STB DOCKET NO. 42069

DUKE ENERGY CORPORATION
v.
NORFOLK SOUTHERN RAILWAY COMPANY

Decided November 5, 2003

The Board finds that the complainant has failed to establish that the challenged rates (for transportation over which the defendant railroad concedes that it has market dominance) are unreasonably high.

TABLE OF CONTENTS

ACRONYMS USED

AAR	Association of American Railroads
ACC	Appalachia & Carolina Central Railroad
AREMA	American Railway Engineering and Maintenance-of-Way Association
CMP	constrained market pricing

CSXT	CSX Transportation, Inc.
CTC	centralized traffic control
CWR	continuous welded rail
CY	cubic yards
DCF	discounted cash flow
DED	defective equipment detector
Duke	Duke Energy Corporation
EIA	Department of Energy, Energy Information Agency
EOTD	end-of-train device
e-WP.	electronic workpaper
Exh.	exhibit
G&A	general and administrative
GTM	gross ton-mile
HR	human resources
ICC	Interstate Commerce Commission
IT	information technology
LTL	less-than-trainload
L&D	loss and damage
LF	linear feet
LUM	locomotive unit-mile
MGT	million gross tons
MGTM	million gross ton-miles
MOW	maintenance-of-way
MSP	modified straight-mileage prorate
Narr.	narrative statement of counsel
NS	Norfolk Southern Railway Company
O/D	origin/destination
Open.	opening evidence
RCAF-A	rail cost adjustment factor, adjusted for changes in railroad productivity
RCAF-U	rail cost adjustment factor, unadjusted for changes in railroad productivity
Reb.	rebuttal evidence
ROI	return on investment
ROW	right-of-way
SAC	stand-alone cost
SARR	stand-alone railroad
V.S.	verified statement
WP.	workpaper

BY THE BOARD:

By complaint filed on December 19, 2001, Duke Energy Corporation (Duke) challenges the rates charged by Norfolk Southern Railway Company (NS) for the movement of coal from origins in Virginia, West Virginia, and Kentucky to Duke's Allen, Belews Creek, Buck, and Dan River electricity generating facilities in North Carolina. Duke asks the Board to prescribe the maximum reasonable rates for this transportation, to award reparations for any unreasonable portions of the charges collected by NS since January 1, 2002, together with interest, and to order NS to reimburse Duke for the filing fee for its complaint. Upon considering the administrative record, the Board finds that Duke has not demonstrated that the challenged rates are unreasonable, and finds that further proceedings on whether the rate violates the phasing constraint may be appropriate.

OVERVIEW

As with all maximum rate cases decided using the stand-alone cost (SAC) methodology, this decision is the product of the particular record that was developed by the parties to the case. The record in this cases was extensive, and was sufficient for the Board to issue this decision finding that the rates charged were not shown to be unreasonable under that test.

This is the first modern SAC case east of the Mississippi River. The relative expense to build transportation projects in the mountainous areas of the Eastern United States compared to projects located primarily in less mountainous areas of the West may have been a factor in this case. It may well be that it is more expensive to build in this part of the East, and the question of whether Duke could have presented a case that could overcome the expense inherent in building in this part of the country cannot be determined. However, in certain areas of the SAC presentation in this case, a more robust record could have been developed. For example, the Board could not use Duke's operating plan for the stand-alone railroad (SARR) because that plan, even after careful analysis, was unworkable. As a result, the Board had to adopt NS's operating plan for the SARR which, at a minimum, would ensure that the shippers that would rely on the SARR would receive the service they need. However, adopting NS's operating plan resulted in the SARR needing to incur additional costs for locomotives, crews, and track, thereby significantly increasing the costs to construct and to operate the SARR.

Under the Staggers Rail Act of 1980, railroads were given considerable freedom to employ demand-based differential pricing provided that such rates were reasonable, and in this case, under the SAC analysis the rates charged were reasonable. However, the Board may review the rates charged to "captive" shippers (i.e., those over whom a railroad has "market dominance") in a number of different ways, and questions whether the shipper in this instance should have to incur rate increases of the magnitude imposed here so abruptly. Therefore, should Duke wish to pursue this matter, the Board will afford the parties an opportunity to address whether the magnitude of the rate increases at issue here violated the Board's phasing constraint and, if so, what method should be used for phasing in these rate increases over time.

PRELIMINARY CLAIM

Separate from its argument that the challenged rates violate the Board's SAC constraint, Duke also argues that these rate increases violate a condition imposed by the Board on its approval of NS's acquisition (together with CSX Transportation, Inc., or CSXT) of the Consolidated Rail Corporation (Conrail), in which the Board directed NS and CSXT to adhere to the representations they had made during the course of that proceeding.[1] Duke contends that NS had represented that captive shippers would not be burdened with the costs associated with that acquisition, but that following the acquisition NS nevertheless embarked upon a program to meet unanticipated cash needs by increasing the rates of its captive coal shippers, including Duke. According to Duke, NS has thus reneged on a pledge to the Board that it would not squeeze its captive shippers if its financial aspirations for Conrail went awry.

In support of its claim that the representations condition precludes significant rate increases, Duke cites a colloquy between then-Chairman Morgan and NS's Chief Executive Officer at the oral argument held by the Board on June 3, 1998:

> CHAIRMAN: One last question. You will hear today concern from shippers that the financial arrangements associated with [the acquisition of Conrail] will cause rates to go up. Will you need to raise your rates particularly as it relates to captive shippers? If this merger is approved?
>
> MR. GOODE: We believe, and our studies and projections tell us, that we will be able to achieve the benefits from this in such a way that it's a very good transaction financially for our shareholders and it pays off very well. And we have not assumed that we will be increasing any rates in order to do that.

NS maintains that the Conrail acquisition was not a factor in its setting of the rates at issue here, nor the cause of NS's current inadequate revenues. NS cites declines in recent years in certain lines of its business as a significant factor in its decision to look to relatively demand-inelastic shippers such as Duke for a greater revenue contribution. NS points to a recent slackening of demand across a number of its lines of business, most notably a large decline in NS's export coal traffic caused by what it characterizes as profound changes in the world coal markets over the course of the last decade. NS states that its annual export coal tonnage declined from 24 million tons in 1998 to 11.6 million tons in 2001, and that its revenues from this traffic declined by an even greater percentage, from \$301 million in 1998 to \$129 million in 2001. NS also notes that it has experienced recent declines in its movements of kaolin clay, paper products, and metals. NS maintains that these traffic declines occurred for reasons totally unrelated to its Conrail acquisition and would have occurred even if that acquisition had not taken place.

The market in which NS operates, like that of most businesses, is a fluid one that requires constant adjustment to changing market conditions. NS has explained that changes in its traffic, which are unrelated to its acquisition of Conrail, caused it to reevaluate the rates being charged to a variety of its customers, including Duke. In addition, Duke has facilities that are competitively served as well as singly-served, and it appears from the record that the dispute which led to this case reflects the unbundling of the rates to the two kinds of plants.

---

[1] *See CSX Corp. et al.—Control—Conrail Inc. et al.*, 3 S.T.B. 196, 387 (1998) (*Conrail*) (Condition No. 19).

The Board has no evidence, and Duke has presented none here, to suggest that the rate increases imposed on Duke were necessitated by NS's acquisition of Conrail. While the Board would be concerned if evidence in this record supported such allegations, the Board cannot take remedial action solely on the basis of Duke's unsupported allegation. In any event, the Board's representations condition in *Conrail* was not, and could not have been, meant to freeze NS's then-existing rates indefinitely, depriving the carrier of the ability to adjust its rates to react to changing market conditions.[2] Therefore, Duke's claim is rejected.

MARKET DOMINANCE

The reasonableness of a challenged rail rate can be considered only if the carrier has market dominance over the traffic involved. 49 U.S.C. 10701(d)(1), 10707(b), (c). Market dominance is "an absence of effective competition from other carriers or modes of transportation for the transportation to which a rate applies." 49 U.S.C. 10707(a).[3] Here, NS concedes that it possesses market dominance over the traffic at issue.[4]

RATE REASONABLENESS STANDARDS

A. Constrained Market Pricing

The Board's standards for judging the reasonableness of rail freight rates are set forth in *Coal Rate Guidelines, Nationwide*, 1 I.C.C.2d 520 (1985) (*Guidelines*), *aff'd sub nom. Consolidated Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987). These guidelines impose a set of pricing principles known as "constrained market pricing" (CMP).[5] They contain three main constraints on the extent to which a railroad may charge differentially higher

[2] Nor can a fair reading of the Goode statement relied upon by Duke be taken as a pledge to indefinitely maintain steady rate levels to all NS's captive shippers irrespective of how market conditions might change.

[3] The statute precludes a finding of market dominance where the carrier shows that the revenues produced by the movement at issue are less than 180% of the variable costs to the carrier of providing the service. 49 U.S.C. 10707(d)(1)(A). Variable costs are those railroad costs that have been found to vary with the level of output.

[4] *See* NS Open. Narr. at I-4.

[5] The objectives of CMP can be simply stated. A captive shipper should not be required to pay more than is necessary for the carrier involved to earn adequate revenues. Nor should it pay more than is necessary for efficient service. A captive shipper should not bear the cost of any facilities or services from which it derives no benefit. And responsibility for payment for facilities or services that are shared by other shippers should be apportioned according to the demand elasticities of the various shippers. *Guidelines*, 1 I.C.C.2d at 523-24.

rates on captive traffic: revenue adequacy,[6] management efficiency,[7] and the stand-alone cost test.[8] A fourth constraint—phasing—can be used to limit the introduction of otherwise-permissible rate increases when necessary for the greater public good.[9]

The revenue adequacy and management efficiency constraints employ a "top-down" approach, examining the incumbent carrier's existing operations. If the carrier is revenue adequate (earning sufficient funds to cover its costs and provide a fair return on its investment), or would be revenue adequate after eliminating unnecessary costs from specifically identified inefficiencies in its operations, the complaining shipper may be entitled to rate relief.[10] In contrast, the SAC constraint uses a "bottom-up" approach, calculating the revenue requirements that a hypothetical new, optimally efficient carrier would need in order to provide rail service to the complaining shipper. Duke has chosen to proceed here using the SAC test.

B. SAC Test

A SAC analysis seeks to determine the lowest cost at which a hypothetical, optimally efficient carrier could provide the service at issue free from any costs associated with inefficiencies or cross-subsidization of other traffic. A stand-alone railroad is hypothesized that could serve the traffic if the rail industry were free of barriers to entry or exit. (It is such barriers that can make it possible for railroads to engage in monopoly pricing absent regulatory constraint.) Under the SAC constraint, the rate at issue cannot be higher than what the SARR would need to charge to serve the complaining shipper while fully covering all of its costs, including a reasonable return on investment.

To make a SAC presentation, a shipper designs a SARR specifically tailored to serve an identified traffic group, using the optimum physical plant or rail system needed for that traffic.[11] Based on the traffic group, services to be provided, and terrain traversed, a detailed operating plan must be developed to

---

[6] The revenue adequacy constraint ensures that a captive shipper will "not be required to continue to pay differentially higher rates than other shippers when some or all of that differential is no longer necessary to ensure a financially sound carrier capable of meeting its current and future service needs." *Id.* at 535-36.

[7] The management efficiency constraint protects captive shippers from paying for avoidable inefficiencies that are shown to increase a railroad's revenue need to a point where the shipper's rate is affected. The management efficiency constraint focuses on both short-run and long-run efficiency. *Id.* at 537-42.

[8] The SAC constraint measures efficiency, ensures that the captive shipper does not cross-subsidize other traffic, and protects the shipper from having to pay more than the revenue needed to replicate rail service in the absence of barriers to entry and exit. *Id.* at 542-46.

[9] *Id.* at 546-47.

[10] *See, e.g.*, *CF Industries, Inc. v. Koch Pipeline Company, L.P.*, 4 S.T.B. 637 (2000), *aff'd sub nom. CF Industries, Inc. v. STB*, 255 F.3d 816 (D.C. Cir. 2001).

[11] Using computer models to simulate the flow of traffic over the defendant's rail system, the complainant can select a traffic group and route system for the SARR to achieve economies of density and thereby maximize revenues while minimizing costs.

define further the physical plant that would be needed for the SARR.[12] Among other things, the operating plan must identify the number of trains, train characteristics (such as number of cars per train, locomotive consists, and locomotive and car cycle times), and the number of operating personnel required.[13] It also must be capable of providing the service required by the SARR's customers. Once an operating plan is developed that would accommodate the traffic group that is assumed, the system-wide investment requirements and operating expense requirements (including such expenses as locomotive and car leasing, personnel, material and supplies, and administrative and overhead costs) can be estimated. (The parties must provide appropriate documentation to support their estimates.) The operating plan is thus a crucial factor in determining both the total investment that would be needed and the annual operating costs that would be incurred by the SARR.

It is assumed that investments normally would be made prior to the start of service and that recovery of the investments would occur over the economic life of the assets.[14] A computerized discounted cash flow (DCF) model simulates how the SARR would likely recover its capital investments, taking into account inflation, Federal and state tax liabilities, and a reasonable rate of return. The annual revenues required to recover the SARR's capital costs are combined with the annual operating costs to calculate the total annual revenue requirements.

The revenue requirements of the SARR are then compared to the revenues that the SARR could expect to receive from the traffic group that it is designed to serve. Absent better evidence, the revenue contributions from non-issue traffic are based on the revenues produced by the current rates (and where the traffic would be interlined with another carrier, the extent of the SARR's participation in the movement).[15] Traffic and rate level trends for that traffic group are forecast into the future to determine the future revenue contributions from that traffic.

By comparing the total costs of the stand-alone system to the total revenues that would be available to the SARR over the full analysis period (usually, as here, a 20-year period), it can be determined whether there would be over- or under-recovery of costs. Because the analysis period is lengthy, a present value analysis is used that takes into account the time value of money, netting annual

[12] For example, roadway must be sufficient to permit the attainment of the speeds and traffic density that are presumed. The length and frequency of passing sidings must be able to accommodate the specific train lengths and frequency of train meets that are assumed. And traffic control devices must be designed to allow trains traveling in opposite directions on the same track to be handled safely and efficiently based on the traffic density assumed in the operating plan. Yards must be built at locations which permit interchange of traffic to connecting carriers, changing of crews, and servicing of equipment. Yards may also be necessary for classification of traffic and consolidation of shipments into line-haul trains.

[13] The number of trains that would be required to move the traffic group is a product of the number of cars in each train, any shipper requirements or limitations, and the number of carloads required to move the shippers' traffic.

[14] The Board's SAC analyses are limited to finite periods of time (here, 20 years), but they provide for sufficient investment to enable the SARR to operate into the indefinite future.

[15] *See Guidelines*, 1 I.C.C.2d at 544.

over-recovery and under-recovery as of a common point in time. If the sum of the present values of over-recoveries does not exceed that of under-recoveries, the existing rate levels are not considered to be unreasonable under the SAC constraint.

C. Proper Role of Rebuttal Evidence

The proper scope of permissible rebuttal evidence in SAC rate cases has been addressed in various prior decisions. In *Procedures for Presenting Evidence in Stand-Alone Rate Cases*, 5 S.T.B. 441 (2001) at 445, the Board reminded parties to SAC cases that the party with the burden of proof—i.e., the shipper on SAC issues[16]— must present its full case-in-chief in its opening evidence. The Board cautioned parties about the consequences of new evidence being improperly presented on rebuttal. *Id.*[17]

Nevertheless, the scope of evidentiary issues that may be raised on rebuttal remains a continuing source of controversy in SAC cases. In recent cases, the Board has sought to clarify the parameters around this issue. In *Texas Municipal Power v. The BNSF Ry. Co.*, 6 S.T.B. 573 (2003) (*TMPA*), for example, the Board (at 692) rejected rebuttal evidence on certain maintenance-of-way expenses, in part, because essentially a new case was offered on that issue on rebuttal, depriving the defendant railroad of an opportunity to address the validity of the revised presentation. Similarly, in *Duke Energy Corp. v. CSX Transp., Inc.*, STB Docket No. 42070 (STB served March 25, 2003), the Board explained that the proper procedure for seeking to introduce a potentially significant redesign of the SARR is to file a petition to supplement the evidentiary record.

In this case as well, there continue to be charges that portions of the rebuttal evidence go beyond the permissible bounds of rebuttal, reflecting some apparent uncertainty by both parties as to where those boundaries lie. The appendices to this decision describe the evidentiary issues that have been raised in this case as well as the resolution of those issues. However, the chronic nature of these types of disputes means that further refinement and clarification must be provided here regarding this issue.

As to disputed issues, where the shipper's opening evidence is feasible and supported, it is used in the Board's SAC analysis. However, where on reply the railroad both (a) demonstrates that what the shipper presented is infeasible and/or unsupported and (b) offers feasible, realistic alternative evidence that avoids the

---

[16] With respect to variable cost issues, there has not been a significant problem of parties exceeding the bounds of permissible rebuttal in recent cases, as each party files both opening and reply evidence: the railroad because it bears the burden of proof regarding the conclusive presumption of no market dominance where the r/vc percentage for the challenged rate does not exceed 180% (*see* 49 U.S.C. 10707(d)(1)(A)) and the shipper because it has the burden to establish the extent of the relief to which it is entitled, which may not result in a rate below the 180% jurisdictional threshold. Thus, each side has an opportunity to address the other side's evidence and make any necessary adjustments to its own evidence prior to the rebuttal stage.

[17] *Citing FMC Wyoming Corp. & FMC Corp. v. Union Pacific RR Co.*, 4 S.T.B. 699 (2000) (*FMC*) at 790, 841.

infirmities in the shipper's evidence and that is itself supported, the Board will use the reply evidence for its SAC analysis.

On rebuttal, as to those issues challenged by the railroad,[18] the shipper may demonstrate that its opening evidence was feasible and supported, it may adopt the railroad's evidence, or in certain circumstances it may offer to refine its evidence to address issues raised by the railroad regarding its opening evidence. Where the railroad has identified flaws in the shipper's evidence but has not provided evidence that can be used in the Board's SAC analysis, or where the shipper shows that the railroad's reply evidence is itself unsupported, infeasible or unrealistic,[19] the shipper may supply corrective evidence. However, a shipper is not free on rebuttal to significantly redesign its SARR or alter the core assumptions upon which its case-in-chief is based without filing a separate petition to supplement the evidentiary record.

This standard balances the interests of both shippers and railroads, as well as the public interest in having rail rate regulation founded on an analysis that is realistic and supported and will help achieve the ultimate goal of the SAC process: a proper evaluation of whether the rate being charged is reasonable. Under this standard, the shipper must plan to submit its best, least-cost, fully supported case on opening. It may not hold back to see the railroad's reply evidence before finalizing or supporting its own case, as an opportunity to correct deficiencies in its opening evidence is not assured. On the other hand, a railroad may not take unfair advantage of weaknesses in the shipper's opening evidence by submitting reply evidence that is itself unsupported, infeasible, or unrealistic, or that presents criticism without appropriate evidence that can be used in the Board's SAC analysis.[20] If it does, the shipper may use rebuttal to correct deficiencies that have been identified. Thus, it is the nature and quality of both the opening and reply evidence that determines the extent to which rebuttal evidence may be considered.

STAND-ALONE COST ANALYSIS

Duke designed a hypothetical SARR called the Appalachia & Carolina Central Railroad (ACC) to serve a selected traffic group. That traffic group consists of coal traffic that NS currently moves from 39 mines in the Central Appalachian region,[21] as well as certain grain traffic currently handled by NS that

---

[18] Other issues are not open to rebuttal.

[19] A railroad's proposal would be unrealistic if, for example, it is not what the defendant railroad itself does in a comparable situation or what other railroads generally would do in that situation, or otherwise constitutes needless "gold-plating."

[20] If the shipper's evidence is so flawed as to preclude the development of appropriate reply evidence to address the flaws, the railroad should file a separate motion bringing that problem to the Board's attention.

[21] The 39 mines are: Ramsey, Toms Creek, Kelly View, Pardee, Steer Branch, Wentz, Fola, High Power Mountain, Bradbury, Colmont, Delbarton, Gund, Hatfield, Marrowbone, Martiki, Pevler, Pontiki, Sand Lick, Scarlet Glen, Sidney, Glen Alum, Hull, Jamboree, Lavoy, Mabley, Scaggs,
(continued...)

moves through this region. The ACC was designed to handle approximately 88 million tons of coal and grain traffic.

A. ACC Configuration

The ACC would replicate approximately 1,100 miles of existing NS lines extending from Kenova (in southwest West Virginia, on the Ohio River) to Duke's Allen coal-fired electricity generating facility, just south of Belmont, NC. Proceeding from north to south, the ACC's main line would start at Kenova and proceed in a southeasterly direction to Bluefield, WV, via Naugatuck, Devon, and Iaeger, WV; continue east to West Roanoke, VA; then turn south to Winston-Salem, Charlotte, and Belmont, NC. The ACC would have two secondary main lines and numerous branch lines to serve mines in Central Appalachia and Duke's five coal-fired electricity generating facilities in North Carolina.

A map and a more detailed description of the ACC's configuration is contained in Appendix A. That appendix also contains the Board's resolution of evidentiary disputes regarding the amount of track that would be needed for the ACC to operate this system.

B. ACC Traffic

Most of the traffic moving over the ACC (approximately 95%) would be coal from Central Appalachian mines; the remainder would be overhead grain traffic that the ACC would receive from the "residual NS" at Kenova and return to the residual NS at West Roanoke.[22] The ACC would originate almost all of the coal that it would handle, although it would receive some coal from NS via interchange at Appalachia, VA, the western terminus of the ACC. The ACC would serve five Duke power plants in North Carolina,[23] as well as two non-Duke power plants,[24] a major manufacturer,[25] and two barge transload facilities on the Ohio River. The vast majority of the traffic moving over the ACC (79%), however, would be interchanged with the residual NS at seven locations along its route: Kenova and Alloy, WV; Appalachia, St. Paul, and West Roanoke, VA; and Winston-Salem and Charlotte, NC.

With respect to the traffic that would be handled by the ACC, the parties disagree on: the amount of traffic and revenues that the ACC traffic group would generate; what portion of those revenues the ACC would receive from "cross-over" traffic (i.e. traffic for which the ACC would not replicate the full length of

---

[21](...continued)
Thomas, Timbar, Luke, Stric, Biggs/Clintwood #2, Clinchfield, Corneliu, Koenig, Page, Hatcher, Kopperston, Pineville, and Pinnacle Creek.

[22] The term "residual NS" refers to that portion of the NS system that would not be replaced by the ACC.

[23] The Dan River, Buck, Allen, Belews Creek, and Marshall plants.

[24] Appalachian Power's Glen Lyn and Clinch River plants.

[25] Celanese's Celco plant at Narrows, VA.

NS's current move but would instead interchange with the residual NS); and whether it is appropriate to assume that the ACC could route cross-over traffic differently from how that traffic currently moves without factoring in additional off-SARR costs that would be incurred by the residual NS for its portion of interlined movements as a result of the different routings.

1. Tonnage and Revenues

The annual tonnage and revenues for the traffic included in the ACC traffic group are addressed in Appendix B. As discussed there, for projecting future tonnage and revenues for this traffic, the Board generally relies on the most recent coal tonnage and revenue projections for the Central Appalachian region obtained from the Energy Information Administration (EIA), a statistical arm of the Department of Energy charged with providing policy-neutral data and forecasts.

2. Revenue Divisions

The majority (almost 80%) of the ACC traffic group would be cross-over traffic. Thus, an important part of determining the revenues that the ACC would receive is computing what portion of the revenues from cross-over traffic would go to the ACC and what portion to the residual NS. In recent SAC cases the Board has accepted, for lack of better evidence, various parties' use of a "modified mileage block prorate" approach (the "Block Methodology") as the formula for allocating cross-over traffic revenues.[26] (Under the "Block Methodology," each carrier is assigned one "block" for every 100 miles or part thereof that it carries the traffic, plus an additional block for originating or terminating the traffic; the total revenues are then allocated based on each carrier's share of the total number of blocks.) The Board has long recognized, however, that this methodology may not work in all cases, and it has been open to suggestions for other methods to allocate cross-over revenues.[27] Duke advocates continued use of the Block Methodology here. NS argues that the Block Methodology is seriously flawed, and it advocates a different approach.

As discussed below, the Board has first considered the more general question posed by NS of whether divisions should be based on a market-based or a cost-based inquiry, and concluded that a market-based inquiry is not appropriate for a SAC analysis. The Board has also considered NS's proposed methodology for allocating revenues here—a formula purporting to account for relative variable costs, distances, and densities—and concluded that NS has not adequately

[26] *See, e.g., McCarty Farms, et. al. v. Burlington Northern, Inc.*, 2 S.T.B. 460, 472 (1997) (*McCarty Farms*); *FMC*, 4 S.T.B. 725-27 & n.62; *Wisconsin Power & Light v. Union Pacific Railroad Company*, 5 S.T.B. 955 (2001) (*WPL*), at 975.

[27] *See, e.g., PPL Montana, LLC v. Burlington Northern & Santa Fe Railway Co.*, 6 S.T.B. 286 (2002) (*PPL*) at 293 n.14 ("We have not adopted a single preferred procedure for developing revenue divisions on cross-over traffic.").

supported that formula. Finally, the Board has considered mileage-based approaches and concluded that the Block Methodology has inherent shortcomings, and that a modified, straight-mileage approach should be used instead.

a. Divisions Based on Market Power

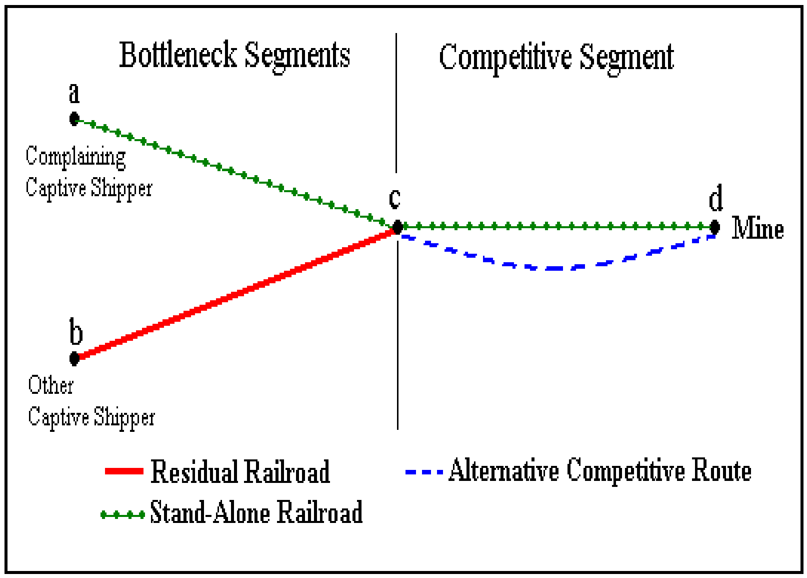
NS argues that the ACC would have little bargaining leverage over the residual NS and thus revenue divisions derived from the Block Methodology would not reflect market realities. NS reasons that, because both the residual NS and CSXT would provide competition to the ACC from other Central Appalachian coal origins, the residual NS, as the bottleneck carrier at the destinations of these movements, could exert bargaining leverage that would drive the ACC's revenue division on cross-over traffic down close to variable cost levels.

As the following example illustrates, however, NS's market power analysis is not appropriate for determining cross-over traffic revenue allocations in a SAC analysis.[28] Assume, as depicted in Figure 1 below, that a defendant railroad carries two large coal movements from the same coal mine to two captive shippers, but that another railroad can haul the coal from the mine to a mid-way interchange point. Thus, the defendant has a bottleneck over half of each movement. Assume also that the complaining shipper includes the traffic of the other shipper in the traffic group for its SAC analysis.

[28] *Cf. Bituminous Coal—Hiawatha, UT to Moapa, NV*, 10 I.C.C.2d 259, 265-66 (1994) (*Nevada Power*) (rejecting the "efficient component pricing" procedure that would limit a SARR's revenue from cross-over traffic to the existing carrier's incremental cost of providing service on the lines the SARR would hypothetically replace as "inconsistent with the nature and purpose of SAC constraint").

Figure 1

The complaining shipper would rightly argue that it should not alone bear the



cost of the competitive segment (c-d), but rather that the other shipper sharing those facilities should contribute as well. But if the Board were to engage in NS's analysis of relative bargaining power, the complaining shipper would have to pay most of the fixed costs of the competitive segment itself. That is because, if a SARR replicated the defendant railroad from plant to mine (a-d), but left the residual railroad with the bottleneck segment for the non-complaint traffic (b-c), NS's analysis would give the bulk of cross-over revenue from the other captive shipper to the bottleneck residual railroad.

There is, however, no good reason why the other captive shipper should not be expected to contribute to both the bottleneck and competitive segments in the example above. Moreover, if that captive shipper were to file its own rate complaint and include the first shipper in its traffic group, NS's approach would have each captive shipper bear most of the fixed cost of the competitive segment by itself. The end result would deprive each complaining shipper of the benefit of grouping traffic (i.e., realizing the economies of scale, scope, and density) held out to them in *Guidelines*, 1 I.C.C.2d at 544.

Thus, a debate over how much of the revenues from cross-over traffic the hypothetical carrier could negotiate with the residual defendant has no place in a SAC analysis. (Indeed, the defendant carrier does not negotiate with itself as to whether one segment of its line should be allocated a larger share of the revenues from a movement than another segment of its own line.)[29] Rather, the revenue allocation issue should reflect, to the extent practicable, the defendant carrier's relative costs of providing service over the two segments.

b. Density Methodology

NS further notes that the economies associated with the high-density lines leading into the Central Appalachian coal mines are made possible by a far-flung delivery network of light-density lines. NS argues that applying a mileage-based revenue allocation formula in this case would enable the complainant to capture the benefits associated with the higher density lines without reflecting the costs associated with NS's lower density delivery network. To address this concern, NS suggests using an alternative revenue allocation approach referred to here as the "Density Methodology."

The premise of NS's proposal is that proportionately more revenues should be allocated to lighter density lines because (all other factors being equal) they would have higher average total costs.[30] Under NS's proposed Density Methodology, the variable cost for each carrier's segment of the movement would need to be calculated, as well as the total available contribution to fixed costs (the total revenues less total variable cost for both segments); revenues would then be allocated between the two carriers in proportion to each segment's

[29] Nor would information about NS's actual divisions with other carriers (which Duke requested in discovery but did not receive) be particularly instructive, as those divisions presumably reflect a wide range of commercial considerations across a broad spectrum of traffic and gateways.

[30] Duke contends that the high-density segments of the NS system could have a higher average total cost than the light-density delivery network, given the massive investment needed to construct those high-density lines.

relative variable cost, distance, and density.[31] Thus, the longer the residual NS would carry the traffic and the lighter the density of the residual NS tracks used, the more revenue would be attributed to the residual NS.

NS's proposed formula contains the critical assumption that light-density lines have the same fixed costs per mile as heavy-density lines[32]—an assumption that Duke challenges here. If the fixed costs per mile are not roughly the same, then NS's methodology could allocate too much revenue to the light-density lines. If the amount of fixed costs required is roughly proportional to the amount of traffic that would move over that line, then NS's complicated formula would collapse to a simple mileage division.[33]

---

[31] NS would allocate cross-over revenue to the ACC according to the following formula:

$$Rev_{ACC} = VC_{ACC} + TC$$

$$* \left[\frac{1}{\frac{Density_{ACC}}{Density_{ResNS}} * \frac{Miles_{ResNS}}{Miles_{ACC}} + 1} \right]$$

NS failed to offer any derivation of its formula (particularly the bracketed part). NS's basic argument, however, is that the portion of revenues from cross-over traffic that exceed variable cost (referred to by NS as the total contribution, or TC) should be allocated in proportion to the average fixed costs (per ton) of the relative segments. The average fixed cost per ton (AFC) of a segment equals MILES × TFC ÷ TONS, where MILES refers to the total route miles of the segment, TONS refers to the total tons traveling over that segment, and TFC refers to the total fixed costs per mile of that segment. NS's formula can be derived as follows:

$$\frac{AFC_{sarr}}{AFC_{sarr}+AFC_{res}} = \frac{\left(MILES_{sarr}*TFC_{sarr}\right)/TONS_{sarr}}{\left(\left(MILES_{sarr}*TFC_{sarr}\right)/TONS_{sarr}\right)+\left(\left(MILES_{res}*TFC_{res}\right)/TONS_{res}\right)}$$

$$= \frac{1}{1+\left(\frac{TONS_{sarr}}{MILES_{sarr}*TFC_{sarr}}\right)\left(\frac{MILES_{res}*TFC_{res}}{TONS_{res}}\right)} = \frac{1}{1+\left(\frac{TONS_{sarr}}{TONS_{res}}\right)\left(\frac{MILES_{res}}{MILES_{sarr}}\right)\left(\frac{TFC_{res}}{TFC_{sarr}}\right)}$$

[32] In other words, it assumes that $TFC_{res} \div TFC_{sarr}$ equals 1.

[33] An approach that would allocate revenues based on the relative average fixed costs of the movements provides a range of plausible revenue divisions depending on the relationship between the required level of fixed investment and the amount of traffic. At one extreme is the simple mileage division (which is the most favorable division for Duke); on the other extreme is NS's proposed formula (which is the most favorable division for NS).

Although possible, it is doubtful that higher-density lines should be allocated more revenues than offered by a simple mileage division. That would require the average fixed costs to increase as traffic increases. *But see* Hal R. Varian, *Microeconomic Analysis* (3rd ed. 1992), at 68 ("In the (continued...)

But there is no evidence that fixed costs per mile are the same for the ACC's segment of any move as they are for the residual NS's. By definition, fixed costs are those costs that do not vary with output and would include investments in land, tunnels, track, and bridges. But this does not mean that the fixed investment costs are the same for light- and heavy-density lines. The fixed investments required for a superhighway are not the same as the fixed investments needed for a country road. The two roads may share certain basic investments, but it would be implausible to just assume that total fixed investment would not depend on the expected use of a road or, in this case, a rail line.

There may be merit to allocating revenues based on the relative variable cost and average fixed cost to haul the traffic over each segment of the move, if those costs can be fairly approximated. But NS has not shown how its proposed formula would account for differences in fixed costs per mile. NS has provided no evidence that its per-mile capital investments in the Central Appalachian region are identical to its per-mile capital investments along its lower-density delivery network. This deficiency strikes at the heart of NS's proposed methodology, and thus the Board will not adopt it.

c. Mileage-Based Methodology

In the absence of a better supported method, the Board is left to continue to apply a mileage-based approach, which clearly bears some relationship to the relative total costs NS incurs to provide service over each segment. There remains a question, however, as to whether the Block Methodology is the most appropriate mileage-based approach to use in a SAC analysis. The Board's concern is that the Block Methodology leads the parties to design SARRs to take advantage of its revenue allocation, rather than produce the fairest division between the carriers.

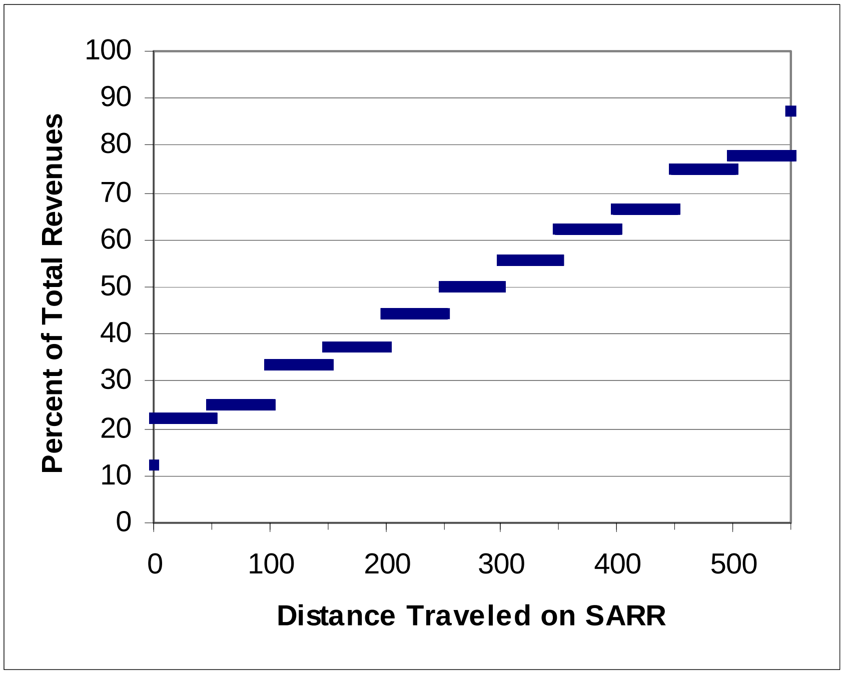
An attractive feature of NS's Density Methodology is that it assures that a carrier receives some incremental revenue for each additional mile that it would move the traffic—a feature not shared by the Block Methodology. As illustrated below, the Block Methodology allocates revenue in a "lumpy" manner.[34] For example, assuming a 550-mile cross-over movement, under the Block Methodology the SARR would first receive 13% of the total revenues for originating the traffic. But then, for hauling that movement only 1 mile from the coal mine, the SARR would be allocated another 9% of the revenue, for a total of 22%. The SARR would not get another penny if it were to carry the traffic another 48 miles. But if its portion of the movement were 50 to 100 miles, the

[33](...continued)
long run all costs are variable costs; in such circumstances increasing average costs seems unreasonable since a firm could always replicate its production process. Hence, the reasonable long-run possibilities should be either constant or decreasing average costs.").

[34] In contrast, the SARR's investment costs and operating expenses reflect the exact number of miles of the SARR that would be constructed and operated.

SARR's share of the revenues would jump to 25%; if it were from 101 to 149 miles, the SARR would receive 33%; and so on.[35] (The total number of blocks to be shared by the two carriers fluctuates, changing every 50 miles as the number of blocks credited to either carrier changes.) Figure 2 below illustrates the entire sequence:

Figure 2: The Block Methodology[36]



The lumpy nature of the Block Methodology could artificially drive the selection of the SARR's configuration. A complainant may find itself in the enticing position in which, by extending the SARR only a few miles, the SARR

[35] Another peculiarity of the lumpy feature of the Block Methodology is that the size of the step changes depending on the total distance of the movement. For example, if the total distance were 525 miles, the SARR would receive 22% if it carried the traffic 1-24 miles, 25% if it carried it for 25-100 miles, 33% if it carried it for 101-124 miles, and so forth.

[36] Figures 2 and 3 assume that the SARR would originate the 550-mile cross-over traffic movement and that the defendant railroad would terminate the movement.

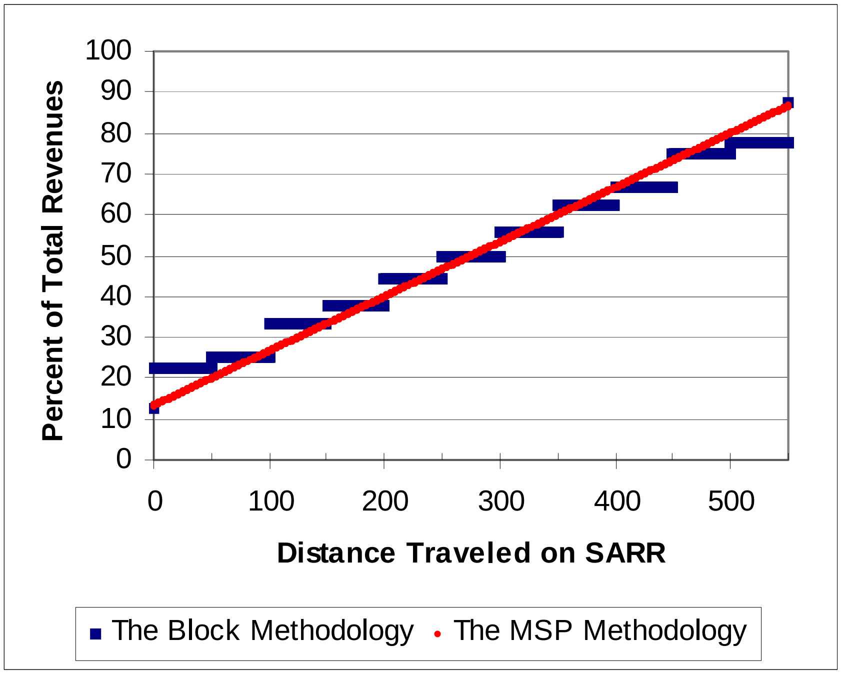
may obtain another block of the revenues and disproportionately increase the SARR's portion of revenues relative to the additional investment costs and operating expenses associated with the added miles. Alternatively, a complainant may be reluctant to extend a SARR as far as it otherwise might if no additional revenues would be forthcoming from cross-over traffic.

As a result of these deficiencies, it is appropriate to modify the Block Methodology here, and a "Modified Straight-Mileage Prorate" (MSP) will be used instead. Under that approach, revenue from cross-over traffic is allocated based on the total mileage hauled by the SARR and the residual carrier, while retaining a 100-mile additive for originating or terminating the traffic.[37] In other words, the revenue division for the SARR would equal [miles carried by the SARR plus a 100-mile originating and/or terminating additive] divided by [the total distance plus 200 miles].

[37] As the Board explained in *McCarty Farms*, 2 S.T.B. at 472, it is appropriate to include additional revenues for originating and/or terminating a movement to reflect the additional costs associated with providing those services. The equivalent of a 100-mile share of the costs has been used in the past as a surrogate for the costs of providing originating or terminating service and (in the absence of any better evidence) is used here.

Figure 3 below depicts the difference between the two approaches:

Figure 3: MSP & Block Methodologies



The only difference between the two approaches is that the lumps in the Block Methodology have been smoothed out. Using the same 550-mile cross-over movement example, both approaches would give the SARR 13% of the cross-over revenue for originating the traffic. But rather than allocating 9% more revenue for the first mile, and no more for the next 48 miles, the MSP Methodology would allocate roughly 0.135% of the revenue to each mile. In contrast to the choppy Block Methodology (as illustrated in Figure 2), the MSP Methodology should better approximate the relative costs the defendant railroad incurs to haul this traffic over each of the segments, by applying the reasonable assumption that average total costs are a continuous function of distance.[38]

[38] The MSP Methodology is nearly identical to the Density Methodology if the relationship between fixed cost and the level of traffic is roughly constant. But the MSP Methodology is far easier to apply, as it does not require the parties to calculate the relative variable cost of each cross-over movement.

Furthermore, this change removes the "gaming" incentive created by the lumpy nature of the Block Methodology.

3. Rerouting of Traffic

This is the second SAC case in which a complainant has sought to reroute traffic in a manner that would change the routing on the residual carrier. In the first case, *TMPA*, the Board addressed a shipper's efforts to reroute onto a SARR traffic that was being carried over a different route. Such rerouting presents a difficult issue that the Board must further refine and clarify here.

a. General Principles

The SAC test is designed to measure the costs of serving traffic in the absence of inefficiencies or cross-subsidies. Inefficiencies can take many forms, including inefficiencies due to a carrier's physical plant. *See Guidelines*, 1 I.C.C.2d at 537. An existing carrier's route structure—which can be the product of a series of line constructions, mergers or line acquisitions, and line abandonments occurring over the course of many years—may be less than optimal. It might be more efficient to site a line differently or to eliminate redundant routes. Therefore, as a general matter, a SARR is not required to use either the configuration or routing of the defendant carrier, as rerouting can be an appropriate means of removing inefficiencies from a system.

Concerns may be raised, however, when a rerouting involves cross-over traffic (traffic for which the ACC would not replicate the full length of NS's current move but would instead interchange with the residual NS), as the SARR would not receive all of the revenues or incur all of the operational and investment costs of serving that traffic. In such a situation, the rerouting may not be designed to address an inefficiency in the defendant's operations. Rather, the rerouting could be designed to shift a greater share of the revenues from the movement onto the SARR and/or to shift costs of serving that traffic off of the SARR onto the residual railroad. The Board must look at each proposed rerouting to ensure that it is permissible and consistent with SAC principles.

As the Board held in *TMPA*, if a complainant wishes to reroute traffic in its SAC presentation without having the SARR operate over all of the rerouted portion of the move, it must ensure that the combined operations of the SARR and the residual carrier would be at least as efficient as the existing operations. At a minimum, the complainant must fully account for all of the ramifications of requiring the residual carrier to alter its handling of the traffic and any changes in the level of service received by the shippers.

The starting point for the Board's analysis for rerouted traffic will be length of haul. If a rerouting shortens the distance, the Board will presume it is acceptable, unless the defendant railroad demonstrates otherwise. The presumption will change for reroutings that result in a longer overall haul. A longer route is not necessarily less efficient, as increased densities and other operational efficiencies may offset the additional distance-related costs. But a logical presumption is that longer routes are generally less efficient than shorter ones; and the greater the disparity in distance, the stronger that presumption.

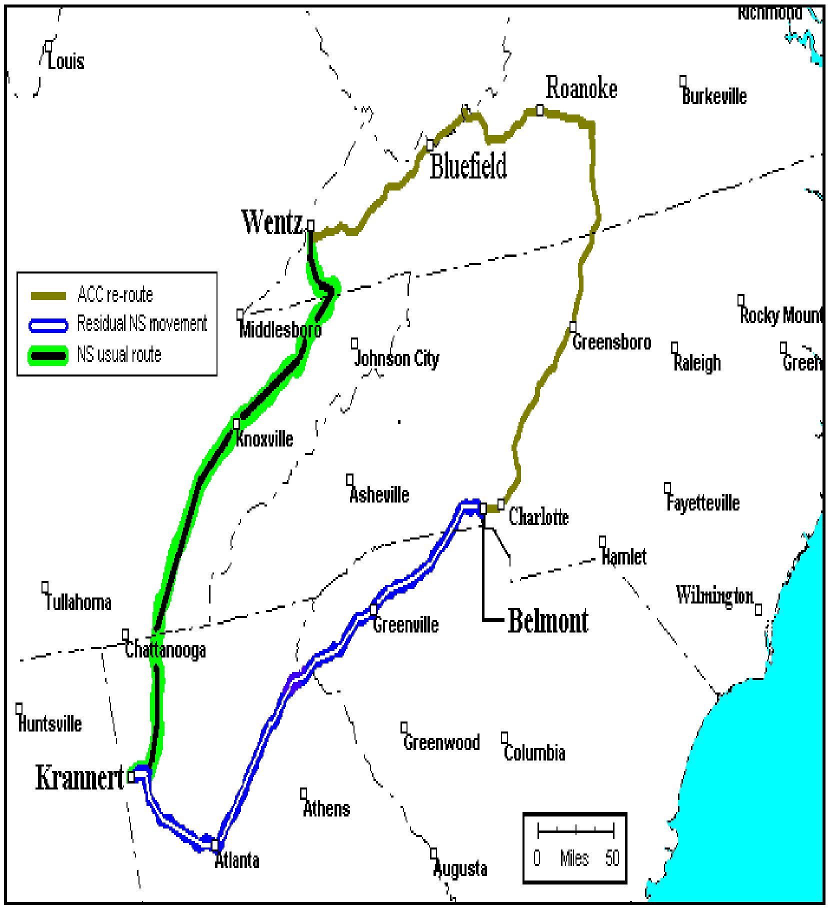
b. Application to This Case

In this case, Duke has proposed to reroute certain traffic, thereby increasing the ACC's earnings from that traffic. NS objected to the rerouting of approximately 13 million tons per year of cross-over traffic (comprising approximately 15% of the total ACC traffic) that Duke would have had the ACC interchange with the residual NS at hypothetical interchanges not along the usual NS route for the traffic.[39] Most of this traffic would have been rerouted over the ACC's Bluefield-to-Belmont line, rather than NS's normal route through St. Paul or Appalachia (interchange points for the ACC with the residual NS on "the Wentz line,"[40] which is the line over which NS currently routes that southbound traffic). According to NS, in almost every instance the rerouting would have been significantly longer—both from the mine to the interchange point and from the interchange point to destination—than the current NS routing.

NS cited the example of a movement from the Pardee mine (located near the western end of the Wentz line) to Krannert, GA. NS's current route is 314 miles, while the combined ACC/residual NS movement with the rerouting would have been 759 miles. (The map below shows NS's current route and the proposed reroute.)

[39] NS has not objected to the rerouting of traffic that would be local to the ACC or that would be interchanged with the residual NS along its usual route. (Because the ACC would not replicate all of the NS lines in the Central Appalachian coal region, some of the ACC's routings of ACC-originated traffic coming out of that region would be different from the routings now used by NS even for traffic terminating on (and thus local to) the ACC or being interchanged with the residual NS along its usual route of movement.) Nor has NS suggested either that it would be disadvantaged or that the shippers' needs would not be met by this type of rerouting.

[40] Duke refers to the portion of the ACC line running southwest from Bluefield to Appalachia as the Wentz line, as Wentz is the most distant origin on that line segment. Duke Reb. Narr. III-A-72. The ACC would have interchange points with the residual NS on the Wentz line at St. Paul and Appalachia.



Reroutings of this magnitude (more than doubling the total length of the movement) would clearly impact both carriers' revenues, investment costs and operating costs, and affect their operational considerations. Yet in its case-in-chief Duke made no attempt to address the ramifications of the reroutings.

The most readily measurable impact would have been on the portion of the revenues that each carrier (the SARR and the residual NS) would have been deemed to receive for its portion of the joint-line service.[41] In the example cited, NS stated that, using NS's current route, the ACC would take the traffic only 5 miles, while the residual NS's length of haul would be 309 miles. Under Duke's "modified mileage block prorate" method of allocating revenues, the ACC would receive 29% of the revenue, while the residual NS would receive a 71% share using NS's current route. But with the reroute, the ACC would have increased its length of haul to 424 miles and its share of the revenue to 55%, while the residual NS's length of haul would have increased to 335 miles but its share of the revenue would have dropped to 45%.[42] Thus, although the residual NS would have had a longer haul as a result of the rerouting, it would have received a substantially lower share of the revenue.[43]

On reply, NS identified some additional investment costs that would have needed to be incurred by the residual NS as a result of the reroutings, but NS did not address the difference in the operating costs for the residual NS that would likely have resulted from carrying this sizeable amount of traffic over different, longer, off-SARR routes. Nor did the parties address the likely off-SARR operational implications of the reroutings, or whether the transportation needs of the customers involved would have been met using substantially longer routes with presumably longer cycle times.

Such an incomplete presentation would defeat the objective of the SAC test—to determine what the defendant carrier would need to charge for its current service by measuring all of the costs (including a reasonable return on investment) needed to serve a subset of the defendant carrier's traffic while excluding any costs attributable to carrier inefficiencies or cross-subsidization of traffic not included in that traffic subset. In making a SAC presentation, a complainant may select a subset of the defendant's traffic for study (rather than the complainant's traffic alone) in order to realize the benefit of the economies of scale, scope, and density inherent in the railroad industry and enjoyed by the defendant. *Guidelines*, 1 I.C.C.2d at 544. And for non-issue traffic, it may also use the device of cross-over traffic—rather than extending the SARR to far-flung origins and destinations of non-issue traffic (which could lead to a SARR of potentially nationwide reach)—to realize the full benefit of those economies. *Nevada Power*, 10 I.C.C.2d at 265-67 & n.12. But to change the way traffic would be handled beyond the boundaries of a SARR introduces additional variables that must be accounted for in the SAC calculus.

Duke would have had the Board simply assume that off-SARR revenues would be sufficient to cover whatever additional off-SARR costs there might

---

[41] Each party attempted to calculate the total revenue impact of the rerouting of cross-over traffic in this case. NS Reply Narr. III-A-57-59; Duke Reb. Narr. III-A-72 n.69. Their calculations were based on revenue allocation methods that are rejected here (for reasons discussed below).

[42] The difference would be no less striking applying the straight-line mileage prorate revenue allocation method used by the Board here. Under that method, based on the current routing, the ACC would collect 20% of the revenues while the residual NS would collect 80%. But with the rerouting, the ACC would have collected 55%, while the residual NS would have collected 45%.

[43] NS complained that the rerouted traffic would have been unprofitable for the residual NS.

be.[44] But to do so would be to presuppose the very matter to be determined through the SAC analysis, i.e., how total revenues compare to total costs for the group of shipments selected for the traffic group.

Because the record developed by the parties did not allow the Board to identify and quantify all of the impacts associated with the rerouting of cross-over traffic, the Board issued an order on October 10, 2003, directing the parties to submit supplemental evidence. That order instructed the parties, at a minimum, to quantify the revenues and costs (including both operating costs and, if applicable, investment costs) of the ACC attributable to these reroutings, so that to the extent the reroutings were to be disallowed then the effects of those reroutings could be removed, as in the *TMPA* case.

Duke contends that, because of the short time frame for response, it was unable to quantify all of the impacts of returning the cross-over traffic to NS's usual route. Comparison of its rebuttal and supplementary DCF analyses shows that Duke reduced the ACC's investment costs by approximately $1.1 million, operating costs by approximately $20 million, and earnings by approximately $28.4 million. NS, in its supplemental evidence, reduced the ACC's investment in track by approximately $49 million, its operating costs by approximately $23 million, and its revenues by approximately $31 million to reflect the return of the cross-over traffic to NS's usual route. NS also removed the approximately $30 million of off-SARR investment costs that it had earlier identified.[45]

In its supplemental evidence, Duke proposed to continue to reroute approximately 1.7 million tons of coal moving to eastern North Carolina (which it would have the ACC interchange with the residual NS at Winston-Salem for delivery east of Greensboro), on the ground that NS had not objected to the rerouting of that traffic. The reroute for that traffic is approximately 21 miles longer than NS's usual route (through Altavista) and would result in an additional $3.2 million share of the revenues for the ACC. In its reply to that supplemental evidence, however, NS made clear that its objections to the reroutings embraced that traffic, since NS alleged that Duke had failed to fully account for the costs and operational ramifications on the residual NS. Therefore, as with the other originally proposed reroutes of cross-over traffic that would result in longer total hauls and would affect the portion of the movement handled by the residual NS, the rerouting is disallowed here because, even though the additional mileage is small, Duke has not sufficiently taken into account all of the impacts on the affected shippers or the residual NS.

---

[44] Duke has further suggested that off-SARR revenues need only cover the residual NS's directly variable costs for its portion of the movements. But Duke's argument is simply the converse of NS's market-power position (that the residual carrier should receive the bulk of the revenues from cross-over traffic)—which is discussed and rejected above—and neither position is appropriate public policy for a SAC analysis.

[45] As Duke notes, both parties concluded that eliminating the reroutes ultimately does not make a material difference in the outcome of the SAC analysis in this case. Duke Supp. Reply at 24. Indeed, NS's figures show that the ACC's reduction in revenues would be less than the ACC's reduction in the costs, so that elimination of the reroutes increases the net contribution from the affected traffic. *Id.* at 23 n.20.

For some movements, however, the total length of haul using the reroute would be shorter than NS's usual route. Those movements involve approximately 0.5 million tons of coal that would originate at mines north and west of Bluestone, WV, and would be destined to Port Wentworth, GA and Wateree, SC.[46] The rerouting of those movements is included in the SAC analysis here, along with a 7,000-foot interchange track at Charlotte, which the parties have agreed would be needed to accommodate the interchange of traffic at Charlotte.[47]

C. Operating Plan

To limit operating expenses, Duke chose an operating plan for the ACC that is different from how NS conducts its coal-hauling operations in the Central Appalachian region. Duke assumes that all trains originated by the ACC would be trainload movements containing from 90 to 115 cars per train. There would be no less-than-trainload (LTL) movements, nor would any trains exceed 115 cars in length.[48] Moreover, Duke assumes that the ACC would not need any staging or gathering yard infrastructure; rather under Duke's proposal, after loading, each ACC train would operate as a single train from origin to destination.

NS has objected to Duke's assumption that the mines, connecting carriers, and shippers would be willing to accept a different level of service than NS provides. Historical data for the traffic group that the ACC would serve show that these customers are accustomed to a greater range of service, with some shipments exceeding 115 cars per train and many others consisting of fewer than 90 cars. Indeed, 18% of the selected coal traffic currently moves in LTL shipments.[49]

A core SAC principle is that the SARR must meet the transportation needs of the traffic it would serve. Thus, as discussed in prior cases, the proponent of a SARR may not assume a changed level of service to suit its proposed configuration unless it also presents evidence showing that the affected shippers, connecting carriers, and receivers would not object.

Applying that principle, in *West Texas Utilities Company v. Burlington N.R.R.*., 1 S.T.B. 638, 667 (1996) (*West Texas*), the Board rejected an operating plan that would have increased average train length, because "train sizes must reflect the operational constraints and restrictions faced by connecting railroads,

---

[46] The ACC's route for the Port Wentworth traffic is 84.5 miles shorter than NS's route while the ACC's Wateree route is 0.5 miles shorter. *See* Duke Supp. filed October 24, 2003, Exh. S-1 Duke/NS WP. 06731.

[47] *See* Duke Rebut. Narr. III-B-15.

[48] *See* Duke Open. Narr. at III-C-3.

[49] *See* Duke Reb. e-WP. "REVISED string chart data for NS.xls."

coal mines, and utilities." Similarly, in *McCarty Farms*, 2 S.T.B. at 467, the Board rejected an operating plan that would have changed the services being provided. As the Board explained, *id.* (footnotes omitted):

> Car loading factors and train lengths cannot be set without regard to the practices and preferences of shippers and connecting railroads. Shippers control loading, and connecting railroads determine train length for traffic received in interchange.

And in *FMC*, 4 S.T.B. at 736, the Board rejected the "contention that the [SARR] could dictate the type of service to be provided."

Duke's assumptions here violate that principle. Its operating plan for the ACC would require some shippers to accept trains much larger or smaller than they have been receiving. For example, Duke would combine 7 large loadings destined for a utility at Catawba, NC, with 3 small loadings destined for Skyland, NC. The Catawba shipments now range from 95 to 140 cars in length, and the Skyland shipments from 47 to 49 cars. Under Duke's operating plan, these loadings would be combined. Catawba would receive 8 unit trains containing from 98 to 108 cars of coal. Two trains of 107 and 110 cars would have headed for Catawba, to be interchanged with the NS for delivery to Skyland.[50] In other words, in its attempt to generate operational efficiencies, Duke postulated an operating plan that would deliver more coal to Skyland and in larger trains than the shipper actually takes, while Catawba would have received less coal, in more frequent, smaller trains than it actually takes.

NS also argues that the operations proposed by Duke for the ACC would be unworkable. Again, a review of Duke's electronic spreadsheets and workpapers illustrates this unworkability. Duke's operating plan would combine cars from different mines to create unit trains. For example, Duke's operating plan would combine into a single 115-car train shipments destined to three shippers located on the residual NS near Atlanta, GA, and Birmingham, AL. According to waybill data, those shipments would consist of 24 cars of coal from the Pinnacle Creek mine, 39 cars from the Scaggs mine, and two loadings totaling a combined 52 cars from the Steer Branch mine. Duke's evidence shows the train containing all of this coal traveling from the Scaggs mine to Belmont for interchange with NS and delivery to these three customers. However, the ACC could not realistically gather cars from the three mines into a single train at the Scaggs mine and then haul that unit train to Belmont for interchange with NS, because Duke did not provide for staging or gathering yards where the cars from the various mines could be assembled into a single train. Nor did its cycle-time figure for the ACC provide for the time that would be needed for a single train to move between several mines to add cars. This example is not an isolated instance; combining traffic from different mine origins in an unworkable way is the defining characteristic of Duke's operating plan.

Alternatively, Duke's unstated assumption may have been that the source of coal for these shippers would be shifted so that, rather than receiving coal

---

[50] This example, and the other examples discussed *infra*, are drawn from Duke's electronic spreadsheets and workpapers. *See* Duke Reb. e-WP. "REVISED string chart data for NS."

from the Pinnacle, Hull, and Steer Branch mines, for example, they would each receive all their coal from the Scaggs mine. But Duke has not shown that these customers would accept such a change in their coal supply sources. When a utility purchases coal from a particular mine, it generally does so for a specific reason. The utility may have a favorable coal supply contract, perhaps even a requirements contract. Moreover, coal is neither perfectly fungible nor perfectly homogeneous; there can be important differences that affect how the coal burns. Shippers pay a premium for coal with higher BTU content or for other specific characteristics. For example, coal with a low sulfur content is at times used as a "sweetener," blended together with other, higher sulfur coal so the power plant's emissions will comply with Clean Air Act requirements. A shipper seeking 20 carloads of low-sulfur coal would not want to receive 20 carloads of lower quality coal from another mine. Similarly, a utility that burns 100 carloads of comparatively inexpensive, high-sulfur coal would not want to receive an unexpected and undesired shipment of more expensive, low-sulfur coal. Thus, it is not reasonable to assume that the purchasers of coal would accept the change in service reflected in Duke's operating plan. Nor is it reasonable to assume that the coal mines whose level of operations would be affected would not object.

Table 1 below illustrates how Duke's operating plan would change the historical traffic flows, resulting in many mines either loading more or less coal. The columns under "Forecast from Waybill" show the traffic that Duke forecasts NS will actually load in the "peak week" from the selected traffic group.[51] The columns under "ACC Operating Plan" then show how much coal it is assumed those same mines would load in the peak week under Duke's operating plan for the ACC. The difference between those columns could be viewed as reflecting a relocation of this coal traffic to different mine origins.

[51] Duke calculates these peak demands by finding the peak week from NS's waybill for the year 2001 and then inflating those coal volumes by Duke's volume forecast for the ACC's peak year.

Table 1
Peak Week Traffic

Mine Origin	Forecast from Waybill		ACC Operating Plan					
	Peak Cars	Peak Tons	Peak Cars	Change	%	Peak Tons	Change	%
Appalachia	254	24,788	254	0	0	24,789	0	0%
Biggs	410	45,633	417	7	2%	45,689	56	0%
Clinchfield	220	21,506	490	270	123%	52,308	30,802	143%
Colmont	416	42,989	482	66	16%	51,320	8,331	19%
Corneliu	157	16,441	307	150	96%	32,241	15,800	96%
Delbarton	207	22,646	182	-25	-12%	19,733	-2913	-13%
Fola	317	31,282	305	-12	-4%	31,425	143	0%
Gund	854	83,818	948	94	11%	94,672	10854	13%
Hatcher	136	14,407	116	-20	-15%	11,648	-2759	-19%
Hatfield	146	15,365	289	143	98%	30,403	15038	98%
High Pow. Mt.	1,655	179,589	1,450	-205	-12%	154,869	-24720	-14%
Hull	286	28,579	162	-124	-43%	16,362	-12217	-43%
Jamboree	420	44,667	517	97	23%	55,449	10,781	24%
Koenig	116	13,233	164	48	41%	18,018	4,786	36%
Kopperston	212	24,514	591	379	179%	63,569	39,054	159%
Lavroy	523	57,251	491	-32	-6%	53,507	-3744	-7%
Luke	53	5,748	180	127	240%	19,215	13,467	234%
Mabley	217	23,924	202	-15	-7%	22,138	-1786	-7%
Marrow-bone	324	37,024	284	-40	-12%	31,756	-5268	-14%
Martiki	231	23,646	97	-134	-58%	9,789	-13857	-59%
Page	709	75,779	595	-114	-16%	62,915	-12865	-17%
Pardee	342	40,266	463	121	35%	54,477	14,211	35%
Pevler	296	31,391	201	-95	-32%	22,145	-9246	-29%
Pinnacle Crk	608	63,077	402	-206	-34%	42,387	-20690	-33%
Ramsey	152	14,727	0	-152	-100%	0	-14727	-100%
Scaggs	69	7,201	115	46	67%	11,982	4,781	66%
Scarlet Glen	446	45,169	286	-160	-36%	29,653	-15516	-34%
Sidney	659	71,101	622	-37	-6%	67,596	-3505	-5%
Steer Branch	768	81,634	669	-99	-13%	70,684	-10950	-13%
Stric	139	14,053	205	66	47%	20,990	6,937	49%
Thomas	595	66,058	585	-10	-2%	64,646	-1412	-2%
Timbar	1,422	156,868	1,199	-223	-16%	129,946	-26923	-17%
Toms Creek	444	49,568	502	58	13%	55,643	6,075	12%
Wentz	372	42,364	399	27	7%	45,503	3,139	7%

Source: Duke Reb. e-WP. “REVISED string chart data for NS.”

As the table shows, Duke's operating plan would alter the historical shipping patterns at the expense of many mines and to the benefit of others. Under Duke's operating plan, the Clinchfield, Corneilu, Hatfield, Kooperston, and Luke coal mines would double the amount of coal they would load in the peak week. The Hull, Martiki, Pardee, Pevler, Pinnacle Creek, and Scarlet Glen mines would lose more than 25% of their business to other mines. And the Ramsey mine, which is forecast to ship 152 cars of export coal to Lambert's Point in the peak week, would ship no coal; all of the Ramsey shipments would be shifted and consolidated with export coal shipments from other mines that also travel to Lambert's Point.

In addition to denying some shippers their selection of the coal to be shipped, the ACC would not even ship the amount of coal demanded by some of its shippers. For example, Duke forecasts that in the peak week, the ACC would need to haul 24 cars from the Tom's Creek mine to Glen Lyn (located on the ACC), and 130 cars from the Fola mine and 149 cars from Timbar mine to Kenova (for delivery by the residual NS to Ashtabula Harbor). To generate operational efficiencies, Duke's plan would combine these shipments into 3 trains of 95 cars each. These 3 trains would be loaded at the Fola mine and hauled by the ACC to Kenova for interchange with NS. However, all of the coal would go to Ashtabula Harbor; Glen Lyn would be short 24 cars of coal, representing 2,760 tons, or roughly 20% of the total coal Glen Lyn would demand in that peak week.[52]

In the end, the complainant's operating plan is fatally flawed. Duke has failed to demonstrate that the service the ACC would provide would be acceptable to all of the affected shippers and mines involved. Yet Duke carries the burden of demonstrating that its operating plan would meet the needs of the traffic group selected.[53]

NS, on the other hand, has proffered an alternative operating plan for the ACC that would provide the same service to all of the shippers and mines as they currently receive from NS. Because Duke's operating plan is not feasible, NS's operating plan is used here.

D. Operating Expenses

Having accepted NS's operating plan, the SAC analysis here necessarily uses NS's operating assumptions for the ACC to determine such matters as the number of locomotives, freight cars, and train crew personnel that would be needed. But the costs of those resources are determined based on the quality of

---

[52] Another example would combine a 119-car movement from the Timbar mine to Spencer (a destination served by the ACC) with a 94-car movement from the Thomas mine to St. Paul (an interchange point with NS). To reduce the size of the Spencer movement, the operating plan would shift 4 cars to the Thomas-to-St. Paul train. But those 4 cars would not then be delivered to Spencer, but instead would be interchanged with the residual NS at St. Paul for final delivery at Emory Gap. Spencer would get too little coal, and Emory Gap too much.

[53] *Guidelines*, 1 I.C.C.2d at 543 (the proponent of the SAC model must show that the alternative is feasible and could satisfy the shipper's needs).

the record presented in this case, as discussed in Appendix C. The total operating expenses used here for the ACC are approximately $226 million in the base year (2002).

E. Road Property Investment

Despite only a small difference between Duke's and NS's estimate of total track miles for the ACC, there is a substantial difference between the parties' estimates of the level of investment that would be required to construct the ACC. Duke claims that the ACC could be built for $2.2 billion, while NS claims that it would cost $5.1 billion. Appendix D discusses the parties' investment figures by category. As shown there, the Board's analysis assumes that it would cost approximately $3.6 billion to construct the ACC.

F. DCF Analysis

A discounted cash flow analysis is used to distribute the total capital costs of the ACC over the 20-year analysis period and determine the total revenues that would be needed by the ACC to cover its operating expenses, meet its tax obligations, recover its investment, and obtain an adequate return on that investment. The stream of revenues that would be generated by the ACC is compared to the stream of costs that the ACC would incur, discounted to the starting year (2002). In this case, the most significant disagreements between the parties regarding the DCF model relate to the indices used to adjust the ACC's operating expenses and road property assets (to account for projected changes in costs over the 20-year analysis period) and the cost of raising the capital to finance the ACC.

1. Indexing

a. Operating Expenses

The parties based their estimates of inflation in operating expenses on the rail cost adjustment factor (RCAF), which is an index of railroad costs developed on a quarterly basis. The Board publishes two versions of the RCAF: one that does not take into account changes in the rail industry's productivity (referred to as the unadjusted RCAF, or the RCAF-U) and one that does (referred to as the adjusted RCAF or RCAF-A). *See* 49 U.S.C. 10708 (requiring quarterly publication by the Board of both the RCAF-U and RCAF-A).

Duke argues that the RCAF-A is the more appropriate index to use here, because the ACC would benefit from practices and productivity enhancements occurring in the industry and reflected in the RCAF-A. NS argues that the ACC would not achieve the same productivity improvements anticipated for the nation's railroad industry as a whole, and that applying the RCAF-A would therefore be inappropriate. NS reasons that, because the ACC would be a new railroad, it would incorporate the latest technology and the efficiencies associated with those technologies, leaving less room for productivity improvements than there is for incumbent railroads, which make such changes incrementally as their older technology assets wear out. NS further argues that the ACC would not realize productivity gains from increasing traffic volume, as the ACC's tonnage is not projected to increase appreciably over the 20-year analysis period.

NS's points are well taken. In the absence of any evidence on specific likely productivity improvements for the ACC, the RCAF-U is used here to index the operating expenses. *See TMPA*, 6 S.T.B. at 750.

b. Road Property Assets

Duke assumed that land value would increase by 4.4% annually, based on a weighted combination of indices reflecting rural and urban land prices. NS used a composite 3% inflation factor, which it claims to have developed by applying separate inflation indices for rural and urban land values. While Duke documented the composite inflation factor for land, NS has not shown how its composite figure was computed. Therefore, the Board uses Duke's inflation factor for land.

To inflate the remaining (non-land) road property assets over the 20-year SAC analysis period, Duke relied on a forecast for rail labor, materials, and supplies. NS would use historical rates of inflation. Duke notes that a forecast was used by the Board in *FMC*, while NS points out that the Board used historical inflation rates in *WPL* and *PPL*.

Forecasts of future inflation, when available, are preferable to historical inflation rates. Forecasts take into account the outlook for the future, using available data and observations to predict the most likely future outcome. In contrast, historical indices, which are simply a compilation of data from the recent past, are not forward-looking. Accordingly, because Duke's evidence is based on forecasts of future inflation, that evidence is used here.

2. Cost of Capital

Both parties relied on a composite of the Board's annual determinations of the rail industry's cost of capital for the years 1999 through 2002 to develop the ACC's cost-of-capital rate. However, the parties' composite figures differ slightly (10.53% used by Duke vs. 10.57% used by NS) as a result of how the debt and equity components were weighted. Because Duke weighted the cost of debt and equity appropriately, its composite figure is used here.

Finally, Duke objects to NS's proposed additive of financing costs (3% placement costs plus fees) to cover the cost of raising new equity capital. Duke argues that the annual cost of capital computation already includes flotation fees. Duke further asserts that NS did not incur these fees, and thus the fees should not be included here. Duke's points are well taken. In *WPL* (5 S.T.B. at 1040) and *TMPA* (6 S.T.B. at 751), the Board rejected the same argument made by NS here, and that argument is similarly rejected here.

3. Results

The results of the Board's DCF calculations are shown in Table 2, below. As that table shows, based on the record presented here, over the 20-year SAC analysis period the ACC would experience a cumulative revenue shortfall of approximately $550 million. Thus, Duke has not demonstrated that the challenged rates are unreasonably high.[54]

Table 2
Cash Flow
(Millions of Dollars)

Year	Capital Costs & Taxes	Annual Operating Costs	Total Annual Costs	Annual Revenues	Annual Over/ (Under) Payment (Current)	Annual Over/ (Under) Payment (Present Value)	Cumulative Over/ (Under) Payment (Present Value)
2002	$333.6	$226.1	$559.6	$487.1	($72.5)	($69.0)	($69.0)
2003	343.8	234.4	578.2	554.1	(24.1)	(20.8)	(89.7)
2004	354.7	232.0	586.7	548.6	(38.1)	(29.7)	(119.4)
2005	366.0	238.2	604.2	575.2	(29.0)	(20.4)	(139.8)
2006	377.9	247.9	625.8	596.0	(29.9)	(19.0)	(158.8)
2007	389.7	258.6	648.3	621.7	(26.6)	(15.3)	(174.2)
2008	401.5	266.3	667.9	636.3	(31.6)	(16.5)	(190.6)
2009	413.7	271.2	684.9	642.1	(42.8)	(20.2)	(210.8)
2010	426.7	276.4	703.1	645.4	(57.7)	(24.6)	(235.4)
2011	440.5	282.0	722.5	652.0	(70.4)	(27.2)	(262.6)
2012	454.7	286.3	741.0	654.1	(86.8)	(30.3)	(293.0)
2013	469.4	296.1	765.6	672.5	(93.0)	(29.4)	(322.4)
2014	484.7	305.3	789.9	687.1	(102.8)	(29.4)	(351.8)
2015	500.4	316.6	817.0	708.2	(108.8)	(28.1)	(379.9)
2016	516.7	323.2	839.9	715.2	(124.7)	(29.2)	(409.1)
2017	533.5	332.9	866.4	731.3	(135.1)	(28.6)	(437.7)
2018	551.0	341.8	892.7	742.1	(150.6)	(28.9)	(466.6)
2019	569.0	353.0	922.0	760.0	(162.0)	(28.1)	(494.7)
2020	587.6	363.9	951.5	772.9	(178.6)	(28.0)	(522.6)
2021	606.9	373.5	980.4	782.9	(197.5)	(28.0)	(550.7)

[54] Because the challenged NS rates have not been shown to be unreasonably high, Duke's request that NS reimburse it for the filing fee for its complaint is moot.

PHASING CONSIDERATION

At times, a rate that may not have been proved unreasonable under a SAC test may be an increase that causes significant economic dislocation or have other inequitable consequences that may need to be mitigated for the greater public good. Therefore, the *Guidelines* include a "phasing" constraint on railroad pricing. *See Guidelines*, 1 I.C.C.2d at 546-47 (establishing the phasing constraint as "an independent constraint relating not to the reasonableness of the ultimate rate, but to the reasonableness of collecting it immediately"). This constraint limits the introduction of otherwise-permissible rate increases if they would lead to severe dislocation of economic resources.

In this case, Duke complains not merely of the rate level, but also of the magnitude of the rate increase. In 2000, the parties entered into a contract that covered the complaint movement. Thereafter, NS notified Duke that it would terminate that short-term contract at the end of 2001. When the parties could not reach an agreement, NS established new common carrier rates for 2002 that were more than 50% higher than the 2001 rates. Duke states that the annual cost to Duke of the increase in these rates is more than $50 million.

NS cannot dispute the magnitude of the rate increase, but it insists that Duke can afford the rate increases. It notes that Duke is a large company with annual profits greater than NS's and that Duke can pass its transportation costs on to its customers. Furthermore, NS contends that the amount of the annual increase in transportation charges is relatively small in comparison with Duke's 2001 operating revenues, net income, and total retail electricity sales.

However, as NS also acknowledges, these rate increases alone amount to approximately 10% of Duke's total ($500 million) annual cost to generate electricity at the issue plants.[55] Given the magnitude of these rate increases and Duke's objection to them, this may be an appropriate situation for the application of the phasing constraint.

The phasing constraint has not yet been applied in a case, and the *Guidelines* provide only cursory guidance on the subject. Therefore, if Duke elects to pursue relief under the phasing constraint, the parties should be prepared to address whether phasing is appropriate under the circumstances presented here, what level of rate increases would violate that constraint, and an appropriate means for applying the phasing constraint.

In proposing ways to apply the phasing constraint, the parties should be mindful that any approach should tie the phasing constraint to the revenue needs of the defendant railroad. Moreover, it should provide some restraint to a railroad's pricing even if the railroad falls far short of the Board's measure of revenue adequacy or has only a small base of potentially captive shippers to cover its revenue shortfall.

Duke should advise the Board, within 30 days of the service date of this decision, whether it wishes to seek relief under the phasing constraint. If Duke elects to pursue this option, it should suggest a procedural schedule that would

[55] NS Open. Narr. IV-C-22.

permit expedited discovery of the phasing-related materials previously sought by NS[56] and the filing of evidence and argument by the parties and would permit quick and fair Board review.

If Duke chooses not to seek relief under the phasing constraint, the Board will discontinue this proceeding.

This decision will not significantly affect the quality of the human environment or the conservation of energy resources

It is ordered:

1. Duke should advise the Board within 30 days of the service of this decision whether it wishes to seek relief under the phasing constraint.

2. This decision is effective December 6, 2003.

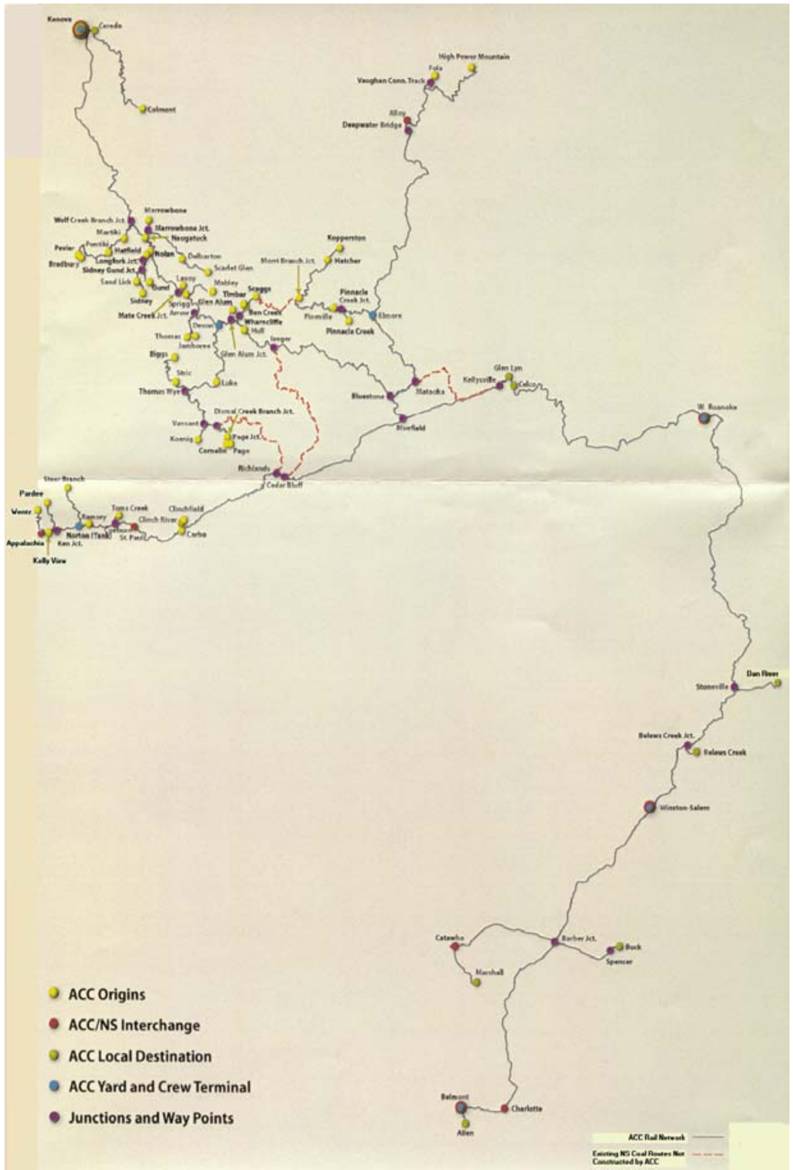
By the Board, Chairman Nober.

APPENDIX A – ACC CONFIGURATION

As shown in the following map, the ACC would replicate approximately 1,100 miles of existing NS lines extending south from Kenova, WV, through portions of the states of Kentucky and Virginia, to Belmont, NC. The ACC would be primarily a single-track system, with passing sidings, yards, and set-out tracks located at strategic points along the route. It would interchange traffic with NS at seven locations. The ACC was designed to move a peak-year total of approximately 88 million tons of traffic.

The ACC would originate the bulk of the coal it handles, although it would receive some coal from NS via interchange at Appalachia, VA (the western terminus of the ACC system). The ACC would serve Central Appalachian coal mines and five Duke power plants in North Carolina (the Allen, Belews Creek, Buck, Dan River, and Marshall plants). The ACC would also provide local service to two other power plants (Appalachian Power's Glen Lyn generating station in Glen Lyn, VA, and Clinch River plant at Carbo, VA), one major manufacturer (Celanese's Celco plant at Narrows, VA), and two barge transload facilities on the Ohio River. However, most of the traffic moving over the ACC would be interchanged with NS. This cross-over traffic would include a certain amount of grain in trainload bridge service between Kenova and West Roanoke.

[56] *See* Decision served July 26, 2002, at 11 (denying NS's motion to compel documents on the impact of the rate increase because Duke had not raised a phasing constraint issue).


Kenova
Ceredo
Colmont
High Power Mountain
Fola
Vaughan Conn. Track
Alloy
Deepwater Bridge
Marrowbone
Wolf Creek Branch Jct.
Marrowbone Jct.
Martiki
Naugatuck
Pevler
Hatfield
Nolan
Bradbury
Longfork Jct.
Sidney Gund Jct.
Dalbarton
Scarlet Glen
Sand Lick
Gund
Sidney
Sprigg
Mate Creek Jct.
Glen Alum
Mabley
Timber
Scaggs
Ben Creek
Wharncliffe
Hull
Devon
Thomas
Jamboree
Glen Alum Jct.
Iaeger
Biggs
Stirrat
Thomas Wye
Luke
Dismal Creek Branch Jct.
Vansant
Koenig
Page Jct.
Cornelia
Page
Richlands
Cedar Bluff
Steer Branch
Pardee
Wenz
Ramsey
Toms Creek
Clinchfield
Clinch River
Norton (Tank)
St. Paul
Carbo
Appalachia
Ken Jct.
Kelly View
Kopperston
Mont Branch Jct.
Hatcher
Pinnacle Creek Jct.
Pineville
Elmore
Pinnacle Creek
Glen Lyn
Kellysville
Celco
Bluestone
Matoaka
Bluefield
W. Roanoke
Dan River
Stoneville
Belews Creek Jct.
Belews Creek
Winston-Salem
Catawba
Barber Jct.
Buck
Spencer
Marshall
Belmont
Charlotte
Allen
ACC Origins
ACC/NS Interchange
ACC Local Destination
ACC Yard and Crew Terminal
Junctions and Way Points
ACC Rail Network
Existing NS Coal Routes Not Constructed by ACC

A. ACC Route

Beginning at Kenova, WV, the ACC would interchange northbound coal traffic from its main line to NS for movement to utilities and other points north of the Ohio River, and receive southbound grain traffic from NS. Proceeding in a southeasterly direction, the ACC would replicate the existing NS main line to Bluefield, WV, via Naugatuck, Devon, and Iaeger, WV.

A secondary line would extend north of Bluefield from a connection at Bluestone, WV, to Elmore, WV, where there would be two connecting branch lines. One branch line would serve the NS interchange at Alloy, WV, and the Fola and High Power Mountain mines.[57] The other branch line would serve the Pinnacle Creek, Pineville, Hatcher, and Kopperston mines. Another secondary line would extend westward from Bluefield to Norton, VA, connecting with NS at St. Paul and Appalachia, VA, and linking the Steer, Kelly View, Pardee, and Wentz branch lines in Virginia.

South and east of Bluefield, the ACC main line would replicate the NS line from Bluefield to Narrows, VA, Salem, VA, and then West Roanoke, VA.[58] From West Roanoke, the ACC main line would proceed southward to Winston-Salem, NC, replicating the NS main line via Martinsville, VA, Stoneville, NC, and Belews Creek Junction, NC. The main line would continue southward from Winston-Salem to Charlotte, and from Charlotte it would extend westward 13.0 miles to Belmont, NC.[59]

The ACC would have the following branch lines: (1) the Ceredo branch, extending from Kenova to Colmont mine via Ceredo, where the ACC would also serve a rail/barge transfer terminal on the Ohio River; (2) the Wolf Creek branch, extending from Wolf Creek Junction, WV, to the Martiki, Pontiki, Bradbury, and Pevler mines; (3) the Naugatuck branch, extending from Naugatuck, WV, to the Marrowbone, Delbarton, and Scarlet Glen mines; (4) the Nolan branch, extending from Nolan, WV, to the Hatfield, Sandlick, Sidney, and Gund mines; (5) the Mate Creek branch, extending from Mate Creek Junction, WV, to the Mabley mine; (6) the Arrow branch, extending from Arrow, WV, to the Thomas and Jamboree mines; (7) the Devon branch, extending from Devon, WV, to the Luke, Stric, Biggs, Koenig, Corneliu, and Page mines; (8) the Wharncliffe branch, extending from Wharncliffe, WV, to the Timbar and Scaggs mines; (9) the Elmore West branch, extending from Elmore, WV, to the Pinnacle Creek, Pineville, Hatcher, and Kopperston mines; (10) the Elmore North branch, extending from Elmore to the Fola mine and High Power Mountain mine (this

---

[57] The Fola mine is located on the tracks of the Vaughan Railroad, over which both CSXT and NS operate.

[58] NS presently uses the route between Narrows and West Roanoke for east/southbound loaded coal trains, and uses a parallel line for west/northbound empty trains. The ACC would replicate only one of these lines—the line between Narrows and Salem which has the gentler eastbound grade.

[59] NS currently uses a different route (one that proceeds east of West Roanoke/Roanoke to Altavista, VA, before turning south) to serve Duke's Dan River, Buck, and Marshall power plants. Duke states that the ACC would move this traffic directly south (toward Winston-Salem) from West Roanoke, and not through Altavista, to reduce the ACC's route miles and increase its traffic.

branch would also serve as an interchange point with NS at Alloy, WV); (11) the Norton branch serving the Clinchfield and Tom's Creek mines, and an interchange with NS at St. Paul, VA; and (12) the Steer, Kelly View, Pardee, and Wentz branches serving mines with the same names and an interchange with NS at Appalachia, VA.

Table A-1 shows the ACC's line segments and route mileages.[60]

Table A-1
ACC Route Mileage

Main Line and Secondary Line Route Miles	
Kenova to Devon	97.34
Devon to Bluefield	71.99
Bluestone to Elmore Branch	33.64
Bluefield to Norton Branch	100.81
Bluefield to West Roanoke	102.84
West Roanoke to Winston-Salem	120.95
Winston-Salem to Belmont	96.21
Total	623.78
Branch Line Route Miles	
Ceredo Branch	40.03
Wolf Creek Branch	23.17
Naugatuck Branch	24.74
Nolan Branch	19.2
Mate Creek Branch	6.37
Arrow Branch	13.44
Devon Branch	71.08
Wharncliffe Branch	11.4
Elmore West Branch	55.71
Elmore North Branch	94.64
Norton Branches	40.58
Dan River Branch	13
Belews Creek Branch	4.02
Buck Branch	14.83
Catawba Branch	37.16
Allen Spur	3
Misc. mine spurs	11.9
Total	484.27
Total Route Miles	1,108.05

[60] NS Reply Narr. at III-B-6-7; Duke Reb. Narr. at III-B-5 (adopting NS's route mileages).

B. Track Miles

The parties disagree on the total track miles that the ACC would need. The parties' track-mile estimates are summarized in Table A-2, and the differences in their estimates are discussed below.

Table A-2
ACC Track Miles

Category	Duke	NS	STB
Single track	1108.05	1108.05	1108.05
Passing sidings	148.35	165.05	153.60
Yard track	67.33	102.92	102.92
Set-out track	7.59	14.26	14.26
Total Track Miles	1331.32	1390.28	1378.83

1. Main Line and Secondary Line Track Miles

The system configuration presented by Duke in its opening evidence is based on the opinion of its experts. Duke tested this configuration with a proprietary string computer model[61] to determine whether the ACC system would have sufficient track capacity to handle peak-week traffic during the peak-year without undue delay. NS also tested Duke's configuration, using another computer model called the Rail Dispatch and Capacity Analysis Model (RDCAM).[62] Based on its tests, NS argues that Duke's configuration would be inadequate to move the peak-period traffic, that it does not account for many required rail activities, and that it fails to account for the physical limitations of many of the ACC's proposed facilities. Thus, the ACC would become gridlocked, according to NS. NS also points to other defects in the string model that it claims produce bizarre operational results. NS would add additional capacity to Duke's ACC system based on the result of an iterative process in which it used the RDCAM model to test a series of incremental additions to the system to determine whether the addition would result in sufficient capacity to move the selected peak-week traffic.

On rebuttal, Duke made changes to both its string model and its configuration for the ACC based on NS's comments. Duke asserts that, given

[61] The term "string" refers to diagrams produced by a computer model which show the locations where trains moving in opposite directions pass each other. String models are used in the rail industry to plan and schedule traffic flows.

[62] RDCAM, a product of Rail Services, Inc., is a railroad dispatching simulator. This computer model was not submitted into evidence.

similar inputs, both computerized capacity models should now produce similar results. Duke has supplied its computer model. However, the program contains undocumented algorithms/subroutines, along with poorly documented databases, so that it cannot be determined whether Duke's revisions made in response to NS's criticisms of the model resolved any of the questions raised by NS. The lack of documentation prevents the Board from testing the reliability of the model's results. Thus, Duke has not met its burden of showing that its main line and secondary line configurations are feasible, by demonstrating that its ACC system would have sufficient track capacity to move the peak-period traffic.

In any event, because, as discussed in the body of the decision, Duke's operating plan for the ACC is rejected, its ACC configuration must also be rejected.[63] Accordingly, NS's main line and secondary line track mile estimates are used here.

2. Branch Line Track Miles

Duke and NS agree on the branch line route mileages for the ACC, but they disagree on the track configurations that would be needed.[64] Duke initially assumed that all of the branch lines would consist of single track with passing sidings. NS suggests several changes to the proposed track facilities at mine sites, which NS claims would be needed for the ACC to access loading points or provide sufficient space for efficient train operations. Duke agrees to these changes for the Pontiki, Marrowbone, Scaggs, Hull, Hatcher, Ramsey, and Kelly View mines. But as to the other mines Duke maintains that its proposed configuration is adequate because, unlike NS, the ACC would use locomotives at both ends of the trains.[65] Duke claims that this distributed power (DP) service would negate the need for "run-around" tracks,[66] as it would permit the ACC, upon arrival at the mine, to move the crew to the other end, switching command to the new head (former tail) locomotive.[67] Duke's approach is reasonable, and the analysis here is based upon use of DP service.

---

[63] As discussed in the body of the decision, Duke's operating plan does not provide for origination of shipments other than in 90- to 115-car trains, and more importantly, does not provide for LTL shipments and classification of those shipments at yards into trains. Duke's proposed train size artificially reduces the number of trains that the ACC would need to operate, resulting in an understatement of the infrastructure needed to provide service to the shipper group.

[64] The parties did not use their computer models to determine the configuration of the branch lines.

[65] In DP service, locomotives are located at different places in the train consist. The lead locomotive is manned by the crew, with the other locomotives connected electronically to the lead locomotive.

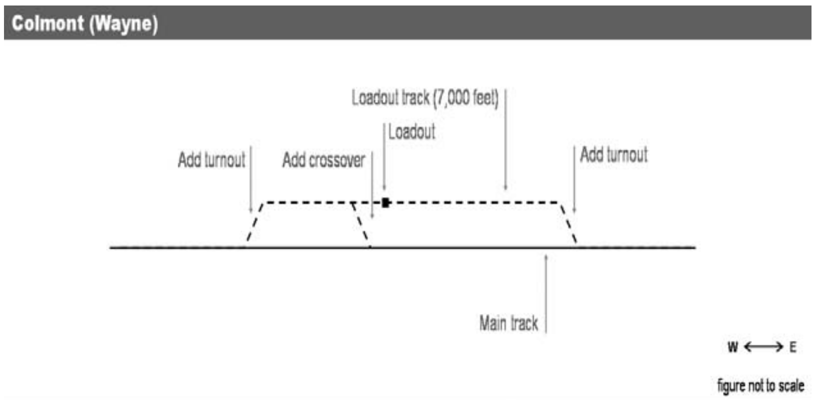
[66] Run-around tracks are used by railroads to reposition locomotives from one end of the train to the other. For example, at the Pevler mine on the Wolf Creek branch, NS would install a run-around track prior to the loadout, to enable the locomotives to run around the train, push the empty cars under the loadout, and then pull the loaded train back to the yard with the locomotives at the front of the train.

[67] While this technology is not new in the industry, NS has very few DP units. Use of a different technology is permissible under the SAC constraint. *See Guidelines*, 1 I.C.C.2d at 542-44.

The track facilities at each mine where the parties do not agree are discussed below. For many of the locations, a diagram, showing the configuration initially proposed by Duke, as well as NS's proposed modifications, is included.

a. Ceredo Branch

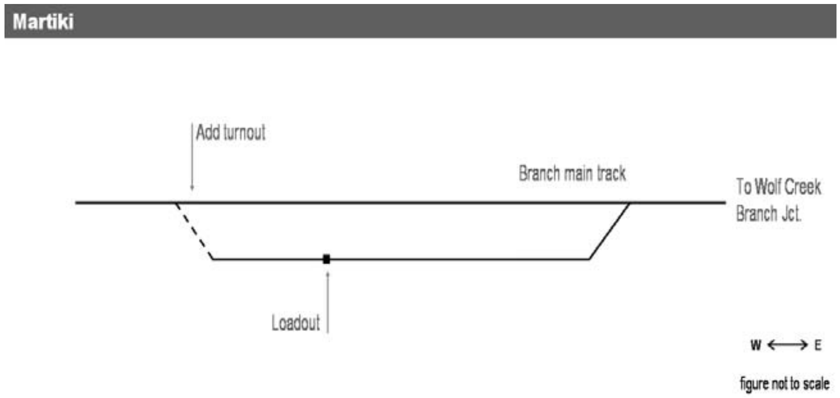
- Colmont Mine



NS asserts that while Duke included track running past the mine, facilities would need to be added to serve the coal tipple. NS would add a 7,000-foot loadout track, attached to the line by two turnouts and a crossover. Duke argues that no such addition would be necessary, as the ACC would locate the main track directly under the mine loadout. Because the mine is at the end of the track on this branch, and the Colmont spur would be solely dedicated to the mine, the use of DP would negate the need for ACC's locomotives to be able to run around the coal cars. Therefore, Duke's routing of the track under the loadout would be feasible, and Duke's configuration is accepted.

b. Wolf Creek Branch

- Martiki Mine

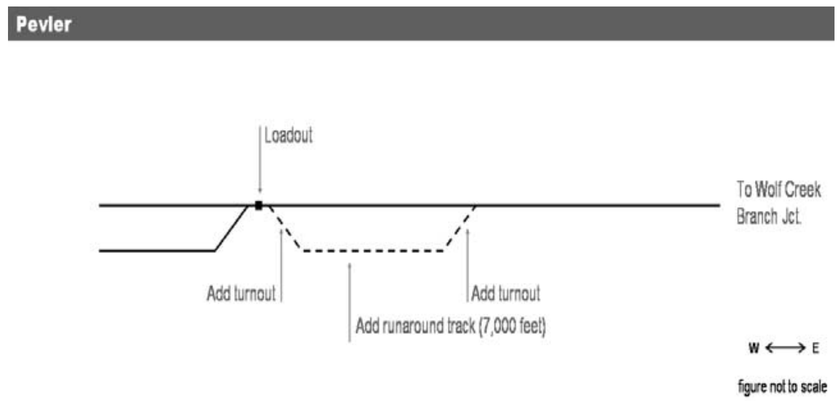


NS would add a turnout to Duke's single track, claiming that without it the ACC would have to split the train and take it through a long backup move. Duke notes that the loadout track would be 1.1 miles long, which would be sufficient to handle a 105-car DP train. Thus, Duke argues, the loadout track would not require locomotives to run around the train and therefore would not require a turnout. Given the proposed use of DP locomotives, Duke's proposal not to include a turnout is reasonable.

- Bradbury Mine

Duke initially included a turnout on the single-track branch line, but on rebuttal would remove it, claiming that the loadout facility was sited over a siding off the branch line and that DP units could handle the operation without a turnout. However, NS did not contest the proposed turnout and Duke cannot change its network configuration on a matter that has not been challenged by NS. Therefore, Duke's opening configuration is used.

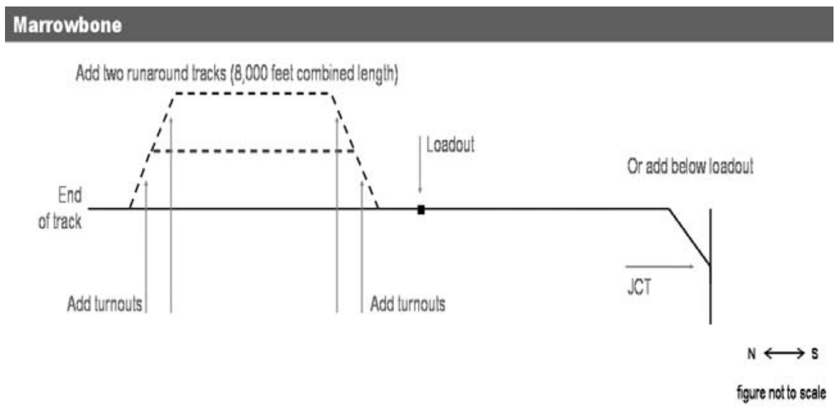
- Pevler Mine



To Duke's proposed single track, NS would add a 7,000-foot run-around track with two turnouts, to allow locomotives to run around trains and avoid lengthy backup movements. Duke argues that this end-of-track mine would not require a run-around track, as the trains would be operating with DP units. Given that the ACC would use DP locomotives, Duke's configuration is accepted.

c. Naugatuck Branch

- Marrowbone Mine



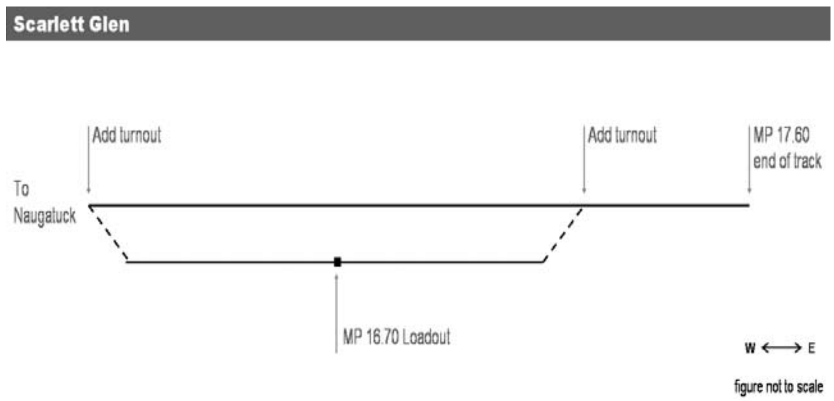
To Duke's proposed configuration, NS would add two run-around tracks (together totaling 8,000 feet) to handle the train lengths that Duke proposes and to allow locomotives to run around trains. Duke responds that the main line would allow sufficient space for feasible DP operations without the added facilities. Duke's configuration is accepted. No run-around tracks would be needed because the mine is at the end of a spur, allowing the ACC to route the track directly under the loadout without obstructing other traffic.

- Delbarton Mine

Duke proposed a single track and turnout at this mine. NS, without comment, would add a second turnout and would also include two 1.8-mile sidings from MP 0.0 to MP 1.8 on the Lenore to Scarlet Glen portion of the Naugatuck branch. Duke maintains that NS's additions are unnecessary.[68] The configuration proposed by Duke in its opening evidence appears to be feasible and NS has not shown otherwise. Therefore, Duke's configuration is used here.

[68] On rebuttal, Duke would also remove the turnout, which it claims was mistakenly included on opening. However, Duke may not change its network configuration on rebuttal on a matter that NS has not contested.

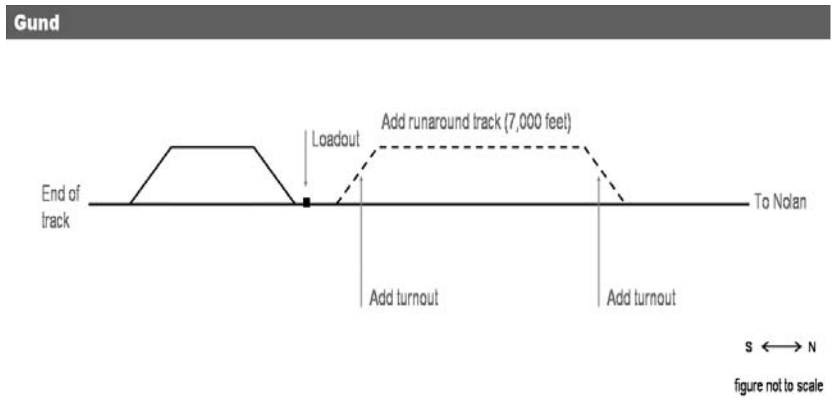
- Scarlet Glen Mine



To Duke's proposed configuration, NS would add two turnouts, to make access to the loadout possible. Duke claims that it designed the ACC's main track so as to have the loadout tipple on the track, with sufficient clearance for entire trains, rather than the way in which the track is portrayed in NS's diagram (replicated above). Duke's proposed configuration is accepted. Because the mine is at the end of the track, turnouts would not be needed.

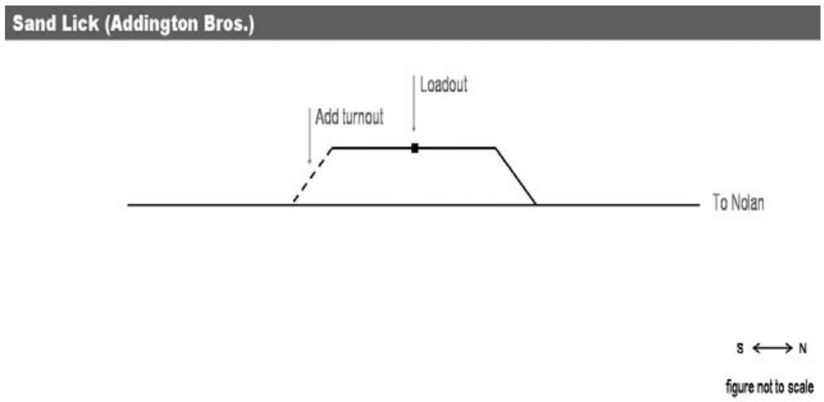
d. Nolan Branch

• Gund Mine



NS notes that Duke's design for single-track facilities at this mine would only allow loading of 50-53 cars at a time. NS would add a 7,000-foot run-around track with two turnouts, to allow full trainload operations. Duke agrees that, if the tail track could not be extended, the train loading operations at this mine would have to be done in two parts. However, with DP locomotives, Duke argues that only one 3,500-foot run-around track with turnouts would be necessary. However, Duke has not shown that the tail tracks could be extended, nor has it provided a sufficient explanation of how operations could be conducted with only a 3,500-foot run-around track. Because Duke has not met its burden of proof here, NS's proposed addition of the 7,000-foot track with two turnouts is accepted.

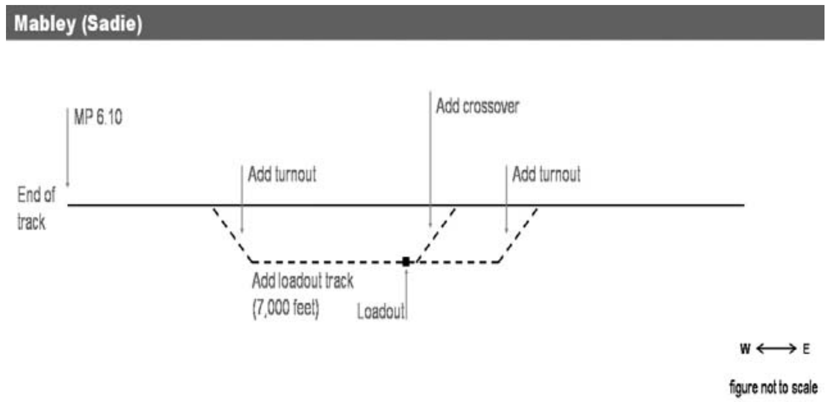
• Sandlick Mine



To its single-track design, Duke initially included a turnout to reach the loadout. NS, pointing to the limited car capacity of the loadout track in Duke's design (only 3-5 cars), argues that, without a second turnout, the ACC would need to handle trains in many cuts, thereby causing significant interference with operations on the main line. Duke responded that DP trains could load directly from the main track if it were located under the loadout, and that, because only one train per day would be loaded at this mine, the ACC could manage the traffic without the proposed turnout. However, Duke may not change its opening configuration on rebuttal as to a matter (the location of the loadout on a siding) that NS has not challenged. Given the limited capacity of Duke's proposed loadout track, the inclusion of a second turnout would be realistic.

e. Mate Creek Branch

• Mabley Mine



To Duke's configuration, NS would add a 7,000-foot loadout track, two additional turnouts, and one additional crossover to accommodate 100-car trains—all of which, NS contends, the ACC would need to reach the mine's loading point. Duke maintains that, because the mine is located at the end of the track, the track could be routed under the loadout. Duke acknowledges that one of two roads that cross the tracks would have to be relocated. Because Duke has not included the cost of relocating the road, it has not supported all elements of its track configuration. Accordingly, NS's suggested changes are accepted.

f. Arrow Branch

• Thomas Mine

To Duke's single-track configuration, NS would add a 7,000-foot run-around track with two turnouts, arguing that the 1.2% to 1.9% grade would make direct loading challenging. According to NS, without these added facilities, the ACC would be forced to make long back-up movements after loading. Citing other mines with a similarly steep grade at which NS loads directly, and because this mine is at the end of the branch, Duke argues that DP units would be capable of loading directly. Given that such operations are used at other mines, the additional track facilities proposed by NS would not be needed.

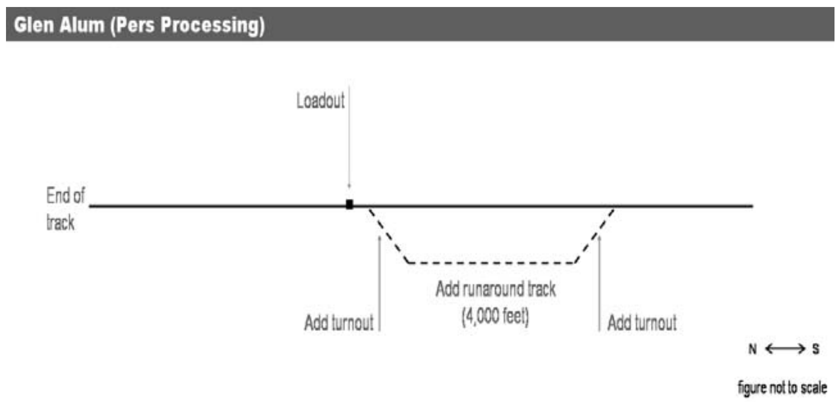
g. Devon Branch

• Thomas Wye

Duke states that helper locomotives would be needed to serve this wye, but Duke failed to include a pocket track for holding those locomotives. NS would add such a pocket track to hold helper locomotives prior to the Thomas Wye. Because track to hold helper locomotives would be needed, NS's addition of the pocket track is accepted.

h. Glen Alum Spur

• Glen Alum Mine



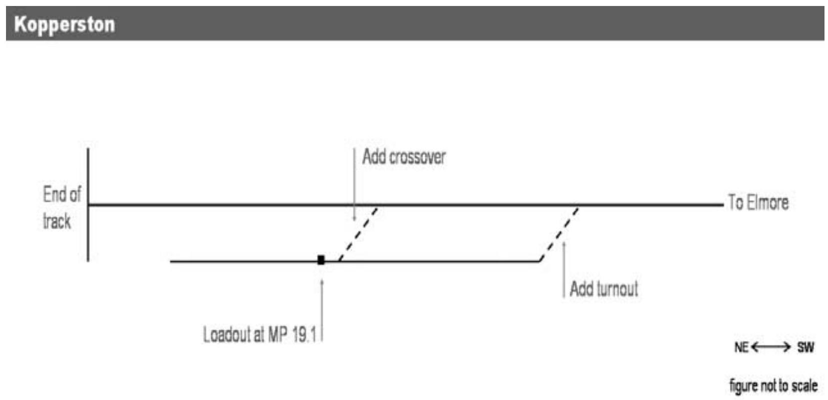
To Duke's configuration, NS would add a 4,000-foot run-around track with two turnouts, claiming that the added facilities would be needed because of the steep grade of the loadout track (ranging from 2.40% to 2.77%) and the small capacity of the loadout track (only 30 cars). Duke maintains that the ACC could manage this loadout if the main line were extended 3,000 feet. However, there is no evidence as to whether such an extension would be possible. Thus, Duke has not supported all elements of its track configuration for this spur, nor has it refuted NS's argument concerning the problem posed by the grade at the loadout. Therefore, the facilities added by NS are accepted.

i. Elmore West Branch

• Pineville Mine

Duke proposed a single-track line and one turnout. NS would also add an additional turnout, to allow locomotives to run around trains. Duke contends that the use of DP would negate the need for an additional turnout. Duke's track configuration at this mine is accepted, because its proposal to use DP locomotives makes run-around track unnecessary.

- Kopperston Mine

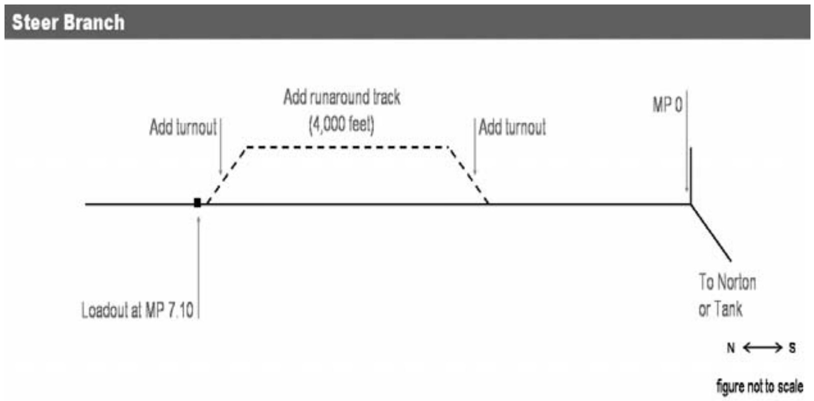


NS states that Duke's proposed single track configuration is inadequate because the 2.3% grade at this mine would make loading long trains difficult. To alleviate this problem, NS would add 3,000 feet of track 5 miles down the line to hold the first cut of loaded cars. In addition, NS would add a crossover and turnout to reach the loadout. Duke responds that, if the loadout track were extended to twice its length, the trains could be loaded in one cut, making the switches and additional track unnecessary.

However, Duke, which concedes that its initial proposal is inadequate, has not shown that NS's proposed modification is unrealistically excessive. Indeed, Duke has not shown that the loadout track could be extended so as to obviate the need for the switches and additional track. Therefore, Duke's modified proposal offered on rebuttal is rejected and NS's proposed trackage changes are accepted.

j. Steer Branch

• Steer Branch Mine



To Duke's proposed configuration, NS would add a 4,000-foot run-around track to allow handling of 100-car trains. Duke argues that NS has not shown that the tail track beyond the loadout is insufficient to load 100 cars in a single cut. But it is Duke that has the burden of demonstrating the feasibility of its proposed operation. Duke must show that the track could accommodate 100 cars; it cannot merely assume so when that assumption is brought into question by NS. Because Duke has not met its burden of proof, NS's track configuration at this mine is used.

3. Yard Tracks

Although the parties generally agree on the location of the ACC yards, they do not agree on the yard track requirements. NS argues that Duke's proposed yard facilities would be inadequate to accommodate all of the activities that would be required to serve the ACC's traffic group. Specifically, NS argues that Duke has failed to provide adequate yard facilities to stage LTL blocks and to classify multiple cuts of cars into trainload quantities for line-haul movement. In addition, NS argues that the ACC's yard facilities would need to be able to accommodate the inspection and repair of empty cars, accommodate the building of empty trains for return to the mines, hold bad-order cars pending movement to a repair facility, fuel and repair locomotives, and hold loaded and empty trains awaiting interchange with NS.

Duke maintains that additional yard trackage would be unnecessary because NS has overstated the space and time required to perform various functions at these yards. Duke states that the principal functions to be performed at the yards would be crew changes, interchanges with the residual NS, and, at West Roanoke and Kenova, 1,000-mile inspections, the related removal/insertion of cars from/into trains, and locomotive refueling. Duke states that no assembling or disassembling of trains would occur, because the ACC would operate only unit trains.

However, as discussed in the body of the decision, a significant part of the ACC traffic group is LTL movements, which would require staging, switching, and sorting. Duke has not shown that customers purchasing LTL shipments from individual mines would either desire or be able to ship in trainload quantities from those mines. Indeed, on rebuttal Duke concedes that it did not provide sufficient yard investment to handle the LTL traffic. Duke has not shown that NS's yard configuration would be inappropriate for handling LTL shipments. Therefore, NS's yard track configurations are generally used.[69]

4. Set-out Tracks

Duke would place two set-out tracks at each failed equipment detector.[70] One would be a single-ended 300-foot track, while the other would be a longer track with switches at both ends. Duke contends that its configuration would have sufficient length to accommodate both bad-order cars and the occasional piece of MOW equipment. NS accepts Duke's placement but argues that the longer track should have another switch and an extension track 1,500 feet long to provide more space for MOW equipment. Because NS's MOW plan is used, NS's proposed additional track and switches are accepted.

APPENDIX B – TRAFFIC VOLUMES AND REVENUES

This appendix examines the volumes of traffic that the ACC would transport, and the revenues that it would receive from that traffic, over the 20-year SAC analysis period (2002-2021). Because the parties agree on the volume and revenue projections for the grain traffic that the ACC would handle, the discussion here addresses only the coal traffic.

A. ACC Tonnage

1. 2002 Through 2004

For the first half of 2002, the record contains actual data on the traffic that moved, showing a significant drop in NS's Central Appalachian coal traffic from the first half of 2001. Because actual data are clearly superior to any forecast or projection, they are used here.

[69] NS would include a pocket track to hold helper locomotives at Appalachia. This track is rejected, as the AC4400CW that would be used by the ACC could likely pull the 2.2% grade for one mile. NS's inclusion of a siding at Catawba is also rejected, because no interchange would occur at Catawba.

[70] Detectors would be placed at 25-mile intervals.

Duke assumed that the tonnage reduction in the first half of the year was temporary and that this traffic would rebound in the second half of the year and continue to increase in 2003 and 2004. Duke claims to have developed its projections using 2001 as a baseline and applying to those traffic levels the rates of expected traffic growth contained in internal business forecasts obtained from NS through discovery.[71] NS argues that forecasting increases based on 2001 traffic levels is not realistic and leads to higher tonnage projections than contained in NS's business forecast.

Accordingly, NS offered two different traffic projections. Its "base case" uses the movement-specific tonnage contained in its business forecast, augmented to account for spot coal movements, which had not been included in that business forecast.[72] NS also submitted an "alternative case" reflecting what it argues is a more up-to-date assessment of expected traffic for 2003 and 2004. The alternative estimate lowered NS's 2003 and 2004 projections from its base case by approximately 4 million tons per year.

The core assumption underlying Duke's figures is that 2001 was a "normal" year, to which it would be appropriate to apply NS's growth forecasts. However, Duke has not supported that assumption. NS's business forecasts, and its actual experience in the first half of 2002, indicate that 2001 was an abnormally good year. It is inappropriate to forecast future volumes by using an unusually good year as a baseline. Such a technique would overestimate, perhaps significantly, the projections.

NS's "alternative case" is also unsupported, as NS did not provide documentation for its assertion that some shippers included in its business forecast will discontinue their use of Central Appalachian coal. But even if it had, the Board would have no way to determine if NS had selectively ignored information from other shippers indicating an offsetting increase in coal consumption. For that reason, forecasts that were prepared in the ordinary course of business before litigation arose are preferable to projections developed to further the litigating position of the parties. *See TMPA*, 6 S.T.B. at 603.

NS's "base case" estimates provide the best evidence of record, as they are derived from NS business forecasts, prepared in the ordinary course of business. Thus, those estimates are used here.

2. 2005-2021 Coal Traffic

Duke provided two tonnage projections for this period. Its case-in-chief would hold tonnage constant at its 2004 forecast level. In the alternative, Duke would use the 2002 forecast of the Energy Information Administration (*EIA*

[71] Duke's electronic spreadsheets contain only hardcoded numbers, without any documentation as to how those figures were developed. However, the Board must be able to verify the procedures used to develop such evidence.

[72] While NS claims that approximately 7 million tons of the spot coal traffic that moved in 2001 would not move in 2002, it concedes that there is some spot coal traffic that would continue.

2002) to project tonnages beyond 2004, except for tonnages to certain designated utility plants in the South, for which Duke assumed a flat tonnage.

NS also presented two forecasts for this period. It used the *EIA 2002* forecast for its "base case" tonnage after 2004. It also presented an "alternative case" using a composite of forecasts by the EIA and various other forecasters. NS would use these forecasts for all traffic other than Duke's. For Duke's tonnage, NS would use Duke's forecast for coal usage that Duke filed with the North Carolina Department of Environmental and Natural Resources.

As the Board has stated before, it is preferable to rely on coal demand forecasts that have not been specifically prepared for litigation. *See TMPA*, 6 S.T.B. at 603. Moreover, composite forecasts can be manipulated through the selective inclusion or exclusion of forecasts. Thus, they are less reliable than a single forecast prepared by an independent, neutral source.

Here, both parties have used EIA forecasts as a reliable source for portions of their presentations. EIA, an independent statistical arm of the Department of Energy, was created by Congress for the express purpose of providing policy-neutral data and forecasts.[73] Thus, EIA provides an authoritative source for coal forecasts.

After the close of the record, new significantly revised EIA forecasts were issued. The *EIA 2003* forecast reflects virtually flat Central Appalachian coal production (fluctuating between 252 and 260 million tons) during the 2005-2021 period.[74] The Board takes official notice of these updated government forecasts of traffic for the Central Appalachian coal producing region, which are available from EIA. These most recent EIA forecasts largely confirm Duke's assertion that tonnage from mines that would be served by the ACC will remain relatively constant. The Board therefore uses the Central Appalachian *EIA 2003* regional forecasts here to develop the projections for tonnage that would move over the SARR between 2005 and 2021.

---

[73] Details about the EIA can be found at its website (www.eia.doe.gov).
[74] *See EIA 2003*, Table 111.

Table B-1 below presents the parties' positions and the Board's findings on volumes.

Table B-1
ACC Tonnages

Year	Duke	NS Base Case	NS Alternate Case	STB
2002	85,734,129	77,945,154	76,364,116	77,945,154
2003	87,889,142	85,924,627	81,785,010	85,924,627
2004	83,873,383	82,003,992	77,771,293	82,003,992
2005	81,292,342	78,287,285	75,341,973	82,299,655
2006	81,806,229	76,976,050	73,680,283	83,966,883
2007	82,425,580	76,699,932	71,033,925	86,914,694
2008	82,026,827	76,484,113	69,381,453	87,774,905
2009	81,670,543	76,035,119	67,785,020	87,322,884
2010	80,931,932	75,107,173	66,119,710	86,825,550
2011	82,746,786	77,698,046	64,506,957	86,299,869
2012	82,649,532	77,363,534	63,889,575	85,137,011
2013	81,376,998	76,013,684	63,279,894	86,048,576
2014	80,468,066	75,215,654	62,677,820	86,345,588
2015	79,881,551	74,775,975	62,083,258	87,342,542
2016	80,046,787	74,810,895	61,496,113	86,738,586
2017	79,542,076	74,110,195	61,230,293	86,844,659
2018	78,397,543	72,775,911	60,965,994	86,460,088
2019	78,383,506	72,935,983	60,703,207	86,730,778
2020	77,987,753	72,523,643	60,441,922	86,681,007
2021	77,987,753	72,118,038	60,182,132	86,067,847

Note: The volume projections used here are greater after 2005 than either party's because the 2003 EIA forecast reflects relatively stable coal production for the Central Appalachian region, whereas the earlier EIA forecast reflected in the parties' evidence projected declining production for that region.

B. Revenues

The parties used different methods for forecasting future rates for the coal traffic in the group.[75] The table below shows the parties' revenue forecasts for the traffic group[76] and the figures used by the Board here. (The table reflects the Board's disallowance of rerouting of cross-over traffic in this case, as discussed in the body of the decision, except for the three shipments where the rerouting would shorten the total movement.)

Table B-2
ACC Revenues

Year	Duke	NS Base Case	NS Alternate Case	STB
2002	$576,846,403	$487,464,767	$457,346,768	$487,112,921
2003	596,835,775	552,552,481	511,483,629	554,090,690
2004	586,700,579	537,825,366	505,954,421	548,566,016
2005	585,576,242	521,996,859	495,168,468	575,219,504
2006	600,324,960	526,667,778	497,302,079	595,967,647
2007	613,896,638	523,322,703	481,322,242	621,738,779
2008	623,125,408	532,012,898	482,148,491	636,326,465
2009	633,525,494	541,215,973	483,407,541	642,094,543
2010	643,718,652	546,064,947	482,376,628	645,399,612
2011	670,986,621	571,004,479	483,134,928	652,028,866
2012	689,935,488	581,070,189	489,331,977	654,136,195
2013	703,070,624	585,820,851	495,865,783	672,522,810
2014	718,768,581	593,827,643	502,914,344	687,090,603
2015	736,974,438	603,601,674	510,294,093	708,212,549
2016	760,579,243	615,969,398	518,231,386	715,205,822
2017	781,378,644	624,456,589	528,602,451	731,291,979
2018	798,978,510	629,839,183	539,505,383	742,091,999
2019	824,291,535	645,439,835	550,759,835	759,994,553
2020	847,638,017	658,667,868	562,186,341	772,931,932
2021	874,278,497	670,850,619	573,929,859	782,930,285

Note: The Board's number for 2002 is lower than either of the party's because the Board's revenue figure reflects use of the modified straight-mileage prorate for revenue divisions.

[75] The parties agree on the rates and revenues for grain traffic for the entire SAC analysis period.

[76] As discussed in the body of the decision, Duke's supplemental evidence continued to reflect some rerouted traffic that is disallowed here.

1. Rates on Traffic Subject to Pending Rate Complaints

Duke questions the propriety of basing a SAC analysis on challenged rates that it claims have been inflated in anticipation of rate litigation before the Board. It suggests that the revenue forecasts for that traffic instead be based upon either the previous rates or a 10% markup over the previous rates (either of which are lower than the challenged rates), so that the alleged manipulation would not influence the amount of relief awarded if the rates were found to be unreasonable. However, because the challenged rates have not been shown to be unreasonably high, this issue need not be addressed here.

2. Rates on Traffic Moving Under Contract

The parties agree, that while traffic is moving under an existing contract, it is the contract that determines the rates that traffic would pay.

3. Rates on Traffic After Expiration of Contracts

To develop the rates that ACC traffic would pay after existing contracts expire, Duke used an approach similar to that used in *WPL*. For traffic that a rail carrier would deliver to final destination, Duke assumed that, following expiration of an existing contract, rates would escalate by the average escalation factor contained in the remaining unexpired contracts. For traffic that a railroad would turn over to another mode of transportation for final delivery, Duke assumed that the rates would escalate based on a relationship between the average escalation factors in current contracts and an index of rail costs published by the Board pursuant to 49 U.S.C. 10708.[77]

NS, in contrast, would apply the average percentage change in rates from its 2002 business forecast through 2004 for any traffic whose contract would expire before the end of 2004, and for subsequent years NS would apply EIA's nationwide coal transportation rate forecast. Recognizing that there is some relationship between rate levels and traffic volumes, NS submits that use of EIA rate forecasts preserves the economic assumptions that EIA used to make its volume forecasts. NS points out that Duke's volume forecasts are unrelated to its rate forecasts.

Duke disagrees with NS's use of EIA forecasts for contracts that expire after 2004. Duke argues that reliance on nationwide rate forecasts is not appropriate, as nationwide coal rate trends are not necessarily representative of rate trends for the Central Appalachian region.

As the Board explained in *TMPA* (6 S.T.B. at 603), reliance on impartial EIA forecasts is preferable. Duke's use of a historic escalation factor is inferior

[77] Duke has not provided the information needed to verify the escalation factors it used; rather those escalation factors merely appear in Duke's electronic spreadsheets.

when impartial forecasts such as EIA's exist.[78] However, Duke's point is well taken that national forecasts may not be representative of rate trends in Central Appalachia. Therefore, as with the EIA forecasts for traffic volumes, the analysis here uses *EIA 2003* rate forecasts that are specific to the Central Appalachian region.

APPENDIX C – OPERATING EXPENSES

This appendix addresses the annual operating expenses that would be incurred by the ACC. The manner in which a railroad operates and the amount of traffic it handles are the major determinants of the expenses a railroad incurs in its day-to-day operations. As discussed in the body of the decision, NS's proposed operating plan for the ACC is used here, which means that NS's operating assumptions determine the level of operational resources that the ACC would need for a given level of traffic.[79] As also discussed in the body of the decision, the rerouting of certain traffic proposed by Duke is disallowed, which has the effect of reducing the overall operating expenses initially estimated by the parties.

---

[78] Indeed, it would seem that EIA forecasts would be an appropriate impartial source of traffic and rate forecasts to use in all future SAC cases.

[79] Because NS's operating plan is used, NS's spreadsheets are used to develop operating costs.

Table C-1 summarizes the operating costs used here. The costs in dispute are discussed below.

Table C-1
ACC Annual Operating Costs (2002)
($ millions)

	Duke	NS	STB
Train & Engine Personnel	$15.3	$43.4	$37.1
Locomotive Ownership	18.1	34.8	27.5
Locomotive Maintenance	14.1	27.1	21.6
Locomotive Operations*	31.9	27.4	18.9
Railcars **	17.2	26.1	26.2
Ad Valorem Tax	6.6	6.8	6.8
Operating Managers	7.2	13.8	12.1
Materials & Supplies	0.8	1.9	1.4
General & Administrative	10.4	23	13
Start-up Costs	4.5	72.3	8
Loss & Damage	0.1	0.1	0.1
Maintenance-of-Way	10.9	50.3	49.7
Insurance	3.2	7	4.3
Trackage Rights Fee	0.3	2.2	0.3
TOTAL	$140.5	$336.1	$226.5

* The Board's estimate of locomotive operations is lower than either party's because the restatement relies upon NS's locomotive unit miles (which are substantially lower than Duke's) and upon Duke's gallons per locomotive-mile and costs per gallon (which are lower than those based on the rejected NS fuel study).
** The Board's figure for railcar expenses is slightly higher than even NS's estimate because 3 rerouted movements are included in the analysis here.

A. Locomotives

1. Locomotive Requirements

The parties agree on the unit cost for acquiring (leasing) locomotives, but as shown in Table C-2, there is a substantial difference in the number of locomotives each party assumes the ACC would need.[80]

Table C-2
Locomotive Requirements

	Duke	NS	STB
Road	103	199	154
Helper	9	15	15
Switch	4	10	10
Total	116	224	179

Locomotive requirements are primarily determined by how the ACC would operate. Because NS's operating plan has been accepted, the basic number of road, helper, and switch locomotives required by that plan are used here. However, individual locomotives would not be available 100% of the time, and therefore additional (spare margin) locomotives would need to be acquired. Duke proposed a spare margin of 5% and supported this figure with witness testimony. NS proposed a 30% spare margin but provided no explanation as to the derivation of this figure. Because NS has not shown that Duke's proposed spare margin is unreasonable, nor provided support for its alternative, a 5% locomotive spare margin is used here.

2. Locomotive Maintenance Expense

The parties agree on the maintenance expense per locomotive. The agreed-upon maintenance expense is used in conjunction with the restated number of locomotives the ACC would need to develop total locomotive maintenance expense.

3. Locomotive Operating Expense

Table C-3 summarizes the unit costs for fuel and locomotive servicing. These unit costs are used in conjunction with the restated number of locomotives the ACC would need to develop total locomotive operating expense.

---

[80] Duke accepts NS's annual lease cost of $158,644 per AC4400CW locomotive and $76,416 per SD-40-2 locomotive. *See* Duke Reb. Narr. at III-D-3.

Table C-3
Fuel and Servicing Expenses

	Duke[81]	NS[82]	STB
Gallons of Fuel per LUMs	2.8	3.9	2.8
Fuel Price per Gallon	$0.6574	$0.7030	$0.6574
Sand and Lube per LUM	$0.1649	$0.1649	$0.1649

a. Fuel Costs

Duke used a fuel cost of $0.6574 per gallon, based on the cost reported in NS's Annual Report filed with the Board (the R-1 report). NS used a $0.7030 per gallon figure, claiming that reliance on the R-1 is improper because that cost does not include the labor cost associated with Duke's proposed use of contractors to fuel locomotives.

Duke's evidence is reasonable. The R-1 expenses include an embedded labor component in the storage and dispensing costs. Furthermore, NS's fuel cost is unsupported. Accordingly, Duke's per-gallon fuel cost, which has a sound basis and is superior to NS's unsupported evidence, is used here.

Total fuel expense also depends on the rate at which fuel is consumed. Duke relied upon NS's system-average fuel consumption, while NS relied on a special study of fuel consumption for a selected group of locomotives. NS's study is rejected because it is based on fuel consumption for a type of locomotive that the ACC would not use. In the absence of a study of fuel consumption by the type of locomotives that the ACC would use, use of system-average fuel consumption is appropriate and is used here.

b. Servicing

Locomotive servicing includes the labor and material costs associated with servicing the locomotives, including the costs of adding lube oil and sand. The parties agree on a cost of $0.1649 per locomotive unit mile (LUM) for servicing locomotives. The Board's SAC analysis develops locomotive servicing cost by using the agreed-upon unit cost for servicing locomotives in conjunction with the number of locomotives needed to serve the ACC's traffic group.

4. Residual NS Distributed Power Locomotives

The parties agree that the ACC would operate its locomotives in a DP configuration. NS included $22 million for retrofitting NS's locomotives with the necessary equipment so that the residual NS could operate in DP run-through

[81] Duke Reb. e-WP. Opr_SUM.123.
[82] NS Reply e-WP. OP EXP BC.xls.

service with the ACC. But as Duke points out, NS's proposed operating plan for the ACC assumed that residual NS locomotives would not operate in DP service and would allow time for exchanging ACC and residual NS locomotives. Because NS's operating plan for the ACC is used here, there would be no need to equip residual NS locomotives to operate in DP service. Therefore, this expense is excluded.

B. Railcars

There is a substantial difference in the parties' estimates for the number of railcars that would be required and the costs of acquiring those cars.

1. Railcar Requirements

Because NS's operating plan has been accepted, that plan is used to estimate the number of coal and grain cars that would be required. However, because of maintenance considerations, cars would not be available 100% of the time and the ACC would need additional (spare margin) cars. Duke assumes that the ACC would need a 5% spare margin, while NS assumes a 10% spare margin based on the Board's findings in prior SAC cases. Duke has failed to meet its burden of proof, because it offered no evidence to support its 5% figure. Therefore, a 10% spare margin is used.

2. Lease Expense

Duke and NS agree on the cost of leasing coal and grain cars. The agreed-upon unit costs are used in the Board's SAC analysis.

C. Train Crew Personnel

There is a substantial difference in the parties' estimates for the number of train and engine (T&E) personnel that the ACC would need. The operating plan is the prime determinant of the number of T&E personnel. Therefore, the number of crew personnel specified by NS is used here, as the ACC's operations are based here on the plan proposed by NS. That crew estimate is adjusted, however, to reflect that train crews could work 270 shifts per year.[83]

D. Non-Train Operating Personnel

There is a significant difference in the parties' estimates for the number of, and expenses for, non-train operating personnel. Table C-4 shows the parties'

[83] Duke notes that the Board accepted 270 shifts in *FMC*. NS argues that 250 shifts per year is more appropriate. However, NS provides no reason to depart from Board precedent here.

staffing requirements and the figures used by the Board. The areas of dispute are discussed below.

Table C-4
Non-Train Operating Personnel

	Duke	NS	STB
Train Manager	6	6	6
Asst. Train Manager	8	4	4
Trainmaster	0	27	27
Clerks	0	25	0
Fueling	0	10	0
Yardmasters	0	10	10
Carmen/Equipment Inspectors	54	72	72
Crew Callers	5	5	5
Dispatchers	18	21	18
Manager - Operations Control	5	0	5
Manager Locomotive Operations	4	7	7
Manager - Mech. Operations	1	3	3
Manager - Dispatch/Crew Call	0	6	5
Total	101	196	162

1. Train Managers, Asst. Train Managers and Trainmasters

Because the number of train managers, assistant train managers, and trainmasters is primarily dependent on the operating plan, NS's evidence is used.

2. Clerks, Yardmasters & Fueling

Duke did not include clerks because it claims that the ACC would have relatively few supervisors and, therefore, there would be little need for clerks. NS added 25 clerks to provide five positions with round-the-clock coverage, but did not explain why that number of clerks would be necessary. Because Duke explained its exclusion of clerks, Duke's evidence is accepted.

Duke does not provide for yardmasters, claiming that the only yard activities would be locomotive fueling and servicing, movements to and from contractor maintenance facilities, and some bad-order car replacements. Because the operating plan used here would have a variety of activities occurring in yards (including staging work to manage LTL shipments), yardmasters would be required. Accordingly, NS's staffing for yardmasters is the best evidence of record and is used here.

Duke contends that contract employees would fuel locomotives; NS would have ACC personnel perform that task. Duke's proposal to use contract personnel is reasonable and is used here.

3. Carmen/Equipment Inspectors

Duke proposed a somewhat lower number of inspectors than NS. While the disallowance of Duke's rerouting of cross-over traffic would eliminate the need for the ACC to inspect trains at Winston-Salem, the trains would be inspected in Devon instead. The additional inspectors provided for by NS would be needed to conduct those inspections. Therefore, NS's evidence is accepted.

4. Crew Callers

For crew calling, the parties agree that five positions would be needed. NS would also add a management position. Duke has explained, however, that the manager of operations control could provide the needed supervision. Therefore, Duke's evidence is used here.

5. Dispatchers

The parties agree that four dispatchers would be needed at all times. Duke assumed that 18 dispatchers, working 250 shifts per year, could provide the needed coverage. NS would include a manager for each shift. Again, Duke has explained that the manager of operations control could provide the needed supervision. Therefore, Duke's staffing estimate is used.

6. Operations Managers

Duke included five positions for operations control management, while NS would staff these positions at an executive level. NS has not demonstrated a need for executive level staffing at these positions. Therefore, Duke's evidence is accepted.

Duke proposed four locomotive operations managers and one manager of mechanical operations, while NS would provide for seven locomotive operations managers and three managers of mechanical operations. Duke has not supported its staffing numbers, nor has it provided any specific reason why NS's proposed staffing is unrealistic. Therefore, NS's evidence is used here.

E. General & Administrative Personnel

The parties' general and administrative (G&A) personnel estimates differ substantially with respect to staffing levels that the ACC would need. Duke proposed a G&A staff of 59 employees for the ACC. Duke developed its proposed staffing on the basis of the experience of its rail operations witnesses, who have held senior management positions at a variety of railroads (including regional and start-up railroads). Duke's plan includes limited in-house staffing, with various financial, marketing, human resources (HR) and information technology (IT) functions outsourced.

NS argues that Duke's staffing levels would be insufficient for a Class I railroad (which the ACC would be).[84] NS proposed a staff of 140, based on a comparison with NS's own staffing levels. But NS has not adequately addressed the outsourcing proposed by Duke, which would reduce the ACC's staffing needs. Duke's G&A staffing levels, which are based on the experience of former senior-level railroad employees, are reasonable and supported, and NS has not supported a need for the additional staffing it proposed. Therefore, Duke's G&A staffing levels are used here, with the exceptions noted below.

Table C-8
G&A Staffing

	Duke	NS	STB
President/Exec. Dept.	3	4	3
Transp. & Engin. - Oper.	12	17	12
Finance & Accounting	20	46	24
Law, Admin. & H.R.	13	25	13
Marketing/Customer Service	11	48	11
Total	59	140	63

a. Outside Directors

The parties disagree on the size of the board of directors that the ACC would need. Because the ACC would not be a publicly owned company, Duke contends that the board could be limited to the ACC's president, the vice-president of transportation, and one (uncompensated) outside director. NS would include five outside directors. NS cites the New York Stock Exchange requirement that outside directors comprise a majority of board members. NS

[84] Portions of NS's submission contains inconsistencies, with different staffing levels in its exhibits, workpapers, and narratives.

also points to the composition of the board for the Florida East Coast Railway Company (FEC), a railroad that is smaller than the ACC would be but has a board consisting of ten members, nine of whom are outside directors.

Duke's proposal is unreasonable, as it would result in unconstrained managerial control and oversight of the ACC. An organization of this scope would require significant independent oversight of its management, regardless of whether it is publicly or privately held. Therefore, NS's proposal for five outside directors is accepted.

b. Information Technology

Duke provided for an IT staff of only nine employees, on the assumption that certain IT functions would be outsourced. NS proposed a larger IT staff of 13, pointing out that Duke failed to account for the cost of outsourcing any IT functions. Because Duke did not provide the funds required for IT outsourcing, NS has provided the only evidence on the IT staffing requirement if all operations were performed in house. Therefore, NS's figure is used here.

F. Wages and Salaries

1. Crew Compensation

Both parties used NS's 2001 Wage Forms A and B as a basis for estimating crew compensation. However, they disagree on the basic wage and constructive allowance for crews, as well as the number of taxi trips and overnight stays that ACC crews would require.

a. Basic Crew Wages

Duke developed basic crew compensation based on each train having an engineer and a conductor. Furthermore, because Duke assumed that the ACC would provide only trainload service, it used the compensation rate for "road" crew personnel. NS assumes that each train would need two engineers. Because its operating plan for the ACC assumes yard as well as road operations, NS assumes that crews would be compensated at a rate reflecting the wages of "road," "yard," and "way" crews.

Duke's assumption of one engineer and one conductor per train seems reasonable, and NS has not explained why two engineers would be required. However, because the operating plan used here includes yard operations, crew compensation should be based on a combination of wages for road, yard, and way train operations. Therefore, the analysis here uses a combined compensation rate for road, yard, and way train engineers and conductors, as set forth on the wage forms relied upon by the parties.

b. Constructive Allowance

Duke included a constructive allowance of 8% to account for overtime, vacation and meal expenses. Duke excluded allowances for certain benefits that it asserts would not be available to the ACC's non-unionized work force. NS would apply a 30% markup, based on data contained in its 2001 Wage Forms A and B. NS's constructive allowance is used here, as it is based on the wage forms used by both parties to develop basic wages and Duke has provided no evidence that non-unionized railroads do not pay these allowances. *See TMPA*, 6 S.T.B. at 687.

c. Taxi Expenses

The parties differ on the number and cost of taxi trips that would be required for ACC crews. Because the number of taxi trips that would be needed is primarily dependent on the operating plan, the number of trips estimated by NS is used here. Furthermore, NS's $25 cost per taxi trip is used, as Duke (the party with the burden of proof on this issue) offered no justification for its $10 estimate.

d. Overnight Expenses

The parties agree on a $45 cost for overnight lodging and meals, but differ on the number of overnight stays that would be required by T&E crews. The number of overnight stays is determined by the operating plan, and NS's operating plan is used here. Therefore, NS's number of overnight stays is used here.

2. Executive Compensation

Both parties used the executive salaries paid by FEC in 2001 as a standard for the executive salaries for the ACC. The parties agree on the salary for the President/CEO. For the salaries for other executive positions, Duke relied upon the individual position comparable to the ACC position, while NS used the salary paid to FEC's Executive Vice President for all executive positions other than President/CEO. Because relying upon salaries tied to the duties of a specific position is more reflective of the compensation for an individual job than relying upon a single, one-size-fits-all salary, Duke's evidence on executive salaries is used here.

The parties disagree on the amount for executive bonuses. Duke does not provide for any bonuses, while NS calculates bonuses of approximately 70% of salaries. Because FEC's base compensation, which has been accepted, contemplated bonuses for its executives, bonuses are appropriately included in executive compensation. However, NS's calculation of bonuses, based upon a 3-year average, is faulty given the rise in FEC's base compensation during that period and the corresponding decrease in bonuses. Because the 2001 bonuses of FEC executives are 45% of salaries,[85] this percentage is used to calculate the ACC executive bonuses.

3. G&A and Non-Crew Operating Compensation

Both parties used NS's Wage Forms A&B to develop non-executive G&A and non-crew operating personnel salaries. While NS stated that it agrees with Duke's index for adjusting the ACC base salaries from 2001 to the first quarter 2002, it used a different index.[86] Because NS has not explained why a different index is more appropriate, Duke's index is accepted. Accordingly, Duke's estimates for non-executive staff salaries are used here.

With respect to non-train operating personnel, the parties again relied upon NS wage data to develop their compensation estimates. Duke, however, made arbitrary adjustments to the salaries.[87] As the party with the burden of proof on this issue, Duke failed to support its compensation levels. Accordingly, NS's compensation levels are used here, except that the base salaries are adjusted by the Wage Rate Index, rather than the Wage Rates and Supplement Index, for the reasons set forth above.

4. Outside Directors

Duke assumed that an outside director would be a shipper or investor representative who would have a direct interest in the ACC's success and would thus be willing to serve on the ACC board with only minimal compensation (for the travel expenses associated with attending board meetings, discussed *infra*). NS proposed a salary of $30,000 a year for each director, but NS failed to provide any basis for its salary proposal. Therefore, Duke's evidence on this issue is accepted.

G. Materials, Supplies, and Equipment

Materials, supplies, and equipment would be needed by various ACC personnel, such as: motor vehicles, office furniture, equipment, utilities, outside services, IT hardware and software, travel, and training. For items on which the parties agree, but the difference in their aggregate cost figures are due to the difference in proposed staffing levels, the costs are restated to the staffing levels found appropriate here and are not further discussed here. Likewise, decisions that are driven by the use of NS's operating plan are not addressed separately. The remaining disputes are discussed below.

---

[85] Duke Open. WP. 03001-004.

[86] Duke relied upon the AAR's Wage Rate Index, while NS used the AAR's Wage Rates and Supplements Index.

[87] For example, in its "NS Salaries" worksheet, Duke showed a salary of $64,775 for an assistant train manager, but in its operating expense spreadsheet, Duke used $60,450 as the unit expense for this position.

1. Vehicles

The parties disagree over the quantity and type of vehicles for use by the ACC's staff. Duke would provide the ACC's supervisory personnel with Ford pick-up trucks. NS would include the cost for a Ford Explorer to transport people and equipment. Given that pick-up trucks are less expensive and could transport both supervisory personnel and cargo, Duke's proposal is reasonable and is used here.

For vehicles used for inspections, Duke included three pick-up trucks, while NS would include eleven. Duke's number is inadequate for the number of inspectors accepted here, and therefore NS's inspection vehicle estimate is accepted.

Duke would provide sedans for the ACC's G&A staff, while NS would provide sport utility vehicles. Duke did not include the costs of these vehicles in its operating expenses, however. Thus, NS's evidence is used here.

2. Computer Equipment and Software

The parties disagree on the price of software for a general accounting system. However, as Duke points out and NS's workpapers confirm, NS double-counted the cost of the software.[88] Therefore, Duke's cost is accepted.

On opening, Duke did not include firewall protection for its computer systems. On reply, NS included a firewall at a cost of $12,148. On rebuttal, Duke agreed that a firewall would be required and proposed a cost of $3,000. Because Duke failed to account for a firewall in its opening evidence and NS's reply evidence is realistic, NS's evidence of the cost of a firewall is accepted.

On reply, NS contended that the network hardware proposed by Duke on opening would be inadequate and it proposed alternative hardware. On rebuttal, Duke pointed out that its specified equipment has the same functional capabilities as NS's product. Duke has thus supported on rebuttal the network hardware proposal set forth in its opening evidence. Therefore, Duke's network hardware proposal (including routers and printers) is accepted. Because Duke's network hardware is accepted, its network-related software expenses are used here.

3. Travel & Entertainment

Duke provided no travel allowance for G&A personnel, on the ground that a regional railroad such as the ACC would cover a limited geographic area and would maintain personnel levels so as to minimize travel. Duke further claims that the $50,000 allowance for miscellaneous expenses that the parties agreed upon could be used for travel. NS proposed travel expenses equivalent to 20% of compensation for marketing staff and 10% for other G&A staff. Given the size of the ACC, and the fact that the $50,000 allowance for miscellaneous

[88] NS Reply WP. III-D-0047.

expenses would have to cover the travel expenses of the five-member board of directors and all other personnel, Duke's omission of travel expenses is not reasonable. As NS's evidence on travel expenses is the only evidence of record, NS's travel allowance costs are accepted.

4. Annual Recruiting and Training Expense

Duke excluded annual training expenses for G&A personnel. NS argues that the ACC would likely confront attrition rates of 5% to 6%, and thus would need to train new staff each year. Aside from contending that turnover would be lower at the ACC (and thus annual training would be minimal), Duke does not explain how it would provide for annual training expenses. Expenses for training new staff is accepted, but the annual figure submitted by NS is adjusted to reflect the ACC's reduced staffing estimates.

H. Start-Up Costs

Duke estimates that it would cost the ACC $4.5 million to hire and train its initial personnel, whereas NS contends that it would cost $12.3 million. While the parties generally agree on the cost for training an employee, they disagree on the number of employees that would need to be hired and trained. NS would also include recruiting costs (fees paid to recruitment agencies).

Duke argues that the ACC could draw on a pool of experienced NS employees that would be displaced by the ACC's replacement of a portion of the NS, obviating the need for the ACC to pay recruiters to find qualified employees. That argument has been previously rejected. *See TMPA*, 6 S.T.B. at 665. It is inconsistent with the purpose of the SAC test to assume that the existence of the defendant railroad would limit the costs the ACC would incur.[89]

For rank-and-file personnel, however, it is inappropriate to include both training costs and recruiting costs for the same people. *TMPA*, 6 S.T.B. at 665. Recruiting costs are generally incurred to find skilled personnel who would not need extensive training. Because training costs are included, it is unnecessary to include recruiting costs as well. After factoring in training costs for rank-and-file employees and recruiting costs for skilled employees, the training and recruiting costs for the ACC would be $8.0 million.

I. Ad Valorem Tax

The ad valorem taxes are driven by the configuration, and NS's configuration for the ACC is used here. Therefore, NS's ad valorem tax estimates are accepted.

---

[89] *Cf. WPL*, 5 S.T.B. at 1038 (rejecting argument that uncertainty associated with construction of a SARR would be limited because of information that is available about existing railroad that SARR would replace).

J. Loss and Damage

The parties agree on the loss-and-damage expense, and that estimate is used here.

K. Maintenance-of-Way

A summary of the MOW costs used here is set forth below in Table C-9.

Table C-9
MOW Costs
($millions)

	Duke	NS	STB
Staffing	$4.714	$28.964	$28.964
Equipment	$0.136	$7.601	$7.601
Materials	$0.293	$3.505	$3.505
Maintenance Work			
Track Geometry Testing	$0.096	$0.096	$0.096
Building Maintenance	$0.113	$0.150	$0.113
Snow Removal	$0.250	$0.250	$0.250
Derailments	$0.500	$1.000	$1.000
Weed Spray	$0.622	$0.693	$0.693
Yard Cleaning	$0.060	$0.083	$0.083
Storm Related Tree Work	$0.090	$0.200	$0.200
Shoulder Ballast Cleaning$0.450$0.450	$0.450	$0.828	$0.828
Crossing Paving	$0.210	$0.350	$0.350
Blasting Rock Slides	$0.010	$0.024	$0.024
Ultrasonic Rail Testing	$0.224	$0.530	$0.224
Rail Grinding	$0.199	$1.241	$0.199

Casualties	$0.000	$2.000	$2.000
Bridge Contract Work	$0.147	$1.000	$1.000
Storm Water Prevention	$0.000	$1.000	$1.000
Ditching	$0.125	$0.000	$0.125
Brush Cutting	$0.025	$0.000	$0.025
Ballast Undercutting	$0.700	$0.000	$0.700
Misc. Engineering	$0.375	$0.750	$0.750
Contract Labor	$0.852	$0.000	$0.000
Misc. Maintenance	$0.672	$0.000	$0.000
TOTAL Operating	$10.864	$50.265	$49.730

1. Staffing and Equipment

The ACC would need a MOW department to perform day-to-day preventive (operating) maintenance.[90] Duke estimated this expense at $10.8 million, while NS estimated this expense at $51.6 million. The majority of the difference in their estimates is due to how each party assumed the MOW department would function and how many personnel would be required.

Duke contends that the ACC could perform the necessary operating maintenance with a streamlined MOW department. It assumes that the ACC would contract out much of the routine operating maintenance work. The ACC itself would employ only a small permanent force of MOW employees to carry out routine inspections and maintenance, including some emergency repairs. Those employees would be cross-trained, so that an individual ACC employee might, for example, perform the functions of a welder one day, operate a machine the next day, and arrange for deliveries of materials a day later.

NS argues that Duke's MOW staffing plan is unrealistic, because such a highly versatile, cross-trained labor force does not exist. NS further argues that Duke's MOW plan understates the amount of daily operating maintenance that would be required on the ACC. NS contends that, because heavily loaded coal trains would be operating over severe curves and grades during varying weather conditions, the ACC would need almost daily track inspections and significant operating maintenance.

[90] The parties included in their respective DCF calculations the necessary funds to replace all of the ACC's assets at the end of their asset lives, thereby obviating the need to provide MOW funds to replace worn-out assets (so-called program maintenance).

NS's proposed MOW staffing levels are accepted as the best evidence of record. Duke has failed to meet its burden of establishing that a small, cross-trained MOW staff would be available and, even if available, whether such a limited MOW staff could provide the unplanned day-to-day maintenance that would be needed by a Class I railroad the size of the ACC. In addition, Duke does not attempt to reflect the higher compensation such skilled, cross-trained workers would command.

Furthermore, on rebuttal Duke did not support its opening evidence, but instead increased its original size of the MOW department by more than 60% (thereby conceding that its opening MOW staffing was insufficient). However, Duke did not demonstrate that NS's MOW staffing would be unrealistic or infeasible. Thus, Duke's alternative evidence on rebuttal is rejected, and NS's evidence is used here. NS's estimate of the ACC's equipment costs is also used, as the amount of equipment that would be required is directly attributable to the railroad's staffing levels.

2. Materials

Duke calculates the materials for operating maintenance would be 5% of the cost of total (operating and program) annual maintenance cost. NS estimates costs using a labor-based charge for materials, of 30% of overhead. Duke's materials estimate is rejected because it did not explain how it determined that only 5% of maintenance materials would be consumed by operating maintenance. Because Duke has failed to meet its burden of proof, NS's figures are used here.

3. Maintenance Work

The parties agree on the total cost for track geometry testing, building maintenance, snow removal, and derailments.[91] They also agree on the per-mile unit cost of weed spraying. But their total spraying costs differ due to their different track configurations. The agreed-upon unit cost for weed spraying is used here, in conjunction with the track configuration used in the Board's analysis to develop total spraying costs.

In its case-in-chief, Duke failed to include any funds for a variety of other work (yard cleaning, storm related tree work, shoulder ballast cleaning, crossing paving, and blasting expense for rock slides). On rebuttal, in response to NS's evidence that such work would be necessary, Duke included some funds for these purposes, but in each case, without any support, Duke lowered NS's cost estimates. Because Duke has not explained why NS's estimates are unrealistic

[91] Despite differing numbers, NS's narrative states that NS agrees with Duke's numbers for building maintenance. Therefore, Duke's building maintenance numbers are used here. Conversely, although the parties had agreed to a $1 million figure for addressing derailments, Duke's rebuttal workpapers show only $500,000 for this expense. The analysis here uses the agreed-upon $1 million figure.

and provided any support for its alternative estimate, NS's evidence is used in the Board's analysis.

a. Ultrasonic Rail Testing

Duke used a unit cost of $90 per mile for semi-annual ultrasonic rail testing, based on a third-party quotation.[92] NS argues that Duke's unit cost does not reflect the cost of frequent hand checks that would be necessary in mountainous territory. NS also contends that testing would be required three times per year. NS uses a unit cost of $187 per test mile, for a total cost of $0.5 million.

Duke's ultrasonic rail testing estimate is accepted, because it is based on discussions with a contractor. NS has not discredited Duke's estimate, nor provided any support for its argument.

b. Rail Grinding

Duke and NS agree on a unit cost of $1,000 per mile for rail grinding. Duke would have the ACC grind all 136-pound premium rail every 150 million gross tons (MGT) on curves exceeding 3 degrees, and at 300 MGT on tangent track. Standard rail used in main tracks and passing sidings would be ground at 50 MGT intervals.

NS argues that grinding would need to be performed more frequently due to the rigid track structure of the ACC resulting from the use of steel ties. However, NS has provided no support for its argument. Because Duke's proposed rail grinding schedule (which is based on rail grinding studies conducted by the Canadian National Railroad, and on the experience of Duke's expert witnesses) is adequately supported, it is used here.

c. Casualties

NS would add $2 million for casualty losses as a result of occurrences such as washouts, floods, land slides, and slope failures, based on the mountainous territory the ACC would traverse. NS states that the $1 million appropriated for derailments would not cover casualty losses, citing its own incurrence of more than $11 million in total casualty losses across its system in 2001. Duke claims that casualty loss expenses have been factored into its railcar lease costs and that a separate expense for this is thus unnecessary. However, Duke has not supported its claim that casualty costs are addressed in rail car leasing costs. Therefore, that additional expense is included here.

d. Bridge Contract Work

Without any explanation, Duke included $147,000 for bridge maintenance work, while NS would include $1 million. NS's estimate is accepted because

[92] *See* Duke Reb. WP. Vol. 5 at 06507.

Duke failed to meet is burden of proof by not presenting any evidence supporting its position.

e. Storm Water Prevention

NS included $1 million for addressing storm water. Duke has not commented on this cost. NS's cost is therefore accepted as unopposed.

f. Ditching, Brush Cutting and Ballast Undercutting

Duke included $125,000 for ditching, $25,000 for brush cutting, and $700,000 for ballast undercutting. NS has not addressed these issues. Thus, Duke's estimates are accepted.

g. Miscellaneous Engineering

Neither party discussed or supported its costs for this category. Because Duke failed to meet its burden of proof, NS's estimate of $750,000 is used.

h. Contract Labor

Duke included $852,000 for contract labor. However, because Duke's proposed use of contract labor to provide the required MOW staffing for the ACC is rejected, there is no need for a contract labor expense. The ACC would use in-house staffing for operating maintenance.

i. Miscellaneous Maintenance

Duke included $672,000 for miscellaneous maintenance, but did not specify what costs are included. NS would not include miscellaneous costs. Because all of the necessary costs for maintaining the line have been included in other cost categories, NS's position that costs are not needed here is accepted.

L. Insurance

The parties agree that insurance costs would be 2.5% of operating expenses. The agreed-upon procedure for estimating insurance costs is used here.

M. Trackage Rights Fee

The ACC would operate over the lines of the Vaughan Railroad under the same trackage rights agreement currently used by NS. The parties agree that the ACC would pay to use these facilities on the same terms as NS currently does.

While NS stated that it paid the Vaughan Railroad a certain amount per net ton for the use of these trackage rights in 2001, upon review of NS documents, Duke noted that NS paid a significantly lower amount per ton in 2001.[93] As Duke provided the only probative evidence showing actual payments made by NS for use of the Vaughan Railroad tracks in 2001, Duke's per ton figure is accepted.

APPENDIX D – ACC ROAD PROPERTY INVESTMENT

This appendix addresses the evidence and arguments of the parties concerning what it would cost to build the ACC. Table D-1 summarizes both the parties' cost estimates associated with that construction and the numbers used here, which total approximately $3.6 billion.

[93] The NS payment per ton is separated into two parts—a capital portion and a maintenance portion. The capital portion was set to expire either on December 31, 2002, or when a certain percentage of the total capital costs have been repaid. Duke argues that, because the invoice shows that no payment for the capital portion is due for the period February 1, 2001 through January 31, 2002, the capital payment portion is no longer applicable under the terms of the agreement.

Table D-1
ACC Construction Costs
($ millions)

	Duke	NS	STB
A. Land	$63.5	$120.7	$105.6
B. Roadbed Preparation	460.6	1,452.3	714.1
C. Track Construction	690.8	885.4	771.0
D. Tunnels	315.2	581.3	414.5
E. Bridges	285.8	782.4	703.3
F. Signals & Communications	116.4	167.3	149.3
G. Buildings & Facilities	18.4	46.0	39.0
H. Public Improvements	3.6	56.7	39.6
I. Mobilization	12.3	100.9	78.9
J. Engineering	128.6	530.2	294.2
K. Contingencies	151.2	397.3	283.1
L. Off-System Investment*	0.0	0.0	0.0
TOTAL**	$2,246.4	$5,120.2	$3,592.7

* NS had originally included $30.1 million for the additional investment that the residual NS would need to accommodate the reroutings originally proposed by Duke that are disallowed here.
** Columns may not sum to totals because of rounding.

A. Land

For those portions of the ACC that would follow an existing NS line, the parties' estimates for the total amount of land that the ACC would need differ only slightly.[94] However, as shown in Table D-2, there is a substantial difference in the land values used by the parties.[95]

[94] The parties agree that the ACC would need 218.1 acres for rail yards. They also agree that the width of the right-of-way (ROW) would be 100 feet in most areas, but only 75 feet in industrial, urban and commercial areas in and around Charlotte and Winston-Salem, NC, and Roanoke, VA.

[95] The record does not permit the combination of one party's acreage estimates with the other party's valuation. Therefore, where one party's valuation of a section of the ACC is used, that same party's estimate of the number of acres that would be needed for that section is also used.

Table D-2
Real Estate Costs

		Duke	NS	STB
ROW	Inspected by NS	$38,615,033	$71,765,991	$71,765,991
	Not Insp. By NS	22,031,680	30,052,451	22,031,680
Easements		655	0	655
Yards		2,638,765	12,452,554	11,761,074
TOTAL		$63,286,133	$114,270,996	$105,559,400

For valuation purposes, Duke physically inspected 89% of the existing NS ROW; for inaccessible areas, Duke used a variety of mapping sources to develop land costs. Duke divided the ROW into 80 large segments (averaging 13.5 miles in length) and valued each segment based on the value of unimproved land in the general area.

NS asserts that Duke's method of dividing the ROW into large segments in urban areas leads to flawed estimates, because long stretches of land cannot be assumed to have entirely uniform characteristics in such areas. NS inspected 7.3% of the ROW (located in the Roanoke, Winston-Salem and Charlotte areas) and assigned values to each segment based on a physical inspection and an analysis of local land sales. For the remaining 92.7% of the ROW which it did not inspect, NS simply increased Duke's land values based on the ratio of NS's valuation to Duke's valuation for areas that both had inspected.

For the segments of the ACC route that both Duke and NS inspected (totaling 985.50 acres of land), NS's valuation method is superior. Because NS used a greater number of comparable sales,[96] it provided a more complete, and thus more accurate, representation of market values. Moreover, NS's procedure of examining parcels along the ROW is superior to Duke's procedure of valuing land in the general area.[97] The land along the ROW is a prime indicator of a ROW's value and has been used in all prior SAC cases.

For the segments of the ACC route that NS did not inspect (totaling 12,110.20 acres of land), Duke has provided the best evidence. NS's approach is unacceptable. NS has provided no basis for its assumption that the

[96] For example, NS classified the ROW in the Roanoke area into 73 units, each with relevant market data. In the Winston-Salem/Forsyth County area, NS reviewed the sales of 100 comparable parcels, compared to only 5 comparables used by Duke.

[97] There is no indication that NS's valuations include an assemblage factor. (An assemblage value is a premium paid above comparable land prices to reflect the cost of assembling a contiguous parcel of land for a railroad right-of-way. Unless the existing railroad, or its predecessor, incurred an assemblage premium, costs associated with such a premium are excluded from the SAC analysis as a barrier-to-entry. *See*, *e.g.*, *FMC*, 4 S.T.B. at 797-98.) Nor has Duke shown benefits of owning property next to a railroad ROW that would inflate the value of such property. Indeed, such a location may lessen the value of the property.

relationship between the two appraisals for urban land prices is equally applicable to rural land values.

Finally, Duke included a one-time easement payment (totaling $655) for 71.3 acres of land, based upon the terms upon which NS now uses that land. Board policy in SAC cases is to assume that the SARR could acquire the same interest in property as the incumbent railroad has. Therefore, Duke's easement acreage and cost for this land are accepted.

B. Roadbed Preparation

To prepare the land for rail operations, the land would have to be cleared of vegetation, then the earth and rock would need to be graded into a suitable railroad right-of-way. Drainage and erosion control measures would also have to be taken to protect the track structure. The table below shows the parties' estimates for the costs necessary to prepare the ACC roadbed, as well as the numbers used here.

Table D-3
Roadbed Preparation Costs
($ millions)

	Duke	NS	STB
Clearing	$21.57	$50.54	$22.01
Grubbing	4.49	9.32	4.58
Earthwork	417.87	1102.38	522.89
Drainage			
Lateral Drainage	0.47	0.6	0.47
Yard Drainage	1.1	8.11	1.08
Culverts	39.94	52.66	35.56
Retaining Walls	12.65	180.49	119.02
Rip Rap	1.05	2.06	2.04
Relocation of Utilities	0.08	0.08	0.08
Seeding/Topsoil Placement	2.27	1.76	1.76
Water for Compaction	0	9.1	0
Waste Excavation			0.47
Surfacing for Roads	0.17	0.17	0.17
Erosion Mitigation			
Silt Fences	0.04	1.07	1.07
Slope Drains	0	2.71	2.71
Environmental Mitigation	0.1	0.1	0.1
TOTAL*	$501.57	$1,452.34	$713.94

* Columns may not sum to totals because of rounding.

1. Clearing and Grubbing

The parties used the ICC Engineering Reports (*Engrg Rpts*)[98] to determine the amount of land that would need to be cleared and grubbed. The parties disagree on the cost to clear and grub land, due to their differing assumptions regarding the number of tracks at particular locations and the size of trees to be removed. The parties' estimates also differ due to the application of a location adjustment factor and cost adjustment index.

The parties' clearing and grubbing quantities are restated based on the findings relative to the number of track miles the ACC would require. *See* Appendix A – ACC Configuration. While both parties used the R.S. Means Manual (*Means*)[99] as a basis for their clearing and grubbing unit costs, Duke used costs for removal of 12-inch-diameter trees, whereas NS used costs for 24-inch-diameter trees. Because Duke inspected portions of the NS route that the ACC would replicate and determined that trees in the area were generally 12 inches in diameter or less, while NS provided no support for assuming that 24-inch trees would need to be removed, the cost for removing 12-inch-diameter trees is used.

The parties agree on the location adjustment factor, but NS used a hard-coded value in its spreadsheet. Because it is necessary to restate the parties' estimates, Duke's approach of incorporating a formula in the spreadsheet for the adjustment is used. Moreover, Duke's indexation procedure appropriately reduced the mid-year 2002 *Means* costs to reflect the lower prices in effect at the beginning of 2002, the startup date of the ACC. In contrast, in developing costs for the beginning of 2002, NS's indexation procedure erroneously increased, rather than decreased, the *Means* mid-year 2002 costs. Accordingly, Duke's clearing and grubbing cost figures ($3,437 and $2,298 per acre, respectively) are used here.

2. Earthwork

As noted above, the parties agree upon the width of the right-of-way (100 feet, except in urban areas, where a 75-foot wide ROW would be used), the roadbed side slope (1.5:1), and the size of drainage ditches (2 feet wide by 2 feet deep). But they disagree on the extent of access roads that would be needed, the amount of grading that would be needed for the yards, for the Dan River branch, and for tunnel daylighting, and the earthwork equipment that would be required. These disputed elements are discussed below.

---

[98] The *Engrg Rpts* are a compendia of data collected by the Interstate Commerce Commission (ICC) in the early part of the 20th century. They detail the material quantities required to build most rail lines in place in the United States at that time. The data continue to be useful as a baseline for estimating current earthwork requirements, subject to adjustments for modern engineering standards.

[99] *Means* is a set of nationwide standardized unit costs, adjusted for localities, used to estimate the cost of construction.

a. Access Roads

Duke excluded costs for access roads, claiming that they would be unnecessary. NS argues that the ACC would need to construct 54,427 feet of access roads to transport labor, materials, and equipment to remote railheads and to improve access to remote culvert, tunnel, and bridge sites along the route.

In past SAC cases, the cost of access roads have not been included where such roads did not exist when the line that the SARR would replicate was originally built[100] or the carrier did not incur the costs of building such roads. Here, NS has provided no evidence that it (or its predecessors) incurred any costs for access roads. Moreover, as Duke points out, remote areas could be reached by using the cleared ROW. Therefore, costs for access roads are not included here.

b. ACC Yards

For yards that would replicate existing NS yards, both parties based grading requirements on an average fill height of 1 foot, based on *Engrg Rpts*. However, the parties disagree on the amount of earthwork that would be needed for new yards. Duke assumed that new yards would have the same fill requirement as NS's existing yards. NS calculated the grading for new yards using the method it used for grading of the main line.

There is no apparent reason, and NS has not explained, why the amount of grading in new yards would be different from what has historically been undertaken in existing yards. Therefore, Duke's method of calculating earthwork quantities for new yards is accepted.

c. Dan River Branch

The Dan River branch line is the only part of the ACC that would not follow an existing NS route. NS claims that the shorter route proposed by Duke is not feasible because 5 miles of that line would be subject to flooding and the potential for washouts of the line. NS argues that, to make this branch line feasible, the ACC would have to construct a trestle to protect the rail line from flooding. Duke maintains that the risk of flooding would be minimal and that, in any event, short periods of flooding would not adversely affect the power plant. Duke notes that the Dan River branch would be a low-use line, carrying only four loaded trains a month, so that any disruption to service would not have serious impacts on either the carrier's or shipper's operations.

Short periods of interrupted service might not affect the production of power at the shipper's plant. However, Duke has provided no assurance that flooding would not wash out portions of the line, causing rail service interruptions for extended periods of time—a risk that the shipper does not currently face because NS's route does not follow the Dan River. A SARR must be able to provide a

[100] *See, e.g.*, *TMPA*, 6 S.T.B. at 702.

shipper with service as reliable as that provided by the incumbent railroad. Therefore, because Duke has chosen to route the ACC along the Dan River, further measures to protect the line would be necessary and construction of a trestle is the only alternative offered on this record that would protect the shipper from service interruption from flooding.

Duke initially estimated that 1.2 million cubic yards (CY) of earthwork would be necessary for the 8-mile section of the Dan River branch between the point at which NS would have the ACC construct a trestle bridge and the connection with the main line at Stoneville. On reply NS identified several errors in Duke's calculation, and then, without providing any support, assumed that 1.4 million CY of earthwork would be required. NS also argued that construction of the Dan River Branch would require the relocation of three holes on a local golf course and condemnation and purchase of four homes at a combined cost of $1.3 million ($300,000 for each hole and $100,000 for each home). On rebuttal, Duke conceded that its initial computation contained several errors and that, after correcting for those errors, 1.33 million CY of earthwork would be required. However, Duke argued that the other expenses asserted by NS would not be needed, as its witness physically inspected the proposed ROW and found that the rail line would skirt the golf course and that no homes would need to be relocated.

Because NS did not provide support for the earthwork estimate contained in its spreadsheet, Duke's rebuttal evidence correcting for errors in its initial earthwork estimate is accepted and used here. Furthermore, Duke's assertion that neither the golf course nor homes would be disturbed by construction of the line is accepted as it is based on an actual inspection of the area.

d. Tunnel Daylighting

Duke and NS disagree on the amount of earthwork that would be associated with installing daylighted tunnels along the ACC route.[101] Duke assumes that the ACC would daylight any terrain that would require 500 linear feet (LF) or less of excavation. It argues that modern earthmoving and excavation equipment now make it less expensive to create open cuts on the ACC route than when the NS line was built, when it was more economical to construct tunnels. While not disputing that daylighting would be appropriate, NS asserts that Duke assumed an inappropriate side slope for the cuts,[102] and thus understated earthwork quantities by an average of 49%. In addition, NS assumes that certain of the daylighted tunnels would be double-tracked and that such tunnels would cost 75% more than similar length single-tracked tunnels.

As Duke points out, the reference manual *Railroad Engineering* by William H. Hay recognizes that cuts can have the side slopes proposed by Duke.

---

[101] Daylighting involves extensive excavation so that, rather than placing the tracks in a tunnel, they are placed in an open cut. Daylighting is undertaken when the cost of boring a tunnel is greater than the cost to excavate an open cut.

[102] NS asserts that the minimum standard for a side slope ratio is 1:1. Duke assumed a 0.5:1 side slope for cuts.

Duke also notes that it provided for 10-foot benches for every 30 feet of vertical height excavation to make the cuts even more stable.[103] Because Duke's proposed side slopes for daylighted tunnels are reasonably supported, they are used here. However, because NS's configuration for the ACC is used (resulting in the double-tracking of certain lines) and because Duke has not addressed NS's 75% markup for excavating double-track daylighted tunnels, NS's markup is used here where double-tracking would be needed.

e. Grading Costs

The *Engrg Rpts* classify earthwork into various types: common excavation, loose rock, solid rock, or borrow (material moved to the construction site for fill). In determining the relative amounts of solid rock and loose rock areas along the ACC, Duke assumed, as has been the assumption in many prior SAC cases, that 50% of the area classified as solid rock in *Engrg Rpts* would actually be rippable using modern equipment. NS maintained that much of the rock classified by *Engrg Rpts* as solid rock would still be classified as solid rock and require blasting rather than removal by modern ripping equipment. NS pointed out that the ACC would traverse the Appalachian mountain range and provided a geologic description of the large masses of solid rock that would be encountered in constructing tunnels. Based on its tunnel study,[104] and Duke's assumption that 90% of the material encountered in daylighting tunnels would be solid rock, NS concluded that 90% of the material classified in *Engrg Rpts* as solid rock would need to be removed by blasting.

The analysis here assumes, as Duke does and as the Board and parties have in prior cases, that 50% of the material classified in *Engrg Rpts* as solid rock would be rippable using modern construction equipment. First, NS misinterpreted Duke's evidence. While Duke did assume that 90% of the rock encountered in daylighting tunnels would be solid, it further assumes that half of such rock could be removed with modern ripping equipment. Moreover, NS has provided no support for its assumption that 90% of the solid rock portions of the ROW other than tunnels would require blasting.[105] Finally, NS has elsewhere acknowledged that "most of the mountainous areas [that the ACC would traverse] contain hard shale rock",[106] a material that NS's own workpapers indicate is rippable.[107] Because the record indicates that much of the solid rock would be rippable, Duke's position that 50% of solid rock would be rippable using modern equipment is the more reasonable assumption here.

In its case-in-chief, Duke proposed a mix of earthwork equipment for use in various soil conditions. NS generally agrees that the equipment proposed by Duke for excavating common earth would be appropriate for the portion of the ACC south of Roanoke, except that NS contends that bulldozers, in addition to

[103] Duke Reb. WP. at 07245.
[104] NS Reply WP. III-F-0122-29.
[105] The geologic study submitted by NS addresses only tunnel construction.
[106] NS Reply Narr. at III-F-30.
[107] NS Reb. WP. III-F-0083 (referencing *Means*).

the scrapers proposed by Duke, would be needed to spread graded material. The Board has previously determined that scrapers can effectively spread graded material and that bulldozers would not be necessary.[108] Accordingly, NS's proposal for additional bulldozers south of Roanoke is rejected.

For grading the ACC through areas of loose and solid rock, NS contends that the equipment proposed by Duke would be inadequate, and NS has proposed a different mix of larger, more powerful earthwork equipment. On rebuttal, Duke acknowledged that some of the equipment in its initial proposal for grading loose and solid rock would be inadequate, and it proposed a mix of equipment that is different both from what it initially presented and from what NS proposed.

Having failed in its opening evidence to account for the difficulty of grading areas of solid and loose rock in mountainous terrain, Duke is limited in what it may present on rebuttal on this issue. Duke objects to NS's unsupported, rough terrain markup for grading the line north of Roanoke. Because NS has not established the need for such an adjustment, it is rejected. In addition, Duke has shown that some, but not all, of the equipment proposed by NS would be unrealistic. Duke points out that the backhoe-type equipment NS designated for grading the ROW is equipment that is designed primarily for trenching and is relatively inefficient for performing other types of excavation; thus it would likely not be used for the grading of a railroad ROW. Therefore, Duke's rebuttal proposal to use a power shovel, equipment more suited for excavation than a backhoe, is used here. However, Duke has not shown that the larger bulldozer that NS specifies for ripping rock in the mountainous terrain north of Roanoke is unrealistic. Furthermore, Duke now concedes that its proposal to use over-the-road dump trucks for moving excavated material was flawed. But Duke has not shown that NS's proposal to use a 22 cubic yard, off-road dump truck to move excavated material is unrealistic and would not be used. While Duke's rebuttal proposal to use a 42 cubic yard off-road dump truck would have been appropriate to propose on opening, it is not appropriate rebuttal in light of NS's realistic alternative. Therefore, NS's bulldozer and dump truck proposal is used here.

For solid rock excavation, because much of the ACC would be in remote areas requiring significant drilling and blasting, Duke used an average of the costs for "bulk drilling and blasting" and "drilling and blasting over 1,500 cubic yards." NS objects to inclusion of bulk drilling and blasting costs, which it contends represents the lowest possible cost for blasting and pertains to quarry operations. However, the bulk drilling and blasting cost used by Duke is not the minimum cost for such activities, but rather an average figure for blasting large quantities of rock.[109] Moreover, there is no indication that the figure used by Duke pertains only to quarry operations. In fact, *Means* has a separately listed cost for drilling and blasting in pits, which would seem to apply to quarry

---

[108] *See PPL*, 6 S.T.B. at 305.

[109] *Means* specifically notes that the cost for bulk drilling and blasting is an average. *See* NS Reply WP. III-F-0082.

operations. Therefore, Duke's unit cost for blasting is reasonable and is used here.

Duke excluded costs for undercutting[110] and fine grading,[111] claiming that they would not be necessary. NS would include costs for both, arguing that unsuitable material must be removed to provide a structurally sound roadbed, and that fine grading is required to efficiently shape the roadbed to the required slope. However, given NS's showing that much of the ROW would be constructed in solid rock areas, there should not be much need to remove soft, structurally unstable soil. Furthermore, NS has not explained why the normal grading activities would not include fine grading. Therefore, the analysis here does not include such costs.

Finally, Duke and NS disagree on the amount of land (925 acres versus 980 acres) that would be required to dispose of waste material generated during the grading process. Because Duke's lower earthwork quantities are generally accepted, Duke's figure for the amount of land needed for waste material is also accepted.

3. Drainage

The parties offer different cost estimates for installing drainage along the ROW and in yards.

a. Lateral Drainage

Duke would have the ACC install lateral drainage along the ACC ROW at the same time as the other roadbed excavation is performed.[112] In contrast, NS would have the ACC install the drainage by re-excavating after completion of the initial roadbed grading, and NS would also include costs for geotextile fabric and for hauling away excavated materials.

In prior SAC cases, it has been found that the more efficient construction procedure would be to install drainage at the same time as the other excavation work would be performed.[113] NS has not demonstrated why that procedure would be infeasible for the ACC. In addition, NS has not shown why geotextile fabric would be necessary. Therefore, Duke's evidence on lateral drainage is used here.

---

[110] Undercutting is the process of removing structurally unsuitable materials from the roadbed.

[111] Fine grading is a process of using specialized equipment to achieve the final grade prior to placement of sub-ballast on the roadbed.

[112] Duke derived the quantity of pipe that would be needed for lateral drainage from *Engrg Rpts* and the cost per LF for installation of the pipe from *Means*.

[113] *See, e.g.*, *PPL*, 6 S.T.B. at 306.

b. Yard Drainage

Duke did not include in its case-in-chief any cost for installing yard drainage. While NS does not discuss the need for yard drainage, its electronic spreadsheets include $8.1 million for such investment. On rebuttal, Duke conceded that yard drainage would be necessary, but it argued that the investment proposed by NS is excessive and not typically used for rail yards. Duke now includes $1.1 million for yard drainage.[114]

Because NS did not discuss why such a high level of investment would be needed, and because Duke points out that the elaborate drainage system shown in NS's workpapers is not generally used by railroads, Duke's rebuttal proposal for yard drainage, which appears reasonable, is used here.

4. Culverts

The parties generally agree that culverts would be used, instead of bridges, to span spaces of less than 20 LF. They disagree, however, on the number of culverts that would be appropriate and on the costs associated with installing them.

a. Quantity

NS argues that the choice between bridges and culverts is not driven by length alone, but must also take into consideration underpass roadway clearances and required hydraulic opening size. NS submits that there are several locations where only a bridge would suffice. Because Duke does not contest NS's evidence that culverts would be unsuitable for certain locations, NS's estimate of the number of culverts is used here.

b. Costs

Duke's cost evidence is based on the use of galvanized corrugated metal pipe culverts similar to those used on the existing NS ROW that would be replicated by the ACC. Duke also specified precast reinforced concrete box (RCB) culverts to replicate the cast-in-place RCB culverts that are in place along the NS ROW. Duke did not include wing walls, headwalls and scour pads on the RCB culverts, as NS's culverts generally do not have such features. Duke also excluded costs for stream diversion, claiming that its method of siting culverts early during the construction process would obviate the need for diversion.

NS asserts that the ACC should use bituminous coated, thicker gauge pipe in order to deter corrosion. NS would also have the ACC use cast-in-place RCB culverts, arguing that the terrain would make it difficult to move precast culverts to where they would be needed. In addition, NS would have the ACC add

[114] While Duke's narrative states that only $0.87 million would be needed for yard drainage investment, its workpapers show a cost of $1.1 million.

wingwalls, headwalls and scour pads to culverts. Finally, NS would include costs for stream diversion during construction of the ACC.

Non-coated corrugated metal pipe and RCB culverts without wingwalls, headwall, or scour pads should be sufficient for the ACC, given NS's use of such culverts on its existing line. Furthermore, Duke has satisfactorily explained that the ACC could move precast culverts over the ROW after it was cleared and that early siting of culverts would eliminate the need for stream diversion. Accordingly, Duke's evidence on culvert costs is used.

5. Retaining Walls

The parties differ significantly in their estimates of the number of, and cost associated with constructing, retaining walls along the ACC ROW. On opening, Duke included costs for soil stabilization gabions (wire mesh containers filled with stone) in place of the masonry retaining walls listed in *Engrg Rpts*, but on rebuttal Duke conceded that the ACC would need additional gabions to replicate other types of retaining walls identified in *Engrg Rpts*. Duke included no costs for handling or acquiring aggregate material to fill the gabions, arguing that the rock excavated during construction of the roadbed could be used.

NS argues that the ACC would need to use structurally stronger retaining wall gabions.[115] In addition, NS would increase Duke's retaining wall quantities to reflect the higher walls necessitated by the ACC's use of a wider roadbed than that reflected in *Engrg Rpts* and to account for walls added to the ROW after *Engrg Rpts* were compiled. Finally, NS would include costs to transport, stockpile, and grade the stone used to fill the gabions.

Given Duke's proposal to use gabions for retaining walls, the ACC would need to purchase gabions that are specifically suited for this purpose. Also, the quantity of retaining walls shown in *Engrg Rpts* would need to be increased to account for the ACC's wider roadbed. As roadbed width increases on sloping terrain, retaining wall height would also need to increase. Furthermore, even if local rock were used, it is reasonable to assume that the ACC would incur costs to handle and sort the rock in order to have materials suitable for preparing structurally sound gabions. Thus, the analysis here includes these costs. However, NS has not demonstrated that the costs must be increased to reflect walls installed after the *Engrg Rpts*. While NS claims to have provided photographs showing post-*Engrg Rpts* walls, the pictures cannot be located in the record and therefore their probative value cannot be assessed.

[115] Retaining wall gabions have specialized anchoring and holding hardware needed for retaining walls.

6. Rip Rap

Duke included only the costs to place rip rap,[116] not any costs for acquiring, transporting, sorting, grading and stockpiling materials for rip rap. Duke asserts that the ACC would collect material from nearby blasted or ripped rock and that the ACC would place this material using equipment already present. Duke contends that, because rip rap can include a wide variety of rock sizes, sorting and grading would be unnecessary.

Duke has offered no evidence, however, to support its assumption that rock would be readily available at each location requiring rip rap and that there would be no additional cost associated with the construction crews gathering and stockpiling the needed rock material. Therefore, the analysis here uses NS's evidence, which includes costs to handle, stockpile and transport rip rap.

7. Relocation of Utilities

The parties agree on the cost ($75,491) that would be incurred for the relocation of utilities along the ACC's Dan River branch. They also agree that, consistent with Board policy,[117] such costs should not be included for any other segments of the ACC, as NS and its predecessors did not incur such costs.

8. Seeding/Topsoil Placement

Duke included costs for seeding and topsoil placement in areas where NS has incurred such costs and on the Dan River branch. Duke relied upon the quantities reported in *Engrg Rpts*, except for the Dan River branch, for which Duke (using *Means*) developed a quantity based on 13 miles of roadbed and a 100-foot-wide ROW.

NS disputes only the quantity of seeding and topsoil placement that would be required for the Dan River branch. NS would include such costs for only the 8-mile portion of the line that would not be subject to flooding while Duke included costs for the entire 13-mile line. Because the Board's SAC analysis incorporates NS's suggestion for building a trestle on 5 miles of the line, seeding and topsoil would be needed for only 8 miles of the line. Accordingly NS's cost evidence is used here.

9. Water for Compaction

NS would include $9.1 million to cover the cost of one water truck for every 3-5 dozers, arguing that this water would be required for compacting soil. Duke did not include any cost for water for compaction, arguing that soil in the eastern

---

[116] Rip rap are large stones placed at the end of drains and culverts to slow and deflect drainage.

[117] *See TMPA*, 6 S.T.B. at 706; *WPL*, 5 S.T.B. at 1025; *McCarty Farms*, 2 S.T.B. at 506; *Burlington N. R.R. v. STB*, 114 F.3d 206, 214 (D.C. Cir. 1997), *affirming West Texas*.

United States has sufficient water content to allow for compaction. As support, Duke provided rainfall charts for West Virginia and North Carolina.[118]

The area traversed by the ACC is not particularly arid, and NS has provided no evidence demonstrating the need for additional water or showing that it uses water for compaction in its own construction projects. Therefore, no cost for water for compaction is included here.

10. Road Surfacing

The parties both use a cost figure of $168,977 for surfacing detour roads along the Dan River branch. While NS argues that the ACC would also incur road resurfacing costs for all road crossings shown in *Engrg Rpts* (2,767 grade crossings), its evidence only includes the cost for surfacing roads on the Dan River branch. Therefore, that is the only cost included here.

11. Erosion Mitigation

The parties agree on the cost for silt fences that would be used during construction of the Dan River branch.[119] Duke did not include such costs for the remainder of the ACC, however, arguing that they are an environmental remediation cost and as such constitute a barrier-to-entry cost that should be excluded from the SAC analysis. To the contrary, the cost of silt fences should be included in the ACC investment base, because such fencing is a modern construction technique needed to preserve the newly constructed roadbed and to prevent accumulation of silt in newly installed culverts or drainage ditches.[120] Absent such fences, additional costs would be incurred to address the damage from runoff.

Duke also excluded costs for slope drains,[121] claiming that NS or its predecessors did not incur costs for such drains when constructing the existing ROW. Again, however, this cost should be included, because slope drains are simply a modern construction practice necessary to avoid the added expense of reworking slopes after heavy rains.

C. Track Construction

A variety of materials would be needed to assemble the tracks of the ACC. Table D-4 summarizes the cost estimates associated with this aspect of constructing the ACC.

---

[118] Duke Reb. WP. at 07286-07290.

[119] The parties also agree on a cost ($100,088) for environmental compliance that would be associated with construction of the Dan River branch.

[120] *See TMPA*, 6 S.T.B. at 707 & n.205.

[121] Slope drains are pipes which carry collected water down a slope without exposing the slope face to soil saturation and erosion. They are temporary devices used to control water runoff during construction before permanent drainage systems are completed.

Table D-4
Track Construction

	Duke	NS	STB
Sub-ballast	$49,523,986	$65,103,181	$54,601,380
Ballast	25,947,202	60,873,902	28,109,423
Ballast Offloading	0	16,535,424	0
Geotextiles	628	8,908,409	5,175,761
Steel Ties (12mm)	85,375,471	95,138,139	92,907,529
Steel Ties (10mm)	48,341,057	59,059,201	55,577,514
Timber Ties	4,183,031	7,047,399	6,003,015
Transition Ties	0	2,173,500	2,173,500
New Rail	95,278,634	116,036,196	95,986,312
Relay Rail	51,537,816	62,693,857	58,907,951
Rail Offloading	0	8,349,229	0
Field Welds	500,664	3,082,625	516,587
Joint Bars	698,425	1,000,616	852,339
Insulated Joints	109,920	678,000	144,640
14 Inch Tie Plates	2,371,356	3,015,631	3,367,890
18 Inch Tie Plates	0	1,315,136	0
6 Inch Spikes	206,205	360,671	321,809
Rail Anchors	124,518	221,375	190,286
Spring Clip Assemblies	115,180,085	129,493,146	127,472,385
Switches	17,245,420	43,050,622	24,762,680
Rail Lubricators	4,446,016	4,352,544	4,352,544
Track Construction	189,745,614	207,669,240	205,710,688
TOTAL*	$690,816,048	$896,158,043	$767,134,233

* Columns may not sum to totals because of rounding.

1. Sub-ballast and Ballast

The parties agree on the use of 8 inches of sub-ballast and 12 inches of ballast for main-line track, and on a sub-ballast cost of $8.03 per cubic yard. They disagree on the need for sub-ballast in yards, the quantities of sub-ballast and ballast needed, the unit cost of ballast, and costs for transporting and offloading ballast.

a. Yards

Duke would have the ACC install 10 inches of ballast in yards (and on spur lines and set-out tracks). Duke argues that 10 inches of ballast over 1 foot of compacted fill would provide sufficient support for the track structure, and Duke has provided evidence demonstrating that the pressure exerted on the subgrade would be well below the American Railway Engineering and Maintenance-of-Way Association (AREMA) maximum loading specifications.[122] NS would have the ACC install 6 inches of sub-ballast in yards and under set-out tracks, in addition to 10 inches of ballast, because of the heavy axle loads of ACC trains, poor soil conditions, and Duke's exclusion of geotextile fabric in the yards.

Duke's reliance on the AREMA industry standards is reasonable, and NS has failed to explain why those standards would not be appropriate to use here. Therefore, no cost for sub-ballast in yards is included here.

b. Quantities of Material

Duke's calculation for quantities of sub-ballast and ballast excluded the area occupied by ties embedded in the ballast. NS presented its own calculations for the quantities of sub-ballast and ballast. Duke's calculation is more accurate, however, as it recognizes that ties and ballast cannot occupy the same area.

In determining the amount of rock the ACC would require, Duke used a conservative conversion factor of 1.5 tons/cubic yard for sub-ballast and ballast, based on a published 1.325 tons/cubic yard conversion factor for compacted granite ballast.[123] NS used conversion factors of 1.76 tons/cubic yard and 1.62 tons/cubic yard for sub-ballast and ballast, respectively. Duke's 1.5 tons/cubic yard conversion factor is used here because it is based on a published reference, whereas NS's conversion factors are unsupported.

c. Unit Costs

Duke based its ballast cost figure on information obtained from NS in discovery. NS restated Duke's unit cost for ballast to include transportation costs from quarries to the work sites. However, the data on ballast costs that NS supplied to Duke in discovery indicate that the cost included delivery to the railroad.[124] Therefore, the transportation costs added by NS are a double count and should be excluded. Duke's cost figure of $4.51 per cubic yard for ballast is accepted.

NS would also add a separate ballast offloading cost of $16.5 million for the labor and equipment needed to move the delivered ballast onto the track structure after the laying of the rail. Duke argues that the contractor responsible for track construction would offload the material. It is reasonable to assume that a quote from a contractor for laying the track and installing the ballast would include the cost for placing the ballast along the ROW. Therefore, a separate offloading cost is rejected.

---

[122] *See* Duke Reb. WP. Vol. 7 at 07297-07304.
[123] *See* Duke Reb. WP. Vol. 7 at 07291.
[124] *See* Duke Open. WP. Vol. 8 at 03687.

2. Geotextile Fabric

Duke would place geotextile fabric only under switches and crossings on the Dan River branch line. Duke reasons that, because geotextile fabric was not developed until 1968 and virtually all of the NS lines that would be replicated by the ACC were built before that time, the cost of geotextile fabric should be excluded from the SAC analysis, as an expense that NS has not itself incurred.

NS argues that it is current standard railroad practice to use geotextile fabric to improve roadbed stabilization in locations subject to diverse lateral forces (such as turnouts and road crossings) and locations with poor subgrade quality, and that failure to include geotextile fabric would increase the need for spot surfacing. NS further argues that Duke's proposal to use steel ties would increase the need for geotextile fabric, because more lateral force is transmitted to the subgrade under steel ties. Accordingly, NS would have the ACC include geotextile fabric costs for all turnouts and crossings, for all curves greater than 6 degrees, and for 10% of the remainder of the ACC to account for poor soil structure. NS would use a unit cost of $1.15 per square yard delivered, and it would add labor, overhead and profit based on *Means*.

As the parties in prior SAC cases have acknowledged, the installation of geotextile fabric under all turnouts and crossings is now a standard practice and, as such, its cost is properly included in the SAC analysis.[125] However, because NS has not shown that geotextiles would be required under steel ties or that it has installed geotextile fabric elsewhere on its own system, this cost is included here only for turnouts and crossings on the ACC.

3. Ties

Duke and NS would include $137,899,559 and $163,418,239, respectively, for ties.[126] The parties agree that the ACC would be constructed with heavy-duty (12mm) steel ties for main lines, and industrial duty (10mm) steel ties for spur lines and light-duty connecting tracks. They agree on a tie spacing of 24 inches for tangent track and on curves of 6 degrees or less. They would use industrial-grade wood ties in yards and for set-out tracks. The parties also agree on a wood tie cost of $20 per tie, with a transportation allowance of $1.50 per tie, and on the cost of steel ties and associated hardware. However, they do not agree on the need for or cost of transition ties,[127] the inclusion of transloading costs for steel ties, and tie spacing on curves greater than 6 degrees. Each of these issues is discussed below. The remaining difference in the parties' cost estimates is due to the difference between their network configurations. The parties' tie requirements are restated based on the network configuration accepted in Appendix A – ACC Configuration.

---

[125] *See TMPA*, 6 S.T.B. at 710; *Arizona Public Service Co. v. The Atchison, T. & SF. Ry. Co.*, 2 S.T.B. 367, 406 (1997) (*Arizona*).

[126] *See* Duke Open. e-WP. "iiif3f.xls" & "III-F Total.xls"; NS Reply Exh. III-F-1.

[127] Transition ties, which are larger than standard ties, are used to absorb some of the impact when a train moves from (stiffer) steel-tied track to (more flexible) wood-tied track.

a. Transition Ties

In its case-in-chief, Duke did not include a cost for transition ties. On rebuttal, Duke agreed to the use of transition ties on main line switches; however, Duke would not place transition ties at approaches to yards and bridges. Also, Duke would use 12' x 7" x 9" ties as transition ties, in place of the specialized transition ties proposed by NS.

While Duke acknowledges that transition ties would be necessary, it has not provided evidence on the number of ties that would be needed on the main line. Thus, the number of ties proposed by NS, which is the only evidence as to the number of transition ties that would be needed, is accepted. As to the type of transition tie to use, there is no indication that NS's proposal is unrealistic. Accordingly, NS's cost figure for transition ties is used here.

b. Transportation Cost

NS would include costs for transloading steel ties from a barge in Cincinnati and transporting them to the various ACC construction railheads. Duke explains that it did not include such costs because its tie vendor indicated that the ties could be shipped to Kenova (on the ACC) for the same price as shipping to Cincinnati,[128] and thus a separate transloading cost would not be necessary. Because Duke's cost evidence for steel ties includes transportation to ACC railheads, Duke's evidence on this cost is used here.

c. Tie Spacing

Duke would use the same tie spacing on tangent track and curves, while NS would have the ACC use reduced tie spacing on curves of greater than 6 degrees. Because steel ties are relatively new, there is no industry standard on tie spacing, and NS has not demonstrated that the spacing on steel ties would need to be reduced. Therefore, the analysis here uses Duke's evidence on this point.

4. New Rail

The parties agree that the ACC would use 136-pound premium continuous welded rail (CWR) on main-line track between Kenova and the West Roanoke yard and on curves of 3 degrees or more elsewhere, and that it would use 136-pound standard CWR for all other main-line track. These specifications are used here in conjunction with the miles of track accepted in Appendix A – ACC Configuration to develop the quantity of each type of track needed.

Duke used a price of $500 per ton for standard CWR and $550 per ton for premium CWR. NS used a cost figure of $593 per ton for standard CWR and $647 per ton for premium CWR. NS argues that Duke's lower unit costs are unrealistic because they are based on quotations from a small supplier that likely

[128] *See* Duke Reb. WP. Vol. 7 at 07306.

would not be able to supply the quantity needed to construct the ACC. However, NS has not shown that Duke's supplier would be any less capable of supplying rail to the ACC than the supplier that NS used for its price quote. Accordingly, Duke's unit cost figures are used here.

5. Relay Rail

The parties agree that the ACC would use 115-pound welded relay rail on branch and spur lines, and 119-pound jointed relay rail in yards and on set-out tracks. They also agree on the cost of 115-pound rail. For 119-pound rail, NS would increase Duke's cost (from $400 per ton to $475 per ton) to account for transportation costs. However, Duke's evidence indicates that its cost estimate included transportation costs.[129] Therefore, Duke's $400 per ton figure is used here.

6. Rail Offloading

NS would add separate costs for offloading and distributing rail materials along the ACC roadbed. However, it is reasonable to assume that a contractor's quote for installing rail would include the cost of placing the rail on the ties. Thus, the analysis here does not include a separate cost for offloading.

7. Field Welds

Duke included a unit cost of $55.25 for field welds. NS contends that Duke's estimate is understated because it does not include labor costs. However, the quotation Duke obtained from the contractor that would install the CWR indicates that the contractor would provide all the labor to lay the track sections. Thus, Duke's unit-cost figure for field welds is used here.

8. Joint Bars

Joint bars are required where CWR rail is not used. On opening, Duke did not include any costs for joint bars in yards or set-out tracks where jointed track would be used; nor did it explain why joint bars would be unnecessary. NS would include a cost for joint bars. On rebuttal, Duke recognized the need for joint bars and simply substituted a lower cost for which it provided no support. Accordingly, NS's cost estimate for joint bars is used here.

9. Insulated Joints

Insulated joints are required on rails both before and after turnouts and at approximately 3-mile intervals in centralized traffic control (CTC) territory. The parties disagree on both the cost and number of insulated joints that would be

---

[129] Duke Open. WP. Vol. 8 at 03716.

required on the ACC. On opening, Duke used a cost of $80 each, based on a third-party quotation and, without any support, proposed a quantity of 100 insulated joints. NS included a cost of $375 per insulated joint, based on a third-party quotation, and a quantity of 1,808 insulated joints. On rebuttal, Duke increased the number of insulated joints it would install to 1,374.

Because Duke's unit-cost estimate is supported by evidence and NS has not shown why its higher cost should be used, Duke's unit-cost figure for insulated joints is used here. However, because the number of insulated joints is dependent on the ACC's configuration and NS's proposed configuration for the ACC is used here, NS's proposed quantity of insulated joints is also used.

10. Tie Plates, Spikes, Rail Anchors, and Spring Clips

The parties agree that the ACC would use 6-inch spikes, rail anchors and spring clip assemblies. They also agree on the use of 4 spikes per tie (2 per plate) and a set of 4 rail anchors every fifth tie for wood ties in yards and set-out tracks. Duke would have the ACC use 14-inch tie plates. NS argues that 18-inch tie plates would need to be used. However, NS itself currently uses 14-inch tie plates; therefore, it would seem reasonable for the ACC to do so as well. Because NS does not dispute Duke's cost figures, those figures are used here.

11. Switches

Switches (turnouts) would be required where trains would enter, exit or cross the main-line track, or navigate on yard tracks. The parties agree on the switch specifications,[130] but disagree on the number of switches that would be required and the unit costs for switches. The parties' differing quantities are based on their differing configurations for the ACC. As discussed in Appendix A – ACC Configuration, NS's proposed network configuration for the ACC, with limited modifications, is used here. The switch count used here is based on that restated network configuration.

Duke's cost estimates are based on third-party quotations for switches and switch components. NS also used cost estimates from third-party contractors, but those estimates were for complete switch packages rather than individual components. NS claims that Duke's method of pricing individual components produces an unrealistic estimate of the total cost of switch installation. However, NS has failed to demonstrate that switch costs cannot be properly developed from a combination of component parts. Accordingly, Duke's costs are used in the restatement here of switch unit costs.

[130] AREMA No. 20 turnouts for all main track and passing track sections; AREMA No. 14 turnouts for lower speed sections and interchanges; and AREMA No. 10 turnouts for yard, set-out tracks and low-speed mine leads.

12. Rail Lubrication

While the parties state that they agree on the quantities and costs for rail lubricators, NS's cost evidence assumed fewer lubricators than Duke's (856 versus 875). NS's evidence can be viewed as a concession that the ACC would need fewer lubricators. Because the purpose of the SAC test is to determine the least cost at which the ACC could efficiently construct and operate its system, NS's lower-cost evidence is used here.

13. Track Construction (Labor and Equipment)

Duke and NS included $189,745,614 and $207,669,240, respectively, for track construction costs. The difference in their estimates is due to their differing configurations for the ACC. Because NS's proposed basic configuration for the ACC is used here, its unit cost for track construction costs is also used.

D. Tunnels

The parties agree that the ACC would have 61,209 linear feet of tunnels.[131] Duke would only provide for single-track tunnels, while NS would double-track 12 of the 63 tunnels on the ACC. The parties agree to base the cost for single-track tunnels on the $2,561 per LF figure developed in *Coal Trading Corp. v. Baltimore & O.R.R.*, 6 I.C.C.2d 361, 422 (1990) (*Coal Trading*). Using *Means*, Duke indexed this cost from 1980 to 2002, arriving at a current unit cost of $5,150 per LF. In contrast, NS used an Association of American Railroads (AAR) index to inflate the costs from 1978 to 2002, arriving at a current unit cost for single-track tunnels of $7,223 per LF. However, the cost in *Coal Trading* was expressed in 1980 dollars,[132] and the *Means* construction index is more appropriate for tunnel construction costs than is an AAR index, which is a more general railroad price index. Therefore, Duke's figure for single-track tunnels is used here. However, because NS's configuration for those portions of the ACC where tunnels would be required has been accepted, the analysis here assumes that 12 tunnels would need to be doubled-tracked. As NS's evidence that the cost of a double-tracked tunnel would be 175% of the cost of a single-track tunnel is the only evidence of record, that percentage is used here to develop the cost of constructing double-tracked tunnels.

---

[131] While Duke's narrative indicates that only 59,342 LF of tunnels would be needed, its calculations of tunnel costs were based on 61,209 LF of tunnels.

[132] *See Coal Trading*, 6 I.C.C.2d at 378. While the SARR in *Coal Trading* was to be built in 1977-78, costs were developed for 1980 and then indexed back in the DCF analysis to the time the various assets would have been needed for construction.

E. Railroad Bridges

Duke and NS offered significantly different estimates for bridge construction. The difference in their estimates is due to disagreements on the number of bridges, the design of bridge superstructures and substructures, and certain unit costs for materials. The parties' cost estimates and the restatement used here are shown in Table D-5 below.

Table D-5
Railroad Bridge Costs
($ millions)

	Duke	NS*	STB
Type I	$15.65	$87.32	$78.08
Type II	30.48	121.88	107.66
Type III	199.72	479.41	430.08
Dan River Bridges	2.40	87.50	87.50
TOTAL	$248.25	$776.11	$703.32

* Excludes $3 million in railroad bridge investment that is actually highway bridge investment.

1. Number of Railroad Bridges

NS has challenged the number and size of bridges included in Duke's cost estimates. Duke generally agrees with NS's bridge inventory.[133] But Duke argues that NS has understated the number of bridges that could be replaced with culverts, that NS wrongly assumed that some bridges would be multi-tracked rather than single-tracked, and that the cost of 60 railroad bridges over highways should be excluded because NS did not bear the cost of constructing those bridges.

Because Duke's proposal to substitute culverts for all existing bridges of less than 20 feet is rejected (*see* Culvert discussion, *supra*), the analysis here uses NS's estimate of the number of bridges. And because NS's general network configuration for the ACC is used (*see* Appendix A–ACC Configuration), the analysis here uses the multi-tracked bridges proposed by NS. However, as it is the Board's policy not to include in a SAC analysis costs that the incumbent railroad has not itself incurred, the restatement here excludes the costs associated

[133] *See* Duke Reb. III-F-100.

with constructing the 60 bridges over highways identified by Duke because there is no evidence that NS, or its predecessors, paid for these bridges.

2. Bridge Design and Unit Costs

The parties' bridge cost evidence used bridge categorizations based on length. Type I bridges would be 20-40 LF, Type II bridges would be 40-75 LF, and Type III bridges would be 75-125 LF. As discussed below, the parties disagree on various matters relating to bridge construction in general, as well as on some matters that relate to specific bridge types.

a. Span Lengths

The parties calculated a slightly different average span length, reflecting the differing number of NS bridges that they assumed the ACC would replicate. As discussed above, the analysis here excludes 60 highway bridges that NS would have included, but it includes some Type I bridges that Duke assumed could be replaced with culverts. Thus, the average bridge span length used here is based on the restated number of bridges that the ACC would need to provide.

b. Handrails

Duke proposed using 34-inch high handrails, whereas NS would have the ACC use 42-inch handrails based on AREMA standards. Duke argues that AREMA standards are guidelines rather than requirements and that NS's own bridges often do not even have handrails.[134] However, even though AREMA standards are only guidelines, Duke has relied on those specifications in other aspects of its bridge design. Therefore, it is appropriate to use the 42-inch handrails specified by AREMA.

c. Steel

The parties agree on the cost for structural steel. But Duke's workpapers do not show that it included the cost of reinforcing steel. As NS points out, Duke's proposed bridges include concrete abutments, wing walls, and piers—all of which would require reinforcing steel.[135] NS's evidence on this cost is thus used here.

---

[134] *See* Duke Reb. WP. at 07441.
[135] *See* Duke Open. WP. at 03856-57.

d. Cofferdams

Duke initially did not include any costs for cofferdams.[136] In response to NS's criticism of this shortcoming, Duke on rebuttal conceded that some cofferdams would be required, but only on 20% of the piers on Type II and Type III bridges. However, Duke failed to provide for cofferdams in its case-in-chief and Duke does not demonstrate that NS's proposal is unrealistic. Indeed, cofferdams are generally used for underwater construction. Accordingly, NS's cost evidence for cofferdams is used here.

e. Rip Rap

Duke included costs for rip rap to protect the wing walls, piers and abutments that would be constructed on the ACC. Claiming that Duke's initial rip rap layouts would be insufficient to protect the wing walls, piers and abutments from washing out, or to protect slopes from erosion due to storm water runoff, NS provided a higher estimate (approximately $247,900) for rip rap. On rebuttal, Duke included substantially more investment (approximately $337,900) for rip rap. Because the parties' estimates are based on approximately the same amount of wing walls, piers and abutments, NS's lower estimate is used, as it is a concession that the ACC could install rip rap for less than the amount estimated by Duke on rebuttal.

f. Transportation

NS would add costs for transporting materials to the construction sites. Duke claims that transportation costs are included in the material unit costs it used, but there is no indication in Duke's evidence that these costs were included. Therefore, NS's separate evidence on transportation costs is used here.

3. Superstructures

a. Type I Bridges

The parties generally agree as to the specifications for Type I bridges, but dispute whether a separate walkway would be needed for these bridges. Duke notes that AREMA guidelines allow a minimum 2-foot width gravel shoulder to be used instead of a separate walkway on ballasted deck bridges. Because Duke's proposal to use 14-foot-wide bridges meets or exceeds the AREMA requirements, its evidence is used here.

---

[136] A cofferdam is a watertight enclosure from which water is pumped to expose the bottom of a body of water to permit construction of a pier.

b. Type II Bridges

The parties disagree on the number of tie hook bolts and the number of guard timbers for Type II Bridges. Duke's opening evidence did not include hook bolts. NS would have the ACC include hook bolts on every bridge timber, allegedly based on AREMA standards. However, a review of the AREMA guidelines reveals no hook bolt standards. Moreover, as Duke pointed out on rebuttal, NS's own standard is to place a hook bolt only at every fifth tie.[137] Duke agrees that hook bolts should be included, but Duke's rebuttal evidence would place one on every fourth timber. Because Duke has shown that NS's proposed hook bolt quantity is unrealistic, based on NS's own practices, Duke's rebuttal evidence is used here.

Duke initially provided for no guard timbers. NS would place 4" x 8" timber curbing on one side of the deck. On rebuttal, Duke agreed that guards would be needed and proposed to use 2" x 6" guard timbers placed on both sides of the deck. Because Duke has not shown that NS's proposal is unrealistic, NS's evidence is used here.

c. Type III Bridges

As with Type II bridges, Duke's placement of hook bolts on every fourth timber and NS's use of 4" x 8" timber curbing is accepted for Type III bridges. Also, while the parties differ on the spacing of girders on Type III bridges, they agree that the AREMA standard is appropriate. Accordingly, the restatement here uses the AREMA recommendation that girder spacing be 1/15 of the deck span.

4. Bridge Substructures

a. Piles

NS notes that the type of pile proposed by Duke is no longer manufactured; NS has proposed a substitute pile.[138] Duke assumes that another manufacturer would enter the business and make those piles for the ACC. But in designing a SARR, the proponent of the design must show that its proposal is feasible. It is inappropriate to assume that a construction component that is not actually currently available would nevertheless be available to the SARR. Accordingly, NS's pile design is used here.

NS also argues that Duke understated the bearing requirements for each type of bridge, because the local soil conditions cannot support bridges with the number of piles specified by Duke. Duke did not respond to this argument. Because Duke has not contested NS's proposal for additional piles, NS's evidence is used here.

---

[137] *See* Duke Reb. WP. at 07374.

[138] NS also claims that problems were encountered when this type of pile was installed.

b. Abutments

While NS accepts Duke's abutment types, NS would change the footing design based on the loads that would be applied to the abutments. Because Duke has not responded to NS's argument, NS's revised abutment cost is used here.

c. Pier Height

Duke calculated pier height as 70% of bridge height, measured from the top of the rail to the top of the ground or normal water elevation. In contrast, NS would subtract the actual average superstructure depth from the total bridge height. Because NS's method, which is based on the actual measurements of the structures that would be replicated by the ACC, is superior, that method is used here.

5. Dan River Railroad Bridges

Initially, Duke included no cost for railroad bridges on the Dan River branch. NS would include $69.5 million for a 5.3-mile open deck trestle bridge, to ensure uninterrupted operations of the Dan River branch in case of flooding. NS would also include $18 million for three smaller bridges. On rebuttal, without any explanation or discussion, Duke included $2.4 million for one bridge.[139]

As discussed above, by locating the Dan River branch line in an area prone to flooding, Duke must ensure that the shipper located on that line would receive service as reliable as the service it currently receives from NS, which is not susceptible to service interruption due to flooding of the Dan River.[140] Accordingly, the SAC analysis assumes that a trestle would need to be constructed to protect the branch line from flooding. Furthermore, because Duke has not provided support for its assumption that only a single $2.4 million bridge would be sufficient for this line, NS's evidence that three other bridges would be necessary is used here.

F. Signals and Communications

As shown in Table D-6, the parties disagree on the costs of providing a signaling and communication system.

---

[139] *See* Duke Reb. e-WP. "III-F-Dan River Line - One Mile.xls."

[140] In an attempt to show that flooding would be an infrequent occurrence, Duke submitted evidence that much of the proposed Dan River branch line would lie within the boundaries of the 100-year flood plain. However, that evidence does not indicate the elevation of the proposed line in relation to the boundaries of the flood plain and thus gives no indication of how often the rail line itself would be likely to experience flooding.

Table D-6
Signals and Communications
($ millions)

	Duke	NS	STB
CTC	$45.05	$55.67	$55.67
Signals in Dark Areas	15.12	14.67	14.67
Failed Equipment Detectors	1.48	1.48	1.48
Slide Fences	0.00	24.80	24.80
Communications	54.72	76.10	58.15
TOTAL*	$116.41	$172.72	$154.77

* Columns may not sum to totals because of rounding.

1. Centralized Traffic Control

The parties agree that the ACC would have CTC on the main lines from Kenova to Belmont, with a computer-assisted "track warrant control" system on other signaled lines. Duke and NS agree on the unit costs for CTC, but not on the total costs. NS would have the ACC use more signals for its double- and triple-track configuration and would place signals in more locations than would Duke. Because NS's basic configuration is used here, and because Duke has not shown that signals would be unnecessary at any of the specific locations identified by NS, NS's cost figures for CTC are used here.

2. Signals in Dark Areas

Duke and NS agree on how to estimate costs for signaling in dark territories, but their cost figures differ due to the differences in their proposed network configuration for the ACC. Because NS's proposed configuration is used here, NS's estimate for signaling in dark areas is also used.

3. Failed Equipment Detectors

Duke and NS agree on the cost for failed equipment detectors.

4. Slide Fences

Duke did not include a cost for slide fences. NS states that such fences would be needed in mountainous terrain to detect earth and rock slides. Because Duke has not responded to this argument, NS's evidence is used here.

5. Communications

On opening, Duke proposed a satellite-based communication system. However, on rebuttal, it adopted NS's proposed microwave-based system, but Duke notes that certain equipment costs are already reflected as operating expenses and that NS's proposed tower count exceeds the number of towers actually on the NS line that the ACC would replicate.

NS's microwave costs are accepted, but restated to exclude costs for equipment already included in operating expenses. Also, because Duke's evidence shows that NS's proposed tower count is unrealistic based on NS's own system, NS's tower count is restated to comport with the 45 towers actually on the NS lines that the ACC would replicate.

G. Buildings and Facilities

The parties disagree on the costs associated with fueling and waste water treatment facilities, locomotive and car repair shops, a headquarters building, scales, and yard air and lighting. Table D-7 below summarizes the parties' cost estimates and the Board's restatement.

Table D-7
Facilities
($ millions)

	Duke	NS	STB
Fueling Facilities	$9.25	$10.62	$10.54
Wastewater Treatment	0.12	2.08	2.08
Locomotive Shop	3.49	14.05	14.05
Car Repair	0.00	6.71	0.00
Headquarters	1.36	1.86	1.86
MOW & Roadway Bldgs	1.89	7.42	7.42
Scales	0.00	0.90	0.00
Yard Air and Lighting	2.26	2.14	2.14
TOTAL*	$18.36	$45.78	$38.09

* Columns may not sum to totals because of rounding.

1. Fueling Facilities

Duke would locate ACC locomotive fueling facilities at Kenova and West Roanoke, at a cost of $9.25 million. NS argues that Duke's estimate is based on a smaller locomotive fleet than would be needed and therefore understates the scope of fueling. NS estimated a cost of $10.62 million for fueling facilities at these locations. Duke objects to the inclusion of fuel meters, claiming that other Class I railroads' fueling facilities do not have meters and that meters would not be necessary to measure fuel that would be consumed only by ACC locomotives.

The size of fueling facilities is related to the number of locomotives to be fueled. Because NS's proposed operating plan and resulting locomotive requirements are used here, NS's cost estimate for fueling facilities is used. However, the cost of fuel meters is excluded as an unnecessary expense, because the ACC would be the only railroad whose locomotives would use the fueling facilities.

2. Wastewater Treatment

On opening Duke included $110,000 for wastewater treatment, but did not provide any support for that figure. NS challenged this figure as too low, and has proposed a cost of $2.1 million. On rebuttal, Duke neither contested NS's evidence nor offered support for its own figure. Accordingly, NS's cost estimate is used here.

3. Locomotive Shop

The parties disagree on the building size and equipment necessary for a locomotive shop. Duke and NS would include $3.49 million and $14.05 million, respectively, for a locomotive repair facility.

a. Building

Duke would have the ACC build a 47,000-square foot locomotive maintenance and repair building. This building would be capable of simultaneously handling 16 locomotives for routine maintenance, with space outside of the building for minor repair of five additional locomotives. NS argues that the ACC would need a 61,000-square foot shop, plus an additional 3,000-square foot common area, to accommodate the larger locomotive fleet that it claims the ACC would need. The appropriate building size is dependent on the locomotive fleet size. Because NS's operating plan and its fleet size (restated) are used here, NS's proposed building size is also used.

Duke's building cost per square foot was based on third-party quotations.[141] NS relied on a building cost per square foot based on AREMA standards.[142] Under those standards, locomotive repair facilities require 44-foot ceilings, whereas Duke's quotations are for a facility with only a 24-foot ceiling. At times, engines are removed from locomotives by overhead cranes; a 24-foot ceiling would not provide enough clearance for such operations. NS's unit cost is used here, as it is the unit cost associated with constructing buildings with the required ceiling height.

b. Equipment

Duke claims that, because the ACC would acquire locomotives under a full-service lease agreement, it would not need to provide all of the equipment required for locomotive repairs. NS argues that, even under a full-service lease agreement, the ACC would need to provide the necessary equipment to service the locomotives. Duke has not provided sample lease agreements or any other evidence supporting its argument that a contractor would provide much of the equipment necessary to support the repair facility. Therefore, NS's estimate for equipment that the ACC would need to provide at the locomotive repair facility is used here.

4. Car Repair

Duke did not include costs for car repair facilities, arguing that under a full-service lease repairs would be made by a third-party contractor at the contractor's facilities.[143] Claiming that there are no contractor facilities close to the ACC, NS would include $6.7 million to construct and equip a 26,000-square-foot car repair facility. On rebuttal, Duke supported its initial evidence by noting that a repair facility is located within a few miles of the ACC.[144] Therefore, the ACC would not need to build its own repair shop.

5. Headquarters Building

Duke would locate the ACC's headquarters building at West Roanoke, because of its central location on the ACC system. The facility would accommodate the ACC's senior operating supervisory staff, clerical and dispatching staff, customer service personnel, CTC control center, and general and administrative staff. This building also would serve as an away-from-home terminal for train crews, as well as the base for the mechanical and MOW personnel stationed at West Roanoke.

---

[141] Duke Reb. e-WP. "Type 3 building.xls," tab "Locomotive Repair."

[142] NS Reply WP. Vol. 8 at III-F-0626.

[143] Duke includes the cost of the full-service lease as an operating expense. *See* Duke Open. Narr. III-D-4, WP. 2976-77.

[144] Duke Reb. WP. Vol. 7 at 07383.

The parties generally agree on the building size and the cost per square foot, but they disagree on site development costs. Duke estimates the total cost at $1.36 million, while NS estimates the cost at $1.86 million. NS's estimate is higher because it includes funds for insurance, surveys, and other costs that would be incurred before constructing a building. Because Duke has failed to account for all the necessary costs, NS's cost estimate is used here.

6. Maintenance-of-Way and Crew Change Buildings

Duke included six roadway crew change buildings at a total cost of $576,355, while NS included seven buildings at a total cost of $2.2 million.[145] For MOW facilities, based on their respective MOW plans, Duke included 12 buildings at a total cost of $1,315,059, while NS included 24 buildings at a total cost of $5.3 million. The differences in the cost estimates are due not only to the difference in the number of MOW buildings, but also to differences in the square footage allotment per employee and the cost per square foot to construct these buildings. NS adjusted Duke's building size to accommodate NS's proposed staffing requirements. And while NS used a cost per square foot that was $2 less than the cost used by Duke on opening, Duke on rebuttal argued for an even lower cost, claiming that NS had included unnecessary items, such as paved parking areas.

Because NS's proposed operating plan (including its MOW plan and requirements) is used here, its building quantities and its restated square footage requirements are also used.[146] In addition, NS's unit costs are used. Duke's attempt to impeach NS's proposed unit costs as too high contradicts the evidence in Duke's own case-in-chief, which used units costs even higher than those proposed by NS.

7. Scales

NS asserts that the ACC would require weigh-in-motion scales at Kenova, Celco, and West Roanoke, at a cost of $300,000 each, including the communications equipment necessary to transmit the weights to the ACC billing system. However, as Duke notes,[147] industry practice is to weigh large-volume movements of coal at either origin or destination. Accordingly, the ACC would not need scales.

---

[145] *See* Duke Open. e-WP. "bldgcst2.xls;" Duke Reb. e-WP. "bldgcst2.xls;" NS Reply e-WP. III-F-7 "crew_change.xls."

[146] As discussed in Appendix C – Operating Expenses, the crew requirements reflected here are based on NS's operating plan for the ACC, but Duke's tonnage projections and crew start figures. While this restatement results in one less crew staff for the ACC than proposed by NS, this difference would not impact the cost of crew change facilities.

[147] *See* Duke Open. Narr. III-B-3-b.

8. Yard Air and Lighting

NS would have the ACC place an air system at each end of yards, to expedite train departure by eliminating the need for locomotives to pressurize a train's air system. Duke argues that such systems would not be required, because locomotives attached to the trains would maintain air pressure for brakes. However, Duke has not shown that a locomotive would be attached to all sets of cars at all times. Thus, the ACC yards would appear to need an air system.

Duke conceded on rebuttal that yard lighting would be necessary. Without any support, Duke included a cost of $510,000 for lighting. Because there is no evidence to support Duke's estimate, it is rejected. Therefore, NS's evidence on both yard air and yard lighting is used here.

H. Public Improvements

Table D-8 lists the type of public improvements and associated costs that the parties estimate would be necessary along the ACC ROW.

Table D-8
Public Improvements

	Duke	NS	STB
Fences	$0	$18,358,466	$0
Signs	180,586	1,813,914	180,586
Road Crossing Protection	0	5,470,686	5,470,686
At-Grade Highway Crossings	3,574,174	15,343,988	15,128,667
Grade-Separated Highway Crossings	1,500,000	16,943,653*	16,943,653
Yard Access Roads	1,855,788	1,897,863	1,897,863
TOTAL**	$7,110,548	$56,828,570	$39,621,455

* Includes $3 million that NS inappropriately included in railroad bridges.
** Columns may not sum to totals because of rounding.

1. Fences

Duke inspected about 70% of the NS lines that the ACC would replicate, and it did not encounter any fencing there. Thus, it did not include any cost for fencing for the ACC. Duke provided 41 photographs of the tracks along the

ACC route, showing that the ROW is not fenced.[148] NS would include costs to fence approximately 27% of the line, relying on *Engrg Rpts* and 16 photographs to show that its ROW is fenced.

While the photographs submitted by NS show random lengths of fencing, they do not show any railroad track.[149] Moreover, while *Engrg Rpts* indicates some fencing of the lines that would be replicated by the ACC, Duke's line inspection provides a more up-to-date assessment of current fencing. Because Duke has presented the best evidence of record on this issue, no fencing costs are included here.

2. Signs

Duke included costs for installation of milepost, whistle post, and flanger signs, as well as some speed restriction and resume speed signs. NS claims that station and yard signs, as well as advance warning, additional speed restriction, and resume speed signs would also be necessary for safe and efficient train operation. NS acknowledges that yard limit, reduce speed, and resume speed areas are set forth in the railroad operating timetable, but it asserts that a locomotive engineer would not consult the timetable for speed changes during a trip. On rebuttal, Duke explained that crews are required to be familiar with conditions on the line over which they operate before beginning a trip.[150]

While it claims that "standard safety procedure" would require signs at all of the locations it has specified, NS has offered no support for the extent of the warning signs that it advocates. Indeed, station signs would not be appropriate because the ACC would have no stations. Accordingly, Duke's cost evidence for signs is used here.

3. Road Crossing Protection

Duke included no costs for crossing protection. NS would include crossing protection costs for those grade crossings included in *Engrg Rpts*. NS estimates that it incurred 10% of the cost for crossing protection at those crossings. Because *Engrg Rpt* indicates that NS's predecessor paid for some crossing protection that is still needed today, and NS offers the only evidence of the extent to which those costs were incurred by the railroad, NS's crossing protection cost estimates are used here.[151]

---

[148] *See* Duke Reb. WP. Vol. 8b at 07442, 07446-47.

[149] *See* NS Reply WP. Vol. III-F-8 at 0777-92.

[150] *See* Duke Reb. WP. Vol. 8 at 07487-88.

[151] Other railroads have also indicated that their predecessors paid for about 10% of the costs associated with crossing protection. *See, e.g., TMPA*, 6 S.T.B. at 742. In the absence of better evidence, it seems reasonable to use this factor in SAC cases, rather than including 100% of the cost of replicating all assets identified in *Engrg Rpts*.

4. At-Grade and Grade-Separated Highway Crossings

a. Lines Replicating Existing NS Route

NS would include costs for all at-grade and grade-separated highway crossings identified in *Engrg Rpts*. Duke argues that *Engrg Rpts* are not helpful in determining whether NS or its predecessors paid for these crossings, because the rules governing the data collection for those reports allowed railroads to count the cost of construction even when their contribution to construction costs might have been minimal or non-existent. However, NS maintains that, even where the railroad preceded the highway, the railroad was typically responsible for approximately 10% of the cost of the crossing. Accordingly, NS would include in the SAC analysis 10% of the cost of these highway crossings.

It is reasonable to presume that, where a group of assets are listed in *Engrg Rpts*, the existing railroad, or its predecessor, incurred some investment cost. To the extent that such investment is still necessary for current rail operations, it is appropriate to include those costs in the SAC analysis. Because NS provided the only crossing cost evidence, its evidence is relied upon here.

b. Dan River Branch

For the Dan River branch, both parties recognize that both at-grade and grade-separated crossings would be needed, but neither party provided any support for its cost estimates. Rather, the costs for such investment simply appear in the electronic spreadsheets of each party. Because Duke has the burden of proof on this issues and has provided no justification for its cost figures, NS's evidence on this issue is used here.

5. Yard Access Roads

Duke and NS included $1,855,788 and $1,897,863, respectively, for yard access roads, but neither party addressed this cost. Because Duke has failed to meet its burden of establishing the reasonableness of its evidence, NS's evidence is used here.

I. Mobilization

Mobilization involves the marshaling and movement of people, equipment, and supplies to the various construction sites. A mobilization factor is calculated as a percentage of the construction costs (excluding land, engineering, and contingency costs). Duke only included funds for initial mobilization, which it estimated at $12.3 million, or 1% of those construction costs that it claims do not already include such costs. Duke argues that a 1% markup is sufficient, because the construction bids it used include mobilization and demobilization costs and

Means supports low mobilization costs.[152] Duke notes that in *WPL* (5 S.T.B. at 1036) a 1.2% markup was used for mobilization. But that figure was in addition to separate costs for performance bonds and demobilization that were included in *WPL*.

NS does not contest using a 1% markup for track, signals and communications, and buildings and facilities, but NS would apply a higher markup to roadbed preparation, tunnels, and bridges. NS would also include additional mobilization costs for establishing field offices and staging areas along the ACC,[153] and, unlike Duke, NS would include costs for demobilization and performance bonds. NS estimates total mobilization costs (covering initial mobilization, demobilization, and performance bonds) to be approximately 2.5% of total construction costs (or $101.2 million).

Duke's evidence is unacceptable, as it ignores several cost elements (bridge mobilization, performance bonds, and demobilization) that have been included in prior SAC cases. Because Duke has failed to meet its burden of establishing the reasonableness of its cost estimate on this issue, its evidence is rejected, and NS's 2.5% mobilization factor is used as the best evidence of record.[154]

J. Engineering

Engineering costs would be incurred to plan, design, and manage the construction of the ACC. The parties calculated engineering costs as a percentage of most categories of investment costs (except land). Table D-9 below summarizes the parties' evidence on this cost.

---

[152] *See* Duke Open. Narr. at III-F-50-54; Duke Reb. Narr. at III-F-124-128.

[153] On rebuttal, Duke agreed that funds should be included to establish field offices and staging areas.

[154] NS's evidence is in line with the factor accepted in prior cases. *See TMPA* (2.0% mobilization factor); *PPL* (2.2% factor); *WPL* (2.6% factor); *FMC* (2.4% factor); *Arizona* (2.8% factor); *West Texas* (3.2% factor).

Table D-9
Engineering Costs

		Duke	NS	STB
Percentage of Investment	Basic Engineering Services	5.0%	5.7%	4.0%
	Planning & Feasibility Studies	0.0%	0.5%	0.0%
	Geotechnical Investigation	0.0%	0.7%	0.0%
	Construction Management	0.0%	4.3%	4.3%
	Resident Inspection	1.8%	1.8%	1.8%
	TOTAL	6.8%	13.0%	10.1%
Flat Fee	Location & Design Surveys ($M)	$0.0	$8.3	$0.0
	Environmental Permitting ($M)	$0.0	$5.5	$0.0

The parties disagree as to what activities should be encompassed within the basic engineering services designation. Duke argues that planning and geotechnical studies, as well as management of the construction project, are part of basic engineering services. Duke notes that the American Society of Civil Engineers' *Manual 45* lists six standard phases of a construction project and that five of those six phases (study and report, preliminary design, final design, bidding or negotiating, and construction) are factored into the estimates of basic engineering services in the references upon which Duke relied. NS asserts that basic engineering services do not include planning/feasibility studies, location and design surveys, and geotechnical subsurface investigations.[155] However, NS has provided no support for that assertion. Therefore, Duke's evidence that basic engineering services include planning, surveys, and geotechnical studies is relied upon here.

The major difference between the parties' basic engineering services percentages stems from their differing characterizations of the complexity of the ACC construction. NS asserts that all of the ACC's construction would be above average in difficulty. Duke, however, notes that the American Consulting Engineers Council of Pennsylvania designates bridge and tunnel construction as "above-average" in complexity but railway construction otherwise as only "average" in complexity.[156] As Duke points out, less than one-third of the ACC's construction would involve bridges and tunnels and Duke's proposed

[155] *See* NS Reply Narr. III-F-146-49.

[156] Duke points out that the terrain in western Pennsylvania is similar to much of the terrain the ACC would traverse.

engineering factor takes that into account. Because Duke has supported its evidence on this point, Duke's evidence is relied upon here.

The remaining dispute centers on whether the ACC would use a construction management firm to oversee the project. As Duke recognizes, the use of such firms has been the standard practice for large modern construction projects for some 40 years. Nevertheless, Duke argues that, because the original NS lines were likely built without the services of a management construction firm, such a cost should not be included in a SAC analysis. However, much of the modern construction process relies on an entity being responsible for overseeing all aspects of the project. As NS points out, Duke assumes that the ACC could be constructed in a 16-month period. Such an expedited process would require careful coordination and oversight. Thus, it is reasonable to include this expense as a modern construction practice.

Because NS has provided the only independent evidence on the cost of a management construction firm's services, its 4.3% factor is used here. However, so as to ensure that there is no possibility of a double count of construction management costs, Duke's 5% basic engineering factor is reduced to 4%.[157]

Finally, NS argues that location and design surveys, as well as environmental permitting, should be added to the engineering costs. Such costs appear to be unnecessary. NS has not explained why the cost of surveys is not captured in the study and design phases that are specifically included in the basic engineering estimates used by Duke. Furthermore, it is contrary to SAC principles to include costs for environmental permitting where such costs have not been incurred by the defendant railroad or its predecessors when its original rail system was built.[158]

In sum, the engineering factor used here for the ACC is 10.1% (4% for basic engineering,[159] 1.8% for resident inspection, and 4.3% for construction management). This figure comports with the percentages used in prior SAC cases.[160]

K. Contingencies

A contingency account provides funds to cover unforeseen costs that might arise during construction. Duke proposes an 8% markup for contingencies. NS argues for the 10% contingency figure used in previous SAC cases.[161] NS cites

---

[157] Duke asserts that 20% of its basic engineering service estimate is attributable to construction management.

[158] *See Guidelines*, 1 I.C.C.2d at 529; *West Texas*, 1 S.T.B. at 668-70.

[159] The engineering factor is calculated as a percentage of construction costs excluding land, mobilization, and contingency costs.

[160] *See TMPA* (10.2% of construction costs); *PPL* (10.5% factor); *WPL* (10.0% factor); *FMC* (11.7% factor); *McCarty Farms* (10.0% factor); *Arizona* (9.5% factor); *West Texas* (9.7% factor).

[161] *See TMPA*, 6 S.T.B. at 746; *WPL*, 5 S.T.B. at 1038.

U.S. Army Corps of Engineers data showing 10% or higher contingency markups for multi-million dollar construction projects.[162]

Duke argues that modern engineering practice (project management software and risk management techniques), barrier-to-entry considerations, and obtaining contractor construction bids in advance would all reduce the amount of the contingency costs that would be appropriate. However, Duke has not shown that project management software and risk management techniques would reduce the risk of contingencies on the ACC. Also, Duke's argument that the risk of late delivery of materials of equipment should be ignored in SAC cases is misplaced. The assumption in SAC cases that scarcities would not be a concern (i.e., that the massive numbers of workers, materials, and equipment needed to build a railroad would be available) does not mean that the SARR would be immune from the risk of late arrival of materials or equipment, a normal occurrence in all business transactions. Duke's argument that advance construction bids would reduce the risk of contingencies must be rejected, because substantial cost overruns can occur after construction bids are approved. Finally, Duke cannot assume that the risk factor, and in turn the contingency costs, would be lower because the new entrant would be the beneficiary of building on an existing route. The SAC analysis does not assume any cost advantage from replicating the incumbent carrier's existing plant.[163] Accordingly, as in prior cases, a 10% contingency factor is used.

L. Off-System Investment

As discussed in the body of the decision, the off-SARR rerouting proposed by Duke generally has been rejected. Accordingly, the dispute as to whether the residual NS system would need additional investment to carry the rerouted traffic that it would receive in interchange from the ACC is moot. Thus, no off-system investment costs are included here.

---

[162] *See* NS Reply Narr. at III-F-156.
[163] *See Nevada Power*, 10 I.C.C.2d at 311.