739,471	53,244,848		142,598,435						
72	2018 4 Qtr	44,990,912	53,284,737	$391,361,229	142,598,435	$570,393,740	$179,032,511	$31,018,966	$1,400,374,712	$31,018,966	31.39%
73	2019 1 Qtr	45,243,992	53,324,656		143,891,914						
74	2019 2 Qtr	45,498,720	53,364,604		143,891,914						
75	2019 3 Qtr	45,755,108	53,404,583		143,891,914						
76	2019 4 Qtr	46,013,169	53,444,591	$396,049,423	143,891,914	$575,567,655	$179,518,232	$28,138,494	$1,428,513,206	$28,138,494	31.19%
77	2020 1 Qtr	46,272,913	53,484,630		145,211,731						
78	2020 2 Qtr	46,534,353	53,524,698		145,211,731						
79	2020 3 Qtr	46,797,500	53,564,797		145,211,731						
80	2020 4 Qtr	47,062,366	53,604,925	$400,846,182	145,211,731	$580,846,925	$180,000,743	$25,524,866	$1,454,038,072	$25,524,866	30.99%

1/ Calculated on West Texas Procedures: Column (8) divided by Column (7).

ACE DISCOUNTED CASH FLOW MODEL

TABLE A: ACE ANNUAL COST OF CAPITAL

Year (1)	Industry Cost of Capital (2)	Industry Cost of Debt (3)	Industry Cost of Preferred Equity (4)	Industry Cost of Equity (5)	ACE's Cost of Debt (6)	ACE's Cost of Preferred Equity (7)	ACE's Cost of Equity (8)	Debt as a Percent of Total Investment (9)	Preferred Equity as a Percent of Total Investment (10)	Equity as a Percent of Total Investment (11)	Composite Cost of Capital (12)	1 + Cost of Capital (13)	STB Prescribed Debt as a % of Capital (14)	STB Prescribed Preferred Equity as a % of Capital (15)
1998	1/ 10.67%	6.60%	6.20%	13.10%	6.60%	6.20%	13.10%	36.00%	1.35%	62.65%	10.67%	1.1067	36.00%	1.35%
1999	2/ 10.76%	7.20%	6.30%	12.90%	7.20%	6.30%	12.90%	35.50%	1.80%	62.70%	10.76%	1.1076	35.50%	1.80%
2000	3/ 11.03%	8.00%	6.30%	13.90%	8.00%	6.30%	13.90%	45.40%	2.50%	52.10%	11.03%	1.1103	45.40%	2.50%
2001	4/ 10.20%	6.90%	6.30%	12.80%	6.90%	6.30%	12.80%	41.80%	2.25%	55.95%	10.19%	1.1019	41.80%	2.25%
2002	5/ 9.80%	6.00%	6.30%	12.60%	6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975	41.20%	2.10%
2003					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2004					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2005					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2006					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2007					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2008					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2009					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2010					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2011					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2012					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2013					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2014					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2015					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2016					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2017					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2018					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2019					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		
2020					6.00%	6.30%	12.60%	41.20%	2.10%	56.70%	9.75%	1.0975		

Alternative Case
Using 2001 and 2002 Cost of Capital

1/ Decision in ICC Ex Parte No. 558 (Sub No. 2) - Railroad Cost of Capital - 1998.
2/ Decision in ICC Ex Parte No. 558 (Sub No. 3) - Railroad Cost of Capital - 1999.
3/ Decision in ICC Ex Parte No. 558 (Sub No. 4) - Railroad Cost of Capital - 2000.
4/ Decision in ICC Ex Parte No. 558 (Sub No. 5) - Railroad Cost of Capital - 2001.
5/ Decision in ICC Ex Parte No. 558 (Sub No. 6) - Railroad Cost of Capital - 2002.

TABLE B: ACE INFLATION INDEXES

		Percent Change					
1. Material prices, wages, and supplements, combined (excl. fuel) 1/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		0.0%	1.7%	3.8%	4.0%	1.7%	
	Year	2003	2004	2005	2006	2007	
		4.5%	2.7%	3.0%	2.9%	2.9%	
	Year	2008	2009	2010	2011	2012	2013-2020
		2.7%	2.8%	2.7%	2.8%	2.8%	2.8%
2. Materials and supplies 2/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		1.1%	-0.1%	-0.4%	2.9%	-0.6%	
	Year	2003	2004	2005	2006	2007	
		0.0%	4.1%	-0.6%	0.5%	0.7%	
	Year	2008	2009	2010	2011	2012	2013-2020
		1.0%	0.9%	0.9%	1.0%	1.1%	1.0%
3. Wages and supplements 3/	Year	1998	1999	2000	2001	2002	
		(2)	(3)	(4)	(5)	(6)	
		-0.1%	2.0%	4.4%	4.2%	2.0%	
	Year	2003	2004	2005	2006	2007	
		5.1%	2.5%	3.5%	3.2%	3.2%	
	Year	2008	2009	2010	2011	2012	2013-2020
		2.9%	3.1%	2.9%	3.1%	3.0%	3.1%
4. Land 4/	Year	2001-2020					
		1.88%					

		Percent Change				
5. Railroad Cost Adjustment Factor	Year	2001	2002	2003	2004	2005
Index		(1)	(2)	(3)	(4)	(5)
Unadjusted 5/		2.7%	-0.2%	4.4%	1.0%	2.5%
	Year	2006	2007	2008	2009	2010
Unadjusted 5/		2.3%	2.5%	2.2%	2.3%	2.3%
	Year	2011	2012	2013-2020		
Unadjusted 5/		2.4%	2.4%	2.4%		
	Year	2001	2002	2003	2004	2005
Index		(1)	(2)	(3)	(4)	(5)
Adjusted 6/		-0.6%	-3.4%	1.0%	-1.1%	-0.2%
	Year	2006	2007	2008	2009	2010
Adjusted 6/		-0.8%	0.0%	0.4%	0.3%	0.3%
	Year	2011	2012	2013-2020		
Adjusted 6/		0.5%	0.3%	0.3%		

1/ Used to index Road Property Accounts 3, 5, 6, 13, 16, 17, 19, 20, 26, 27, and 39.
2/ Used to index Road Property Accounts 8, 9, and 11.
3/ Used to index Road Property Accounts 1, and 12.
4/ Used to index Road Property Account 2.
5/ Used to index revenues in Table L.
6/ Used to index operating expenses in Table K.

TABLE C: ACE ROAD PROPERTY INVESTMENT VALUES

Construction of the ACE occurs over a three year period,
Investments are assumed to be in January 1, 2001 dollars.

Road Property Account (1)	Road Property Component (2)	Service Life In Years 1/ (3)	Investment In 7/1/1998 Dollars 2/ (4)	Investment In 7/1/1999 Dollars 3/ (5)	Investment In 7/1/2000 Dollars 4/ (6)	1998 Investment Value 5/ (7)	1999 Investment Value 6/ (8)	2000 Investment Value 7/ (9)	Total Property Investment 1Q2001 8/ (10)
1	Engineering	NA	$61,353,917	$64,053,489	$66,743,735	$14,158,596	$49,271,914	$0	$63,430,511
2	Land	NA	12,508,318	12,744,000	12,984,122	$0	$12,744,000	$0	12,744,000
3	Grading	83	215,481,425	223,700,749	232,741,391	$0	$186,417,291	$38,790,232	225,207,523
5	Tunnels	88	0	0	0	$0	$0	$0	0
6	Bridges & Culverts	74	116,328,828	120,766,074	125,646,714	$0	$43,130,741	$80,772,888	123,903,629
8	Ties	21	102,272,238	101,863,150	104,817,181	$0	$25,465,787	$78,612,886	104,078,673
9	Rails and OTM	28	205,905,692	205,082,069	211,029,449	$0	$51,270,517	$158,272,087	209,542,604
11	Ballast	25	156,041,270	155,417,105	159,924,201	$0	$38,854,276	$119,943,151	158,797,427
12	Labor	26	113,760,445	118,765,905	123,754,073	$0	$29,691,476	$92,815,555	122,507,031
13	Fences and Roadway Signs	81	162,372	68,851	71,634	$0	$17,213	$53,725	70,938
1A	Training Costs	NA	5,215,204	5,414,133	5,632,940	$0	$0	$5,632,940	5,632,940
17	Roadway Buildings	26	3,004,768	3,119,382	3,245,449	$0	$779,846	$2,434,087	3,213,932
19	Fuel Stations	30	18,578,920	19,287,594	20,067,083	$0	$4,821,898	$15,050,312	19,872,210
20	Shops and Enginehouses	48	8,029,496	8,335,773	8,672,655	$0	$2,083,943	$6,504,492	8,588,435
26	Communications Systems	23	9,426,733	9,786,306	10,181,810	$0	$2,446,577	$7,636,357	10,082,934
27	Signals and interlockers	31	66,324,321	68,854,196	71,636,869	$0	$17,213,549	$53,727,652	70,941,201
39	Public improvements	53	103,802	107,762	112,117	$0	$26,940	$84,088	111,028
	Total		$1,094,497,750	$1,117,366,538	$1,157,261,423	$14,158,596	$464,235,969	$660,330,450	$1,138,725,015

1/ 1 + Depreciation Rate in Schedule 332 of BNSF's 2001 Annual Report R-1.
2/ 1/1/2001 (Column (6)), indexed to 1998 dollars; Column (5) + (1 + Annual Inflation Rate from Table B, Column (3)).
3/ 1/1/2001 (Column (6)), indexed to 1999 dollars; Column (6) + (1 + Annual Inflation Rate from Table B, Column (4)).
4/ 1/1/2001 (Column (6)), indexed to 2000 dollars; Column (6) + (1 + Annual Inflation Rate from Table B, Column (5)^0.5).
5/ Column (4) x Percent constructed in 1998.
6/ Column (5) x Percent constructed in 1999.
7/ Column (6) x Percent constructed in 2000.
8/ Sum of Column's (7) through (9).

TABLE D: INTEREST DURING CONSTRUCTION

Month of Installation (1)	Cost of Funds 1/ (2)	Timing of Account 1 Invesment 2/ (3)	Timing of Account 2 Invesment 2/ (4)	Timing of Accounts 3 and 13 Invesment 2/ (5)	Timing of Accounts 5 and 6 Invesment 2/ (6)	Timing of Accounts 8 Through 39 Invesment 2/ (7)	Total Investment by Month 3/ (8)	Interest During Construction 4/ (9)	Cost of Debt 5/ (10)	Deductible Interest During Construction 6/ (11)
							$2,359,766		0.53%	
Jul 98	0.85%	$2,359,766					2,359,766	$20,015	0.53%	$4,537
Aug 98	0.85%	2,359,766					2,359,766	40,201	0.53%	9,112
Sep 98	0.85%	2,359,766					2,359,766	60,557	0.53%	13,726
Oct 98	0.85%	2,359,766					2,359,766	81,086	0.53%	18,379
Nov 98	0.85%	2,359,766					2,359,766	101,789	0.53%	23,072
Dec 98	0.85%	2,359,766					6,520,191	123,665	0.58%	29,832
Jan 99	0.86%	4,927,191	$1,593,000				6,520,191	180,476	0.58%	43,537
Feb 99	0.86%	4,927,191	1,593,000				6,520,191	237,773	0.58%	57,359
Mar 99	0.86%	4,927,191	1,593,000				6,520,191	295,560	0.58%	71,300
Apr 99	0.86%	4,927,191	1,593,000				6,520,191	353,841	0.58%	85,359
May 99	0.86%	4,927,191	1,593,000				6,520,191	412,620	0.58%	99,539
Jun 99	0.86%	4,927,191	1,593,000				6,520,191	471,902	0.58%	113,839
Jul 99	0.86%	4,927,191	1,593,000				52,433,240	531,691	0.58%	128,263
Aug 99	0.86%	4,927,191	1,593,000	$37,286,901	$8,626,148		50,840,240	984,589	0.58%	237,518
Sep 99	0.86%	4,927,191	0	37,286,901	8,626,148		108,391,844	1,427,739	0.58%	344,421
Oct 99	0.86%	4,927,191	0	37,286,901	8,626,148	$57,551,603	103,464,652	2,366,797	0.58%	570,955
Nov 99	0.86%	0	0	37,286,901	8,626,148	57,551,603	103,464,652	3,271,753	0.58%	789,262
Dec 99	0.86%	0	0	37,286,901	8,626,148	57,551,603	107,272,130	4,285,966	0.64%	1,429,435
Jan 00	0.88%	0	0	38,843,957	8,974,765	59,453,407	68,428,173	5,263,034	0.64%	1,755,302
Feb 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	5,908,448	0.64%	1,970,557
Mar 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	6,559,516	0.64%	2,187,698
Apr 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	7,216,286	0.64%	2,406,741
May 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	7,878,808	0.64%	2,627,702
Jun 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	8,547,133	0.64%	2,850,599
Jul 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	9,221,311	0.64%	3,075,448
Aug 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	9,901,394	0.64%	3,302,266
Sep 00	0.88%	0	0	0	8,974,765	59,453,407	68,428,173	10,587,433	0.64%	3,531,070
Oct 00	0.88%	0	0	0	0	0	0	10,680,162	0.64%	3,561,997
Nov 00	0.88%	0	0	0	0	0	0	10,773,703	0.64%	3,593,194
Dec 00	0.88%	0	0	0	0	0	0	$107,785,252		$34,932,018
Total		$63,430,511	$12,744,000	$225,278,461	$123,903,629	$707,735,475	$1,133,092,075			

1/ ((1 + Cost of Capital from Table A for the applicable year)^(1/12) - 1) x 100.
2/ Applicable account value from Table C for the applicable investment period.
3/ Sum of Columns (3) through (7).
4/ Aug 98 equals Column (2) x prior Column (8), all other periods equal Column (2) x ((Sum of Column (8) for all prior periods) + (Sum of Column (9) for all prior periods)).
5/ ((1 + Cost of Debt from Table A for the applicable year)^(1/12) - 1) x 100.
6/ Aug 98 equals prior Column (8) x Column (10) x Table A, Column (9) for 1998, all other periods equal Column (10) x ((Sum of Column (8) for all prior periods) + (Sum of Column (9) for all prior periods)) x Table A, Column (9) for the applicable year.

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$111,012	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
1	$5,206,408	$5,171,794	$111,012	$34,614	$76,398
2	5,171,794	5,136,672	111,012	35,122	75,890
3	5,136,672	5,101,034	111,012	35,637	75,375
4	5,101,034	5,064,874	111,012	36,160	74,852
5	5,064,874	5,028,183	111,012	36,691	74,321
6	5,028,183	4,990,954	111,012	37,229	73,783
7	4,990,954	4,953,178	111,012	37,776	73,236
8	4,953,178	4,914,848	111,012	38,330	72,682
9	4,914,848	4,875,956	111,012	38,892	72,120
10	4,875,956	4,836,493	111,012	39,463	71,549
11	4,836,493	4,796,450	111,012	40,042	70,970
12	4,796,450	4,755,821	111,012	40,630	70,382
13	4,755,821	4,714,595	111,012	41,226	69,786
14	4,714,595	4,672,764	111,012	41,831	69,181
15	4,672,764	4,630,319	111,012	42,445	68,567
16	4,630,319	4,587,252	111,012	43,068	67,945
17	4,587,252	4,543,552	111,012	43,700	67,313
18	4,543,552	4,499,211	111,012	44,341	66,671
19	4,499,211	4,454,220	111,012	44,991	66,021
20	4,454,220	4,408,568	111,012	45,652	65,361

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,594,659	Per Quarter 6/

Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(7)	(8)	(9)	(10)	(11)
$168,587,504	$167,466,672	$3,594,659	$1,120,832	$2,473,827
167,466,672	166,329,394	3,594,659	1,137,278	2,457,380
166,329,394	165,175,427	3,594,659	1,153,967	2,440,692
165,175,427	164,004,527	3,594,659	1,170,900	2,423,759
164,004,527	162,816,446	3,594,659	1,188,081	2,406,577
162,816,446	161,610,931	3,594,659	1,205,515	2,389,143
161,610,931	160,387,726	3,594,659	1,223,205	2,371,454
160,387,726	159,146,572	3,594,659	1,241,154	2,353,505
159,146,572	157,887,206	3,594,659	1,259,366	2,335,292
157,887,206	156,609,360	3,594,659	1,277,846	2,316,813
156,609,360	155,312,763	3,594,659	1,296,597	2,298,062
155,312,763	153,997,140	3,594,659	1,315,623	2,279,036
153,997,140	152,662,211	3,594,659	1,334,928	2,259,730
152,662,211	151,307,694	3,594,659	1,354,517	2,240,142
151,307,694	149,933,301	3,594,659	1,374,393	2,220,266
149,933,301	148,538,741	3,594,659	1,394,560	2,200,098
148,538,741	147,123,717	3,594,659	1,415,024	2,179,635
147,123,717	145,687,929	3,594,659	1,435,788	2,158,871
145,687,929	144,231,073	3,594,659	1,456,856	2,137,802
144,231,073	142,752,839	3,594,659	1,478,234	2,116,425

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$7,274,934	Per Quarter 6/

Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(12)	(13)	(14)	(15)	(16)
$341,190,400	$338,922,041	$7,274,934	$2,268,359	$5,006,575
338,922,041	336,620,397	7,274,934	2,301,644	4,973,290
336,620,397	334,284,978	7,274,934	2,335,418	4,939,516
334,284,978	331,915,290	7,274,934	2,369,688	4,905,246
331,915,290	329,510,830	7,274,934	2,404,460	4,870,474
329,510,830	327,071,087	7,274,934	2,439,743	4,835,191
327,071,087	324,595,543	7,274,934	2,475,544	4,799,391
324,595,543	322,083,674	7,274,934	2,511,869	4,763,065
322,083,674	319,534,946	7,274,934	2,548,728	4,726,206
319,534,946	316,948,818	7,274,934	2,586,128	4,688,807
316,948,818	314,324,742	7,274,934	2,624,076	4,650,858
314,324,742	311,662,160	7,274,934	2,662,581	4,612,353
311,662,160	308,960,509	7,274,934	2,701,652	4,573,283
308,960,509	306,219,213	7,274,934	2,741,295	4,533,639
306,219,213	303,437,693	7,274,934	2,781,521	4,493,414
303,437,693	300,615,356	7,274,934	2,822,336	4,452,598
300,615,356	297,751,605	7,274,934	2,863,751	4,411,183
297,751,605	294,845,832	7,274,934	2,905,773	4,369,161
294,845,832	291,897,420	7,274,934	2,948,412	4,326,522
291,897,420	288,905,744	7,274,934	2,991,677	4,283,258

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$111,012	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
21	$4,408,568	$4,362,247	$111,012	$46,321	$64,691
22	4,362,247	4,315,246	111,012	47,001	64,011
23	4,315,246	4,267,555	111,012	47,691	63,321
24	4,267,555	4,219,164	111,012	48,391	62,621
25	4,219,164	4,170,063	111,012	49,101	61,911
26	4,170,063	4,120,242	111,012	49,821	61,191
27	4,120,242	4,069,690	111,012	50,552	60,460
28	4,069,690	4,018,395	111,012	51,294	59,718
29	4,018,395	3,966,349	111,012	52,047	58,965
30	3,966,349	3,913,538	111,012	52,811	58,202
31	3,913,538	3,859,953	111,012	53,585	57,427
32	3,859,953	3,805,581	111,012	54,372	56,640
33	3,805,581	3,750,411	111,012	55,170	55,843
34	3,750,411	3,694,432	111,012	55,979	55,033
35	3,694,432	3,637,631	111,012	56,801	54,212
36	3,637,631	3,579,997	111,012	57,634	53,378
37	3,579,997	3,521,517	111,012	58,480	52,532
38	3,521,517	3,462,180	111,012	59,338	51,674
39	3,462,180	3,401,971	111,012	60,209	50,803
40	3,401,971	3,340,879	111,012	61,092	49,920

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,594,659	Per Quarter 6/

	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
	(7)	(8)	(9)	(10)	(11)
	$142,752,839	$141,252,913	$3,594,659	$1,499,925	$2,094,733
	141,252,913	139,730,978	3,594,659	1,521,935	2,072,724
	139,730,978	138,186,710	3,594,659	1,544,268	2,050,391
	138,186,710	136,619,782	3,594,659	1,566,928	2,027,731
	136,619,782	135,029,861	3,594,659	1,589,921	2,004,738
	135,029,861	133,416,610	3,594,659	1,613,251	1,981,407
	133,416,610	131,779,686	3,594,659	1,636,924	1,957,735
	131,779,686	130,118,742	3,594,659	1,660,944	1,933,715
	130,118,742	128,433,426	3,594,659	1,685,316	1,909,342
	128,433,426	126,723,380	3,594,659	1,710,046	1,884,612
	126,723,380	124,988,240	3,594,659	1,735,139	1,859,519
	124,988,240	123,227,640	3,594,659	1,760,600	1,834,058
	123,227,640	121,441,205	3,594,659	1,786,435	1,808,223
	121,441,205	119,628,556	3,594,659	1,812,649	1,782,010
	119,628,556	117,789,308	3,594,659	1,839,248	1,755,411
	117,789,308	115,923,072	3,594,659	1,866,236	1,728,422
	115,923,072	114,029,450	3,594,659	1,893,621	1,701,037
	114,029,450	112,108,042	3,594,659	1,921,408	1,673,251
	112,108,042	110,158,440	3,594,659	1,949,802	1,645,056
	110,158,440	108,180,229	3,594,659	1,978,211	1,616,448

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$7,274,934	Per Quarter 6/

	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
	(12)	(13)	(14)	(15)	(16)
	$288,905,744	$285,870,168	$7,274,934	$3,035,576	$4,239,358
	285,870,168	282,790,048	7,274,934	3,080,120	4,194,815
	282,790,048	279,664,732	7,274,934	3,125,317	4,149,616
	279,664,732	276,493,554	7,274,934	3,171,177	4,103,757
	276,493,554	273,275,844	7,274,934	3,217,710	4,057,224
	273,275,844	270,010,917	7,274,934	3,264,927	4,010,008
	270,010,917	266,698,082	7,274,934	3,312,836	3,962,099
	266,698,082	263,336,634	7,274,934	3,361,448	3,913,487
	263,336,634	259,925,861	7,274,934	3,410,773	3,864,161
	259,925,861	256,465,038	7,274,934	3,460,822	3,814,112
	256,465,038	252,953,433	7,274,934	3,511,606	3,763,329
	252,953,433	249,390,298	7,274,934	3,563,135	3,711,800
	249,390,298	245,774,878	7,274,934	3,615,420	3,659,515
	245,774,878	242,106,407	7,274,934	3,668,472	3,606,463
	242,106,407	238,384,105	7,274,934	3,722,302	3,552,632
	238,384,105	234,607,182	7,274,934	3,776,923	3,498,012
	234,607,182	230,774,837	7,274,934	3,832,345	3,442,590
	230,774,837	226,886,257	7,274,934	3,888,580	3,386,354
	226,886,257	222,940,617	7,274,934	3,945,640	3,329,294
	222,940,617	218,937,079	7,274,934	4,003,538	3,271,396

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$111,012	Per Quarter 6/

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,594,659	Per Quarter 6/

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$7,274,934	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
41	$3,340,879	$3,278,890	$111,012	$61,989	$49,024	$108,180,229	$106,172,990	$3,594,659	$2,007,239	$1,587,420	$218,937,079	$214,674,794	$7,274,934	$4,062,285	$3,212,649
42	3,278,890	3,215,992	111,012	62,898	48,114	106,172,990	104,136,298	3,594,659	2,036,693	1,557,966	214,674,794	210,752,899	7,274,934	4,121,695	3,153,040
43	3,215,992	3,152,171	111,012	63,821	47,191	104,136,298	102,069,719	3,594,659	2,066,579	1,528,080	210,752,899	206,570,520	7,274,934	4,182,379	3,092,556
44	3,152,171	3,087,413	111,012	64,758	46,254	102,069,719	99,972,816	3,594,659	2,096,903	1,497,755	206,570,520	202,326,770	7,274,934	4,243,750	3,031,184
45	3,087,413	3,021,705	111,012	65,708	45,304	99,972,816	97,845,143	3,594,659	2,127,673	1,466,986	202,326,770	198,020,747	7,274,934	4,306,022	2,968,912
46	3,021,705	2,955,033	111,012	66,672	44,340	97,845,143	95,686,249	3,594,659	2,158,894	1,435,765	198,020,747	193,651,539	7,274,934	4,369,208	2,905,726
47	2,955,033	2,887,383	111,012	67,650	43,362	95,686,249	93,495,676	3,594,659	2,190,573	1,404,085	193,651,539	189,218,217	7,274,934	4,433,321	2,841,613
48	2,887,383	2,818,740	111,012	68,643	42,369	93,495,676	91,272,958	3,594,659	2,222,717	1,371,941	189,218,217	184,719,842	7,274,934	4,498,375	2,776,559
49	2,818,740	2,749,089	111,012	69,650	41,362	91,272,958	89,017,625	3,594,659	2,255,333	1,339,325	184,719,842	180,155,458	7,274,934	4,564,384	2,710,551
50	2,749,089	2,678,417	111,012	70,672	40,340	89,017,625	86,729,197	3,594,659	2,288,428	1,306,231	180,155,458	175,524,097	7,274,934	4,631,361	2,643,573
51	2,678,417	2,606,707	111,012	71,709	39,303	86,729,197	84,407,189	3,594,659	2,322,008	1,272,651	175,524,097	170,824,777	7,274,934	4,699,321	2,575,614
52	2,606,707	2,533,946	111,012	72,762	38,250	84,407,189	82,051,109	3,594,659	2,356,081	1,238,578	170,824,777	166,056,499	7,274,934	4,768,278	2,506,656
53	2,533,946	2,460,116	111,012	73,829	37,183	82,051,109	79,660,455	3,594,659	2,390,653	1,204,005	166,056,499	161,218,252	7,274,934	4,838,247	2,436,688
54	2,460,116	2,385,203	111,012	74,913	36,099	79,660,455	77,234,722	3,594,659	2,425,733	1,168,925	161,218,252	156,309,009	7,274,934	4,909,243	2,365,692
55	2,385,203	2,309,191	111,012	76,012	35,000	77,234,722	74,773,394	3,594,659	2,461,328	1,133,330	156,309,009	151,327,729	7,274,934	4,981,280	2,293,654
56	2,309,191	2,232,064	111,012	77,127	33,885	74,773,394	72,275,948	3,594,659	2,497,445	1,097,213	151,327,729	146,273,355	7,274,934	5,054,375	2,220,560
57	2,232,064	2,153,805	111,012	78,259	32,753	72,275,948	69,741,856	3,594,659	2,534,093	1,060,566	146,273,355	141,144,813	7,274,934	5,128,542	2,146,393
58	2,153,805	2,074,397	111,012	79,408	31,605	69,741,856	67,170,578	3,594,659	2,571,277	1,023,381	141,144,813	135,941,016	7,274,934	5,203,797	2,071,137
59	2,074,397	1,993,824	111,012	80,573	30,439	67,170,578	64,561,571	3,594,659	2,609,008	985,651	135,941,016	130,660,859	7,274,934	5,280,157	1,994,778
60	1,993,824	1,912,069	111,012	81,755	29,257	64,561,571	61,914,278	3,594,659	2,647,292	947,367	130,660,859	125,303,222	7,274,934	5,357,637	1,917,297

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (8) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE E: ACE AMORTIZATION SCHEDULE OF ASSETS PURCHASED WITH DEBT CAPITAL
(Continued)

AMORTIZATION SCHEDULE FOR THE ACE 1998 ROAD PROPERTY INVESTMENT FOR THE 1Q2001 START-UP

1. TOTAL INVESTMENT	$14,158,596	1/
2. IDC	$303,648	2/
3. PRINCIPAL	$5,206,408	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$111,012	Per Quarter 6/

Quarter	Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(1)	(2)	(3)	(4)	(5)	(6)
61	$1,912,069	$1,829,115	$111,012	$82,955	$28,057
62	1,829,115	1,744,943	111,012	84,172	26,840
63	1,744,943	1,659,535	111,012	85,407	25,605
64	1,659,535	1,572,875	111,012	86,660	24,352
65	1,572,875	1,484,943	111,012	87,932	23,080
66	1,484,943	1,395,721	111,012	89,222	21,790
67	1,395,721	1,305,189	111,012	90,532	20,481
68	1,305,189	1,213,329	111,012	91,860	19,152
69	1,213,329	1,120,121	111,012	93,208	17,804
70	1,120,121	1,025,546	111,012	94,576	16,436
71	1,025,546	929,582	111,012	95,963	15,049
72	929,582	832,211	111,012	97,372	13,641
73	832,211	733,410	111,012	98,800	12,212
74	733,410	633,160	111,012	100,250	10,762
75	633,160	531,439	111,012	101,721	9,291
76	531,439	428,225	111,012	103,214	7,798
77	428,225	323,496	111,012	104,728	6,284
78	323,496	217,231	111,012	106,265	4,747
79	217,231	109,407	111,012	107,825	3,188
80	109,407	(0)	111,012	109,407	1,605

AMORTIZATION SCHEDULE FOR THE ACE 1999 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$464,235,969	1/
2. IDC	$10,658,408	2/
3. PRINCIPAL	$168,587,504	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$3,594,659	Per Quarter 6/

Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(7)	(8)	(9)	(10)	(11)
$61,914,278	$59,228,140	$3,594,659	$2,686,138	$908,521
59,228,140	56,502,586	3,594,659	2,725,554	869,105
56,502,586	53,737,038	3,594,659	2,765,548	829,110
53,737,038	50,930,908	3,594,659	2,806,130	788,529
50,930,908	48,083,602	3,594,659	2,847,306	747,352
48,083,602	45,194,515	3,594,659	2,889,087	705,571
45,194,515	42,263,033	3,594,659	2,931,481	663,177
42,263,033	39,288,536	3,594,659	2,974,497	620,161
39,288,536	36,270,391	3,594,659	3,018,145	576,514
36,270,391	33,207,959	3,594,659	3,062,433	532,226
33,207,959	30,100,589	3,594,659	3,107,370	487,288
30,100,589	26,947,621	3,594,659	3,152,967	441,691
26,947,621	23,748,388	3,594,659	3,199,233	395,425
23,748,388	20,502,209	3,594,659	3,246,178	348,480
20,502,209	17,208,397	3,594,659	3,293,812	300,846
17,208,397	13,866,252	3,594,659	3,342,145	252,513
13,866,252	10,475,064	3,594,659	3,391,187	203,471
10,475,064	7,034,115	3,594,659	3,440,949	153,709
7,034,115	3,542,674	3,594,659	3,491,441	103,218
3,542,674	0	3,594,659	3,542,674	51,985

AMORTIZATION SCHEDULE FOR THE ACE 2000 ROAD PROPERTY INVESTMENT FOR 1Q2001 START-UP

1. TOTAL INVESTMENT	$654,697,510	1/
2. IDC	$96,823,196	2/
3. PRINCIPAL	$341,190,400	3/
4. INTEREST	6.0%	4/
5. TERM	80	Quarters 5/
6. PAYMENT ====>>	$7,274,934	Per Quarter 6/

Beginning Balance	Ending Balance 7/	Payment	Principal 8/	Interest 9/
(12)	(13)	(14)	(15)	(16)
$125,303,222	$119,866,968	$7,274,934	$5,436,254	$1,838,680
119,866,968	114,350,943	7,274,934	5,516,025	1,758,909
114,350,943	108,753,977	7,274,934	5,596,966	1,677,968
108,753,977	103,074,882	7,274,934	5,679,095	1,595,839
103,074,882	97,312,452	7,274,934	5,762,429	1,512,505
97,312,452	91,465,466	7,274,934	5,846,986	1,427,948
91,465,466	85,532,682	7,274,934	5,932,784	1,342,150
85,532,682	79,512,841	7,274,934	6,019,841	1,255,093
79,512,841	73,404,665	7,274,934	6,108,175	1,166,759
73,404,665	67,206,860	7,274,934	6,197,806	1,077,129
67,206,860	60,918,109	7,274,934	6,288,751	986,183
60,918,109	54,537,077	7,274,934	6,381,031	893,903
54,537,077	48,062,411	7,274,934	6,474,666	800,269
48,062,411	41,492,737	7,274,934	6,569,674	705,260
41,492,737	34,826,661	7,274,934	6,666,076	608,858
34,826,661	28,062,768	7,274,934	6,763,893	511,041
28,062,768	21,199,622	7,274,934	6,863,146	411,789
21,199,622	14,235,768	7,274,934	6,963,854	311,080
14,235,768	7,169,727	7,274,934	7,066,041	208,893
7,169,727	(0)	7,274,934	7,169,727	105,207

1/ From Table D, Column (8) for the applicable year investment.
2/ From Table D, Column (9) for the applicable year investment.
3/ (Total Investment + IDC) x (Proportion of Debt from Table A, Column (9)).
4/ From Table A, Column (6) for the applicable year investment.
5/ Model life of 20 years x 4.
6/ Line 3 Principal financed over Line 5 Term at Line 4 Interest Rate on a quarterly basis.
7/ Current quarter Beginning Balance - Principal.
8/ Current quarter Payment - Interest.
9/ Current quarter Beginning Balance x (1 + The Quarterly Interest Rate).

TABLE F: ACE PRESENT VALUE OF REPLACEMENT COST

Road Property Account (1)	Road Property Component (2)	Service Life In Years 1/ (3)	Investment 2/ (4)	Salvage 3/ (5)	Replacement Year Asset Net Cost 4/ (6)	Replacement Cost Adjusted To Reflect An Infinite Life 5/ (7)	Present Value Of Replacement Cost Adjusted To Reflect An Infinite Life (2001 Dollars) 6/ (8)
3	Grading	83	$2,445,196,778	$0	$2,246,071,014	$2,249,689,443	$551,423
5	Tunnels	88	0	0	0	0	0
6	Bridges & Culverts	74	1,038,799,368	0	726,879,027	729,276,147	450,232
8	Ties	21	133,508,996	0	81,358,230	100,796,877	12,012,034
9	Rails and OTM	28	286,005,098	26,362,136	158,914,297	179,156,021	10,697,603
11	Ballast	25	210,643,426	0	128,362,708	150,041,214	12,311,317
12	Labor	26	284,085,736	0	173,117,267	200,846,465	15,539,517
13	Fences and Roadway Signs	81	727,719	0	509,207	510,166	153
1A	Training Costs	NA	0	0	0	0	0
17	Roadway Buildings	26	7,087,637	0	5,654,464	6,513,337	474,892
19	Fuel Stations	30	48,829,974	0	44,853,482	49,714,748	2,462,836
20	Shops and Enginehouses	48	35,068,830	0	32,212,983	33,005,683	266,358
26	Communications Systems	23	20,454,186	0	12,464,451	14,947,317	1,468,735
27	Signals and interlockers	31	177,974,421	7,099,751	104,684,476	115,332,907	5,304,935
39	Public improvements	53	519,572	0	363,560	369,651	1,833
	Total		$4,688,901,741	$33,461,887	$3,715,445,166	$3,830,199,977	$61,541,869

1/ From Table C, Column (3).
2/ (Table C, Column (10) after allocation of Engineering) x (Table B, Inflation Index)^(Column (3)).
3/ [(Column (4) x Estimated Salvage %) - (Table C, Column (10) after allocation of Engineering x Salvage %)] x (1 - Current Federal Tax Rate) + (Table C, Column (10) after allocation of Engineering x Salvage %).
4/ Column (4) - (Present Value of the remaining tax deductions for depreciation, interest expense and the Present Value of any salvage).
5/ Column (6) + [(Column (6) / ((1 + Real Cost of Capital)^Column (3) - 1)].
6/ Column (7) / ((1 + Nominal Cost of Capital)^Column (3)).

TABLE G: ACE TAX DEPRECIATION SCHEDULES

Depreciation of Start-up investment for tax purposes using
accounting lives from Modified Accelerated Cost Recovery System (MACRS) 1/

Road Property Account (1)	Road Property Component (2)	Asset Lives Per MACRS (3)	Total 1/1/2001 Investment (4)	Depreciable Base (5)
1	Engineering	2/	$63,430,511	$63,430,511
2	Land	N/A	12,744,000	0
3	Grading	50	225,207,523	225,207,523
5	Tunnels	50	0	0
6	Bridges & Culverts	15	123,903,629	123,903,629
8	Ties	7	104,078,673	104,078,673
9	Rails and OTM	7	209,542,604	209,542,604
11	Ballast	7	158,797,427	158,797,427
12	Labor	7	122,507,031	122,507,031
13	Fences and Roadway Signs	15	70,938	70,938
1A	Training Costs	2/	5,632,940	5,632,940
17	Roadway Buildings	15	3,213,932	3,213,932
19	Fuel Stations	15	19,872,210	19,872,210
20	Shops and Enginehouses	15	8,588,435	8,588,435
26	Communications Systems	7	10,082,934	10,082,934
27	Signals and interlockers	7	70,941,201	70,941,201
39	Public improvements	15	111,028	111,028
	Total		$1,138,725,015	$1,125,981,015

1/ Applicable Depreciation Method: 200 or 150 percent
Declining Balance Switching to Straight Line
Applicable Recovery Periods: 7, 15 and 50 a/ years
Applicable Convention: Mid-quarter(property placed in service in first quarter)
The Depreciation Rates are as follows for the corresponding
Recovery Period and Recovery year:

Recovery Year	5-Year	7-year	15-year	50-year
1	20.00%	25.00%	8.750%	2.00%
2	20.00%	21.43%	9.130%	2.00%
3	20.00%	15.31%	8.210%	2.00%
4	20.00%	10.93%	7.390%	2.00%
5	20.00%	8.75%	6.650%	2.00%
6		8.74%	5.990%	2.00%
7		8.75%	5.900%	2.00%
8		1.09%	5.910%	2.00%
9		0.00%	5.900%	2.00%
10		0.00%	5.910%	2.00%
11		0.00%	5.900%	2.00%
12		0.00%	5.910%	2.00%
13		0.00%	5.900%	2.00%
14		0.00%	5.910%	2.00%
15		0.00%	5.900%	2.00%
16		0.00%	0.740%	2.00%
17		0.00%	0.000%	2.00%
18		0.00%	0.000%	2.00%
19-50		0.00%	0.000%	2.00%

a/ 50 year property uses the Straight Line Method for all time periods

2/ Applicable Recovery Period of 5 years for amortization of business start-up costs.

TABLE G: ACE TAX DEPRECIATION SCHEDULES
(Continued)

	Amortization - 5 Years			Depreciation - MACRS 7 Years			Depreciation - MACRS 15 Years			Depreciation - MACRS 50 Years			
Year	Unamortized Investment 1/	Rate 2/	Annual Amort. 3/	Undepreciated Investment 4/	Rate 2/	Annual Amount 5/	Undepreciated Investment 6/	Rate 2/	Annual Amount 7/	Unamortized Investment 8/	Rate 2/	Annual Amount 9/	Total Annual Depreciation 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1	$69,063,451	20.00%	$13,812,690	$675,949,870	25.00%	$168,987,467	$155,760,172	8.75%	$13,629,015	$225,207,523	2%	$4,504,150	$200,933,323
2	55,250,760	20.00%	13,812,690	506,962,402	21.43%	144,856,057	142,131,157	9.13%	14,220,904	220,703,372	2%	4,504,150	177,393,801
3	41,438,070	20.00%	13,812,690	362,106,345	15.31%	103,487,925	127,910,254	8.21%	12,787,910	216,199,222	2%	4,504,150	134,592,676
4	27,625,380	20.00%	13,812,690	258,618,420	10.93%	73,881,321	115,122,343	7.39%	11,510,677	211,695,071	2%	4,504,150	103,708,838
5	13,812,690	20.00%	13,812,690	184,737,099	8.75%	59,145,614	103,611,667	6.65%	10,358,051	207,190,921	2%	4,504,150	87,820,506
6				125,591,486	8.74%	59,078,019	93,253,615	5.99%	9,330,034	202,686,770	2%	4,504,150	72,912,203
7				66,513,467	8.75%	59,145,614	83,923,581	5.90%	9,189,850	198,182,620	2%	4,504,150	72,839,614
8				7,367,854	1.09%	7,367,854	74,733,731	5.91%	9,205,426	193,678,469	2%	4,504,150	21,077,430
9							65,528,305	5.90%	9,189,850	189,174,319	2%	4,504,150	13,694,001
10							56,338,454	5.91%	9,205,426	184,670,168	2%	4,504,150	13,709,577
11							47,133,028	5.90%	9,189,850	180,166,018	2%	4,504,150	13,694,001
12							37,943,178	5.91%	9,205,426	175,661,868	2%	4,504,150	13,709,577
13							28,737,752	5.90%	9,189,850	171,157,717	2%	4,504,150	13,694,001
14							19,547,902	5.91%	9,205,426	166,653,567	2%	4,504,150	13,709,577
15							10,342,475	5.90%	9,189,850	162,149,416	2%	4,504,150	13,694,001
16							1,152,625	0.74%	1,152,625	157,645,266	2%	4,504,150	5,656,776
17										153,141,115	2%	4,504,150	4,504,150
18										148,636,965	2%	4,504,150	4,504,150
19										144,132,814	2%	4,504,150	4,504,150
20										139,628,664	2%	4,504,150	4,504,150
										135,124,514			

1/ From Table G, Page 10, Column (5), Road Property Account 1 and 1A.
2/ From Table G, Footnote 1/, Page 10.
3/ Column (2), Year 1 x Column (3).
4/ From Table G, Page 10, Column (5), Road Property Accounts 8, 9, 11, 12, 26, and 27.
5/ Column (5), Year 1 x Column (6).
6/ From Table G, Page 10, Column (5), Road Property Accounts 6, 13, 16, 17, 19, 20 and 39.
7/ Column (8), Year 1 x Column (9).
8/ From Table G, Page 10, Column (5), Road Property Accounts 3 and 5.
9/ Column (11), Year 1 x Column (12).
10/ Column (4) + Column (7) + Column (10) + Column (13).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
0		1.000	1.000	1.000	1.000	$12,744,000	$1,125,981,015	1.000
1	2001 1 Qtr	1.005	1.024	1.000	1.028	12,803,611	1,142,283,889	1.014
2	2001 2 Qtr	1.009	1.029	1.021	1.030	12,863,501	1,155,325,665	1.026
3	2001 3 Qtr	1.014	1.037	1.024	1.039	12,923,671	1,161,734,739	1.032
4	2001 4 Qtr	1.019	1.037	1.024	1.039	12,984,122	1,161,940,139	1.032
5	2002 1 Qtr	1.024	1.067	1.020	1.074	13,044,857	1,180,647,161	1.048
6	2002 2 Qtr	1.028	1.067	1.015	1.073	13,105,875	1,178,179,431	1.046
7	2002 3 Qtr	1.033	1.074	0.984	1.085	13,167,179	1,168,825,426	1.038
8	2002 4 Qtr	1.038	1.070	0.948	1.086	13,228,769	1,150,250,918	1.022
9	2003 1 Qtr	1.043	1.084	0.927	1.104	13,290,648	1,149,937,281	1.022
10	2003 2 Qtr	1.048	1.097	1.023	1.107	13,352,816	1,202,340,339	1.068
11	2003 3 Qtr	1.053	1.110	1.009	1.124	13,415,275	1,204,722,741	1.070
12	2003 4 Qtr	1.058	1.111	1.024	1.123	13,478,026	1,212,388,894	1.077
13	2004 1 Qtr	1.063	1.119	1.035	1.130	13,541,070	1,222,031,219	1.085
14	2004 2 Qtr	1.068	1.126	1.045	1.137	13,604,410	1,231,753,963	1.094
15	2004 3 Qtr	1.073	1.134	1.056	1.144	13,668,045	1,241,557,829	1.102
16	2004 4 Qtr	1.078	1.141	1.066	1.151	13,731,979	1,251,443,525	1.111
17	2005 1 Qtr	1.083	1.150	1.065	1.161	13,796,211	1,256,500,542	1.116
18	2005 2 Qtr	1.088	1.158	1.063	1.171	13,860,744	1,261,604,146	1.120
19	2005 3 Qtr	1.093	1.167	1.062	1.181	13,925,579	1,266,754,691	1.125
20	2005 4 Qtr	1.098	1.175	1.060	1.191	13,990,717	1,271,952,535	1.129

1/ Table C, Page 3, Column (10).
2/ Previous Column (3) x (1 + Inflation Rate from Table B on a Quarterly Basis).
3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
4/ Previous Column (5) x (1 + Inflation Rate from Table B on a Quarterly Basis).
5/ Previous Column (6) x (1 + Inflation Rate from Table B on a Quarterly Basis).
6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
21	2006 1 Qtr	1.103	1.184	1.061	1.200	14,056,159	1,278,237,018	1.135
22	2006 2 Qtr	1.108	1.192	1.063	1.210	14,121,908	1,284,563,919	1.140
23	2006 3 Qtr	1.113	1.201	1.064	1.219	14,187,964	1,290,933,548	1.146
24	2006 4 Qtr	1.119	1.209	1.065	1.229	14,254,330	1,297,346,213	1.152
25	2007 1 Qtr	1.124	1.218	1.067	1.239	14,321,005	1,304,086,083	1.158
26	2007 2 Qtr	1.129	1.227	1.069	1.249	14,387,993	1,310,870,844	1.164
27	2007 3 Qtr	1.134	1.235	1.071	1.258	14,455,294	1,317,700,819	1.170
28	2007 4 Qtr	1.140	1.244	1.073	1.268	14,522,910	1,324,576,336	1.176
29	2008 1 Qtr	1.145	1.252	1.075	1.277	14,590,842	1,331,377,924	1.182
30	2008 2 Qtr	1.150	1.261	1.078	1.287	14,659,092	1,338,220,233	1.188
31	2008 3 Qtr	1.156	1.269	1.081	1.296	14,727,661	1,345,103,524	1.194
32	2008 4 Qtr	1.161	1.277	1.083	1.305	14,796,550	1,352,028,062	1.200
33	2009 1 Qtr	1.166	1.286	1.086	1.315	14,865,762	1,359,225,562	1.207
34	2009 2 Qtr	1.172	1.295	1.088	1.325	14,935,298	1,366,469,272	1.213
35	2009 3 Qtr	1.177	1.304	1.091	1.335	15,005,159	1,373,759,513	1.220
36	2009 4 Qtr	1.183	1.314	1.093	1.346	15,075,347	1,381,096,609	1.226
37	2010 1 Qtr	1.188	1.322	1.096	1.355	15,145,863	1,388,093,755	1.232
38	2010 2 Qtr	1.194	1.331	1.098	1.365	15,216,709	1,395,132,994	1.239
39	2010 3 Qtr	1.200	1.340	1.101	1.375	15,287,886	1,402,214,600	1.245
40	2010 4 Qtr	1.205	1.348	1.103	1.385	15,359,397	1,409,338,848	1.251

1/ Table C, Page 3, Column (10).
2/ Previous Column (3) x (1 + Inflation Rate from Table B on a Quarterly Basis).
3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
4/ Previous Column (5) x (1 + Inflation Rate from Table B on a Quarterly Basis).
5/ Previous Column (6) x (1 + Inflation Rate from Table B on a Quarterly Basis).
6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) + (Period 0; (Column (7) + Column (8))).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
41	2011 1 Qtr	1.211	1.358	1.106	1.395	$15,431,242	$1,417,051,691	1.258
42	2011 2 Qtr	1.217	1.368	1.109	1.406	15,503,422	1,424,814,169	1.265
43	2011 3 Qtr	1.222	1.377	1.111	1.417	15,575,941	1,432,626,626	1.272
44	2011 4 Qtr	1.228	1.387	1.114	1.428	15,648,799	1,440,489,409	1.279
45	2012 1 Qtr	1.234	1.396	1.117	1.438	15,721,997	1,448,347,960	1.286
46	2012 2 Qtr	1.239	1.406	1.120	1.449	15,795,538	1,456,255,567	1.293
47	2012 3 Qtr	1.245	1.416	1.123	1.460	15,869,423	1,464,212,556	1.300
48	2012 4 Qtr	1.251	1.425	1.126	1.470	15,943,653	1,472,219,259	1.307
49	2013 1 Qtr	1.257	1.435	1.129	1.482	16,018,231	1,480,334,766	1.314
50	2013 2 Qtr	1.263	1.445	1.132	1.493	16,093,157	1,488,502,696	1.321
51	2013 3 Qtr	1.269	1.456	1.135	1.504	16,168,434	1,496,723,411	1.329
52	2013 4 Qtr	1.275	1.466	1.138	1.516	16,244,063	1,504,997,279	1.336
53	2014 1 Qtr	1.281	1.476	1.140	1.528	16,320,046	1,513,324,670	1.343
54	2014 2 Qtr	1.287	1.486	1.143	1.539	16,396,385	1,521,705,954	1.351
55	2014 3 Qtr	1.293	1.497	1.146	1.551	16,473,080	1,530,141,508	1.358
56	2014 4 Qtr	1.299	1.507	1.149	1.563	16,550,134	1,538,631,707	1.366
57	2015 1 Qtr	1.305	1.518	1.152	1.575	16,627,549	1,547,176,933	1.373
58	2015 2 Qtr	1.311	1.529	1.155	1.587	16,705,325	1,555,777,568	1.381
59	2015 3 Qtr	1.317	1.539	1.158	1.599	16,783,466	1,564,433,997	1.389
60	2015 4 Qtr	1.323	1.550	1.160	1.611	16,861,972	1,573,146,609	1.396

1/ Table C, Page 3, Column (10).
2/ Previous Column (3) x (1 + Inflation Rate from Table B on a Quarterly Basis).
3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
4/ Previous Column (5) x (1 + Inflation Rate from Table B on a Quarterly Basis).
5/ Previous Column (6) x (1 + Inflation Rate from Table B on a Quarterly Basis).
6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE H: ACE AVERAGE ANNUAL INFLATION IN ASSET PRICES
(Continued)

Development of average annual inflation factors for all capital assets

1. 1Q2001 Land value	$12,744,000	1/
2. 1Q2001 Road Property asset value accounts 3, 5, 6, 13, 17, 19, 20, 26, 27, and 39	$461,991,830	1/
3. 1Q2001 Road Property asset value accounts 8, 9, and 11	$472,418,704	1/
4. 1Q2001 Road Property asset value account 1, 1A and 12	$191,570,481	1/

Period	Quarter	Inflation Index For Land 2/	Inflation Index For Line 2 Road Property Assets 3/	Inflation Index For Line 3 Road Property Assets 4/	Inflation Index For Line 4 Road Property Assets 5/	Land Value 6/	Road Property Value 7/	1Q2001 Inflation Index 8/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
61	2016 1 Qtr	1.329	1.561	1.163	1.624	16,940,845	1,581,915,795	1.404
62	2016 2 Qtr	1.336	1.572	1.166	1.636	17,020,087	1,590,741,949	1.412
63	2016 3 Qtr	1.342	1.583	1.169	1.649	17,099,700	1,599,625,467	1.420
64	2016 4 Qtr	1.348	1.594	1.172	1.661	17,179,685	1,608,566,749	1.428
65	2017 1 Qtr	1.354	1.606	1.175	1.674	17,260,044	1,617,566,197	1.436
66	2017 2 Qtr	1.361	1.617	1.178	1.687	17,340,780	1,626,624,217	1.444
67	2017 3 Qtr	1.367	1.628	1.181	1.700	17,421,892	1,635,741,216	1.452
68	2017 4 Qtr	1.373	1.640	1.184	1.713	17,503,385	1,644,917,605	1.460
69	2018 1 Qtr	1.380	1.651	1.187	1.726	17,585,258	1,654,153,800	1.468
70	2018 2 Qtr	1.386	1.663	1.190	1.739	17,667,515	1,663,450,216	1.476
71	2018 3 Qtr	1.393	1.675	1.193	1.753	17,750,156	1,672,807,273	1.485
72	2018 4 Qtr	1.399	1.686	1.196	1.766	17,833,183	1,682,225,396	1.493
73	2019 1 Qtr	1.406	1.698	1.199	1.780	17,916,600	1,691,705,008	1.501
74	2019 2 Qtr	1.412	1.710	1.202	1.793	18,000,406	1,701,246,541	1.510
75	2019 3 Qtr	1.419	1.722	1.205	1.807	18,084,604	1,710,850,425	1.518
76	2019 4 Qtr	1.426	1.734	1.208	1.821	18,169,196	1,720,517,096	1.527
77	2020 1 Qtr	1.432	1.747	1.211	1.835	18,254,184	1,730,246,992	1.535
78	2020 2 Qtr	1.439	1.759	1.214	1.849	18,339,569	1,740,040,555	1.544
79	2020 3 Qtr	1.446	1.771	1.217	1.863	18,425,354	1,749,898,230	1.553
80	2020 4 Qtr	1.453	1.784	1.220	1.877	18,511,540	1,759,820,463	1.562
Annual Average								2.28%

1/ Table C, Page 3, Column (10).
2/ Previous Column (3) x (1 + Inflation Rate from Table B on a Quarterly Basis).
3/ Previous Column (4) x (1 + Inflation Rate from Table B on a Quarterly Basis).
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6/ Line 1 x Column (3).
7/ (Line 2 x Column (4)) + (Line 3 x Column (5)) + (Line 4 x Column (6)).
8/ (Column (7) + Column (8)) ÷ (Period 0; (Column (7) + Column (8))).

TABLE I: ACE DISCOUNTED CASH FLOW

Discounted Cash Flow
Present Value of the Cash Flow Discounted at the Cost of Capital in Table A
Inflation In Asset Values From Table H

1. 1Q2001 Road Property Investment	$1,138,725,015	1/
2. Interest During Construction (1Q2001 Invest.)	$107,785,252	2/
3. Total 1Q2001 Investment	$1,246,510,267	3/
4. Present Value Of Replacement Cost for the ACE	$61,541,869	4/
5. Total Cost Recovered From Quarterly Revenue Flow	$1,308,052,135	5/

Fed. Tax Rate	35.0%
Weighted Average State Tax Rate	7.5% 6/

Period (1)	Quarter (2)	Quarterly Levelized Capital Carrying Charge Requirement 7/ (3)	Interest on Investment Financed With Debt 8/ (4)	Tax Depreciation 9/ (5)	Actual Federal Tax Payments 10/ (6)	Actual State Tax Payments 11/ (7)	Cash Flow 12/ (8)	Present Value Cash Flow 13/ (9)	Cumulative Present Value 14/ (10)
1	2001 1 Qtr	$28,548,418	$7,556,801	$50,233,331	$0	$0	28,548,418	$28,204,311	$28,204,311
2	2001 2 Qtr	28,872,230	7,506,560	50,233,331	0	0	28,872,230	27,840,734	56,045,044
3	2001 3 Qtr	29,032,120	7,455,583	50,233,331	0	0	29,032,120	27,324,108	83,369,152
4	2001 4 Qtr	29,038,691	7,403,857	50,233,331	0	0	29,038,691	26,675,414	110,044,566
5	2002 1 Qtr	29,502,543	7,351,372	44,348,450	0	0	29,502,543	26,465,324	136,509,890
6	2002 2 Qtr	29,443,060	7,298,117	44,348,450	0	0	29,443,060	25,804,835	162,314,726
7	2002 3 Qtr	29,213,387	7,244,081	44,348,450	0	0	29,213,387	25,014,996	187,329,722
8	2002 4 Qtr	28,755,834	7,189,252	44,348,450	0	0	28,755,834	24,057,188	211,386,910
9	2003 1 Qtr	28,749,611	7,133,618	33,648,169	0	0	28,749,611	23,499,102	234,886,012
10	2003 2 Qtr	30,046,309	7,077,168	33,648,169	0	0	30,046,309	23,994,449	258,880,462
11	2003 3 Qtr	30,106,735	7,019,890	33,648,169	0	0	30,106,735	23,490,037	282,370,498
12	2003 4 Qtr	30,297,757	6,961,771	33,648,169	0	0	30,297,757	23,095,688	305,466,186
13	2004 1 Qtr	30,537,629	6,902,799	25,927,210	0	0	30,537,629	22,743,438	328,209,624
14	2004 2 Qtr	30,779,496	6,842,962	25,927,210	0	0	30,779,496	22,396,630	350,606,254
15	2004 3 Qtr	31,023,375	6,782,247	25,927,210	0	0	31,023,375	22,055,179	372,661,433
16	2004 4 Qtr	31,269,284	6,720,641	25,927,210	0	0	31,269,284	21,719,002	394,380,435
17	2005 1 Qtr	31,395,857	6,658,131	21,955,126	0	0	31,395,857	21,305,643	415,686,078
18	2005 2 Qtr	31,523,590	6,594,703	21,955,126	0	0	31,523,590	20,900,580	436,586,658
19	2005 3 Qtr	31,652,490	6,530,345	21,955,126	0	0	31,652,490	20,503,639	457,090,297
20	2005 4 Qtr	31,782,566	6,465,043	21,955,126	0	0	31,782,566	20,114,646	477,204,943
21	2006 1 Qtr	31,939,507	6,398,782	18,228,051	0	0	31,939,507	19,749,314	496,954,258
22	2006 2 Qtr	32,097,504	6,331,549	18,228,051	0	0	32,097,504	19,390,788	516,345,045
23	2006 3 Qtr	32,256,564	6,263,330	18,228,051	0	0	32,256,564	19,038,936	535,383,981
24	2006 4 Qtr	32,416,696	6,194,109	18,228,051	0	0	32,416,696	18,693,632	554,077,614
25	2007 1 Qtr	32,584,922	6,123,873	18,209,904	0	0	32,584,922	18,358,704	572,436,317

TABLE I: ACE DISCOUNTED CASH FLOW
(Continued)

Period	Quarter	Quarterly Levelized Capital Carrying Charge Requirement 7/	Interest on Investment Financed With Debt 8/	Tax Depreciation 9/	Actual Federal Tax Payments 10/	Actual State Tax Payments 11/	Cash Flow 12/	Present Value Cash Flow 13/	Cumulative Present Value 14/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
26	2007 2 Qtr	$32,754,266	$6,052,606	$18,209,904	$0	$0	$32,754,266	$18,029,910	$590,466,228
27	2007 3 Qtr	32,924,734	5,980,293	18,209,904	0	0	32,924,734	17,707,138	608,173,365
28	2007 4 Qtr	33,096,336	5,906,919	18,209,904	0	0	33,096,336	17,390,272	625,563,638
29	2008 1 Qtr	33,266,119	5,832,469	5,269,358	0	0	33,266,119	17,077,684	642,641,322
30	2008 2 Qtr	33,436,916	5,756,926	5,269,358	0	0	33,436,916	16,770,787	659,412,108
31	2008 3 Qtr	33,608,734	5,680,275	5,269,358	0	0	33,608,734	16,469,475	675,881,583
32	2008 4 Qtr	33,781,579	5,602,498	5,269,358	0	0	33,781,579	16,173,645	692,055,228
33	2009 1 Qtr	33,961,179	5,523,581	3,423,500	0	0	33,961,179	15,885,874	707,941,102
34	2009 2 Qtr	34,141,928	5,443,505	3,423,500	0	0	34,141,928	15,603,311	723,544,413
35	2009 3 Qtr	34,323,836	5,362,255	3,423,500	0	0	34,323,836	15,325,862	738,870,276
36	2009 4 Qtr	34,506,910	5,279,812	3,423,500	0	0	34,506,910	15,053,433	753,923,708
37	2010 1 Qtr	34,681,590	5,196,159	3,427,394	1,524,888	37,790	33,118,912	14,115,814	768,039,522
38	2010 2 Qtr	34,857,318	5,111,279	3,427,394	9,132,315	226,316	25,498,687	10,618,130	778,657,652
39	2010 3 Qtr	35,034,102	5,025,154	3,427,394	9,223,782	227,892	25,582,428	10,408,122	789,065,774
40	2010 4 Qtr	35,211,948	4,937,764	3,427,394	9,235,409	459,907	25,516,632	10,142,718	799,208,492
41	2011 1 Qtr	35,404,349	4,849,093	3,423,500	9,333,852	463,609	25,606,889	9,944,620	809,153,112
42	2011 2 Qtr	35,597,986	4,759,120	3,423,500	9,431,820	467,307	25,698,858	9,750,919	818,904,031
43	2011 3 Qtr	35,792,866	4,667,827	3,423,500	9,530,676	471,036	25,791,154	9,560,991	828,465,022
44	2011 4 Qtr	35,988,998	4,575,194	3,423,500	9,630,428	474,795	25,883,775	9,374,759	837,839,781
45	2012 1 Qtr	36,185,034	4,481,202	3,427,394	9,729,268	478,530	25,977,236	9,192,335	847,032,116
46	2012 2 Qtr	36,382,291	4,385,831	3,427,394	9,830,358	482,330	26,069,604	9,012,965	856,045,081
47	2012 3 Qtr	36,580,777	4,289,060	3,427,394	9,932,357	486,160	26,162,260	8,837,082	864,882,163
48	2012 4 Qtr	36,780,500	4,190,869	3,427,394	10,035,276	490,021	26,255,204	8,664,618	873,546,781
49	2013 1 Qtr	36,982,921	4,091,238	3,423,500	10,140,975	493,968	26,347,978	8,495,358	882,042,139
50	2013 2 Qtr	37,186,647	3,990,144	3,423,500	10,246,281	497,915	26,442,451	8,329,837	890,371,975
51	2013 3 Qtr	37,391,685	3,887,567	3,423,500	10,352,554	501,894	26,537,238	8,167,532	898,539,508
52	2013 4 Qtr	37,598,046	3,783,485	3,423,500	10,459,804	505,905	26,632,336	8,008,382	906,547,890
53	2014 1 Qtr	37,805,739	3,677,876	3,427,394	10,566,693	509,917	26,729,128	7,852,731	914,400,621
54	2014 2 Qtr	38,014,772	3,570,716	3,427,394	10,675,933	513,996	26,824,843	7,699,694	922,100,315
55	2014 3 Qtr	38,225,155	3,461,985	3,427,394	10,786,184	518,108	26,920,863	7,549,629	929,649,944
56	2014 4 Qtr	38,436,898	3,351,658	3,427,394	10,897,457	522,255	27,017,186	7,402,478	937,052,422
57	2015 1 Qtr	38,650,010	3,239,712	3,423,500	11,011,115	526,470	27,112,425	7,257,813	944,310,236
58	2015 2 Qtr	38,864,500	3,126,123	3,423,500	11,124,467	530,687	27,209,347	7,116,327	951,426,563
59	2015 3 Qtr	39,080,378	3,010,868	3,423,500	11,238,875	534,938	27,306,565	6,977,587	958,404,149
60	2015 4 Qtr	39,297,654	2,893,921	3,423,500	11,354,353	539,226	27,404,076	6,841,537	965,245,687

TABLE I: ACE DISCOUNTED CASH FLOW
(Continued)

Period (1)	Quarter (2)	Quarterly Levelized Capital Carrying Charge Requirement 7/ (3)	Interest on Investment Financed With Debt 8/ (4)	Tax Depreciation 9/ (5)	Actual Federal Tax Payments 10/ (6)	Actual State Tax Payments 11/ (7)	Cash Flow 12/ (8)	Present Value Cash Flow 13/ (9)	Cumulative Present Value 14/ (10)
61	2016 1 Qtr	$39,516,337	$2,775,258	$1,414,194	$12,168,120	$560,827	$26,787,390	$6,533,852	$971,779,539
62	2016 2 Qtr	39,736,437	2,654,854	1,414,194	12,285,771	565,187	26,885,480	6,407,035	978,186,574
63	2016 3 Qtr	39,957,964	2,532,683	1,414,194	12,404,526	569,583	26,983,855	6,282,662	984,469,236
64	2016 4 Qtr	40,180,928	2,408,720	1,414,194	12,524,399	574,017	27,082,512	6,160,685	990,629,921
65	2017 1 Qtr	40,405,339	2,282,937	1,126,038	12,745,389	580,966	27,078,984	6,018,286	996,648,206
66	2017 2 Qtr	40,631,207	2,155,309	1,126,038	12,867,535	585,475	27,178,197	5,901,487	1,002,549,693
67	2017 3 Qtr	40,858,542	2,025,808	1,126,038	12,990,836	590,022	27,277,684	5,786,936	1,008,336,629
68	2017 4 Qtr	41,087,354	1,894,407	1,126,038	13,115,305	594,608	27,377,440	5,674,589	1,014,011,218
69	2018 1 Qtr	41,317,653	1,761,077	1,126,038	13,240,957	599,233	27,477,463	5,564,403	1,019,575,621
70	2018 2 Qtr	41,549,451	1,625,791	1,126,038	13,367,803	603,898	27,577,750	5,456,337	1,025,031,958
71	2018 3 Qtr	41,782,756	1,488,520	1,126,038	13,495,859	608,602	27,678,296	5,350,348	1,030,382,306
72	2018 4 Qtr	42,017,581	1,349,235	1,126,038	13,625,137	613,346	27,779,098	5,246,398	1,035,628,703
73	2019 1 Qtr	42,253,935	1,207,906	1,126,038	13,755,651	618,131	27,880,152	5,144,446	1,040,773,149
74	2019 2 Qtr	42,491,828	1,064,503	1,126,038	13,887,416	622,958	27,981,455	5,044,454	1,045,817,603
75	2019 3 Qtr	42,731,273	918,995	1,126,038	14,020,445	627,826	28,083,002	4,946,383	1,050,763,986
76	2019 4 Qtr	42,972,279	771,353	1,126,038	14,154,754	632,735	28,184,790	4,850,197	1,055,614,183
77	2020 1 Qtr	43,214,858	621,544	1,126,038	14,290,356	637,687	28,286,814	4,755,859	1,060,370,042
78	2020 2 Qtr	43,459,019	469,536	1,126,038	14,427,267	642,682	28,389,070	4,663,334	1,065,033,376
79	2020 3 Qtr	43,704,776	315,299	1,126,038	14,565,502	647,720	28,491,554	4,572,586	1,069,605,962
80	2020 4 Qtr	43,952,138	158,798	1,126,038	14,705,075	652,802	28,594,260	4,483,580	1,074,089,542
Future		2,255,699,808		135,124,514	730,683,544	32,908,026	1,492,108,238	233,962,593	1,308,052,135

1/ From Table C, Column (10).
2/ From Table D, Column (9).
3/ Line 1 + Line 2.
4/ Table F Column (8).
5/ Line 3 + Line 4.
6/ Weighted average state tax rates for New Mexico, Texas, and Arizona.
7/ Quarterly carrying costs needed to recover the total investment over 80 quarters after consideration of the applicable interest payments, tax depreciation and tax liability. The Future value is an estimate of a perpetual income stream for the ACE and is calculated by taking the Period 80, Column (3) value and dividing it by the ACE's estimated quarterly Real Cost of Capital.
8/ Value from Table E.
9/ Value from Table G, Page 11, Column (14) divided by 4 quarters.
10/ Table J: Part 1 Pages 19, 20 of 27.
11/ Table J: Part 2 Pages 21, 22 of 27.
12/ (Column (3) - Column (6) - Column (7)).
13/ Column (8) discounted by the fourth root of the annual Cost of Capital adjusted to midquarter dollars from Table A.
14/ Cumulative total of Column (9).

TABLE J - PART 1: COMPUTATION OF FEDERAL TAX LIABILITY - TAXABLE INCOME

Time Period (1)	Taxable Income B/4 NOL's ACE1/ (2)	Net Operating Losses Generated 2/ (3)	NOL's Generated Plus Carryforward 3/ (4)	Carryfoward Utilized 4/ (5)	Carryfoward Remaining 5/ (6)	Carryback Available 6/ (7)	Carryback Utilized 7/ (8)	Carryback Remaining 8/ (9)	Annual Taxable Income 9/ (10)	Annual Tax Liability 10/ (11)
1998	($68,825)	($68,825)	($68,825)	$0	($68,825)	($68,825)	$0	($68,825)	$0	$0
1999	(2,571,185)	(2,571,185)	(2,640,009)	0	(2,640,009)	(2,640,009)	0	(2,640,009)	0	0
2000	(32,292,008)	(32,292,008)	(34,932,018)	0	(34,932,018)	(34,932,018)	0	(34,932,018)	0	0
2001 1 Qtr	(29,241,714)	(29,241,714)	(64,173,731)	0	(64,173,731)	(64,173,731)	0	(64,173,731)	0	0
2001 2 Qtr	(28,867,661)	(28,867,661)	(93,041,392)	0	(93,041,392)	(93,041,392)	0	(93,041,392)	0	0
2001 3 Qtr	(28,656,793)	(28,656,793)	(121,698,185)	0	(121,698,185)	(121,698,185)	0	(121,698,185)	0	0
2001 4 Qtr	(28,598,497)	(28,598,497)	(150,296,683)	0	(150,296,683)	(150,296,683)	0	(150,296,683)	0	0
2002 1 Qtr	(22,197,280)	(22,197,280)	(172,493,963)	0	(172,493,963)	(172,493,963)	0	(172,493,963)	0	0
2002 2 Qtr	(22,203,508)	(22,203,508)	(194,697,470)	0	(194,697,470)	(194,697,470)	0	(194,697,470)	0	0
2002 3 Qtr	(22,379,144)	(22,379,144)	(217,076,615)	0	(217,076,615)	(217,076,615)	0	(217,076,615)	0	0
2002 4 Qtr	(22,781,869)	(22,781,869)	(239,858,483)	0	(239,858,483)	(239,858,483)	0	(239,858,483)	0	0
2003 1 Qtr	(12,032,176)	(12,032,176)	(251,890,659)	0	(251,890,659)	(251,890,659)	0	(251,890,659)	0	0
2003 2 Qtr	(10,679,028)	(10,679,028)	(262,569,688)	0	(262,569,688)	(262,569,688)	0	(262,569,688)	0	0
2003 3 Qtr	(10,561,324)	(10,561,324)	(273,131,012)	0	(273,131,012)	(273,131,012)	0	(273,131,012)	0	0
2003 4 Qtr	(10,312,182)	(10,312,182)	(283,443,194)	0	(283,443,194)	(283,443,194)	0	(283,443,194)	0	0
2004 1 Qtr	(2,292,379)	(2,292,379)	(285,735,574)	0	(285,735,574)	(285,735,574)	0	(285,735,574)	0	0
2004 2 Qtr	(1,990,676)	(1,990,676)	(287,726,249)	0	(287,726,249)	(287,726,249)	0	(287,726,249)	0	0
2004 3 Qtr	(1,686,082)	(1,686,082)	(289,412,331)	0	(289,412,331)	(289,412,331)	0	(289,412,331)	0	0
2004 4 Qtr	(1,378,567)	(1,378,567)	(290,790,897)	0	(290,790,897)	(290,790,897)	0	(290,790,897)	0	0
2005 1 Qtr	2,782,600	0	(290,790,897)	2,782,600	(288,008,297)	(288,008,297)	0	(288,008,297)	0	0
2005 2 Qtr	2,973,760	0	(288,008,297)	2,973,760	(285,034,538)	(285,034,538)	0	(285,034,538)	0	0
2005 3 Qtr	3,167,018	0	(285,034,538)	3,167,018	(281,867,520)	(281,867,520)	0	(281,867,520)	0	0
2005 4 Qtr	3,362,397	0	(281,867,520)	3,362,397	(278,505,123)	(278,505,123)	0	(278,505,123)	0	0
2006 1 Qtr	7,312,674	0	(278,505,123)	7,312,674	(271,192,449)	(271,192,449)	0	(271,192,449)	0	0
2006 2 Qtr	7,537,904	0	(271,192,449)	7,537,904	(263,654,545)	(263,654,545)	0	(263,654,545)	0	0
2006 3 Qtr	7,765,183	0	(263,654,545)	7,765,183	(255,889,362)	(255,889,362)	0	(255,889,362)	0	0
2006 4 Qtr	7,994,536	0	(255,889,362)	7,994,536	(247,894,826)	(247,894,826)	0	(247,894,826)	0	0
2007 1 Qtr	8,251,146	0	(247,894,826)	8,251,146	(239,643,680)	(239,643,680)	0	(239,643,680)	0	0
2007 2 Qtr	8,491,756	0	(239,643,680)	8,491,756	(231,151,924)	(231,151,924)	0	(231,151,924)	0	0
2007 3 Qtr	8,734,538	0	(231,151,924)	8,734,538	(222,417,387)	(222,417,387)	0	(222,417,387)	0	0
2007 4 Qtr	8,979,513	0	(222,417,387)	8,979,513	(213,437,873)	(213,437,873)	0	(213,437,873)	0	0
2008 1 Qtr	22,164,293	0	(213,437,873)	22,164,293	(191,273,581)	(191,273,581)	0	(191,273,581)	0	0
2008 2 Qtr	22,410,633	0	(191,273,581)	22,410,633	(168,862,948)	(168,862,948)	0	(168,862,948)	0	0
2008 3 Qtr	22,659,102	0	(168,862,948)	22,659,102	(146,203,846)	(146,203,846)	0	(146,203,846)	0	0
2008 4 Qtr	22,909,723	0	(146,203,846)	22,909,723	(123,294,123)	(123,294,123)	0	(123,294,123)	0	0
2009 1 Qtr	25,014,098	0	(123,294,123)	25,014,098	(98,280,025)	(98,280,025)	0	(98,280,025)	0	0
2009 2 Qtr	25,274,923	0	(98,280,025)	25,274,923	(73,005,102)	(73,005,102)	0	(73,005,102)	0	0
2009 3 Qtr	25,538,081	0	(73,005,102)	25,538,081	(47,467,021)	(47,467,021)	0	(47,467,021)	0	0
2009 4 Qtr	25,803,598	0	(47,467,021)	25,803,598	(21,663,423)	(21,663,423)	0	(21,663,423)	0	0
2010 1 Qtr	26,020,247	0	(21,663,423)	21,663,423	0	0	0	0	4,356,823	1,524,888
2010 2 Qtr	26,092,329	0	0	0	0	0	0	0	26,092,329	9,132,315
2010 3 Qtr	26,353,662	0	0	0	0	0	0	0	26,353,662	9,223,782
2010 4 Qtr	26,386,882	0	0	0	0	0	0	0	26,386,882	9,235,409

TABLE J - PART 1: COMPUTATION OF FEDERAL TAX LIABILITY - TAXABLE INCOME
(Continued)

Time Period	Taxable Income B/4 NOL's DRR 1/	Net Operating Losses Generated 2/	NOL's Generated Plus Carryforward 3/	Carryfoward Utilized 4/	Carryfoward Remaining 5/	Carryback Available 6/	Carryback Utilized 7/	Carryback Remaining 8/	Annual Taxable Income 9/	Annual Tax Liability 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2011 1 Qtr	$26,668,148	$0	$0	$0	$0	$0	$-0	$0	$26,668,148	$9,333,852
2011 2 Qtr	26,948,059	0	0	0	0	0	0	0	26,948,059	9,431,820
2011 3 Qtr	27,230,503	0	0	0	0	0	0	0	27,230,503	9,530,676
2011 4 Qtr	27,515,509	0	0	0	0	0	0	0	27,515,509	9,630,428
2012 1 Qtr	27,797,908	0	0	0	0	0	0	0	27,797,908	9,729,268
2012 2 Qtr	28,086,737	0	0	0	0	0	0	0	28,086,737	9,830,358
2012 3 Qtr	28,378,163	0	0	0	0	0	0	0	28,378,163	9,932,357
2012 4 Qtr	28,672,216	0	0	0	0	0	0	0	28,672,216	10,035,276
2013 1 Qtr	28,974,215	0	0	0	0	0	0	0	28,974,215	10,140,975
2013 2 Qtr	29,275,088	0	0	0	0	0	0	0	29,275,088	10,246,281
2013 3 Qtr	29,578,724	0	0	0	0	0	0	0	29,578,724	10,352,554
2013 4 Qtr	29,885,156	0	0	0	0	0	0	0	29,885,156	10,459,804
2014 1 Qtr	30,190,552	0	0	0	0	0	0	0	30,190,552	10,566,693
2014 2 Qtr	30,502,666	0	0	0	0	0	0	0	30,502,666	10,675,933
2014 3 Qtr	30,817,668	0	0	0	0	0	0	0	30,817,668	10,786,184
2014 4 Qtr	31,135,591	0	0	0	0	0	0	0	31,135,591	10,897,457
2015 1 Qtr	31,460,328	0	0	0	0	0	0	0	31,460,328	11,011,115
2015 2 Qtr	31,784,190	0	0	0	0	0	0	0	31,784,190	11,124,467
2015 3 Qtr	32,111,072	0	0	0	0	0	0	0	32,111,072	11,238,875
2015 4 Qtr	32,441,007	0	0	0	0	0	0	0	32,441,007	11,354,353
2016 1 Qtr	34,766,058	0	0	0	0	0	0	0	34,766,058	12,168,120
2016 2 Qtr	35,102,202	0	0	0	0	0	0	0	35,102,202	12,285,771
2016 3 Qtr	35,441,504	0	0	0	0	0	0	0	35,441,504	12,404,526
2016 4 Qtr	35,783,997	0	0	0	0	0	0	0	35,783,997	12,524,399
2017 1 Qtr	36,415,398	0	0	0	0	0	0	0	36,415,398	12,745,389
2017 2 Qtr	36,764,385	0	0	0	0	0	0	0	36,764,385	12,867,535
2017 3 Qtr	37,116,674	0	0	0	0	0	0	0	37,116,674	12,990,836
2017 4 Qtr	37,472,301	0	0	0	0	0	0	0	37,472,301	13,115,305
2018 1 Qtr	37,831,305	0	0	0	0	0	0	0	37,831,305	13,240,957
2018 2 Qtr	38,193,724	0	0	0	0	0	0	0	38,193,724	13,367,803
2018 3 Qtr	38,559,597	0	0	0	0	0	0	0	38,559,597	13,495,859
2018 4 Qtr	38,928,962	0	0	0	0	0	0	0	38,928,962	13,625,137
2019 1 Qtr	39,301,860	0	0	0	0	0	0	0	39,301,860	13,755,651
2019 2 Qtr	39,678,331	0	0	0	0	0	0	0	39,678,331	13,887,416
2019 3 Qtr	40,058,415	0	0	0	0	0	0	0	40,058,415	14,020,445
2019 4 Qtr	40,442,154	0	0	0	0	0	0	0	40,442,154	14,154,754
2020 1 Qtr	40,829,589	0	0	0	0	0	0	0	40,829,589	14,290,356
2020 2 Qtr	41,220,763	0	0	0	0	0	0	0	41,220,763	14,427,267
2020 3 Qtr	41,615,719	0	0	0	0	0	0	0	41,615,719	14,565,502
2020 4 Qtr	42,014,500	0	0	0	0	0	0	0	42,014,500	14,705,075
Future	2,087,667,269	0	0	0	0	0	0	0	2,087,667,269	730,683,544

1/ Table I, Column (3) - Table E, Columns ((6),(11) & (16)) - Table G, Column (14) / 4 - Table J Part 2, Column (11).
Values for 1998-2000 from Table D, Sum of Column (11).
2/ Column (2) if less than zero, otherwise zero.
3/ Cumulative total of Column (2).
4/ If Column (2) is greater than zero, and (Column (2) + Column (4) is less than zero, than Column (2), otherwise Column (4).
5/ Column (4) + Column (5) + Column (8).
6/ Previous period Column (9) + current period Column (3) - current period Column (5).
7/ If previous Column (10) is greater than zero, and previous Column (10) is less than current Column (7), then previous Column (10), otherwise zero.
8/ Column (7) + Column (8).
9/ If Column (2) is greater than zero, then Column (2) - Column (5) - Column (8), otherwise zero.
10/ Column (10) times applicable maximum Federal Statutory Tax Rate.

TABLE J - PART 2: COMPUTATION OF STATE TAX LIABILITY - TAXABLE INCOME

Time Period (1)	Taxable Income B/4 NOL's ACE 1/ (2)	Net Operating Losses Generated 2/ (3)	NOL's Generated Plus Carryforward 3/ (4)	Carryfoward Utilized 4/ (5)	Carryfoward Remaining 5/ (6)	Carryback Available 6/ (7)	Carryback Utilized 7/ (8)	Carryback Remaining 8/ (9)	Annual Taxable Income 9/ (10)	Annual Tax Liability 10/ (11)
1998	($68,825)	($68,825)	($68,825)	$0	($68,825)	($68,825)	$0	($68,825)	$0	$0
1999	(2,571,185)	(2,571,185)	(2,640,009)	0	(2,640,009)	(2,640,009)	0	(2,640,009)	0	0
2000	(32,292,008)	(32,292,008)	(34,932,018)	0	(34,932,018)	(34,932,018)	0	(34,932,018)	0	0
2001 1 Qtr	(29,241,714)	(29,241,714)	(64,173,731)	0	(64,173,731)	(64,173,731)	0	(64,173,731)	0	0
2001 2 Qtr	(28,867,661)	(28,867,661)	(93,041,392)	0	(93,041,392)	(93,041,392)	0	(93,041,392)	0	0
2001 3 Qtr	(28,656,793)	(28,656,793)	(121,698,185)	0	(121,698,185)	(121,698,185)	0	(121,698,185)	0	0
2001 4 Qtr	(28,598,497)	(28,598,497)	(150,296,683)	0	(150,296,683)	(150,296,683)	0	(150,296,683)	0	0
2002 1 Qtr	(22,197,280)	(22,197,280)	(172,493,963)	0	(172,493,963)	(172,493,963)	0	(172,493,963)	0	0
2002 2 Qtr	(22,203,508)	(22,203,508)	(194,697,470)	0	(194,697,470)	(194,697,470)	0	(194,697,470)	0	0
2002 3 Qtr	(22,379,144)	(22,379,144)	(217,076,615)	0	(217,076,615)	(217,076,615)	0	(217,076,615)	0	0
2002 4 Qtr	(22,781,869)	(22,781,869)	(239,858,483)	0	(239,858,483)	(239,858,483)	0	(239,858,483)	0	0
2003 1 Qtr	(12,032,176)	(12,032,176)	(251,890,659)	0	(251,890,659)	(251,890,659)	0	(251,890,659)	0	0
2003 2 Qtr	(10,679,028)	(10,679,028)	(262,569,688)	0	(262,569,688)	(262,569,688)	0	(262,569,688)	0	0
2003 3 Qtr	(10,561,324)	(10,561,324)	(273,131,012)	0	(273,131,012)	(273,131,012)	0	(273,131,012)	0	0
2003 4 Qtr	(10,312,182)	(10,312,182)	(283,443,194)	0	(283,443,194)	(283,443,194)	0	(283,443,194)	0	0
2004 1 Qtr	(2,292,379)	(2,292,379)	(285,735,574)	0	(285,735,574)	(285,735,574)	0	(285,735,574)	0	0
2004 2 Qtr	(1,990,676)	(1,990,676)	(287,726,249)	0	(287,726,249)	(287,726,249)	0	(287,726,249)	0	0
2004 3 Qtr	(1,686,082)	(1,686,082)	(289,412,331)	0	(289,412,331)	(289,412,331)	0	(289,412,331)	0	0
2004 4 Qtr	(1,378,567)	(1,378,567)	(290,790,897)	0	(290,790,897)	(290,790,897)	0	(290,790,897)	0	0
2005 1 Qtr	2,782,600	0	(290,790,897)	2,782,600	(288,008,297)	(288,008,297)	0	(288,008,297)	0	0
2005 2 Qtr	2,973,760	0	(288,008,297)	2,973,760	(285,034,538)	(285,034,538)	0	(285,034,538)	0	0
2005 3 Qtr	3,167,018	0	(285,034,538)	3,167,018	(281,867,520)	(281,867,520)	0	(281,867,520)	0	0
2005 4 Qtr	3,362,397	0	(281,867,520)	3,362,397	(278,505,123)	(278,505,123)	0	(278,505,123)	0	0
2006 1 Qtr	7,312,674	0	(278,505,123)	7,312,674	(271,192,449)	(271,192,449)	0	(271,192,449)	0	0
2006 2 Qtr	7,537,904	0	(271,192,449)	7,537,904	(263,654,545)	(263,654,545)	0	(263,654,545)	0	0
2006 3 Qtr	7,765,183	0	(263,654,545)	7,765,183	(255,889,362)	(255,889,362)	0	(255,889,362)	0	0
2006 4 Qtr	7,994,536	0	(255,889,362)	7,994,536	(247,894,826)	(247,894,826)	0	(247,894,826)	0	0
2007 1 Qtr	8,251,146	0	(247,894,826)	8,251,146	(239,643,680)	(239,643,680)	0	(239,643,680)	0	0
2007 2 Qtr	8,491,756	0	(239,643,680)	8,491,756	(231,151,924)	(231,151,924)	0	(231,151,924)	0	0
2007 3 Qtr	8,734,538	0	(231,151,924)	8,734,538	(222,417,387)	(222,417,387)	0	(222,417,387)	0	0
2007 4 Qtr	8,979,513	0	(222,417,387)	8,979,513	(213,437,873)	(213,437,873)	0	(213,437,873)	0	0
2008 1 Qtr	22,164,293	0	(213,437,873)	22,164,293	(191,273,581)	(191,273,581)	0	(191,273,581)	0	0
2008 2 Qtr	22,410,633	0	(191,273,581)	22,410,633	(168,862,948)	(168,862,948)	0	(168,862,948)	0	0
2008 3 Qtr	22,659,102	0	(168,862,948)	22,659,102	(146,203,846)	(146,203,846)	0	(146,203,846)	0	0
2008 4 Qtr	22,909,723	0	(146,203,846)	22,909,723	(123,294,123)	(123,294,123)	0	(123,294,123)	0	0
2009 1 Qtr	25,014,098	0	(123,294,123)	25,014,098	(98,280,025)	(98,280,025)	0	(98,280,025)	0	0
2009 2 Qtr	25,274,923	0	(98,280,025)	25,274,923	(73,005,102)	(73,005,102)	0	(73,005,102)	0	0
2009 3 Qtr	25,538,081	0	(73,005,102)	25,538,081	(47,467,021)	(47,467,021)	0	(47,467,021)	0	0
2009 4 Qtr	25,803,598	0	(47,467,021)	25,803,598	(21,663,423)	(21,663,423)	0	(21,663,423)	0	0
2010 1 Qtr	26,058,036	0	(21,663,423)	21,663,423	0	0	0	0	4,394,613	37,790
2010 2 Qtr	26,318,645	0	0	0	0	0	0	0	26,318,645	226,316
2010 3 Qtr	26,581,554	0	0	0	0	0	0	0	26,581,554	227,892
2010 4 Qtr	26,846,789	0	0	0	0	0	0	0	26,846,789	459,907

TABLE J - PART 2: COMPUTATION OF STATE TAX LIABILITY - TAXABLE INCOME
(Continued)

Time Period	Taxable Income B/4 NOL's DRR 1/	Net Operating Losses Generated 2/	NOL's Generated Plus Carryforward 3/	Carryfoward Utilized 4/	Carryfoward Remaining 5/	Carryback Available 6/	Carryback Utilized 7/	Carryback Remaining 8/	Annual Taxable Income Before Income 9/	Annual Tax Liability 10/
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
2011 1 Qtr	$27,131,756	$0	$0	$0	$0	$0	$-0	$0	$27,131,756	$463,609
2011 2 Qtr	27,415,366	0	0	0	0	0	0	0	27,415,366	467,307
2011 3 Qtr	27,701,539	0	0	0	0	0	0	0	27,701,539	471,036
2011 4 Qtr	27,990,304	0	0	0	0	0	0	0	27,990,304	474,795
2012 1 Qtr	28,276,438	0	0	0	0	0	0	0	28,276,438	478,530
2012 2 Qtr	28,569,066	0	0	0	0	0	0	0	28,569,066	482,330
2012 3 Qtr	28,864,323	0	0	0	0	0	0	0	28,864,323	486,160
2012 4 Qtr	29,162,237	0	0	0	0	0	0	0	29,162,237	490,021
2013 1 Qtr	29,468,184	0	0	0	0	0	0	0	29,468,184	493,968
2013 2 Qtr	29,773,002	0	0	0	0	0	0	0	29,773,002	497,915
2013 3 Qtr	30,080,618	0	0	0	0	0	0	0	30,080,618	501,894
2013 4 Qtr	30,391,061	0	0	0	0	0	0	0	30,391,061	505,905
2014 1 Qtr	30,700,469	0	0	0	0	0	0	0	30,700,469	509,917
2014 2 Qtr	31,016,661	0	0	0	0	0	0	0	31,016,661	513,996
2014 3 Qtr	31,335,776	0	0	0	0	0	0	0	31,335,776	518,108
2014 4 Qtr	31,657,846	0	0	0	0	0	0	0	31,657,846	522,255
2015 1 Qtr	31,986,798	0	0	0	0	0	0	0	31,986,798	526,470
2015 2 Qtr	32,314,877	0	0	0	0	0	0	0	32,314,877	530,687
2015 3 Qtr	32,646,011	0	0	0	0	0	0	0	32,646,011	534,938
2015 4 Qtr	32,980,233	0	0	0	0	0	0	0	32,980,233	539,226
2016 1 Qtr	35,326,885	0	0	0	0	0	0	0	35,326,885	560,827
2016 2 Qtr	35,667,389	0	0	0	0	0	0	0	35,667,389	565,187
2016 3 Qtr	36,011,087	0	0	0	0	0	0	0	36,011,087	569,583
2016 4 Qtr	36,358,015	0	0	0	0	0	0	0	36,358,015	574,017
2017 1 Qtr	36,996,364	0	0	0	0	0	0	0	36,996,364	580,966
2017 2 Qtr	37,349,860	0	0	0	0	0	0	0	37,349,860	585,475
2017 3 Qtr	37,706,696	0	0	0	0	0	0	0	37,706,696	590,022
2017 4 Qtr	38,066,909	0	0	0	0	0	0	0	38,066,909	594,608
2018 1 Qtr	38,430,538	0	0	0	0	0	0	0	38,430,538	599,233
2018 2 Qtr	38,797,622	0	0	0	0	0	0	0	38,797,622	603,898
2018 3 Qtr	39,168,198	0	0	0	0	0	0	0	39,168,198	608,602
2018 4 Qtr	39,542,308	0	0	0	0	0	0	0	39,542,308	613,346
2019 1 Qtr	39,919,991	0	0	0	0	0	0	0	39,919,991	618,131
2019 2 Qtr	40,301,288	0	0	0	0	0	0	0	40,301,288	622,958
2019 3 Qtr	40,686,240	0	0	0	0	0	0	0	40,686,240	627,826
2019 4 Qtr	41,074,889	0	0	0	0	0	0	0	41,074,889	632,735
2020 1 Qtr	41,467,276	0	0	0	0	0	0	0	41,467,276	637,687
2020 2 Qtr	41,863,445	0	0	0	0	0	0	0	41,863,445	642,682
2020 3 Qtr	42,263,440	0	0	0	0	0	0	0	42,263,440	647,720
2020 4 Qtr	42,667,302	0	0	0	0	0	0	0	42,667,302	652,802
Future	2,120,575,294	0	0	0	0	0	0	0	2,120,575,294	32,908,026

1/ *Table I, Column (3) -Table E, Columns ((6),(11) & (16))* - Table G, Column (14) / 4. Values for 1998-2000 from Table D, Sum of Column (11).
2/ Column (2) if less than zero, otherwise zero.
3/ *Cumulative total of Column (2).*
4/ If Column (2) is greater than zero, and (Column (2) + Column (4) is less than zero, than Column (2), otherwise Column (4).
5/ *Column (4) + Column (5) + Column (8).*
6/ Previous period Column (9) + current period Column (3) - current period Column (5).
7/ If previous Column (10) is greater than zero, and previous Column (10) is less than current Column (7), then previous Column (10), otherwise zero.
8/ Column (7) + Column (8).
9/ *If Column (2) is greater than zero,* then Column (2) - Column (5) - Column (8), otherwise zero.
10/ Column (10) times applicable maximum State Statutory Tax Rate.