STB DOCKET NO. 37809[1]

McCARTY FARMS, INC., ET AL.
v.
BURLINGTON NORTHERN, INC.

Decided August 14, 1997

Upon reopening, the Board finds that the rates at issue do not exceed a maximum reasonable level.

TABLE OF CONTENTS

[1] This proceeding embraces *McCarty Farms, Inc. v. Burlington N.R.R.*, No. 37809 (Sub-No. 1), and *Mont. Dep't of Agric. v. Burlington N. Inc.*, No. 37815S.

LIST OF ABBREVIATIONS

AAR	Association of American Railroads
AFE	authority for expenditure
ATF	across-the-fence
B&B	bridge and building
BN	Burlington Northern Railroad
CMP	constrained market pricing
CTC	centralized traffic control
DCF	discounted cash flow
DOT	U.S. Department of Transportation
ECP	efficient component pricing
EOTD	end of train device
FRR	Farmers Railroad
G&A	general and administrative
ICC	Interstate Commerce Commission
ICCTA	ICC Termination Act
IDC	interest during construction
ITC	investment tax credit
L&D	loss and damage
LUM	locomotive unit mile
MDOA	Montana Department of Agriculture
MGT	million gross tons
MOW	maintenance of way
PNW	Pacific Northwest
PRB	Powder River Basin
QCS	Quarterly Commodity Statistics
RCRI	railroad cost recovery index
R/VC	revenue-to-variable cost
SAC	stand-alone cost
SARR	stand-alone railroad
TOFC/COFC	trailer on flatcar/container on flatcar
USOA	uniform system of accounts
V.S.	verified statement

BY THE BOARD:[2]

In this proceeding, reopened on court remand, we evaluate the reasonableness of single-line rates assessed from 1978 onward by defendant Burlington Northern, Inc. (BN)[3] for transporting export wheat and barley from origins in Montana to ocean ports in the Pacific Northwest (PNW). We have not revisited the ICC's prior finding of market dominance as that finding was not judicially challenged.[4] Following the court remand, the parties agreed that the constrained market pricing (CMP) approach, specifically the stand-alone cost (SAC) constraint, developed in *Coal Guidelines*[5] should be used to evaluate the reasonableness of the challenged rates. Upon application of the SAC test, we find that the assailed rates do not exceed a maximum reasonable level.

I. PROCEDURAL HISTORY

This proceeding originated as a class action suit in the United States District Court for the District of Montana on behalf of approximately 10,000 Montana farmers and grain elevators (the McCarty group).[6] McCarty sought reparations on past shipments of wheat transported by BN from origins in Montana to ocean ports in Oregon and Washington, and prescription of reasonable rates for the future. The court referred the matter to the ICC, on March 16, 1981, for a

---

[2] The *ICC Termination Act of 1995*, Pub. L. No. 104-88, 109 Stat. 803 (the *ICCTA*), abolished the Interstate Commerce Commission (ICC) and transferred certain functions and proceedings to the Surface Transportation Board (Board) effective January 1, 1996. Section 204(b)(1) of the *ICCTA* provides, in general, that proceedings pending before the ICC on the effective date of that legislation shall be decided under the law in effect prior to January 1, 1996, insofar as they involve functions retained by the Act. This decision relates to a proceeding that was pending with the ICC prior to January 1, 1996, and to functions that are subject to Board jurisdiction pursuant to 49 U.S.C. 10701. Therefore, this decision applies the law in effect prior to the *ICCTA*, and citations are to the former sections of the statute, unless otherwise indicated.

[3] On May 14, 1981, the railroad division of Burlington Northern, Inc., became the Burlington Northern Railroad Company.

[4] Market dominance is "an absence of effective competition from other carriers or modes of transportation for the transportation to which a rate applies" and a prerequisite to our evaluation of the reasonableness of a challenged rate. 49 U.S.C. 10709.

[5] *Coal Rate Guidelines--Nationwide*, 1 I.C.C.2d 520 (1985), *aff'd sub nom. Consolidated Rail Corp. v. United States*, 812 F.2d 1444 (3d Cir. 1987). As explained in detail below, CMP is the collective term for the constraints we impose on a railroad's freedom to charge differentially higher rates on captive traffic.

[6]McCarty Farms, Inc., is one of six class representatives in the court action. We refer to all of the complainants in these consolidated proceedings as McCarty.

determination of the reasonableness of the wheat rates, and McCarty filed a complaint in No. 37809, on March 27, 1981, alleging that BN's rates on wheat, and on barley as well, were unreasonable. In an initial decision served December 14, 1981, an Administrative Law Judge found that BN had market dominance over the involved wheat and barley traffic, and that the rates assessed were unreasonable.

By decision served July 30, 1982, the ICC concluded that barley rates were properly before it, but, because barley was not subject to the class action court referral, the ICC instituted another proceeding, No. 37809 (Sub-No. 1), to deal with those rates. The ICC also reopened the record in No. 37809 for new evidence to comport with its latest decisions on various costing and jurisdictional issues. The two proceedings were then consolidated with a third complaint, No. 37815S, which had been filed jointly by the Montana Department of Agriculture (MDOA) and the Montana Wheat Research and Marketing Committee against wheat and barley rates from Montana.[7] Finally, in a decision served December 21, 1981, the ICC directed the parties to submit suggestions for further evidence on market dominance and maximum rate reasonableness consistent with the latest standards in *Market Dominance Determinations*, 365 I.C.C. 118 (1981),[8] and the then-proposed standards in *Coal Guidelines*.

Numerous delays ensued while the parties pursued discovery and the ICC reevaluated its rate reasonableness standards.[9] Subsequently, in response to a petition for mandamus filed in U.S. District Court, the ICC, by decision served September 11, 1984, reopened the proceedings and directed the parties to submit

[7] Prior to consolidation, no record had been developed in No. 37815S. The complaint, filed March 26, 1981, initially involved shipments to Minneapolis, MN, as well as the PNW. Subsequently, at MDOA's request, the complaint was dismissed as to Minneapolis shipments, by decision served December 28, 1984.

[8] *Aff'd sub nom. Western Coal Traffic League v. United States*, 719 F.2d 772 (5th Cir. 1983) (*en banc*), *cert. denied*, 466 U.S. 953 (1984), *modified, Product and Geographic Competition*, 2 I.C.C.2d 1 (1985).

[9] The proceedings were reopened along with other non-coal cases by a decision served August 12, 1983 in No. 37028, *The Anaconda Co., Aluminum Div. v. Burlington N.* (*Anaconda*). The parties were directed to comment on the extent to which the revised guidelines proposed in *Coal Guidelines* (ICC served February 24, 1983) should be applied in considering maximum reasonable rates on non-coal commodities. Both McCarty and BN filed position statements on this issue. On November 14 and December 2, 1983, the ICC issued follow-up decisions in *Anaconda* holding the consolidated McCarty cases and these other non-coal cases in abeyance pending adoption of final standards in *Coal Guidelines*.

additional market dominance evidence. By decision served April 15, 1986, the record was again reopened for additional market dominance evidence because of the changes adopted in *Product and Geographic Competition*, 2 I.C.C.2d 1 (1985).

In *McCarty Farms et al. v Burlington Northern Inc.*, 3 I.C.C.2d 822 (1987), the ICC found that BN has market dominance over the movement of wheat and barley from Montana to PNW ports, and made tentative rate reasonableness findings based on a revenue-to-variable cost comparison (R/VC_{COMP}) test proposed in *Rate Guidelines--Non-Coal Proceedings*, Ex Parte No. 347 (Sub-No. 2) (*Non-Coal Proceedings*) (ICC served April 8, 1987).[10] In a subsequent decision, 4 I.C.C.2d 262 (1988), the ICC rejected alternatives to the R/VC_{COMP} test and determined benchmark R/VC ratios to be used for judging the reasonableness of each class of transportation service involved (single-car, multiple-car, and trainload). Reparations and a rate prescription were ordered based on the R/VC_{COMP} benchmarks, and the parties were ordered to compute the reparations due.

Upon consideration of the parties' responses, the ICC, in a decision served February 21, 1989, made some technical corrections, recomputed the R/VC_{COMP} benchmark ratios, and provided additional guidance to the parties on the calculation of reparations. In subsequent decisions served March 27 and November 26, 1991, the ICC determined that some of the rates--those on trainload (52-car) movements during the period 1981-1986--were shown to have been unreasonably high. Reparations plus interest were awarded for trainload movements that had occurred during that 6-year period. (Because post-1986 trainload rates were found not to exceed the R/VC_{COMP} benchmark, the ICC determined that a rate prescription for the future was unnecessary.)

Both the shippers and the railroad sought judicial review of the ICC's rate reasonableness determination. BN attacked the R/VC_{COMP} test as an invalid maximum rate standard, arguing that CMP should have been used instead to evaluate the rate levels. McCarty supported the R/VC_{COMP} test, but challenged

---

[10] The R/VC_{COMP} test--one of three non-coal reasonableness benchmarks adopted in *Rate Guidelines - Non-Coal Proceedings,* 1 S.T.B. 1004 (1996)--was originally proposed as a sole test of reasonableness for disputes in which a CMP proceeding would be too costly given the potential damages. Under this simplified test, a challenged rate would be found unreasonable if its revenue-to-variable cost (R/VC) ratio exceeded the R/VC ratio of similar traffic. The ICC found, 3 I.C.C.2d at 840-41, that this case, with its diverse origins and low-volume shipments, lent itself better to the developing simplified methodologies than to CMP.

several aspects of how the test was applied. The United States Court of Appeals for the District of Columbia Circuit remanded the case, finding inadequate the ICC's explanation as to why CMP was not used, and questioning the theoretical grounding for the R/VC_{COMP} test.[11]

On remand, by decision served March 26, 1993, the ICC asked the parties for suggestions as to how to proceed.[12] By agreement of the parties, in a decision served July 22, 1993, the ICC announced that the CMP maximum rate standards would be used on remand to test the reasonableness of the assailed rates.[13]

McCarty undertook discovery and, on October 28, 1994, filed its opening evidence on rate reasonableness.[14] BN then initiated discovery and, on January 19, 1995, filed a motion to dismiss the complaints on the grounds that McCarty had failed to make a prima facie case. BN contended that McCarty had failed to include all of the issue traffic in its stand-alone model and otherwise to show that the model would be feasible. Given the complexity of the case, the ICC declined to dismiss the case at that early stage, but required McCarty to affirmatively show that all issue traffic was included in its stand-alone model and directed BN to present any challenge to the feasibility of the model in the railroad's case-in-chief.

BN filed its reply evidence on March 29, 1995, and revisions on May 23, 1995. McCarty filed a rebuttal on July 17, 1995, and the parties filed simultaneous briefs on August 16, 1995.[15] Before proceeding to an analysis of their evidence, we will summarize our methodology under CMP.

---

[11] *Burlington N.R.R. v. ICC*, 985 F.2d 589 (D.C. Cir. 1993).

[12] Because the ICC's market dominance findings were not challenged on appeal, the ICC announced that those findings would not be reconsidered on reopening.

[13] The rates at issue on remand involve all shipments of export wheat and barley from Montana to PNW ports from 1978 forward. The ICC rejected BN's argument that it should consider only those rates found unreasonable in its 1991 decisions, *i.e.*, rates on trainload movements between 1981-86 at 5.

[14] McCarty filed a supplement on February 28, 1995, and errata on March 8, 1995.

[15] BN raised new arguments on brief, in response to McCarty's change of position in rebuttal (in which McCarty accepted a BN reply theory but offered its own evidence). In those circumstances, the brief was BN's first opportunity to respond to McCarty's new evidence. In the interest of a complete record, we have exercised our broad discretion and considered all arguments presented.

II. SAC GENERALLY

CMP imposes certain constraints on the extent to which a railroad may charge differentially higher mark-ups on captive traffic. The three main constraints[16] are revenue adequacy,[17] management efficiency,[18] and SAC.[19] The revenue adequacy and management efficiency constraints employ a "top-down" approach, examining the defendant carrier's existing operations.[20] More commonly, however, the parties (as here) use the "bottom-up," or engineering, approach of SAC to calculate the revenue requirements for a hypothetical carrier to provide the rail service needed by the complaining shipper free from costs associated with inefficiencies and free from cross-subsidies of other traffic.

The SAC analysis seeks to determine the lowest cost at which a hypothetical, efficient carrier could serve the traffic at issue together with other traffic selected to share the burden of the hypothetical carrier's joint and common costs. Under the SAC constraint, the rate at issue can be no higher than what the hypothetical carrier would have to charge to provide the needed service to the complaining shipper while fully covering all its costs, including a reasonable return.

To make a SAC presentation, a shipper designs a hypothetical new carrier (a stand-alone railroad, or SARR) with the optimum physical plant needed to

---

[16] A fourth constraint--phasing--can be used to limit the introduction of otherwise permissible rate increases if they would lead to undue inflation and dislocation of important economic resources. *Coal Guidelines*, 1 I.C.C.2d at 546-47.

[17] 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.

[18] 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.

[19] The SAC constraint measures efficiency and ensures that the captive shipper does not cross-subsidize other traffic. It ensures that the shipper is not required to pay any more than would be required to replicate the transportation service that it needs (assuming no barriers to entry or exit). *Id.* at 542-46.

[20] 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, a complaining shipper may be entitled to rate relief.

serve a selected traffic group. The SARR's need for plant, equipment and personnel depend on the type and amount of traffic to be handled and the manner in which the SARR would operate (its operating plan). For example, roadway must be sufficient to permit the attainment of the speeds and densities 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 that would be traveling in opposite directions on the same track to be handled safely and efficiently based on the density and congestion assumed in the operating plan.

Once the traffic group and needed physical plant have been determined, the next step in the SAC analysis is to estimate the total revenues that would be generated and costs that would be incurred by the SARR over a selected time period. To be fully viable, a SARR would have to generate sufficient revenues to cover investment costs, the cost of funds tied up during the construction period, operating expenses, tax liabilities, and a reasonable return on investment.[21] Absent better evidence, we presume that the revenues available to the SARR would be comparable to the revenues collected by the incumbent railroad from the traffic that is included in the SARR's traffic group. A past and future revenue stream is thus derived. The total operating and capital costs that would be incurred by the SARR in a base year are derived from the investment in physical plant and the operating plan that are assumed. A cost stream is generated for other years based on projected inflation.

We then compare the revenue stream available to the SARR to the cost stream associated with owning and operating the SARR. Because revenues would be generated and costs incurred over many years, a present value analysis is employed.[22] If the revenues that would be generated by the traffic in the SARR shipper group would exceed the total cost of the SARR, we can conclude that the existing rate levels are too high.

We proceed now to an analysis of the SAC evidence presented in this case.

---

[21] *See, Bituminous Coal--Hiawatha, UT to Moapa, NV*, 10 I.C.C.2d 259, 274-79 (1994) (*Nevada Power II*).

[22] We use a discounted cash flow (DCF) model to discount the revenue and cost streams to the time at which the SARR service would be (hypothetically) initiated.

III. FRR SYSTEM

McCarty has hypothesized a SARR, named the Farmers Railroad (FRR), to carry the coal, intermodal, grain, and general merchandise traffic now moving over BN lines through Idaho, Illinois, Minnesota, Montana, North Dakota, Oregon, Washington, Wisconsin, and Wyoming. As described in more detail in Appendix A, the FRR would generally follow the existing BN routes from Chicago, IL to Seattle, WA, with a major extension into the Powder River Basin (PRB) coal fields of Wyoming.

McCarty excluded some grain gathering branch lines, because it assumed that the FRR would provide substitute truck service to move grain from 80 origins currently served by BN branch lines to approximately 10 grain elevator sites on the FRR. This is an acceptable assumption, so long as the costs for providing the substitute service are included in the SAC analysis (as they have been here). While a stand-alone carrier must meet the shippers' existing service requirements, it may choose to do so in a manner that is different from, and more efficient than, the incumbent carrier's service. Indeed, a primary objective of a SAC analysis is to posit the least-cost, most-efficient way to meet the shippers' transportation needs. *See, Coal Guidelines*, 1 I.C.C.2d at 543.

More troubling is McCarty's exclusion of certain branch lines necessary to serve some of the traffic included in the FRR traffic group. McCarty assumes that BN would continue to own and operate these lines, even though they would be stranded from the rest of the BN rail system, and that the "crossover" traffic originating or terminating on BN branch lines would be interlined with the FRR at new interchange points.[23] However, McCarty has not shown that it would be feasible for BN to maintain lines that would be isolated from the remainder of BN's system.[24] Thus, we seriously question the propriety of the FRR configuration. We need not rule on that issue here, however, because McCarty's

[23] Crossover traffic refers to traffic that would be hypothetically interlined between a SARR and another carrier at interchanges that do not currently exist. It includes traffic that currently is served directly by the defendant carrier, as well as traffic that the defendant carrier currently interchanges with other railroads at different interchange points. *See, Nevada Power II*, 10 I.C.C.2d at 262 n.9.

[24] As explained in *Nevada Power II*, 10 I.C.C.2d at 265-67, a SAC analysis assumes that the SARR would be a replacement for, not a competitor to, the incumbent carrier with respect to the lines included in the SARR.

SAC presentation is unsuccessful even with such a configuration, for the reasons discussed in this decision.

IV. FRR TRAFFIC VOLUMES & REVENUES

For purposes of evaluating the reasonableness of BN's rates, we consider whether the revenues generated by BN's rates for the FRR traffic group would be sufficient to enable the FRR to fully recover its costs over the 20-year (1979-1998) period selected by McCarty for the SAC analysis. (McCarty assumes that the FRR would have begun service in January 1979.) We start our analysis by measuring the revenues that would be available to the FRR under BN's rate structure. The parties estimate the tonnages and revenues that would be available to the FRR based on actual data for the years 1981 to 1993, reconstructed data for 1979 and 1980,[25] and forecast data for 1994 to 1998.

Table 1 shows the traffic volume and revenue estimates for each year, and our analysis follows.

[25] Because BN no longer has traffic data for 1979 and 1980, estimates were necessary for those years.

Table 1

FRR TONNAGES AND REVENUES
(000)

Year	BN		McCARTY		STB	
	Tons	Revenues*	Tons	Revenues	Tons	Revenues
1979	43,253	$644,798	43,548	$657,375	43,253	$653,121
1980	48,164	753,949	48,238	789,121	48,164	788,922
1981	46,901	840,648	46,901	868,135	46,901	863,252
1982	42,665	825,673	42,665	849,623	42,665	845,022
1983	43,065	859,372	43,065	888,907	43,065	884,752
1984	45,406	957,513	45,406	994,747	45,406	989,382
1985	42,180	895,920	42,180	918,382	42,180	913,376
1986	43,651	939,612	43,651	966,047	43,651	961,881
1987	54,394	1,054,228	54,394	1,080,601	54,394	1,075,535
1988	60,796	1,133,768	60,796	1,171,546	60,796	1,163,928
1989	64,070	1,160,682	64,070	1,202,996	64,070	1,195,527
1990	67,277	1,235,633	67,277	1,275,990	67,277	1,268,433
1991	67,220	1,250,978	67,212	1,285,405	67,220	1,277,887
1992	67,679	1,252,007	67,679	1,305,414	67,679	1,295,526
1993	69,152	1,317,371	69,152	1,352,875	69,152	1,343,309
1994	73,241	1,385,428	71,997	1,501,969	73,484	1,431,751
1995	73,612	1,404,822	74,179	1,625,072	73,828	1,442,684
1996	76,112	1,457,589	76,433	1,758,507	76,602	1,501,462
1997	77,337	1,496,022	78,763	1,903,163	78,231	1,538,004
1998	79,453	1,540,915	81,172	2,060,003	80,633	1,589,970

* BN's revenues for crossover traffic are developed using the efficient component pricing concept discussed *infra*.

A. Historical Traffic and Revenues (1981-1993)

The parties agree on the volume of traffic that would have moved on the FRR from 1981 through 1993, and on the revenues during that period for traffic that would have been local to the FRR or interchanged with railroads other than BN. However, the parties disagree over how to estimate what the FRR's share would have been of the revenues from crossover traffic moved over BN's feeder lines and interchanged with the FRR under McCarty's stranded-lines hypothesis. McCarty assumed that the revenues from this crossover traffic would have been divided between the carriers based on a straight mileage proration method.[26] (The ICC used a similar approach in *Nevada Power II* in the absence of any better evidence.) BN objects to a straight mileage proration, noting that railroad revenue divisions are negotiated and are generally not based on mileage formulae. BN argues that, by including in the FRR network only the densest portions of the BN's lines in the area but not providing for the full economic cost of getting traffic to and from the FRR, McCarty has postulated a feeder system that could not cover its cost of providing the feeder service.

BN proposed several alternative means of distributing the revenues from the crossover traffic. One alternative would be to eliminate the hypothetical interchanges, and thus the need for revenue divisions, by incorporating the feeder lines into the FRR network configuration. We are unable to do so, however, because BN did not include an operating plan or identify the costs associated with the movement of traffic over these segments. Thus, there is insufficient evidence in the record for us to fully analyze the feeder lines in this way.

Another alternative suggested by BN would be to construct FRR revenue shares for this crossover traffic using an "efficient component pricing" (ECP) method. BN assumed that it would be capable of providing both single-line and interline service between the same points and would choose to interline with the FRR only if the FRR's share of the revenues did not exceed the incremental cost saved by BN by not itself providing that portion of the service. Use of ECP as a measure for revenue divisions on crossover traffic has been rejected in SAC

[26] McCarty calculated the FRR's share of revenues based on the ratio of miles the traffic would have moved on the FRR to the total number of miles the traffic actually moved from origin to destination.

cases, however. As the ICC explained at some length in *Nevada Power II*, 10 I.C.C.2d at 265-67, it would be inconsistent with the nature and purpose of a SAC analysis to treat the SARR as a competitor of the incumbent railroad rather than its replacement.

The third alternative suggested by BN is a modified mileage proration method. To account for the non-mileage-based costs incurred when carriers switch freight cars (at origin, destination, and interchange points), certain additional shares of the revenues would be assigned to carriers for originating, terminating, or interchanging the freight car. McCarty has not objected to these modifications and, as BN has pointed out, they mirror the procedures that we use in our Waybill costing to assign costs and revenues to particular segments of a move. We find that the modified mileage proration method is superior to a straight mileage proration, because it takes into consideration differing handling costs. Accordingly, we use BN's modified mileage proration method for computing the FRR's share of revenues from crossover traffic in 1981 through 1993.

B. Reconstructed Traffic and Revenues (1979-1980)

Because actual data for 1979 and 1980 is no longer available, both parties estimated traffic volumes for the FRR for those years using Quarterly Commodity Statistics (QCS) data filed with the ICC by BN. The ratios of QCS data for 1979 to 1981 and for 1980 to 1981 were applied to the actual 1981 traffic data to estimate volumes and accompanying revenues available from the stand-alone traffic group for 1979 and 1980, respectively. McCarty applied the QCS coal relationship to unit-train coal movements, the QCS field crop relationship to grain unit-trains, and the QCS relationship for all other commodities to all other traffic, including coal and grain moving in non-unit-train service. In contrast, BN applied the QCS coal ratio to all coal and the ratio for field crops to all grain, because the QCS data did not distinguish between unit-train and non-unit-train movements of those commodities. On rebuttal, McCarty adopted BN's procedure for field crops, but not for coal. We see no basis on which to treat unit-train and non-unit-train service differently, as McCarty would with respect to coal. Therefore, we use BN's more consistent application of the QCS factor developed for coal.

Again, the parties agree on the revenues attributable to traffic that would have been local to the FRR or interchanged with railroads other than BN. As for crossover traffic in 1979 and 1980, BN has not provided a restatement of the revenues based on its modified mileage proration method, and there is no evidence in the record from which we could apply this procedure to the traffic in those years. Therefore, we use McCarty's estimates, based on its straight mileage proration method, as the best available estimate of the revenues available to the FRR from crossover traffic in 1979-1980.

C. Forecast Traffic and Revenues (1994-1998)

1. Tonnage

McCarty forecasted tonnages for FRR coal, grain, and general freight traffic for 1994-1998 by indexing actual 1993 tons by the average historical tonnage growth rate for each of those commodity groups over the comparable BN lines between 1981 and 1992. To forecast FRR intermodal traffic growth for 1994, McCarty indexed 1993 intermodal tonnages by the historical growth rate for that traffic group over the comparable BN lines since 1981 (13.2%). For 1995-1998, McCarty used a 4.9% growth rate for intermodal traffic, based on the low end of an industry forecast.

BN argues that McCarty's projections overstate the tonnage growth that could realistically be anticipated for the FRR from 1994-1998. BN estimated tonnage growth for FRR grain, general freight and intermodal traffic for the FRR based on BN's September 1993 systemwide forecast, and coal tonnages for the FRR based on a portion of BN's March 1994 coal forecast,[27] both of which were prepared as part of BN's normal business planning activities.[28] We discuss the parties' projections for each category of traffic below.

a. *Coal.* Absent an actual forecast of future growth trends, McCarty's method of projecting traffic growth based on historical trends would be used.

---

[27] BN substituted its March 1994 coal forecast for the coal forecast from its September 1993 systemwide forecast because the March 1994 coal forecast contained a specific breakout of coal traffic from the PRB to the Chicago and Minnesota marketing areas, which constitutes 95% of the coal included in the FRR traffic group. While McCarty complains that BN's March 1994 coal forecast was for BN's entire system, BN used only the focused tonnage growth forecast for the PRB-Chicago/Minnesota markets to estimate growth in FRR coal traffic.

[28] BN's September 1993 systemwide and March 1994 coal forecasts only provided projections for 1994-1997. BN projected 1998 tonnages based on the average annual change in tons between 1993 and 1997 from these forecasts.

However, BN's prospective coal forecast was produced in the normal course of business and encompasses 95% of the FRR coal traffic. Given the choice between a normal business forecast (based on more than just historical growth patterns) made by the carrier serving a particular market, and a projection that merely assumes that historical trends will continue in the future, we find the business forecast preferable. Thus, we use BN's estimate of coal tonnage for the 1994-1998 period.

b. *Grain*. McCarty argues that, because BN's September 1993 grain forecast was an aggregate forecast for the entire BN system (which in 1993 included five times more grain traffic than the FRR would handle), it is not necessarily representative of the FRR grain traffic group. We agree that to base an estimate of FRR grain traffic on a forecast that for the most part focuses on geographic areas not served by the FRR would be inappropriate. In this circumstance, we find that McCarty's projections, based on historical trends that are specific to the FRR traffic group, is the better evidence of record.

c. *Intermodal.* Based on the historical growth rate for the FRR intermodal traffic group, McCarty estimated that this traffic would increase by 13.2% in 1994. For subsequent years, McCarty projected a 4.9% growth rate, based on a rail industrywide forecast. In contrast, BN's used its 1993 systemwide forecast, which projected that BN's intermodal traffic would increase by 0.2, 7.0, 5.8, 5.6, and 3.8% respectively over the 1994-1998 period.

Because we favor the forecasts that are most directly related to the traffic that would use the FRR, we accept McCarty's 13.2% growth rate for 1994, which is based on past trends for this specific traffic.[29] Applying this same preference, however, we believe that BN's 1993 systemwide forecast provides the best evidence of record for the growth in intermodal traffic that the FRR would experience for the 1995-1998 period. BN's systemwide forecast is more closely related to the FRR group than the broader, industrywide forecast on which McCarty relied.

---

[29] BN's low systemwide growth rate for the intermodal traffic for 1994 (0.2%) was, McCarty asserts, a result of BN's termination of its Texas intermodal service in April 1994. In any event, BN's forecast of 0.2% growth for 1994 appears to have been too low. Even with the cessation of Texas intermodal service, BN had an actual systemwide intermodal traffic growth rate of 2.5% between the third quarters of 1993 and 1994. Regionally, the larger Western carriers experienced double-digit percentage increases in intermodal traffic in 1994, with an average increase for Western Class I railroads of 14.8%.

d. *General Freight.* McCarty used historical trends to project the growth for FRR general freight traffic, while BN relied on its own 1993 systemwide forecast. The parties have not addressed the minimal differences (less than one-half of one percent) in their respective projections for general commodities. Because McCarty's projections were based on the historical pattern of traffic that would be carried by the FRR, whereas BN's forecast involved a much broader spectrum of traffic, we use McCarty's figures for this traffic.

2. Revenues

McCarty projected annual average increases in FRR revenues of 4.49% for the period 1994-1998 by indexing the 1993 revenue levels by the average annual change in a general rail industry cost index[30] between 1988 and 1993. BN used an overall 0.3% projected revenue growth, based on its September 1993 systemwide forecast for grain, intermodal, and general commodity revenues for 1994-1998.[31] Because its March 1994 coal forecast did not include revenue projections, BN used its system-average revenue per ton-mile for coal to project changes in FRR coal revenues. We conclude that the narrower, BN-specific estimate of revenue growth is preferable to McCarty's estimate based on industrywide data.[32] We therefore find that BN's 0.3% growth rate for revenues for the 1994-1998 period is the best evidence of record.

---

[30] Association of American Railroads' (AAR) Annual Index for Materials Prices, Wage Rates and Supplements Combined (including fuel) for the Western District (AAR Index) from 1988 to 1993.

[31] BN notes that, in the period 1988-1993, its actual revenues per ton-mile for the intermodal traffic that would have been handled by the FRR actually decreased by an average annual rate of 1.3% due to an increasing length of haul and to competitive market pressures. Despard Rebuttal Exhibit BAD-11, page 1. In that same time period, BN's systemwide revenue per ton on all traffic increased at an average annual rate of only 0.3%--the growth rate that BN forecast for the FRR for the 1994-1998 period.

[32] We note that BN's systemwide historical revenue per ton grew by 1.7% annually from 1979-1993, and that the revenue growth per ton for traffic that the FRR would have transported during the same period was 1.8%. Rather than relying on the historic growth rate of the specific traffic that would be carried by the FRR, as it did to project tonnages, McCarty used revenue projections for 1994-1998 that exceeded the historical growth rate by 60%.

V. FRR OPERATING PLAN

The parties next developed an operating plan for moving the amount and type of traffic that would use the FRR. An operating plan determines the types of investment and number of personnel that would be needed by the hypothetical rail system. Among other things, an operating plan entails the identification of train characteristics, such as the numbers of trains and their lengths, consists, weights, and how they operate over the system.

We reject McCarty's operating plan as infeasible, even for an optimally efficient rail carrier. McCarty's plan assumes that the FRR would move all freight in evenly distributed carloads 365 days per year. The assumption that traffic would be evenly distributed throughout the year is wholly unrealistic. Many commodities (grain in particular) are subject to seasonal fluctuations due to factors beyond the control of any railroad. In order to meet its customers' needs, any railroad must equip itself to accommodate fluctuating traffic requirements, and not simply the yearly average.[33]

We likewise reject McCarty's assumptions that each car would be loaded to capacity, and that trains would be significantly longer than those historically transported by BN. Car loading factors and train lengths cannot be set without regard to the practices and preferences of shippers[34] and connecting railroads. Shippers control loading, and connecting railroads determine train length for traffic received in interchange. While McCarty argues that the load factors and train lengths that it has posited for the FRR could be achieved by offering incentives to shippers, McCarty has not attempted to quantify or to incorporate into its SAC analysis the cost of such incentives, whether in the form of rate

[33] McCarty fails to take into account that numerous factors cause wide, unpredictable fluctuations in demand. For example, grain quality and protein content must be coordinated to meet purchaser orders, and export vessel schedules must be accommodated.

[34] For example, McCarty's loading factors for coal assume the use of high capacity aluminum cars from the start of 1979. Yet most of this traffic moves in shipper-owned coal cars, so that the FRR could not unilaterally select the cars used. BN's historic car type data show that shippers did not make the switch to large-capacity aluminum cars until later in the 20-year analysis period. McCarty also erroneously assumed that the grain car types not available until 1991 would have been available to shippers using the FRR in 1979.

reductions or additional costs to the railroad.[35] Moreover, some of the proposed loading factors would be unobtainable in any event. (For barley traffic, for example, the volume capacity of the grain cars is reached before weight capacity.) Thus, we cannot accept McCarty's car loading factors and train lengths.

We also reject McCarty's assumptions as to the locomotive power that would be needed to move the FRR trains.[36] The number of locomotives that McCarty allots for grain gathering operations is particularly unrealistic. McCarty would have the FRR provide only two locomotive units to service all twelve gathering areas for the years 1979-1982 and 1986, and only four units for high volume years such as 1993.[37] However, grain origins on the FRR would cover a huge, 9-state geographical area stretching from Washington to Minnesota, and McCarty made no provision for moving the limited number of locomotives devoted to gathering operations from place to place. Rather, it appears that McCarty simply assumes that locomotives could be available whenever and wherever needed for grain shipments.

Furthermore, McCarty's operating plan employs a formulaic procedure that would call for different numbers of locomotives for an individual train as it moves from segment to segment along an FRR route.[38] McCarty failed to provide sufficient staging and storage tracks for locomotives to support operating in this manner. But even if such an operation were possible, we

---

[35] Similarly, McCarty argues that its loading factors and train lengths would also be adopted by connecting carriers because they would improve efficiency and make good business sense. Connecting carriers, however, would face the same practical hurdles discussed here.

[36] Without support, McCarty assumes that locomotives would be available for service 85% of the time. This far exceeds the utilization rates achieved by the railroads that McCarty cites as examples of efficiently operated railroads.

[37] For the years in which traffic forecasts were used, McCarty assigned four and a fraction locomotive units to grain gathering operations.

[38] Based on its assumed lading weight per car and train length, McCarty calculated the annual number of trains needed to move the traffic over each segment. It then multiplied the number of trains times the number of locomotives per train times the miles of each segment to calculate the locomotive unit miles (LUMs) per segment. This figure was then divided by 186,150 (the number of miles that McCarty assumed each locomotive could operate in a year) to determine the total number of locomotives needed for each segment. This approach is not practical. Under McCarty's criteria, for example, westbound intermodal trains in 1981-1983 would run four locomotives from Chicago to Savanna, IL (144 miles), three for the next 296 miles into Minneapolis, MN, four for the 242 miles to Fargo, ND, three for the trip to Glendive, MT and five locomotives to traverse other parts of Montana.

question whether it would be feasible. The necessity to stop trains at each segment to add or detach locomotives would hamper a railroad's ability to achieve reasonable schedules and cycle times.

Finally, the cycle times used by McCarty are unsupported, because of McCarty's exclusion of much of the underlying data regarding this traffic. McCarty states that it merely excluded outliers and empty transit time from BN's figures.[39] However, McCarty's exclusions were far more expansive[40] or simply inappropriate.[41]

For all these reasons, we reject McCarty's operating plan as infeasible. Accordingly, we use BN's operating plan, which is based on BN's own experience handling the traffic that would move over the FRR line segments, as the best evidence of record.

---

[39] BN relied on 1991 through 1994 data from its Computer On-Line Data Base data to develop car cycle times for the traffic handled by the FRR. BN contends that its cycle times favor McCarty because: the 1991-1994 period reflects a high point in BN efficiency; FRR would serve a smaller geographic area than BN with additional interchanges; and FRR's "Northern Corridor" rerouting of Montana Rail Link and Minot to Fargo traffic would be circuitous.

[40] McCarty defined outliers as those "annual averages by time category and commodity grouping that exceed[ed] the maximum annual average for the same time category and commodity grouping for the remaining three years by at least 200%." Andrews Rebuttal v.s. at 11-12. As BN points out, of the 241 annual averages eliminated as outliers, only two exceeded McCarty's standard for classification as an outlier.

For certain data, McCarty eliminated a large number of observations and developed averages based on substantially fewer observations. For example, by eliminating the 1991 average time for unloading of intermodal cars at Chicago, McCarty eliminated 478 observations, or 46% of the total observations included within BN's total for that time category and commodity for the four year study. Similarly, 708 observations for the empty transit of coal cars from Casselton, ND, to Big Horn, MT, in 1994 were eliminated, and average hours for the study period were based on only 2 observations from other years. These substantial omissions cannot be characterized as a valid adjustment for outliers.

[41] Based on the assumption that BN had included cars with incomplete cycle times from its data base, McCarty adjusted the empty time portion of the cycle times developed by BN by a mileage-based factor (derived from its own estimates of empty return ratios). BN has acknowledged that empty cars with incomplete cycle times were included in its data base, but states that no adjustment was necessary because it computed cycle times from records that included only a complete car cycle. But even if an adjustment were necessary, McCarty has failed to explain why it would be appropriate to apply a mileage-based factor to adjust a time measure.

VI. FRR OPERATING EXPENSES

The assumptions used to develop the operating plan affect the level of expenses that would be incurred in operating the FRR. Because we reject McCarty's operating plan, we cannot accept its operating expense calculations, for the most part. We have looked at several significant expense categories (freight car, locomotive and roadway maintenance expense) and determined, based on the evidence before us, what those expenses would be for the FRR. It is clear from examining those few items that McCarty cannot prevail on this record, *i.e.*, it cannot show that BN's existing and projected revenues would exceed the SAC for the FRR. Even if all other operating expenses were decided in McCarty's favor (which they could not be, if affected by elements of the McCarty operating plan that we have found unrealistic), it would not change the outcome of this case. Accordingly, for administrative economy and efficiency, we have chosen not to complete a detailed review of those other operating expense components.[42] Instead, we have applied an "assuming arguendo" approach in our SAC analysis - that regardless of which party's figures are accepted for those components, and hence even if we were to use the lower figures, the outcome of the case (that the challenged rates are not shown to be unreasonable) would not be affected. Table 2 below shows the parties' estimates for operating expenses, along with our restatement.

---

[42] We do not specifically address the parties' expenses associated with the Locomotive and Car Maintenance, Locomotive Fuel and Servicing, Operating Personnel, General and Administrative (G&A) Personnel, Truck Expense, TOFC/COFC Services, Motor Vehicle Services, Ad Valorem Taxes, Loss and Damage (L&D), and Insurance. Instead, we apply the cost estimates most favorable to McCarty for the remaining operating expense items in the DCF model.

Table 2

FRR OPERATING EXPENSES
(1979 dollars)

EXPENSE ITEM	BN	McCARTY	STB
Freight Cars	$100,884,386	$ 2,265,726	$75,702,997
Locomotives	39,552,945	10,075,489	43,476,813
Maintenance-of-Way	72,195,416	18,646,612	63,038,000
*Locomotive Maintenance	57,592,948	25,761,409	25,761,409
*Locomotive Fuel	87,898,985	57,243,073	57,243,073
*Locomotive Service	13,724,840	9,017,404	9,017,404
*Freight Car Maintenance	29,233,766	23,046,199	23,046,199
*Operating Personnel	53,608,343	23,751,170	23,751,170
*G&A Personnel	14,026,741	3,435,377	3,435,377
*Truck Expense	4,319,174	1,954,262	1,954,262
*TOFC/COFC Service	12,567,602	12,544,082	12,544,082
*Motor Vehicle Service	428,327	428,298	428,298
*Ad Valorem Taxes	6,209,006	5,453,737	5,453,737
*L & D Expenses	3,848,252	3,874,483	3,848,252
*Insurance	10,266,071	4,087,904	4,087,904
TOTAL	$506,246,803	$201,585,224	$352,815,208

NOTE: Expense categories marked with an asterisk are those categories for which we make no finding, but instead use an "assuming arguendo" analysis.

A. Freight Cars

The greatest difference between the two parties' operating expense figures relate to the cost of meeting the FRR's freight car requirements. Freight car requirements are a function of traffic levels, car loading factors, and cycle times. Because we use BN's assumptions as to each of these elements, we use BN's estimates of the number of cars that would be required by the FRR. However, we use McCarty's figures for the per-car cost of those freight cars. BN's figures are based on the cost of purchasing this equipment, whereas McCarty assumed that this equipment would be leased. Because equipment leasing would result in a lower per-car cost and McCarty's lease rates are substantiated (as they are based on actual BN leases), we use McCarty's per-car cost.

B. Locomotives

Another significant area of difference relates to the cost of meeting the FRR's locomotive needs. The number of locomotives would have to be sufficient to serve all traffic tendered and include a spare margin to allow for mechanical failures, inspections, routine maintenance, and damage from derailments. The parties differed dramatically in their estimates of locomotive needs. For example, McCarty assumed that only 288 locomotives would be needed in the first year of operation, while BN argues that the FRR would need 653. (There is a similarly wide discrepancy between the parties' numbers for each of the succeeding years.) The parties' differing assumptions as to train lengths account for some of the difference in their locomotive requirements. Even more important, however, are their different assumption as to how intensively locomotives would be used and how they would be dispatched.

McCarty calculated the LUMs per year for each track segment based on the total trailing tonnage moving over each segment and on McCarty's estimates of car loading factors, train lengths, and locomotive units per train.[43] However, as discussed above, McCarty's estimates of carloadings and train lengths are unrealistic. Moreover, McCarty's locomotive utilization rate is also unrealistic,

[43] The LUMs for each individual segment were added together to give a total annual LUM. This total was then divided by an assumed locomotive utilization rate to determine the locomotives required. McCarty initially estimated that each locomotive would provide 186,150 LUMs of service per year. It reduced that estimate substantially on rebuttal, to a number that remained far in excess of BN's estimate.

as discussed above. Therefore, we use BN's locomotive requirements for the FRR--which are well substantiated (as they are based on the number of trains historically used, by traffic type, to serve the FRR traffic group in peak traffic periods[44])--as the best evidence of record.[45] We agree with BN that, for the FRR to meet the service needs of shippers in peak periods, excess locomotives would be unavoidable at nonpeak times.[46] Again, however, we use McCarty's evidence as to the cost of leasing an individual locomotive, rather than BN's evidence based on the higher cost of purchasing the equipment. The lease cost submitted by McCarty is substantiated (as it is based on actual BN lease arrangements) and represents the least-cost method of procuring locomotives for the FRR.[47]

---

[44] For grain traffic, BN identified the number of trains historically used for this traffic. BN's intermodal and general freight train numbers were based on historic shipper demands and the schedules necessary to meet those demands. BN developed the number of unit coal trains for specific origin/destination pairs based on the actual traffic the FRR would handle.

[45] McCarty complains that BN based its figures on high-volume traffic years (1981, 1988, and 1989). BN counters that the average tonnage for these years is within 4% of the 20-year average for the FRR traffic group and that the years chosen are the most representative with regard to type of service.

McCarty contends that the FRR could reduce the intermodal locomotive requirement by operating longer trains and using helper service in mountainous terrain. However, McCarty has not shown that it would be feasible to operate longer, less frequent trains for time-sensitive intermodal traffic. Moreover, McCarty has not demonstrated any net reduction in LUMs from the use of longer trains and helper service. Finally, McCarty contends that BN has overstated the number of locomotives required to move grain west of Spokane. BN points out, however, that McCarty failed to account for the additional power required to traverse a long, steep grade from Spokane to Pasco, WA. (An alternative BN routing over the Hangman's Gulch bridge, which does not require additional power, is not included in the FRR network.) In sum, McCarty's criticisms of the locomotives figures submitted by BN are either unsupported, erroneous, or directed at BN's insistence that the FRR be capable of fully meeting the service needs of the shippers.

[46] BN's evidence assumed that the FRR would minimize the excess by coordinating train utilization between intermodal and general freight service. BN rightly assails as impractical McCarty's suggestion that locomotive units used to pull loaded grain trains but not needed for returning empty grain trains would be used for intermodal movements. Intermodal traffic is time-sensitive and could not wait until locomotives not needed elsewhere became available.

[47] As shown in Table 2, our restatement of Locomotive Expense for 1979 is higher than BN's estimate. (This occurs because the inflation indexes used in BN's locomotive DCF analysis would inflate costs faster than the lease rates presented by McCarty.) However, over the entire 20 years the present value of our restatement is approximately $345,800,000 less than BN's estimate.

C. Maintenance-of-Way

The second largest area of difference between the parties' estimates of operating expenses is in the maintenance-of-way (MOW) expenses. The major disagreements over MOW costs involve the estimates of the total amount of labor needed to maintain the FRR and the distribution of labor expenses between operating and program maintenance.[48] McCarty incorrectly categorized all maintenance involving the replacement of any material as program maintenance.[49] Thus, McCarty attributed the labor and equipment associated with any maintenance activity involving materials replacement (*e.g.*, the replacement of isolated ties or spikes) to program maintenance. But operating maintenance includes all material repair and replacement other than the scheduled replacement of assets at the end of their predicted useful life. This treatment is reflected in our Uniform Systems of Accounts (USOA).[50] By classifying all maintenance involving the replacement of any material as program maintenance, McCarty significantly underestimated the labor and equipment expense associated with operating maintenance. BN's evidence more appropriately recognizes that much of the routine maintenance involving repairs

[48] To develop the operating expenses associated with maintaining the FRR roadway, the parties first estimated normalized MOW expense. Normalized maintenance consists of both "operating" and "program" maintenance. Operating maintenance expenses are incurred as an annual expenditure by a carrier to keep its system in good repair, and are included as part of the operating expenses in the SAC analysis. Program maintenance, on the other hand, consists of the replacement of assets worn out by providing service. Because the parties' investment evidence included funds to replace assets at the end of their useful lives, program maintenance costs should be excluded from MOW expenses. The parties agree that the preponderance of the costs associated with procuring the materials used to maintain the FRR should be considered capital expenditures which are appropriately attributed to program maintenance accounts.

[49] The only items of track maintenance that McCarty classified as operating maintenance were: inspection, testing, and spot adjustments to line gauge and surface; labor required to repair broken material; and actions taken to maximize the life of materials. McCarty seeks to draw support from a report commissioned by the U.S. Department of Transportation (DOT), "Analyzing the Economic Costs of Railroad Property for Pricing Purposes." Although the DOT report classifies some categories of material replacement (*e.g.*, electronic components of signal and communication) as program maintenance, the overall context does not support McCarty's position. *See* page 3 of the report, *Non-Project/Program Expense Items* (the replacement of rail, cross ties, switch ties, and other track materials are considered to be separate line items properly considered as operating maintenance).

[50] *See*, 49 CFR Part 1201, Subpart A, USOA, Instruction 2-9 and 2-10 (replacement of less than a complete unit and all track repairs should be treated as an operating expense).

and the replacement of less than a complete unit of property should be treated as an operating expense. Thus, we accept BN's allocations of normalized maintenance between operating and program maintenance, which more closely follows the USOA instructions, as the better evidence of record. Furthermore, as discussed in Appendix B, we generally accept BN's evidence on the number of employees that would be needed to maintain the FRR as the better evidence of record.[51]

VII. FRR CONSTRUCTION COSTS

Finally, the parties submitted significantly differing estimates of the costs that would be necessary to construct the FRR system.[52] McCarty and BN

[51] McCarty notes that BN's proposed per-mile MOW expenses for the FRR exceed BN's own 1979 systemwide per-mile maintenance expense by 50%. However, BN points out that in 1979, only 34% of it track carried more than 5 million gross tons (MGT) per mile, whereas 77% of the FRR track would carry more than 5 MGT. In terms of expense per weighted track mile, BN's estimate for the FRR is only 89% of BN's 1979 systemwide costs. In light of the wide disparity in traffic densities between BN and FRR, we focus our analysis on the individual components of MOW and not on a general comparison to BN's system. Individual MOW issues are discussed in Appendix B and restated in Table B-1.

[52] The parties disagreed as to how long it would take to construct the FRR. Construction of the 36,970-foot Flathead Tunnel, running between Columbia Falls and Sandpoint, MT would be the most time-consuming construction project, requiring 1 year for design and 2 years for construction. McCarty assumed that all other construction would proceed independently and could be completed within this 3-year period. McCarty also assumed that sufficient construction resources and material would be available at normal market prices to accommodate this schedule. We regard the unconstrained resource assumption as necessary to eliminate a barrier to entry. *See, Nevada Power I*, 6 I.C.C.2d at 55; *West Texas Utilities Company v. Burlington Northern RR Co.*, 1 S.T.B. at 671-72 (*West Texas*), *aff'd sub nom. Burlington N. R.R. v. Surface Transp. Bd.*, 114 F.3d 206(D.C. Cir.1997) (*Burlington Northern*); *Arizona Public Service Co. v. Atchison, T.& SF. Ry. Co.*, 2 S.T.B. at 385-86. Existing railroads were built on a piecemeal basis and were not saddled with a need to marshal, in a short period of time, the resources required to construct a rail system the size of the FRR. Consequently, the additional costs associated with marshaling the resources needed to build an entire rail system within a 3-year period should not be imposed on the SARR. Our SAC analysis assumes that labor, material, and machinery would be available in sufficient quantity at current market prices to construct FRR in the minimum time dictated by technological feasibility.

BN has not shown that weather would adversely affect the ability to complete the Flathead Tunnel in the time allotted. BN's evidence on the impact of weather on construction relates only to highway grading, which can be restricted because of freezing during the winter months. Tunnel boring would not be affected by frozen soil.

estimated $3.54 billion and $7.54 billion, respectively. We find that the FRR investment costs would be $4.80 billion.

Five items account for 80% of the difference between McCarty's estimate and our restatement. *See* Appendix C, Table C-1. Two of these, engineering and contingencies, are derivative expenses, *i.e.*, are calculated as a percentage of the construction costs (excluding land). As explained in Appendix C, McCarty substantially understated the factors to be applied, because it failed to take into account the need for certain engineering functions and did not adequately support its estimates for others. McCarty also incorrectly assumed that there would be little uncertainty associated with the FRR construction project and thus little need to have funds available to deal with unanticipated contingencies.[53] Further, as also explained in detail in Appendix C, McCarty substantially understated the costs of land, bridges, and buildings. Most significantly, McCarty failed to account for the cost of transporting track materials from origin to construction access points.

VIII. RESULTS OF SAC ANALYSIS

As described earlier, the SAC test is designed to determine whether the revenues generated by the traffic group served by the SARR would exceed the total costs of providing service on the SARR, including an adequate rate of return on investment. We use a DCF model to compute the sum of the present value of the revenue and cost streams of the FRR over the 20-year analysis period.[54] The table below depicts the resulting overall revenue shortfalls for the FRR from 1979 through 1998. This table shows the amount of traffic that the FRR would handle and the revenues that would be earned, the cost of building and operating the hypothetical railroad, and the shortfall in revenues that would be experienced over the 20-year period.

---

[53] *See, Nevada Power II*, 10 I.C.C.2d at 311.

[54] McCarty's DCF model used 80 quarters, whereas BN's used 20 years. Our DCF model uses 20 years, as opposed to 80 quarters, because much of our analysis is based on BN's operating plan and cost data and we have no way to distribute such data on a quarterly basis.

Table 3

DISCOUNTED CASH FLOW - FRR
(000)

Year	Group Tons	Group Revenues	Road Property Capital Costs	Operating Expenses	Total Annual Expenditures	Overpayment or (Shortfall)	Present Value of Overpayments and Shortfalls
1979	43,253	$653,121	$307,301	$352,789	$660,090	($6,969)	($6,603)
1980	48,164	788,922	387,505	401,122	788,628	294	250
1981	46,901	863,252	417,886	419,422	837,309	25,944	19,555
1982	42,665	845,022	403,763	400,416	804,179	40,842	26,832
1983	43,065	884,752	421,174	396,166	817,340	67,413	38,754
1984	45,406	989,382	457,531	434,341	891,872	97,510	49,375
1985	42,180	913,376	434,028	424,183	858,212	55,164	24,742
1986	43,651	961,881	457,900	455,074	912,974	48,907	19,632
1987	54,394	1,075,535	575,824	537,281	1,113,105	(37,570)	(13,574)
1988	60,796	1,163,928	675,257	560,891	1,236,148	(72,220)	(23,531)
1989	64,070	1,195,527	738,412	583,059	1,321,472	(125,945)	(37,025)
1990	67,277	1,268,433	807,042	621,383	1,428,425	(159,993)	(42,414)
1991	67,220	1,277,887	894,371	624,066	1,518,437	(240,550)	(57,429)
1992	67,679	1,295,526	988,714	642,410	1,631,124	(335,598)	(72,134)
1993	69,152	1,343,309	1,025,507	651,706	1,677,214	(333,905)	(64,563)
1994	73,484	1,431,751	1,102,218	700,570	1,802,788	(371,037)	(64,400)
1995	73,828	1,442,684	1,139,710	737,909	1,877,620	(434,936)	(67,728)
1996	76,602	1,501,462	1,235,051	784,115	2,019,166	(517,704)	(72,432)
1997	78,231	1,538,004	1,338,903	802,581	2,141,484	(603,480)	(75,890)
1998	80,633	1,589,970	1,452,074	854,345	2,306,419	(716,449)	(80,979)
Cumulative Present Value of Overpayments And Shortfalls							($499,562)

Based on our restatement of the parties' evidence, we calculate that the cumulative shortfall in revenues for the FRR traffic group over the analysis period would be at least $499,562,000, in present value terms.[55] Because the revenues that would be collected from the group selected by McCarty would not be sufficient for the efficient SAC carrier that McCarty has hypothesized, McCarty has failed to show that the challenged rates are unreasonably high.

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

---

[55] This is the minimum amount; the shortfall may be greater if we did not use a limited, "assuming arguendo" analysis to select the lowest cost estimate for many of the operating expenses without regard to whether they were adequately substantiated.

Chairman Morgan, *commenting:*

In our recent maximum rate cases, the Board has used SAC, and SAC is what the parties chose as the decisional framework for this case. When we review a SAC case, we look at hundreds of individual cost calculations and traffic projections made by both parties. A shipper has an advantage in a SAC case, because the stand-alone railroad, by definition, consists of an optimal traffic mix moving under optimal conditions selected by the shipper. If a shipper's operating plan and assumptions of efficiencies are plausible and reasonable, we use them, even if they are different from the operations actually conducted by the incumbent railroad.

In this case, we reviewed the numerous calculations made by the parties. For several, we accepted McCarty's calculations. Overall, however, the evidence, viewed even in the most favorable light, failed to show that the hypothetical FRR could earn sufficient revenues to fully cover all of its costs over the 1979-1998 period. As the decision points out, many of the assumptions McCarty made in the plan that it submitted about how the FRR would operate were incompatible with real world rail operations.

For example, no large railroad transporting a variety of products is immune from yearly fluctuations in traffic levels, and no carrier operates with each car fully loaded all of the time, assumptions that McCarty made in order to show that BN's rate structure was excessive. Particularly with respect to grain service, a railroad cannot count on an even level of traffic throughout the year; grain traffic is especially subject to fluctuations.

In addition, McCarty's evidence discounted or significantly understated numerous costs that any railroad would incur. For example, the attempt to reduce construction costs by over $250,000,000 by assuming that track materials would be delivered without charge to the construction site is unrealistic. Likewise, the assumption that only a few locomotives could provide grain gathering services over an immense area stretching from Washington to Minnesota unrealistically limited the number of locomotives that the FRR would need.

In short, the assumptions that McCarty made as to how the FRR would operate and what costs would be incurred did not satisfy the standard of feasibility that is a fundamental requirement of the SAC test. *Coal Guidelines*, 1 I.C.C.2d at 543. Given these evidentiary problems, it was not possible to conclude that BN has abused its market power.

In reaching the conclusion that McCarty's stand-alone cost evidence has not demonstrated that BN's rates were unreasonably high, I have taken into account the earlier decision by the ICC that found, based on the revenue-to-variable cost comparison test, certain rates during the 1981-1986 period to be unreasonably high (a finding that led to a decision partially in favor of the shipper, which did not survive judicial review). The results of the SAC analysis are consistent with those earlier conclusions; indeed, the SAC analysis showed, as did the earlier ICC revenue-to-variable cost analysis, that BN earned revenues between 1981 and 1986 that exceeded the costs of providing service allocated to those years. *See* Table 3. However, under the SAC test, the revenues earned and the costs incurred in the provision of service are viewed cumulatively over the entire analysis period (here the 20-year period 1979-1998). The overall conclusion here is somewhat different from that reached by the ICC in the earlier case, because, on a cumulative basis, the revenues earned did not come close to exceeding the costs incurred by the FRR.

In reaching a decision in this case, I am mindful of the frustration that the McCarty shippers must feel. After pursuing rate relief through litigation in various forums over many years, they may feel that they walk away empty-handed as a result of this decision. However, reaching a decision in this case is one more step in fulfilling the Board's commitment to resolving the agency's rail rate complaint docket, particularly old cases such as this one inherited from the ICC. Furthermore, as with any adjudicative body, this agency must make decisions based on the evidence submitted on the record. Recent decisions confirm that the Board will not hesitate to find rates unreasonable and to prescribe future rates and award reparations when the SAC evidence demonstrates that a railroad is abusing its market power. Such a demonstration, however, was not made here.

It is ordered:

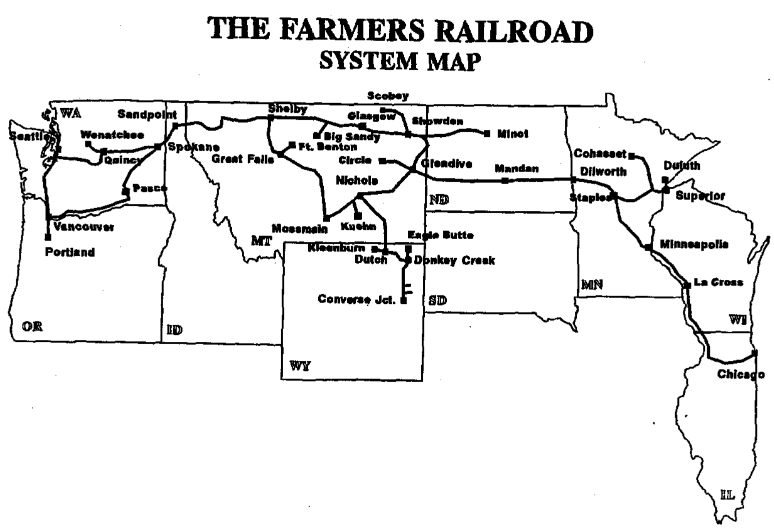
1. These proceedings are discontinued.
2. This decision is effective September 19, 1997.
3. A copy of this decision will be provided to the United States District Court for the District of Montana.

By the Board, Chairman Morgan and Vice Chairman Owen. Chairman Morgan commented with a separate expression.

APPENDIX A

FRR SYSTEM CONFIGURATION

The FRR extends from Chicago, IL to Seattle, WA, with a major extension into the Powder River Basin coal fields of Wyoming. It is designed to handle traffic moving through Idaho, Illinois, Minnesota, Montana, North Dakota, Oregon, Washington, Wisconsin, and Wyoming.



The parties agree on the route that the FRR would follow and the need for, and location of, 12 intermodal, 9 automobile, 18 industrial, 10 regional, and 14 local yards. Table A-1 reflects the parties' estimates and our restatement of the number of miles of track needed by the FRR.

Table A-1

FRR ROUTE AND TRACK MILES

TYPE OF TRACK	McCARTY	BN	STB
Route Miles	4,433.9	4,469.3	4,469.3
Double/Passing Track	979.1	1,583.1	1,141.2
Industrial/Bad Order/MOW Track	192.85	176.0	176.0
Yard Track			
Industrial	50.76	52.43	37.50
Intermodal	73.46	189.00	189.00
Automobile	22.40	(Incl.)	(Incl.)
General Frt. (Regional and Local)	157.77	454.16	202.00
Total	304.39	695.59	428.50
Total Track Miles	5,910.24	6,923.99	6,215.00

A. Route Miles

For analysis purposes, the FRR was divided into 82 segments. The parties agree on route mileage for all but 18 of the 82 segments of the FRR. Their disagreements involve a total of only 35.8 miles. We accept BN's route miles for the disputed segments because McCarty failed to include all of the necessary track or selected incorrect mileage from BN timetable data.[56]

[56] For example, McCarty did not include any track for segment K06 (Wenatchee to Cashmere, MN), contending that no FRR traffic would use this segment. However, a review of McCarty's traffic files shows that McCarty included all tonnage and revenues for traffic moving from Cashmere.

Additionally, McCarty did not include any miles between St. Paul Freight and Northtown Jct., MN (Segment K04) under the mistaken impression that the mileage between these stations has already been included in Segment K05 (Northtown to Minneapolis, MN). A review of BN's workpapers (KKA000025 and KKA000022) indicates that this mileage was not included in Segment K05 and, therefore, should be included in the FRR system in segment K04.

Further, McCarty eliminated 6.9 miles of track at seven mine locations based on a misinterpretation of BN's mine spur track data. For example, on Segment K12 (Belle Ayr Jct. to (continued...)

B. Double/Passing Track

McCarty developed its double/passing track requirements for the FRR from the actual track design of the BN line segments included in the FRR. It separated BN's line segments into six density categories and developed an average ratio of track miles to route miles for each density category. McCarty applied the appropriate ratio to the route miles of each FRR line segment, based on its estimate of density for that segment, to estimate the track mile requirement.

BN acknowledges that density is a general indicator of the need for double or passing track, but contends that McCarty failed to consider other relevant factors such as the number, type, and speed of trains moving over each segment. We concur that factors other than density impact the need for double/passing track. However, as discussed below, BN has not explained how it incorporated the specific factors that it cites in determining double/passing track requirements, or why these factors require an increase in the miles of double/passing track. Although McCarty's method did not explicitly consider factors other than density, such factors are presumably reflected in BN's actual track design upon which McCarty relied.[57] Therefore, with an adjustment to reflect the appropriate density on the FRR,[58] we use McCarty's evidence.

We find that McCarty's evidence, as adjusted, is superior to BN's double track estimates. BN's witness Galassi calculated separate double/passing track requirements for five categories--full double track, interval double track, and 11-, 14-, and 25-mile passing track. While we reject Galassi's estimates we discuss his evidence by grouping.

1. Full Double Track

Because McCarty did not include in the FRR system the trackage of the Montana Rail Link (between Huntley, MT and Sandpoint, ID) or the BN line segment between Minot and Fargo, ND, the overhead traffic now moving over those lines would have to move over the Spokane-Shelby and Glendive-Staples segments, increasing the congestion on these segments. Galassi determined that, on a peak day on the 260-mile Spokane-Columbia Falls portion of the Spokane-Shelby segment, there would be 153 train meets requiring 260 miles of passing track,[59] which would be equivalent to double-tracking the entire segment. From that analysis, Galassi assumed that the entire 403-mile

[56](...continued)
Belle Ayr, MT) BN included 1.8 miles, while McCarty included only 1.1 miles. McCarty excluded 0.7 miles based on its reading of BN's workpaper KKA000057. However, BN's workpaper KKA000048 shows exactly 1.8 miles between these points.

[57] BN's operating plan for the FRR reflects BN's current method of handling the FRR's traffic group. Thus, it can be inferred that BN's current track design could provide service equal to that of the BN's.

[58] As discussed in the body of this decision, we reject McCarty's plan for heavier-than-average carloadings. McCarty's use of fewer cars than what we find would be feasible produced a lower total tare weight and hence lower gross tonnage and density than could realistically be expected. We have restated the FRR double/passing track requirement to reflect the line segment densities that we conclude would occur during peak usage of the FRR.

[59] Based on BN-preferred 9,000-foot sidings (to cover train meets without stopping): 153 train meets = (260 miles x 5,280)/9,000. (Galassi workpapers Vol 1, at JRJ000199-JRG000201 3/29/95.)

Spokane-to-Shelby line segment and the 515-mile Glendive-to-Staples segment would also require double track.

Galassi's Spokane-Columbia Falls analysis did not indicate that any attempt was made to efficiently schedule trains. Potentially, efficient scheduling could alleviate the need for full double-tracking. In any event, demonstrating that double track would be needed for the 260-mile Spokane-Columbia Falls segment does not support double tracking the entire 918 miles of the Spokane-Shelby and Glendive-Staples segments.

2. Interval Double Track

Galassi determined that the Staples-Chicago, Pasco-Vancouver, Glasgow-Shelby, and Nichols-Dutch segments would each handle more than 20 trains daily. He concluded that this density would require significant intermittent double/passing track to eliminate congestion; adequately serve fast intermodal trains, interchange traffic and coal trains; and handle grain gathering operations. Galassi proposed a track design for these segments consisting of 10 miles of double track with two crossovers, followed by 30 miles of single track with a 2-mile passing siding in the middle.

Galassi's based his estimate for these segments on the number of daily trains, his familiarity with operations over these segments, and his use of string charts between Pasco and Vancouver, WA, and between Chicago, IL and Lacrosse, WI. However, there is no explanation as to how the number of trains moving over these segments equates to the number and location of double or passing tracks. Further, the string charts for the Chicago-LaCrosse and Pasco-Vancouver segments do not demonstrate that trains are scheduled for maximum efficiency. In addition, the Chicago-LaCrosse string chart (supporting the Chicago-Staples double/passing track requirement) covers only about half the distance between Chicago and Stables.

3. Eleven, Fourteen, and 25-Mile Passing Track

Finally, to avoid delays and congestion on the remaining single track segments, Galassi determined the location of passing sidings based on the number and mix of trains, the grade traversed and his general experience. For higher density track, he placed 2-mile sidings approximately every 14 miles in relatively flat terrain, and about 11 miles apart elsewhere. Although not specifically discussed in his statement, Galassi's workpapers indicate that he located 1-mile passing tracks every 25 miles on lower-density segments.[60] But he failed to show that these track requirements are standard for the rail industry or would be appropriate for the FRR.

C. Industrial and Bad Order/Maintenance-of Way Track Miles

McCarty included 158.35 miles of industrial track and 34.5 miles of bad order/maintenance-of-way track. BN included a combined total of 176 miles for both types of track. There is no explanation by either party as to how these estimates were developed. In the absence of any support for either estimate, we use BN's lesser miles because they require a lower investment cost.

[60] There is no documentation supporting the development of these passing track miles.

D. Yard Track Miles

The parties agreed on yard locations along the FRR. Their yard track requirements, detailed in Table A-1, were separated into industrial, intermodal, automobile, and regional and local yards.

1. *Industrial.* BN included 52.43 yard track miles for 18 industrial-yard sidings, and McCarty did not contest this figure. However, based on Galassi's explanation, that each industrial siding would require two 4,000-foot tracks and two-1,500 foot tracks,[61] the total miles of track would be 37.5, not 52.43.[62] Our restatement thus reflects 37.5 miles.

2. *Intermodal and Automobile.* McCarty developed investment cost for the yard track and facilities needed to handle TOFC and automobile traffic. However, its investment failed to include all the facilities necessary to service this traffic (*e.g.*, lift equipment and buildings). BN's investment for intermodal and automobile traffic is based on the cost per TOFC lift and automobile loaded. Because McCarty failed to include sufficient investment to service TOFC and automobile traffic, we use BN's evidence, including its estimate of the miles of yard track needed by the FRR.

3. *Regional and Local.* McCarty based its regional and local yard track mileage on the track required to hold and switch the daily average number of loaded and empty general freight and grain cars moving into and out of each yard in the highest volume year (1998). In addition, McCarty added one 2-mile lead track for yards with 10 miles or less of track and two 2-mile leads for yards with 10 miles or more of track. McCarty argues that its approach is generous because not all of the cars moving over the FRR would require switching at every yard.

With respect to all of these categories, BN argues that McCarty has understated yard track miles by assuming an even flow of cars throughout the year (no traffic peaks)[63] and by understating annual carloads (because McCarty assumed each car would carry maximum tonnage). We agree that McCarty's yard track estimate (based on daily average carloads of grain and general merchandise traffic) does not provide sufficient yard capacity to account for peak traffic periods. Based on our analysis of BN's systemwide weekly carloads for 1992, and extrapolation of that data to general merchandise and grain carloads for the FRR, we find that traffic volumes can fluctuate as much as 28% above the average.[64] Therefore, we increase McCarty's yard track requirement commensurately.

We find that McCarty's evidence, as adjusted, is preferable to BN's yard track evidence, which is undocumented and unsupported. For the three main FRR yards--at Dilworth, WA, Glendive, MT, and Spokane, WA--BN simply substituted yards the size of existing BN yards at Lincoln, NE (Hopson Yard), Galesburg, IL, and Alliance, NE, respectively. BN, however, did not

---

[61] Galassi v.s. at 144.

[62] (2 x 4,000') + (2 x 1,500') = 11,000'/5,280' per mile = 2.0833 miles; and 18 yards @ 2.0833 miles per yard = 37.5 miles.

[63] BN notes that grain traffic in particular is seasonal, moving in peaks and valleys through the year. McCarty would attribute these grain traffic fluctuations to conditions within the control of the carrier, because the carrier supplies the grain cars. McCarty provided no probative evidence, however, of the extent to which the FRR could eliminate traffic fluctuations or what impact such action would have on grain shipments (*i.e.*, whether total annual grain movements on the FRR would decline from BN's historic levels). As discussed in the body of this decision, we find that the prospects for achieving a uniform flow of grain traffic throughout the year would be remote.

[64] No data on daily carloads exists, therefore we used weekly average carloads for 1992 (the most current data available) from AAR's Weekly Carloadings.

demonstrate why such yards would be appropriate for the FRR's needs. While BN's witness Galassi asserted that Dilworth would service 1,000 cars per day, he did not explain how he determined that 1,000 cars per day would be switched at Dilworth, or why the Hopson Yard track-mile requirement would be needed for the FRR Dilworth Yard. The same unanswered questions exist with respect to BN's yard track requirements for Glendive, MT and Spokane, WA.

For the remaining seven regional yards, Galassi included 19.56 miles of track for each yard. He explained that these yards would service at least 500 cars per day, requiring 5 tracks "approximately 8,000 to 9,000 feet long" and "15 shorter (about 2,500 feet long) tracks", providing fueling, car repair and scale facilities. For the 14 local yards, Galassi included 7.97 track miles each. He explained that each of these yards would handle 200 to 500 cars per day and require two 8,000-foot tracks and seven 1,500-foot tracks. Again, however, Galassi did not explain how he determined the number of daily cars moving through these yards or how these numbers would establish the track mile requirements.

APPENDIX B

MAINTENANCE-OF-WAY

The parties differed substantially in their estimates of the normalized maintenance costs that would be required by the FRR. BN estimated that $176 million would be needed each year to maintain the FRR. In contrast, McCarty claimed that the FRR system could be maintained at a cost of $91 million per year. Table B-1 summarizes our findings regarding MOW expenses.[65]

[65] As noted in the body of this decision, McCarty's method of assigning costs between operating and program maintenance is inconsistent with the current accounting regulations. Because BN has more appropriately adhered to the USOA instructions in separating maintenance between operating and program maintenance expense, we use its allocations to develop the operating portion of MOW costs. For several of the materials/equipment expense categories, BN did not assign any of the normalized maintenance costs to operating expense. Consequently, we need not discuss the parties' normalized MOW estimates for bridges & buildings, signals & communications, work train service, and track materials, as none of these costs were assigned as an operating maintenance expense.

Table B-1

FRR MAINTENANCE-OF-WAY COSTS
($000)

Description	Normalized			Operating		
	BN	McCarty	STB	BN	McCarty	STB
Personnel						
System Engineering	$2,228	$1,242	$2,002	$785	$124	$705
Division Engineering	1,320	685	1,186	808	69	726
Track Department	25,237	22,412	22,677	17,324	7,403	15,566
Bridge & Building	6,026	2,944	4,639	5,947	786	4,578
Signals & Communication	24,707	5,459	20,686	24,288	3,354	20,335
Electrical Department	2,724	0	2,724	2,694	0	2,694
Purchasing & Stores	3,490	376	3,490	2,618	0	2,618
Contract Work	5,925	3,787	5,191	5,052	3,412	4,426
Materials/Equip.						
MOW Equipment	22,230	3,517	19,758	12,543	1,150	11,271
Stores	184	41	161	138	0	121
Bridge & Building	20,231	10,611	*	0	0	0
Signals & Communications	8,663	6,912	*	0	1,154	0
Work Train Service	958	385	*	0	19	0
Track Material	52,535	32,318	*	0	1,175	0
TOTAL	$176,458	$90,691	N.M.	$72,195	$18,647	$63,038

NOTE: Expense categories marked with an asterisk are categories for which it is unnecessary to make any findings because none of the normalized MOW costs are considered an operating maintenance expense.

A. Personnel

Personnel expenses were calculated by multiplying staffing levels by their respective salaries and fringe benefits. Both parties developed a salary structure and fringe benefit estimate, but McCarty provided no basis for its estimate, no factual discussion regarding the derivation of its costs, and no workpapers supporting its data. Because BN's data (which is based on actual wage data from its 1979 Wage Form A) is the only documented evidence, we use it as the best evidence of record.

1. System Engineering

BN proposed staffing this office with 72 employees in 30 job classifications. McCarty included only 44 employees, simply asserting that a number of job classifications included by BN are unnecessary.[66] McCarty also asserted that BN's staffing level was prorated from levels that included an abnormally large engineering staff, reflecting the additional staff BN needed to construct the Orin Line. However, McCarty presented no evidence to show that BN's system engineering staffing levels were any larger in 1979 than in other years due to the Orin Line construction. Therefore, we use BN's personnel requirements, as they are based on the number of personnel actually employed to maintain these lines.

2. Division Engineering

BN claimed that engineering personnel would also be required at the division level. BN proposed a staff of 44 that would include a division engineer and two assistant division engineers, clerical staff, public works engineers, environmental engineers, and welding and grinding supervisors. McCarty assigned only 26 staff, including 12 engineers, to maintain the FRR. Again, McCarty failed to provide any workpapers or other support for its estimate, and therefore, we use BN's estimate, which is based on the number of personnel it uses to service these lines.

3. Track Maintenance

Using a manpower allocation model to estimate MOW resources,[67] BN estimated that a staff of 1,068 (565 for operating and 503 for program maintenance) would be required to maintain the FRR. McCarty argues that BN's model should not be used to determine staffing requirements for the FRR because the FRR would not be encumbered by unions and craft distinctions. McCarty estimated a total staff of 1,067, but with only 348 workers assigned to operating maintenance.

---

[66] McCarty did not present any supporting documents or workpapers to show how its work force estimates were developed. Its only evidence were entries in an electronic spreadsheet. McCarty failed to explain how its witness arrived at these personnel requirements or why the number of personnel would be appropriate.

[67] BN's manpower allocation model considers such factors as track miles, track miles of curves greater than or equal to two degrees, number of turnouts, number of grade crossings, track miles of concrete ties and track miles of continuous welded rail. The model develops maintenance manpower requirements based on estimates of the annual tonnage carried over each line segment, the time available for maintenance crews to occupy the track, and overall conditions of the track.

McCarty based its staffing level on witness Johnson's estimate following his review of the amount of territory traversed by the FRR, material replacement gang production rates, and asset replacement schedules.

We find that McCarty's evidence is flawed. First, McCarty's staffing estimates are based on its non-standard definition of operating maintenance. As noted in the body of this decision, McCarty failed to follow our regulations or the accounting principles of the railroad industry in separating total track maintenance expense between operating and program activities. Second, McCarty has not adequately supported its staffing estimate or costs. Rather, its estimates are based solely on its witness' general experience without any additional support. Third, McCarty did not support the material replacement rates that were critical to its calculation of the amount of material requiring replacement. For many material categories, McCarty substituted longer service lives than the actual experience routinely reported to the agency by BN, without providing support for these changes. Finally, McCarty has not explained where manpower requirements would be different for a union or non-union operation, or what standards in BN's model would be different for the FRR. In short, McCarty has not shown that the FRR could be maintained by the personnel set forth in its evidence. Therefore, we use BN's staffing requirements, which have been explained and which reflect the FRR's characteristics.

4. Bridges and Building

McCarty and BN included 134 and 195 bridge and building (B&B) maintenance personnel, respectively, for the FRR as shown below:

Table B-2

BRIDGE AND BUILDING PERSONNEL

JOB TITLE	McCARTY	BN
1. B&B Supervisor	6	6
2. Bridge & Scale Insp.	15	15
3. B&B Carpenter & Helpers	78	78
4. Bridge Tenders	12	48
5. B&B Water Service & Treatment Plant Operators	10	14
6. B&B Welders	0	17
7. B&B Foreman	13	17
TOTAL	134	195

The first difference in the parties' staffing numbers is for bridge tenders. Bridge tenders would be needed to operate lift bridges on the FRR. McCarty and BN estimate the FRR would require 3 and 11 lift bridges, respectively. As discussed in Appendix C, we use BN's estimate of 11 lift bridges. Therefore, we accept its estimate for 48 bridge tender personnel.

The difference between the parties' estimates for water service and treatment plant operators stems from McCarty's view that the FRR would not require all of the facilities now being maintained by BN. However, as discussed in Appendix C, we use BN's estimate for buildings and other facilities on the FRR. Therefore, we use BN's estimate of 14 personnel for water service and treatment plant operators.

McCarty does not dispute the need for welders, but argues that bridge welding could be handled by the track department welders. BN does not dispute that track maintenance welders could perform welding on bridges, but points out that welders are also required to work with water service personnel in performing repairs on towers, lighting, buildings and other facilities and structures. While it might be possible for track maintenance welders to perform other welding duties on the FRR, MOW cost must be included to account for these activities. Neither party made any allowance in its track MOW cost for welders to perform other duties. Therefore, because McCarty agrees that B&B welders are necessary, and BN's staffing estimate for B&B welders is the only evidence of record, we use BN's staffing figures.

Finally, while the parties did not specifically discuss their B&B foreman estimates, we use BN's estimate. BN's higher staffing levels, which we use, would logically require a greater number of supervisory personnel.

5. Signals & Communications

McCarty initially estimated that 26 signals and communications employees would be needed on the FRR but, in response to BN's evidence, increased the number to 232 employees.[68] BN claims that 657 staff would be needed--372 for communications and 285 for maintaining signals. BN based its signals staffing estimates on AAR signal units,[69] and its communications personnel estimates on its own staffing experience in the 1980s on that portion of the BN system that the FRR would replace.[70]

---

[68] This figure was not accompanied by support, description, or workpapers relating to how it was developed. McCarty did not include separate categories for signals and communications personnel. McCarty maintains that both functions could be performed by signals personnel. However, other than its witness' statement, no support was provided to show that combining signals and communications maintenance responsibilities would be feasible.

[69] AAR signal units are an industrywide standard that assigns a unit value to every piece of signal equipment on the railroad. The total number of signal units is divided by the yearly maximum number of units serviceable by a technician. The maximum number depends upon Federal Railroad Administration and state requirements.

[70] McCarty complains that BN has suggested higher staffing levels per mile for the FRR than BN requires for its overall system, based on BN's 1979 Wage Form A data. However, a much higher percentage of the FRR would require signaling than does BN's overall system, in view of the FRR's higher traffic densities. In 1979, only 28% of BN's system had centralized traffic control

(continued...)

McCarty provided no support for the staffing levels assumed by its opening evidence. On rebuttal, it increased the staffing estimate nine-fold, but provide no explanation of how either the original or revised levels were developed or the logic used to support the increase. McCarty's evidence was based solely on the opinion of its witness, which was not supported by any probative evidence. Therefore, we use BN's estimates, which are based on industry (AAR) standards and its own experience, as the best evidence.

6. Electrical Department

BN included 75 staff to maintain heating, ventilation, and air conditioning systems in buildings, power distribution systems in yards and other facilities, lighting in yards and parking lots, and track switch heaters. McCarty did not include any electrical personnel, on the ground that these positions should be part of the mechanical department responsible for maintaining equipment such as locomotives. McCarty estimated that the limited electrical maintenance would amount to only $100,000 per year and included the cost for these employees under locomotive maintenance.

As discussed in Appendix C, we use BN's number of and construction cost for roadway buildings and other facilities. McCarty's estimate of $100,000 is for a significantly smaller investment in buildings and facilities and would not be sufficient to service the facilities of the FRR. Thus, we use BN's 75-person staff figures and associated costs.

7. Stores and Handling

BN assumed that a main facility plus two smaller facilities would be needed to supply the FRR. McCarty contends that BN's staffing requirements are overstated because they are based on the current BN system and are designed to handle all supplies for all departments, but McCarty provided no support for its significantly lower staffing levels.[71] Consequently, McCarty has not met its burden of proof as the proponent of the FRR with respect to this issue and, therefore, we use BN's evidence.

8. Contract Work

McCarty accepted most of BN's contract work expense items, but adjusted them to reflect its calculation of FRR track miles. Moreover, McCarty limited track geometry testing costs to twice a year for lines carrying 25 MGT per mile or greater, once a year for track with 1 to 25 MGT per mile, and every other year for branch line track. BN contends that all main line track should be tested twice yearly, and secondary routes and sidings should be tested once a year.

McCarty failed to show that BN's current testing schedule would be inefficient for the FRR, which has line-segment densities greater than BN's, or that other railroads utilize the more limited testing proposed. Therefore, we use BN's track geometry testing schedule, which is based upon actual experience.

---

[70](...continued)
(CTC) and 29% had microwave communication, compared to the FRR requirements of 85% CTC and 100% microwave communication.

[71] *See*, Johnson v.s. at 30-31; Johnson Rebuttal v.s. at 63-64.

The parties' estimates of other contract costs differ principally because of differing track mile estimates. Our restatement of these other costs is based on the total track miles we accepted in Appendix A.

B. Materials and Equipment

As noted above, BN allocates to operating maintenance only two categories of materials and equipment costs. Thus, we need only consider those categories.

1. Maintenance-of-Way Equipment

The parties' differing estimates of MOW equipment costs results from their use of different staffing levels, material specifications, and service lives. As discussed above, we use BN's staffing levels, which are based on actual experience, because McCarty's are unsupported. Similarly, we use BN's service lives, because McCarty's are unsupported. Finally, BN's use of higher quality materials should reduce maintenance costs. Accordingly, we use BN's MOW equipment cost estimates.

2. Stores Department Equipment Requirement

McCarty and BN estimated a normalized MOW expense for this category of $41,276 and $183,536, respectively, based on their estimates of stores department staffing. As indicated above, we use BN's larger staffing level. Therefore, we use BN's cost estimates.

APPENDIX C

FRR ROAD PROPERTY INVESTMENT COSTS

Table C-1 details the road property investment costs for the FRR. Each investment category listed in the table is discussed below.

Table C-1

INVESTMENT COST
($ millions)

ITEM	BN	McCARTY	STB
A. Engineering	$ 643.5	$ 187.2	$ 378.5
B. Land Assemblage Cost	345.7 1,037.2	150.4 0.0	224.4 2.4
C. Grading	715.5	492.0	508.7
D. Tunnels	283.2	206.0	223.7
E. Bridges	735.0	427.0	547.7
F. Culverts	61.3	55.5	55.5
G. Track Material	1,960.6	1,236.5	1,562.9
H. Track Laying & Surfacing	432.5	365.1	386.2
I. Signs, Fences & Snowsheds	57.8	46.5	46.7
J. Buildings & Facilities	209.1	78.5	183.5
K. Roadway Buildings	1.4	0.0	1.4
L. Communication System	74.7	27.1	74.7
M. Central Traffic Control	235.0	140.8	149.2
N. Detectors	35.0	27.3	32.2
O. Railroad Crossings	4.2	3.3	3.3
P. Public Improvements Crossing Warning Devices	 89.7 56.9	 8.1 6.4	 7.9 1.5
Q. Contingencies	559.3	83.3	416.4
TOTAL	$ 7,535.7	$ 3,541.1	$ 4,806.8

A. Engineering Costs

Engineering costs are expenses associated with (1) planning and preliminary design, (2) final design and design services during construction, and (3) construction management. McCarty's and BN's aggregate engineering costs represent 6% and 13%, respectively, of their total estimates for construction costs.[72] Based on an analysis of these three components, we conclude that overall engineering would constitute 10% of construction costs.

1. Planning and Preliminary Design

McCarty contends that, while a number of track design standards for the FRR would be below-average in complexity, and a number of bridge design and construction issues would be above-average in complexity, the overall construction project would be average in complexity. McCarty provided for only nine functions in the planning and preliminary design phase,[73] and assigned to these functions a cost equal to 1% of the total investment in the FRR.

BN allocated 2% of the total investment costs to planning and preliminary design. BN rates the project as above average in complexity. BN compared this project for a 4,469-mile railway traversing nine states, including the design and construction of more than 1,600 bridges, to the construction of the U.S. Interstate Highway system. BN points out that soil investigations, land surveys, photogrammetry, and engineering surveys--which are included as Special Services in the *ASCE Manual,* but omitted from McCarty's analysis--would be necessary for the successful completion of planning and preliminary design. We agree.[74] The soil investigations and the land and engineering surveys for a 4,469-mile railway represent significant costs in addition to those included by McCarty. In the absence of evidence that the FRR could avoid such costs, we use BN's 2% additive for planning and preliminary design.

---

[72] McCarty's engineering costs are based on the experience of its witness Johnson and fall into the lower portion of the 5% to 10% range in the American Society of Civil Engineers' *Manual and Reports on Engineering Practice No. 45* (*ASCE Manual*). BN states that its 13% overall cost is consistent with a recent unrelated request for proposals prepared by McCarty's consultant, L.E. Peabody & Co., for engineering services connected with the construction of a 5.8-mile rail line.

[73] McCarty included: aerial photography; spot surveys as required to confirm site specific relationships; preliminary geotechnical program; graphical definitions of track alignment and profile; preliminary definitions of all scope elements and their cost and schedule; contract packaging for final design, construction and procurement; coordination with adjacent communities and public agencies; preliminary right-of-way identification; and development of design standards. McCarty states that these items are the only necessary elements included in the *ASCE Manual.*

[74] McCarty contends that these costs were not incurred by BN when the existing rail lines were constructed and therefore should be excluded as a barrier-to-entry. We disagree. These are normal design-related activities that would be incurred using the modern construction methods the parties agreed would be used to build the FRR. They are simply modern substitutes for the procedures that were used to construct the existing rail lines.

2. Final Design and Design Services During Construction

McCarty's witness Johnson assigned 4% for final design and design services during construction, based on the *ASCE Manual*.[75] BN claims that a 4% additive is not sufficient and that 6% is a better estimate, based on its witness' corporate experience with large projects and a review of professional literature.

We use McCarty's 4% figure, based on the *ASCE Manual*. BN has not explained why a greater percentage is necessary.[76]

3. Construction Management

McCarty proposed 1% for construction management and coordination, including contract administration, but did not specifically discuss how this additive was derived or provide any factual support for its 1% figure. BN asserted that the costs associated with managing the FRR project would be 5%, based, in part, on the 4.29% additives used in the Northeast Corridor Rail Passenger Improvement Project, a rail construction project.[77] BN's evidence on the Northeast Corridor Project provides some insight into the engineering costs faced by a railroad, and thus is the best evidence of record. However, because the FRR would not have to contend with the problems of rebuilding a railroad while continuing to operate, the Northeast Corridor Project construction management percentage probably somewhat overstates the engineering costs that would be associated with the FRR. Consequently, we round the Northeast Corridor Project percentage to 4%, thereby providing some adjustment for the less complex construction management of the FRR.

In summary, we accept 2% for the overall costs for planning and preliminary design, 4% for final design, and 4% for construction management. The reasonableness of these estimates is confirmed by the *ASCE Manual*, which indicates that engineering costs generally range from 5-10% of the total cost of a project.

---

[75] The *ASCE Manual* indicates that 4.61% is an appropriate estimate for basic engineering services including preliminary engineering, final design, and design services during construction.

[76] BN stated that proper design services are essential to the construction of a well-designed, safe and efficient railroad constructed in a timely manner, and therefore sizable sums must be expended to "get off on the right foot." However, BN never sufficiently explained what sums would be needed to "get off on the right foot," did not discuss the details of the additional cost elements proposed for the FRR, and failed to identify any inadequacies in McCarty's estimate.

[77] BN also pointed to the Eurotunnel, Singapore Mass Transit Project, and Chicago Southeast Transit Project construction projects, which had 4.7%, 9.1%, and 4.9% additives, respectively. These projects, however, bear little resemblance to the engineering of the FRR.

B. Land

1. Amount of Land

The parties differ on the amount of the land that would be needed by the FRR.[78] The amount we use reflects our analysis of the evidence on double/passing and yard track requirements discussed in Appendix A.

BN generally assumed a right-of-way (ROW) width of 100 feet. BN increased the ROW to 155-foot width in urban areas. McCarty agrees that 100-foot ROW is appropriate in rural areas, but contends that a ROW width of 75 feet is sufficient in urban/suburban areas. Accordingly, McCarty's witness restated BN's data so that land classified as (a) industrial, residential, or commercial by BN would have a 75-foot ROW and (b) agricultural, grazing, open space, or other categories would have a 100-foot ROW.

BN has admitted that ROW widths less than 100 feet are feasible.[79] Further, BN has not shown that a 75-foot urban ROW would be infeasible based on current engineering specifications. Because the FRR could be designed according to any feasible plan, our restatement uses an urban ROW of 75 feet and a rural ROW of 100 feet.

2. Land Values

As in prior cases, we assign a zero cost to property acquired by the incumbent by easement where the incumbent railroad has not shown that any cost was incurred for procuring or maintaining the easement.[80] McCarty's evidence identified those line segments where BN or its predecessor was granted an easement to use the property.[81]

For the remaining land, McCarty used a commercial atlas[82] to classify the land parcels required for the ROW as urban (the built-up area of a large, central city of a metropolitan area), suburban/town (the metropolitan area less the urban area), or rural (all other land). To value most urban land, McCarty used an average value estimate of the Urban Land Institute for a standard improved 10,000-square foot lot. For property values in Chicago, McCarty used *Olcott's Blue Book of Land Values 1977*. McCarty used an average price for actual land sales (obtained from BN

---

[78] BN's real estate spreadsheets used 4,492.4 route miles, rather than the 4,469.3 route miles sponsored in its witness' operating plan verified statement. Absent any explanation for this discrepancy, we reject the additional 23.1 route miles.

[79] Simons Reply v.s.. at 73.

[80] *See, Nevada Power I,* 6 I.C.C. 2d at 54-55.

[81] BN argues that these easements have value. According to BN, the standard appraisal practice is to value easements characterized by exclusive use and indefinite duration at the same value that the land would sell for in fee simple. However, BN has not submitted evidence indicating that any cost was incurred in obtaining the easements or that it pays a fee for the continued use of the properties. Further, it does not appear that there is any opportunity cost associated with continued use of such land, since such land would be forfeited upon exit. To include such costs, which could not be recovered upon exit from the industry, would result in a SAC rate designed to allow BN to recover costs it has not incurred. Such a result is at odds with the theory of contestability.

[82] 1985 Rand McNally *Commercial Atlas and Marketing Guide.*

during discovery) to estimate suburban/town prices. For rural estimates, McCarty relied on a U.S. Department of Agriculture reference bulletin providing a state-wide average for farm real estate.

BN claims that McCarty's method of determining "across the fence" (ATF) value[83] ignores the standard ATF method for determining land acquisition costs and is not based on any commonly used or professionally acceptable method. Specifically, BN contends that McCarty's urban land prices are based on an average value for a residential lot, which is not an appropriate measure for valuing industrial and commercial property; McCarty's source for Chicago values is unreliable because it is based on assessed tax values, not actual market transactions; McCarty's rural estimates are flawed because they are based on a single state-wide average for farm real estate; and suburban/town values are unreliable because of the variability of prices (McCarty used an average of $2,751 per acre, while actual prices ranged from $946,582 to $388 per acre). Use of an average price ignores the specific uses of the land being valued and the value of comparable land in the same vicinity.

BN sent appraisers to each parcel along the ROW to value the property. The ATF value of each parcel was established using sales data from the relevant markets for comparable properties.[84] The market data necessary to make the sales comparisons were obtained from local appraisers, real estate brokers, government agencies, and from BN's own records. The comparative sales data were adjusted for factors peculiar to each parcel, such as topography, access, and utilities. Wherever possible, sales comparisons were based on mid-to-late 1970s data.

We agree with BN that McCarty's use of broad geographic averages to determine land values does not take into account the specific uses of the land being valued and the value of comparable land in the same vicinity. It is inferior to BN's evidence, which employed standard real estate appraisal techniques to estimate the value of the particular parcels that would be needed by the FRR. Thus, we use BN's ATF value of the real estate, subject to the adjustments discussed.

3. Assemblage Costs

BN significantly increased its land cost estimate for damage-related costs and corridor-acquisition costs. Damage-related costs are additional payments made to landowners because a parcel of land is split into unusable parts by the right-of-way and for moving or reconstructing structures displaced by the right-of-way. Corridor-acquisition costs are the premium costs incurred to purchase a contiguous corridor.

BN quantified these costs by analyzing the costs associated with several recent ROW acquisitions. BN's acquisition of the Reno to Orin line is particularly relevant because the Orin Line would comprise a portion of the FRR ROW. The Orin Line was acquired in 1978--within

---

[83] ATF (or fair market) value is the highest price the property will bring in the open market by a seller who is willing but not obliged to sell, allowing a reasonable amount of time to find a buyer who is willing but not obliged to buy, both parties having full knowledge of all the uses to which the property is adapted and for which it is capable of being used.

[84] This approach is based on a valuation theory called the principle of substitution. Under this principle, prices, rents, and rates tend to be set by the prevailing prices, rents and rates for equally desirable substitutes. Data are gathered on reasonably substitutable properties, and the market values of these properties are then adjusted for various factors, such as time of sale, zoning, location, and conditions of sale. The resulting comparisons are then used to determine the expected price.

3 years of FRR's assumed acquisition. According to BN, the total amount paid to acquire the Orin Line ROW was 6.65 times the ATF values of the individual land parcels.[85]

McCarty does not object to inclusion of an acquisition-cost additive for the Orin Line where BN actually paid a premium to assemble a continuous ROW for that line. However, McCarty properly objects to the use of an assemblage/damage-related factor to increase ATF values in general.

Only when the incumbent carrier has incurred a sunk cost should that cost be included in the SAC analysis. *Nevada Power II*, 10 I.C.C.2d at 267; *Burlington Northern*, 114 F.3d at 214, *affirming West Texas* 1 S.T.B. at 670-71.[86] Here, no evidence has been presented that BN incurred assemblage or damage-related costs to obtain the ROW for any line other than the Orin Line. Thus, such costs (with the exception of the premium costs associated with the Orin Line) constitute barrier costs that are excluded from the SAC analysis.

The following table summarizes our restatement of land values based on a 75-feet ROW in urban areas, the FRR network route miles, the double/passing and yard miles shown in Table A-1, the removal of easement values, and the corridor-acquisition and damage-related costs associated only with the Orin Line.

Table C-2

RESTATED LAND VALUE

ITEM	VALUE
BN'S Appraisal	$ 305,777,844
Less ROW Adjustment	$ 67,370,833
Less 23.1 Route Mile Adjustment	$ 1,225,894
Less Easement Adjustment	$ 2,756,817
Plus Orin Line Adjustment	$ 2,433,524
TOTAL	$ 226,857,824

[85] The purchase prices for the other projects cited by BN exceeded ATF values by factors ranging from 3.74 to 14.09. BN concluded that a conservative valuation for the acquisition of the FRR's entire ROW would be four times the ATF value.

[86] The objective of the SAC test is to determine the rate level that would be available to the shipper in a contestable market--a market with freedom of entry and exit. Because the rail industry is not characterized by free entry and exit, the SAC analysis must therefore exclude the costs associated with entry and exit barriers. As the Third Circuit observed in approving the *Coal Guidelines* (*Consolidated Rail*, 812 F.2d at 1457):

The railroad industry does not in fact operate in a contestable market because there are significant entry and exit barriers, or sunk costs. By netting out these sunk costs, the advantages an existing carrier has over a hypothetical stand-alone system offering the same service are eliminated, making market dominant rail traffic theoretically contestable.

C. Grading

Extensive preparation of the ROW would be necessary before installation of the track structure could begin. Table C-3 provides a breakdown of the activities that would be involved in the preparation of the ROW, and each activity is discussed separately below.

Table C-3

FRR GRADING COSTS

ITEM	BN	McCARTY	STB
Earthwork	$451,024,615	$421,140,480	$418,984,417
Utilities	8,168,540	0	139,454
Clearing/Grubbing	142,957,841	16,223,104	29,838,176
Seeding	8,604,452	8,962,356	8,962,356
Lateral Drainage	1,037,513	913,718	963,726
Riprap	25,839,412	25,066,318	24,001,740
Retaining Walls	21,671,053	19,076,416	20,129,830
Geotextiles	828,093	631,854	767,589
Soil Stabilization	1,408,953	0	1,408,953
Topsoil Placement	24,393,439	0	433,191
Road Surfacing	29,519,727	0	3,114,641
TOTAL	$715,453,638	$492,014,246	$ 508,744,073

1. Earthwork

Earthwork costs are based on the quantity (cubic yards) of earth required to be graded for cuts and fills, and the unit price per cubic yard moved. With one minor exception,[87] the parties agree on the unit cost for moving a cubic yard of earth. The difference in the parties' earthwork quantities is due primarily to their differing estimates of double/passing track miles, and yard track miles needed for the FRR. Our earthwork cost restatement reflects the parties' agreed-upon unit costs and the previously accepted track and yard miles for the FRR.

[87] BN included a cost of $0.065 per cubic yard for water compaction in arid areas embedded within its earthwork costs. Water is used to adjust the soil moisture content to achieve proper compaction. McCarty did not discuss the issue. Clearly, however, the ROW would need to be adequately compacted in order for the FRR to provide safe and reliable service. Thus, we agree with BN that water for compaction would be a necessary component of the construction costs.

2. Relocation of Utilities

The parties disagree regarding the inclusion of costs for the relocation, encasement or other treatment to protect transmission lines or pipelines encountered during subgrade construction. McCarty excluded these costs as a barrier-to-entry, while BN included such costs. In accordance with the general rule governing entry barriers, relocation costs should not be included unless they fall on the incumbent and new entrant alike. Here, McCarty excluded utility relocation costs because such costs were not generally incurred when the existing railroad was constructed. BN included those costs for the entire FRR based on the costs for relocating utilities that were incurred in constructing the 76-mile Orin Line.[88] The only location on the FRR for which BN has shown that it incurred utility relocation cost is the Orin Line. Therefore, our restatement reflects utility relocation for the Orin Line only.[89]

3. Clearing and Grubbing[90]

McCarty estimated that 17,333 acres of the FRR ROW would require clearing, at a cost of $793 per acre. Of this acreage, 3,535 acres also would require grubbing, at an additional $701 per acre. BN estimated that 46,086 acres would require clearing and grubbing, at a cost of $3,102 per acre.

BN's estimate is less precise than McCarty's because BN did not take into account that the ratio of acres requiring both clearing and grubbing to acres requiring only clearing varies between line segments. Furthermore, BN's unit costs are based on the costs for a single 70-acre project, but BN has not shown that the costs incurred for that area are representative of the costs that would be incurred for the entire FRR line. Moreover, the estimate is based on BN's rejected earthwork quantities.

McCarty's acreage figures, based on ICC Engineering Reports,[91] are line segment specific. They take into account that clearing and grubbing acreage would vary among valuation sections. Therefore they represent the better evidence here. McCarty's unit cost estimates are derived from the *Means Handbook*,[92] but McCarty adjusted clearing costs downward from $1,579 per acre based

[88] According to BN, these costs for the Orin Line totaled $1,827.70 per route mile (BN workpaper JLS 000216).

[89] Using BN's unit cost of $1,827.70 per route mile (BN's workpaper JLS 000216) results in a total utility-relocation cost of $139,454.

[90] Clearing involves the cutting of trees and brush. Grubbing involves the removal of stumps and roots.

[91] The Engineering Reports are compendia of data collected in the early part of the century by the ICC. They detail the material quantities required to build most rail lines in place at the time. The data continue to be useful as a baseline for current earthwork quantities, subject to adjustments for modern engineering specifications. We acknowledge BN's concern that the ICC Engineering Reports do not include modern construction techniques, but we find that McCarty's estimates of acreage requiring clearing and grubbing based on actual data are preferable to BN's approach.

[92] R. S. Means, *1980 Building Construction Cost Data* ("*Means Handbook*"), at 15. The *Means Handbook* includes costs for clearing and grubbing of $1,925 and $855 per acre,

(continued...)

on a 33% percent saving resulting from burning timber and an additional 25% to recognize potential revenues from the sale of marketable timber.

We generally use McCarty's evidence, because it is based on line-specific information and the industry reference *Means Handbook*. However, we exclude McCarty's unsupported adjustments for burning and sale of timber.[93] McCarty made no provision for the costs associated with the personnel and equipment needed to control the fires, nor provided any evidence to show that 25% of the timber would be marketable.

4. Seeding

The parties agree on seeding cost per acre. Because they differ on how much land would require clearing or grubbing, however, they differ on the number of acres that would require seeding. As discussed above, we use McCarty's evidence on the number of acres that would require clearing and grubbing. Because it is these acres that would need seeding, we accept McCarty's estimate for the acreage needing seeding. We calculate that 30,693 acres would require seeding, at a total cost of $8,962,356.

5. Lateral Drainage, Rip Rap, and Retaining Walls

The parties agree on the unit costs for these items. Their quantities differ because of their disagreement regarding track miles for the FRR. Our restatement is based on the accepted miles of track.

6. Geotextiles

McCarty would place geotextile fabric under 50% of the public highway crossings and under all turnouts except those in yards, resulting in 204,684 square yards of fabric at a cost of $1 per square yard. McCarty states that fabric would be needed only at road crossings where subgrade bearing quality and drainage are poor. McCarty's witness Johnson claims that his experience shows that only a small percent of highway crossings have the conditions necessary to justify the use of geotextile fabric.

In contrast, BN would place geotextile fabric under all public highway crossings and under all main track turnouts. BN contends that the investment in geotextiles would forestall extensive maintenance costs in certain subgrade areas and that it comports with general engineering practices. In addition, BN's fabric quantity is higher than McCarty's because of its higher turnout count and its reliance upon larger turnouts, and because BN increased the quantity of fabric at double track locations by a factor of 2.17.

(...continued)

respectively. Indexing these costs to 1978, using an index factor of 0.82, results in respective costs of $1579 and $701.

[93] Clearing costs are: 17,333 acres x $1,579 per acre = $27,360,141. Grubbing costs are: 3,535 acres x $701 per acre = $2,478,035. Our restated Clearing and Grubbing Costs are thus $29,838,176.

Neither party has attempted to quantify maintenance savings relative to additional geotextile investment, but BN's maintenance plan, which we use, assumes fabric under all crossings. For consistency, we use BN's investment in geotextiles, adjusted to reflect our restated double/passing track miles.

7. Soil Stabilization, Topsoil Placement, and Surfacing of Roads

Soil stabilization would be needed in areas where the subgrade consists of expansive clays that are susceptible to swelling under varying moisture conditions. Topsoil could be added after grading to facilitate vegetation growth and restore the land to its original condition. Road surfacing costs would be incurred for temporary detour roads needed for maintaining highway traffic during construction. McCarty excluded any cost associated with these activities on the basis that they were not incurred by BN and, therefore, constitute barrier-to-entry costs.

McCarty has failed to show, however, that, regardless of when the original rail lines were constructed, soil stabilization would not have been a valid engineering consideration. Indeed, without soil stabilization, the safety and reliability of any line would be jeopardized. Therefore, we include BN's soil stabilization cost for the entire FRR.

Topsoil placement and road surfacing, on the other hand, were not undertaken by BN over the entire line. When most of its lines were constructed, there were few roads, and fewer, if any, were paved. Moreover, Federal regulations requiring topsoil placement are a relatively recent requirement. Therefore, we have allowed the cost of topsoil placement and road surfacing only on the lines where BN shows that it actually incurred these costs; otherwise, they are rejected.[94]

D. Tunnels

The parties agree on the unit costs and number of tunnels, but differ as to the need to double track some tunnels. Because we reject BN's evidence relative to double/passing track miles, we reject the additional cost involving double track of tunnels. We agree with McCarty that passing track could be arranged to eliminate the need for double track tunnels. Our restatement of the costs for tunnels thus reflects investment for single track.

E. Bridges

McCarty included $427.5 million for bridge construction.[95] BN estimated that total bridge construction costs would be $735.0 million. The parties' estimates differ as to (1) bridge type; (2) bridge height; (3) the need for walkways; and (4) the need for double track. As discussed below, we accept BN's bridge types and heights, but reject its $17,611,300 walkway cost and its $169,677,299 double track cost.

---

[94] Similarly, BN has not shown the extent to which it incurred costs for permits, licenses, and environmental compliance when its lines were built. Therefore, we do not include these costs in the SAC analysis.

[95] This includes a 5% contingency factor, which is discussed separately *infra*.

1. Bridge Type

The parties agree that the FRR would require six categories of bridges: lift, treated pile trestle, deck plate girder, through plate girder, beam span, and steel truss. BN replicated its own bridge inventory by category on the FRR. McCarty substituted timber pile bridges for some of BN's beam span bridges. McCarty asserts that the higher normalized maintenance cost of pile bridges[96] is more than offset by lower construction costs. McCarty states that its normalized maintenance cost estimate was increased accordingly. However, because of the evidentiary deficiencies in McCarty's maintenance costs (discussed in detail under MOW), McCarty has not adequately reflected the additional maintenance costs that would be required for trestle bridges. Therefore, we reject McCarty's trade-off between initial construction costs and long-term maintenance costs.[97]

The parties also disagree on the number of lift bridges that would be required for the FRR. McCarty provided for only 3 lift bridges, while BN contends that 11 would be needed. McCarty asserts that information provided by BN during discovery identified only 3 bridges as functional lift bridges. However, BN has shown that 11 lift bridges were identified in the bridge data provided to McCarty. BN acknowledges that 2 lift bridges were inoperative in 1978, but notes that they were repaired in 1980 and are required to be maintained in operating condition by the U.S. Coast Guard.[98] Therefore, we use BN's 11 lift bridge figure.

2. Bridge Height Adjustment Factors

BN applied a construction cost premium of 25% for bridges between 50 and 99 feet in height, 50% between 100 and 149 feet, 75% between 150 and 199 feet, and 100% for bridges more than 200 feet high.[99] According to BN, bridges taller than 50 feet (except lift bridges) are more costly to construct than shorter structures due to the increased materials required in the construction of the bridge substructure. We agree that generally the taller a structure the more costly it would be to construct. Thus, in the absence of better evidence as to what cost premium should be assigned as bridge heights increase, we accept BN's evidence.

3. Walkways

BN included walkways on FRR bridges. The cost for bridge walkways is estimated at $50 per walkway foot for timber bridges, and $100 per walkway foot for steel bridges. Although the Federal Railroad Administration has no specific walkway regulations, BN claims that certain safety

---

[96] According to McCarty, the estimated life for trestle timber bridges is 45 years, while the life of beam span bridges approaches 100 years.

[97] The total cost of bridges over the SAC analysis period includes both the initial construction costs and normalized maintenance costs. Both components must be fully analyzed to determine which provides greater benefit. In this proceeding, McCarty fails to adequately address the normalized maintenance component.

[98] McCarty has not challenged BN's claim that these bridges must be maintained in operating condition.

[99] Only a small percentage of the bridges that the FRR would need would be taller than 50 feet.

requirements in 49 CFR 214.104 mandate the use of walkways for the safety of trainmen. We disagree, as the regulation does not require that bridges have walkways. Absent a specific Federal or State requirement, walkways are discretionary for the individual railroad. Therefore, the FRR would not necessarily need bridge walkways.

4. Single/Double Track Bridges

BN double tracked several bridges located on its proposed double-track line segments. We have rejected BN's double/passing track criteria, *supra*; a least-cost efficient railroad would place passing track in locations to avoid double tracking bridges. Therefore, we do not assume that the FRR would have double-track bridges.

F. Culverts

McCarty included $55.5 million, and BN included $61.3 million, for culvert construction. BN has not shown that McCarty's substitution of less expensive multiple-pipe culverts for BN's proposed more expensive single-box culverts is infeasible. Therefore, we use McCarty's lower cost alternative.

G. Track Materials

Track materials consist of such items as rail (premium and secondhand), ties (wood and concrete), tie plates, track spikes, rail anchors, turnouts, lubricators, and subballast. The total cost of these materials is affected by the track miles of the FRR,[100] the engineering specifications, and unit costs.

1. Engineering Specifications

The parties agree to tie spacing and other track specifications, except that BN would install 132-pound premium rail on curves of greater than two degrees, consistent with its standard operating practice for track classes A1, A2, and A3. McCarty points out that the use of premium rail on curves is an economic trade-off. While premium rail requires less maintenance and has a longer life, it is more expensive than standard rail. McCarty would limit premium rail to curves of greater than four degrees. McCarty provided no corroborating evidence that a four degree cutoff is used by any railroad on track with densities the same or greater than the FRR. In the absence of evidence demonstrating the practicality of using normal rail for curved track of less than four degrees, we use BN's specifications for premium rail on two-degree or greater curves as an accepted railroad practice.

2. Unit Costs of Materials

The parties agree on the cost of all materials except concrete ties and secondhand relay rail. McCarty based the costs for secondhand relay rail on the $236.76 per ton cost used in *Nevada*

[100] Our restated track material costs are based on the FRR network configuration used herein.

Power II.[101] BN valued relay rail at 70% of the cost of new rail, or $302.15 per ton. BN notes that L.B. Foster, a supplier of metal rail products, quotes the price of 115-pound relay rail at 89% of new rail.

In *Nevada Power II*, the shipper's estimate of the price of good quality relay rail was unreasonably low, *i.e.*, it was less than even the price of scrap rail. The ICC accepted a $236.76 per ton cost sponsored by the railroad as the best evidence of record merely because the estimate at least exceeded the price of scrap rail. Thus, the ICC's use of the $236.76 figure was not a finding that relay rail could have actually been purchased for that amount. McCarty's use of the figure accepted in *Nevada Power II* therefore has only minimal support. Because BN provided an independent basis to support its estimate, we use its evidence as the better evidence of record.

McCarty included a concrete tie unit cost of $37.80, based on a 1983 *Railway Age* article reporting that Amtrak installed 1.1 million concrete ties and fasteners over a 5-year period at a cost of $38 per tie, and a November 1977 Amtrak purchase order showing a delivered price of $34.37 per concrete tie (including fastening systems). BN used a concrete tie cost (including fasteners) of $56.14 for alignments with less than four degree curvature, and $59.03 for curves greater than four degrees. BN's costs are based on 1980 information obtained from David Brookings, Chief Engineer of the Kansas City Southern Railway Co., and 1994 information obtained from John Bosshart, BN, Assistant Director--Ties. BN asserts that costs were higher in the 1970s because concrete tie technology was still being perfected.

Amtrak's 1977 and later purchases establish a market price for concrete tie costs at the time the FRR would have been built. This contradicts BN's claim that tie costs were higher at that time. BN has not explained why the FRR would have to pay more for ties than did Amtrak. Therefore, our restatement reflects McCarty's lower cost per concrete tie.

Finally, BN included $262.3 million to transport materials from the suppliers to the construction access points along the FRR. This cost was based on the rates that BN charges for transporting materials for other railroads. McCarty contends that a separate expense for transportation cost is improper for two reasons. First, it argues that transportation costs are a barrier-to-entry because they were not incurred by BN when its lines were constructed. Second, it claims that the unit costs for rail, ties, ballast and subballast already include transportation cost because they were based on BN's Roadway Completion Reports. McCarty alleges that the significant increase in cost from BN's Authority for Expenditures (AFE) to its Roadway Completion Reports (obtained during discovery) are due to embedded transportation costs.

We do not view these transportation costs as a barrier-to-entry. Rather, they are an expense that is either embedded in the cost of the materials or an expense that any railroad must have incurred. McCarty's evidence showing that a completion report cost exceeded an initial estimate for materials does not prove that the latter included transportation cost. It is simply an ambiguous showing of a cost overrun.[102] In the absence of any evidence demonstrating that the cost of materials includes the cost of delivering the materials to the construction site, we cannot assume that transportation costs are included. Consequently, we use BN's evidence on transportation costs as the only evidence of record.

---

[101] 10 I.C.C. 2d at 308.

[102] Indeed, McCarty's attribution of the cost overrun to transportation cost is inconsistent with its argument that BN did not incur material transportation costs.

H. Track Laying and Surfacing (Labor)

The parties agree on unit costs for track construction labor. Total track laying and surfacing costs reflect the track miles accepted herein for the FRR.

I. Roadway Signs, Fences, and Snowsheds

1. Roadway Signs[103]

The parties agree on the unit costs, but disagree on some sign quantities. McCarty excluded station signs because there would be no stations on the FRR. BN argues that railroad operating rules require a station sign at every location identified as a station in the timetable in order to identify those locations for both railroad and non-railroad persons. However, BN has not shown that its current stations would be required on the FRR. Clearly, signs would not be needed to mark the locations of nonexistent stations. Thus, we exclude station sign costs.

McCarty also contends that flanger signs[104] would be unnecessary because a MOW employee (track supervisor) familiar with the track could accompany all snow plows. We disagree. McCarty has dedicated no employees to this service and has not shown that other personnel could be diverted. Dedication or diversion of a track supervisor for weather contingencies would be inconsistent with a streamlined maintenance personnel staff and would be less efficient than a one-time sign expenditure. Consequently, we accept BN's cost for flanger signs.

We have restated other non-disputed sign requirements to reflect the restated track miles of the FRR.

2. Fences

McCarty and BN included fence costs of $1.36 and $1.69 per linear foot, respectively. McCarty's estimate is based on BN's AFE.[105] BN did not specify the basis for its estimate. Because BN's estimate is unsupported, we use McCarty's unit cost estimate and apply it to the restated FRR route miles.

3. Snowsheds[106]

The parties agree on the need, locations, and linear feet of snowsheds required for the FRR. BN's higher cost for snowsheds reflect the greater amount of double track that BN assumed the FRR would require. We reject BN's additional costs because we use McCarty's single passing track configuration.

---

[103] Numerous types of signs are installed along a railroad network to ensure efficient and safe operations. These include milepost, whistle post, speed restriction, station, advanced warning, yard limits, flanger, resume speed, railroad crossing 1 mile, railroad crossing 800 feet, yard limit 1 mile, end double track, 1 mile switch, and begin/end CTC.

[104] Flanger signs warn snow plow operators of an obstacle ahead, such as a crossing or turnout.

[105] *See*, McCarty's Rebuttal workpaper 920.

[106] Protective snowsheds are constructed over tracks in potential avalanche areas.

J. Buildings and Facilities

The FRR would require a substantial number of office buildings, roadway buildings, fuel stations, shops and enginehouses, trailer-on-flat-car and container-on-flat-car (TOFC/COFC) terminals, and auto ramp facilities. A breakdown of the cost for each type of structure is shown in Table C-4, and each of these items is then discussed separately.

Table C-4

FRR BUILDINGS AND FACILITIES
($ millions)

ITEM	BN	McCARTY	STB
TOFC/COFC Facility TOFC/COFC Off Bldg Auto Facility Auto Facility Off Bldg	$ 53.5 1.3 19.0 2.8	$12.8	$37.7 0.9 19.0 2.8
Fueling Facilities Water Treatment Plant	29.6 7.9	29.6 5.3	29.6 7.9
Shops & Enginehouses			
Track Scales	0.8	0.6	0.8
Turntables	0.2	0.2	0.2
Locomotive Maint	31.3	13.0	29.3
Locomotive Washer	1.4	1.4	1.4
Car/Caboose Maint	17.7	14.0	17.7
Rdy Repair Shop	1.6	1.6	1.6
Storehouse	5.9	0.00	5.9
Station/Office Bldgs			
Yard Offices	13.4	0.00	13.4
Sys/Div Office	7.0	0.00	7.0
TY&E Lunch/Locker	1.6	0.00	1.6
Sectionmen's Bldgs	0.3	0.00	0.3
Remote Buildings	6.0	0.00	0.0
Hump Retardation Systems	6.4	0.00	6.4
TOTAL	$203.1	$78.5	$183.5

1. TOFC/COFC and Auto Ramp Facilities

TOFC/COFC and automobile traffic would require specialized loading and unloading facilities. Both parties included the costs for these facilities plus the costs for the office buildings associated with these operations.

McCarty calculated a total investment of $12.8 million for BN's TOFC/COFC and auto facilities and office buildings by multiplying BN's 1989 systemwide replacement cost[107] for TOFC/COFC and automobile facilities by the percentage of BN's book investment for TOFC/COFC and automobile facilities that is in the states that would be traversed by the FRR, and by then indexing the resulting figure back to 1978. BN bases its evidence on the actual costs associated with constructing the Rennick Yard in 1985 and 1986,[108] and an auto ramp facility built in 1987.[109]

We find that BN's cost figures are superior for TOFC/COFC and auto ramps. An estimate of investment costs based on indexing book value figures to replacement cost levels (the Report 5 procedure) is less precise than using the actual cost of constructing such facilities. However, we find BN's TOFC/COFC unit cost (the cost per lift) to be overstated because the facility on which the estimate was based is underutilized. Substituting the design capacity (185,000 lifts annually) for actual usage (130,315 lifts) would reduce the unit cost to $37.71, reducing the overall TOFC/COFC costs to $38.6 million.

2. Fueling and Waste Water Treatment Facilities[110]

The parties agree on the cost for fueling stations. McCarty provided for smaller, less costly water treatment facilities than did BN, reflecting the smaller number of cars and locomotives McCarty assumed would need repair. Because we use BN's locomotive and car requirements, we use its cost for water treatment facilities.

3. Shops and Enginehouses

McCarty and BN included $30.9 million and $58.8 million, respectively, for track scale, turntable, locomotive, car, and caboose maintenance facilities; locomotive washers; roadway repair

---

[107] Replacements costs were taken from ICC Report 5 and are developed by indexing historical book value costs.

[108] The number of lifts made in the Rennick Yard in 1992 was used to calculate the capital cost per lift ($53.53 in 1978 dollars). BN multiplied the cost per lift times the total number of lifts for the FRR to calculate a cost of $53,479,735. Adding the cost of office buildings at the 13 facilities resulted in a total cost of $54,805,442.

[109] BN developed a cost per auto ramp loading of $58.87. Total costs for auto ramps of $19.0 million, and buildings of $2.5 million, resulted in a total cost of $21.8 million.

[110] These facilities would include waste water/oil separators and treatment plants to handle disposal of the used and spilled fuels and other hazardous materials that would be generated by the FRR operations.

shops; and storehouses.[111] BN would have the FRR construct a large locomotive repair facility at Glendive, a medium sized facility at Spokane, and a small facility at Dilworth. In addition, BN would have the FRR provide three freight car repair facilities (at Glendive, Spokane and Dilworth) and 11 caboose servicing facilities.

McCarty argues that BN overstated the size of the locomotive repair facilities, basing them on BN's locomotive repair facility in Alliance, NE. The Alliance facility services the 712 locomotives operated in the southern portion of the Powder River Basin, WY. McCarty states that the FRR would have an average of 363 locomotives, or roughly half BN's estimates. Therefore, McCarty used 50% of BN's costs for these facilities.

The Alliance facility services approximately the same number of locomotives that we find would be required by the FRR (see our discussion of locomotive requirements) and, thus reasonably approximates the size of the facilities that the FRR would need to maintain its locomotive fleet.[112] Therefore, we use BN's locomotive repair facility costs.

Similarly, McCarty reduced BN's car maintenance facilities cost because McCarty's projected car requirements were substantially less than BN. However, because we use BN's car requirement figures (see our discussion of freight car requirements), we use BN's car maintenance facilities cost.

McCarty reduced BN's caboose servicing facilities cost from 11 to 6 facilities based on McCarty's projected use of end-of-train-devices (EOTD) in states where cabooses are not required. BN claims that McCarty's use of EOTDs in 1978 would be unrealistic because, prior to 1984, EOTDs were not commercially available and were not approved for use by the Federal Railroad Administration. BN's operating plan assumed that all trains would be equipped with cabooses through 1983, after which time cabooses would be used only on through trains operating in states where cabooses are required by law. Because the technology was not available to use EOTDs before 1984, we use BN's caboose-servicing facility estimate, which is the only estimate for the cost to build adequate service facilities for cabooses.

McCarty also reduced BN track scale facilities expenses to exclude a hump yard weigh-in-motion scale, claiming the hump yard would not be needed. BN notes that the weigh-in-motion scale and the hump yard are a requirement in its operating plan. We use BN's track scale facility cost because we use its operating plan.

4. Station and Office Buildings

As previously noted, the FRR would not include stations. However, the parties acknowledge a need for yard offices, system/division offices, lunch/locker facilities, and sectionmen's buildings. Nevertheless, McCarty did not include any costs for such facilities, either in its investment cost figures or in its operating expense figures.[113] Therefore, we use BN's cost as the only evidence of record.

---

[111] McCarty does not include any cost for these facilities in its opening evidence. On rebuttal, McCarty accepts BN's evidence with adjustments. The parties agree on the cost for turntables, locomotive washers and roadway repair shops.

[112] We have reduced BN's locomotive maintenance facility costs by $2 million to reflect an overstatement (acknowledged by BN on brief) related to the cost for a wheel truing machine.

[113] McCarty claims that these facilities would be leased, but failed to include a lease cost.

5. Remote Communications

McCarty made no provision for remote communications on the FRR. BN included $6.0 million for remote communications and signals, but provided no explanation for this category. Because BN has not explained why this investment would be necessary, we exclude it.

6. Hump Yard Car Speed Retardation System

BN included two hump yards (one at Spokane and one at Dilworth), at a cost of $6.4 million. McCarty states that hump yards would not be required and thus McCarty did not include any cost for the installation of car speed retardation systems. Because we use BN's operating plan, which includes hump yards, we include the cost for installation of retardation systems.

K. Roadway Buildings

McCarty did not include investment for roadway buildings, claiming these facilities would be leased. However, it included no lease cost for these buildings in its operating expenses. Consequently, to account for the cost of roadway buildings, we use BN's estimate of $1.3 million for construction of these facilities, because it is the only evidence of record.

L. Communication Systems

In addition to agreed-upon components and unit costs included in a microwave radio system and other communication systems for the FRR,[114] BN contends that the system would require installation of a pole (power) line, at a cost of $47,367,439.[115] McCarty contends that the pole line proposed by BN would duplicate CTC expenditures. Relying on a BN AFE, McCarty asserts that the cost per mile for CTC (account 27) includes costs associated with "aerial cable, messenger wire, pole guying and lashing."[116]

McCarty's reliance is misplaced. Account 27 relates to the costs of adding CTC hardware to an existing pole system. Costs of material and labor initially to install the pole lines appear in Account 26. The AFE relied on by McCarty dealt primarily with the installation of a CTC system and included only the costs to modify existing pole lines. Because McCarty's evidence failed to include pole line costs, we use BN's pole line cost of $47.4 million as the only evidence of record.

[114] These other communications systems include multiplex equipment, dispatcher radio network, mobile radio access, PBX video car identification, data communications network, and CTC code converter.

[115] The pole line would be necessary because encoded track circuitry was not an accepted industry standard in 1978.

[116] McCarty's Opening Workpapers at 396 and 398.

M. Centralized Traffic Control

McCarty incorporated CTC only on segments with annual traffic levels of 25 MGT per mile (for a total 2,430.8 miles or 54% of the FRR system) at a cost of $138.1 million. BN contends that all main lines should be covered by CTC. Thus, it incorporated CTC on 3,828.6 miles (more than 85% of the FRR system), at a cost of $235.0 million.

McCarty alleges that only 50% of BN's own corresponding lines have CTC. BN points out, however, that the ratio of heavy traffic miles to light traffic miles would be much higher on the FRR than on BN's system. We agree, and accordingly, we use BN's proposed CTC mileage figures.

BN accepts McCarty's unit cost, but increased the CTC costs for double-track segments by a 55% additive or $32.2 million. BN claims that its 55% additive is based on internal company estimates, but has offered no supporting data or workpapers. McCarty states that its costs are based on BN workpapers that include cost for double track segments, making this additional markup unnecessary. Absent supporting documentation, we cannot accept BN's 55% additive.[117]

N. Detectors

The parties included hot box, dragging equipment, high/wide, and rock/mud slide detectors to identify malfunctioning cars, oversize loads, and landslides that would interfere with the operations of the FRR. Table C-5 provides a breakdown of the parties' costs and our restatement for these items.

Table C-5

DETECTORS
($ millions)

ITEM	BN	McCARTY	STB
Hot box	$17.3	$12.7	$14.9
Dragging Equip	$ 2.9	$ 0.0	$ 2.5
High/Wide	$ 0.2	$ 0.2	$ 0.2
Rock/Mud Slide	$14.6	$14.4	$14.6
TOTAL	$35.0	$27.3	$32.2

[117] Consistent with the parties' evidence, our restatement of $149.2 million reflects the cost for CTC on a unit-mile basis.

McCarty would place hot box detectors every 40 miles, noting that all cars built in the last 10 to 15 years are equipped with rolling bearings and most older cars have had the less reliable journal bearings replaced with rolling bearings. McCarty did not include any dragging equipment detectors. BN included hot box and dragging equipment detectors every 25 and 40 miles, respectively. BN asserts that cars were commonly equipped with journal bearings in 1978. Once a journal bearing becomes hot, a car cannot travel more than 25 miles before failure.

McCarty did not explain why the FRR would not need detectors for dragging equipment or why it proposed wider spacing of hot box detectors would be feasible given that the cars that would have moved over the system in 1978 would have had journal bearings. Therefore, we accept BN's use of, and spacing for, hot box/dragging equipment detectors. However, BN included a higher unit cost for hot box and dragging equipment detectors located on its proposed double track segments than it did on the single line segments of the FRR. Because we have rejected BN's double tracking of the FRR in favor of single track with passing sidings, we reject its higher unit cost associated with detectors used on double track segments. Our restatement uses the agreed upon unit cost for hot box detectors on single line track and BN's unit cost for dragging equipment detectors located on single line track.

The parties agree on the cost for high/wide load and rock/mud detectors. The minor difference in the parties' cost for high/wide load detectors is due to their differences in route miles for the FRR. Because we use BN's route miles, we use its cost for these detectors. Also, BN included $6.0 million for remote signals and communication equipment. We have not included this cost because BN does not provide any explanation as to where this equipment would be required.

O. Railroad Crossings

The parties agree on the unit cost for railroad crossings. McCarty included $3.3 million for 14 railroad crossings (10 single and 4 double track). BN included $4.2 million for 16 crossings (8 single and 8 double track). McCarty, on rebuttal (Stedman rebuttal v.s. at 54) showed that, based on BN witness Simmons' workpapers as well as material provided by BN on discovery, there would only be 14-railroad crossings on the FRR.[118] Because BN does not rebut McCarty's evidence showing only 14 crossings, we accept McCarty's evidence on this point. Further, because we have accepted McCarty's evidence relative to double and single track, we accept its single- and double-track crossings evidence. Therefore, our restatement includes the cost for 10 single and 4 double track railroad crossings.

P. Public Improvements

This category includes at-grade crossings (also known as highway or road crossings), highway warning devices for the at-grade crossings, and highway overpasses. Highway warning devices are normally installed at all highway crossings for safety purposes. As explained in *West Texas*, 1 S.T.B. at 672, the party crossing an existing right-of-way (the "junior party") customarily is responsible for the costs associated with the crossing. Therefore, under the principle that sunk costs not incurred by the incumbent railroad are not included in SAC, we exclude most construction costs for grade crossings from the SAC analysis. Because most of the BN right-of-way replicated by the FRR existed prior to the existing highway system, the cost of constructing road crossings would

[118] *See*, McCarty workpapers 000916 and 000917.

have been included in the highway construction cost. However, we include the $7.9 million that BN actually incurred to construct grade crossings and overpasses on the Orin Line and other segments and $1.5 million that it incurred for highway warning devices.

Q. Contingencies

A contingency factor is included to cover unexpected costs caused by various unknown factors encountered during the construction process. McCarty did not include an overall contingency factor, but instead applied a small additive (from 2 to 5%) to 16 selected cost items.[119] BN included a 10% across-the-board (excluding land) contingency. McCarty claims that an overall contingency factor is not needed because the FRR would following existing BN rail lines, making the uncertainty much less than for a usual construction project.[120] It is inappropriate to assume that uncertainty would be removed because the hypothetical carrier would follow the route of the BN system;[121] BN enjoyed no such advantage. Moreover, we agree with BN that the cost for a project the size of the FRR cannot be estimated with such accuracy that an overall contingency factor becomes unnecessary.

BN surveyed agencies and construction companies involved in very large construction projects and found contingency factors between 10% and 30%, depending on the size of the project and the construction stage. BN's figure is also supported by the U.S. Army Corps. of Engineers' policy, which includes a 10% contingency for projects above $10 million. Indeed, contigency factors of at least 10% have been accepted in previous SAC cases.[122] Accordingly, we use BN's contingency factor.

---

[119] Johnson v.s. at 21-22 and Table 7.

[120] McCarty reasons that much of the planning and design work has already been performed, material quantities have been calculated and environmental concerns have been removed.

[121] *See, Nevada Power II,* 10 I.C.C.2d at 311 n.72.

[122] *Nevada Power II,* 10 I.C.C.2d at 311; *West Texas,* 1 S.T.B. at 709-710

APPENDIX D

DISCOUNTED CASH FLOW COMPUTATION

The parties used the DCF methodology developed in *Nevada Power II* to calculate the SAC constraint. The modified perpetual model used there recognizes that a railroad, once constructed, will generally provide continued service into the indefinite future. It also recognizes that it would be impractical to attempt to project the financial results of the hypothetical carrier's operations beyond some finite period. Thus, the model allocates investment costs between the DCF analysis period and the post-analysis period. If the SARR, by charging the rates assessed by the incumbent carrier, would earn revenues in excess of those needed to cover all costs during the analysis period, the incumbent's rates will be found to be unreasonably high. Here, however, the evidence indicates that the FRR would not earn enough revenues to cover all its costs, and therefore, we find, that under the SAC test, BN's rates are not shown to be unreasonable.

Below we discuss a number of issues not discussed elsewhere that affect the DCF computation.

A. Cost of Capital

The cost of capital is the rate of return that the FRR would be required to pay to obtain funds from investors. The ICC conducted an annual proceeding from 1978 to 1995 to determine the industrywide capital structure of equity and debt and their respective costs. Both parties applied the ICC-determined 1978 capital structure mix, consisting of 40% debt financing and 60% equity financing, as the capital structure of the FRR.[123] They differ, however, on how to calculate and use the costs of debt and equity.

McCarty states that the FRR's cost of debt should be the weighted average of the cost of debt during the 3-year construction period (8.25%). It estimated the cost of debt for 1976 and 1977[124] and used the ICC-determined 1978 cost of debt to develop this weighted average. BN, on the other hand, maintains that the FRR's cost of debt should be based on the current cost of debt (ranging from 6.9 to 14%) for each of the 20 years of the SAC analysis period.[125] BN contends that use of a debt rate lower than that which prevailed during certain of the years would artificially constrain rates to levels below those that would exist in a contestable market. It argues that the use of these lower rates would provide an incentive for the railroad to seek alternative investments that provide a higher rate of return.

We accept McCarty's use of a weighted average cost of debt based on debt costs for 1976 through 1978. The FRR would have been constructed with funds obtained between 1976 and 1978, and would have issued debt instruments reflecting investor expectations during that time period.

---

[123] BN contends that a constant capital structure mix understates stand-alone costs but has acquiesced in its use for the sake of simplicity.

[124] Because the ICC did not issue cost of capital decisions on the industry's cost of capital prior to 1978, McCarty's estimates for 1976 and 1977 were based on the 5-year average bond rates contained in *Moody's Transportation Manual* and the ICC-determined debt rates for the years 1978 through 1982.

[125] For the years 1994 through 1998, BN used the average of the debt rate for the years 1978 through 1993.

Subsequent fluctuations in the cost of debt, reflecting post-construction market conditions, are irrelevant, because the FRR would not need to raise appreciable amounts of debt capital in the years immediately following construction (when debt rates were at peak levels).[126]

Both parties used the cost of equity developed in the ICC's annual cost of capital determinations for each year from 1978 through 1993.[127] For years before 1978 and after 1993, McCarty used the 5-year averages of 1978 through 1982 and 1989 through 1993, respectively. BN used an average of the rail industry's cost of equity for 1978 through 1993 to estimate equity costs for years where the agency-determined cost of capital findings are unavailable.

We have restated the cost of equity for 1994 and 1995 based on the agency's cost-of-capital determinations released after the close of the evidentiary record. We use McCarty's evidence on the cost of equity for 1976-1977 and its method for estimating the cost of equity for 1996-1998, because use of 5-year averages better estimate near-term equity costs than BN's long-term average for the period from 1978 through 1993.[128] We substitute a 1991-1995 5-year average for McCarty's 1989-1993 average, to reflect the more recent agency cost-of-equity determinations.

B. Inflation Indexes

BN and McCarty used the appropriate AAR Western District Railroad Cost Recovery Indexes (RCRI)[129] to index all road property investment accounts except land.

1. Land

Consistent with *Nevada Power II*, both parties used a constant inflation factor for land.[130] BN developed a constant 5.03% inflation rate, based on its estimate of changes in land values between 1975 and 1994. McCarty developed a 7.2% inflation factor, based on changes between 1950 and 1994. The 1975-1994 time frame is more appropriate for use in this proceeding. The longer time frame reflects changes in land values that occurred as long as a quarter of a century before the construction of the FRR would occur and is thus inappropriate for computing a more current

[126] The rail industry cost of debt reached 14% in 1982. As an efficient, least-cost replacement for the incumbent, the FRR would be free to choose a method of financing its debt to minimize that cost. Locking in debt during the 1976-1978 period would result in a lower cost of debt capital then allowing the debt rate to float on an annual basis.

[127] The 1993 cost of equity was the latest available data when the parties filed their evidence.

[128] BN notes that its method was used by the ICC in *Nevada Power II*. However, in that case the cost of equity had to be projected for a 10-year period (1994-2003). Use of a longer term average is more appropriate for projecting equity costs for a long-term (10-year) period. Here we need only project the cost of equity for the 3-year (1996-98) and 2-year (1976-1977) period adjacent to the period for which actual data is available. As a general matter, we believe that the cost of equity for a short-term period is a better predictor of what the near-term cost of equity would likely be.

[129] Both parties employed the materials and supplies index for track accounts (other than track labor), the wages and supplements index for the track labor account, and the material prices-wages and supplements combined (excluding fuel) index for the other accounts. BN also used the latter account for engineering, while McCarty used wages and supplements for engineering.

[130] Both BN and McCarty used variable rates for the other indexes.

inflation factor. Indeed, McCarty's data show that most of the increase in land value occurred between 1950 and 1975, not 1975 through 1994.[131] Furthermore, McCarty's use of changes in land prices over a 44-year period is inconsistent with its development of the other inflation factors, which are limited to the SAC analysis years. Thus, we use BN's 5.03% land inflation factor which is based on the inflation rate experienced during the 20-year period covered by the SAC analysis.

2. Engineering

BN used the RCRI material prices/wages and supplements combined (excluding fuel) index for the inflation factor for engineering. McCarty used the wages and supplements index. Because engineering consists mostly of labor with few material costs, the material prices/wages and supplements combined (excluding fuel) index is a less appropriate index for inflating engineering costs than is the wages and supplements index, a labor-only index. Thus, we use McCarty's figures for this component.

3. Other Road Property

The parties used the same RCRI for the remaining road property accounts, but McCarty developed quarterly inflation factors for 1977 through the second quarter of 1994, whereas BN based its numbers on annual inflation changes. For the years prior to 1977 (the first year RCRI numbers were available), as well as after the second quarter of 1994, McCarty used the second quarter 1994 index divided by the second quarter 1989. BN used the average inflation rate between 1977 and 1993 for both pre-1977 and post-1993 inflation factors.

Consistent with our cost-of-equity analysis, we conclude that inflation estimates based on shorter time frames that are adjacent to the periods being estimated yield more reliable results than estimates based on 17-year averages. Thus, we use McCarty's procedure to estimate inflation rates for years where actual data is unavailable. However, McCarty's use of the 1989 to 1994 factors for pre-1977 data is inappropriate and inconsistent with the procedures used to estimate the cost of equity. A better estimate of pre-1977 inflation factors is obtained by using 1977 through 1982 data. For 1996 through 1998, we use an average of 1991 through 1995 inflation rates.

---

[131] Summary of McCarty's evidence by state:

State	% Change 1950-75	% Change 1975-94
Idaho	434	113
Illinois	474	90
Minnesota	523	95
Montana	621	150
North Dakota	648	108
Oregon	381	159
Washington	372	138
Wisconsin	514	92
Wyoming	555	96

C. Investment at Start-Up

Because the parties' time frames for constructing the FRR differ, the timing and amounts of investment for each year in the construction cycle differ. Because we use McCarty's 3-year time frame for planning and construction, the investment schedule incorporated in our calculations uses McCarty's construction schedule, with the exception of an adjustment for when land would be purchased.[132] The dollar amounts for the various accounts are based on the investment costs developed in Appendix C.

D. Interest During Construction

Both parties added interest during construction (IDC) to the total investment to be recovered over the life of the FRR. Because we use McCarty's schedule for construction of the FRR, we calculate IDC for that time period. The parties agree that the cost-of-capital rate represents the cost of raising construction funds.

BN's IDC calculations assumed that, because investment would be made throughout the year, the interest expense for any year can be estimated by multiplying the annual interest rate times one half of the year's investment cost. McCarty computed IDC on a monthly basis. Because McCarty's procedure more closely tracks when the various investments would be made over the course of the year, its IDC schedule is more precise. Thus, we use McCarty's methodology.

E. Debt Amounts and Amortization Schedules

Both parties assumed that 40% of the FRR's capital would be debt-financed. Total debt was computed by multiplying the total of investment plus IDC by 40%. The resulting total debt is then amortized over 20 years using the FRR's cost of debt.

F. Investment Tax Credit

Investment Tax Credits (ITCs) were available under the tax laws in effect at the time the FRR would have been built. These credits would be used to offset taxable income and would be carried forward for use in other years. Both parties used the same procedure (10% of eligible investment) to develop the initial dollar amounts of ITCs. Both parties correctly excluded land, grading, and tunnels and subways from eligibility for ITCs. BN included ITCs for buildings, while McCarty did not because it proposes the use of leased buildings. Our ITC calculations include buildings, because these structures are included in the investment base. The actual application of the ITC as it relates to the FRR's taxable income is discussed below, in the Federal income tax section.

---

[132] McCarty's schedule shows that land would be purchased in July 1977. We have moved the purchase date back to January 1977, based on McCarty's start date for grading, tunnels, bridges, and public improvements.

G. Tax Depreciation For Road Property Assets

With the exception of buildings, both parties used the same depreciation methods for each of the road property accounts. We use the methods agreed upon by the parties.[133]

For yard, office and roadway buildings, McCarty did not develop a depreciation schedule because it assumed these assets would be leased. Because we assume that these assets would be owned, as discussed above, it is necessary to develop depreciation schedules for these assets. Because BN provided the only depreciation schedule for these assets, we use its evidence.

H. Average Inflation in Asset Prices

The average inflation in asset prices is a necessary component of the DCF model. The weighted average change in asset values due to inflation is computed on a periodic basis. McCarty calculated quarterly adjustments, whereas BN made annual adjustments. Because we use BN's annual DCF model, we use annual estimates of inflation in asset prices. However, as discussed previously, we reject BN's estimate of future inflation (based on average inflation from 1979 to 1993) and use McCarty's procedure to develop inflation factors for 1976 and for 1996 through 1998.

I. Present Value of Replacement Cost

In lieu of a program maintenance expense, both BN and McCarty included in their DCF calculations a replacement cost for all of the FRR's assets except land (which would never need to be replaced). These replacement costs were computed on the basis of the current initial investment and the anticipated rates of inflation and service lives of each specific asset type, and discounted to the FRR's start-up date. Although the dollar impact of these present value calculations (approximately $126 million) represents only a small percentage of total costs to be recovered, several disagreements and discrepancies require discussion.

McCarty excluded replacements for tunnels and subways (Account 5) and grading (Account 3), arguing that they would never be totally replaced. McCarty maintains that tunnels, once bored, do not have to be replaced, and grading, once completed, does not require major regrading. Although tunnels and grading are very long-lived assets, we have nevertheless included them in our computations[134] because, as BN notes, tunnels and grading have finite service lives and require maintenance at levels above those that could be funded entirely from the FRR's operating maintenance budget.[135]

---

[133] Disagreements as to the proper way of computing the tax consequences associated with depreciation are resolved in our discussion of the present value of replacement cost of assets, *infra*.

[134] Accord, West Texas, 1 S.T.B. at 714.

[135] We also include, as did McCarty, the present value of the replacement cost for several other accounts that BN apparently overlooked. These accounts are: Account 13 (fences, snowsheds, and signs); Account 16 (station & office buildings); Account 17 (roadway buildings); Account 19 (fuel stations); Account 20 (shops and enginehouses); and Account 25 (TOFC/COFC facilities).

Finally, as McCarty notes, BN misapplied asset depreciation in the computation of replacement costs. BN relied on the 1979 tax law, which prohibited depreciating an asset below its salvage value. However, the Modified Accelerated Cost Recovery System applicable for depreciation of assets after 1979 allows depreciation to zero regardless of salvage. McCarty further points out that BN erred in the calculation of replacement costs relative to depreciation of engineering for tax purposes. We agree with McCarty and incorporate McCarty's procedure in our DCF model.

J. Federal Income Tax Liability

The Federal income tax liability that the FRR would face depends on year-to-year changes in the statutory tax rate; losses from the years during which the FRR would be under construction;[136] losses due to accelerated depreciation of the track accounts during 1981 (when expenses would have greatly exceeded revenues); and the treatment of ITCs under changing tax laws.[137]

BN incorrectly computed the ITC. For years in which the FRR would have taxable income (as opposed to a loss), BN multiplied that taxable income by a factor (14% for 1988 and later) to determine the amount of ITC to be deducted from taxable income. In effect, BN treated ITC as a tax deduction, rather than a tax credit. The proper method is to first compute income tax liability and then subtract an appropriate ITC percentage from that figure.

BN also did not appropriately limit the amount of ITCs that could be used during the years 1987-1992. The Technical and Miscellaneous Tax Act of 1987 allowed only 62.5% of 1987 tax liability, and 55.88% of 1988 through 1992 tax liabilities, to be offset by ITC carryforwards.

Finally, BN failed to consider the impact of the change in the tax law during 1987 that reduced the amount of ITC carryforwards. Under section 49(c) of the Internal Revenue Code, any ITC carryover that existed as of July 1, 1987, was to be reduced by 35%. Accordingly, BN reduced each year's ITC carryforwards for the FRR by 35% of the balance remaining for that year, until the carryforwards were reduced to zero. The 35% reduction, however, was a one-time event, not a compounding event. McCarty correctly made a one-time 35% adjustment to ITC carryforwards. Our tax calculations use McCarty's procedure.

Finally, McCarty double-counted deductible interest during construction. Both parties showed taxable losses for years prior to 1979 equal to the deductible interest during construction; however, McCarty added the total deductible IDC again for the first quarter of 1979.[138] This error has been corrected in our DCF model.

---

[136] During the construction years there would be no income generated by the FRR. However, there would be expenses generated by the interest being paid on the debt portion of interest during construction. This would result in taxable losses for each of these years, which would be carried forward into the future.

[137] The tax law that existed in 1979 allowed for 10% of the start-up asset base to be used as an ITC that could be carried forward from year to year until used up. However, the 1987 Technical and Miscellaneous Tax Act changed the law concerning ITCs, resulting in a portion of any unused ITC carryforward being eliminated as an offset to taxable income.

[138] McCarty's model calculated taxes on a quarterly basis, while BN used annual figures. Because we use BN's annual DCF model, we use annual figures.

K. State Tax Liability

State income taxes must also be taken into account. The FRR would operate in nine states. Seven of these states--Idaho, Illinois, Minnesota, Montana, North Dakota, Oregon, and Wisconsin--impose a state income tax on railroads. Washington, while not having a corporate income tax, does have a public utility tax to which the railroads are subject. (Wyoming has no state tax of either type.) A discussion of the proper application of each state's taxes is included in McCarty's opening and rebuttal statements. BN did not discuss state taxes; its only evidence is contained in its electronic spreadsheets. A state-by-state discussion follows.

1. Idaho

The parties agree on the Idaho's tax rate after 1982--7.7% for 1983 through 1986 and 8.0% thereafter. There is a major difference, however, for 1982 and earlier years. Both parties used Idaho's statutory tax rate of 6.5% for those years, but McCarty made adjustments for the fact that Idaho's tax code allowed a full deduction for Federal taxes paid in 1979 through 1982. In order to properly compute Idaho's taxes for those years, the 6.5% statutory rate must be reduced by the Federal tax rate in effect (48% for 1978 and earlier; and 46% for 1979 through 1982). This results in Idaho's effective state tax rate being equal to 3.38% for 1978 and earlier and 3.51% for 1979 through 1982.[139] We use these rates in our DCF model.

2. Illinois

In their statements, the parties agree that Illinois has both a corporate income tax and a personal property replacement tax. McCarty notes that Illinois allows deductions from gross taxable income for income taxes paid to other states--deductions that BN failed to include. Our computations adjust Illinois taxes for income taxes that would be paid to other states.

3. Minnesota

The parties agree on the income tax rates for Minnesota for all years. We use the agreed-upon rates in our DCF model.

4. Montana

McCarty notes that Montana imposed tax surcharges in 2 years--4% of the state tax rate in 1988 and 5% of the state tax rate in 1990. BN also considered these surcharges, but made small rounding errors in its calculations. Also, beginning in 1993, Montana imposed a higher tax rate on taxable income over $500,000. BN failed to consider this higher rate on income over $500,000, and McCarty failed to consider the lower rate on the first $500,000. Our calculations take the 1988 and 1990 surcharges into account. We also subtract $2,450 from total Montana taxes for each year beginning in 1993 to reflect the lower tax rate on the first $500,000 (7.08%).

---

[139] McCarty's evidence failed to take into account the higher 48% Federal tax rate in effect prior to 1979, using instead the 46% rate. Our calculations use the higher rate.

BN used a 6.75% tax rate for Montana for 1994 through 1998. McCarty used the 1993 rate (7.57%) for these years. Neither party indicated how it arrived at these rates. For other states, both parties held the tax rates constant at the 1993 level. Thus, for consistency we use McCarty's evidence.

5. North Dakota

McCarty notes that North Dakota's tax code allows for deductions of Federal income taxes paid. BN did not take this Federal tax deduction into account. While McCarty deducted Federal taxes, it failed to consider the change in the maximum Federal tax rate (from 34% to 35%) that occurred in 1993. Our calculations incorporate the Federal tax deduction and adjust for the tax rate change in 1993.

6. Oregon

McCarty notes that Oregon allowed deductions for both its own and other states' taxes for 1979 through 1982. BN did not make any adjustment for those years. Our calculations make adjustments for these deductions for all years through 1982.

7. Washington

McCarty notes that Washington does not have a corporate income tax but does impose a 3.6% public utilities tax, which is applicable to railroads for all years in question. McCarty contends that, because this is not an income tax, it can be treated as a pre-tax expense deductible from the taxable income in other states. BN treated this tax as an income tax and did not deduct it before computing other state taxes. Since this tax is not an income tax, we treat it like any other non-income tax expense and deduct it before determining the taxable income in other states.

8. Wisconsin

Prior to 1991, Wisconsin did not impose a corporate income tax on railroads. Beginning in 1991, both a 7.9% corporate tax rate and a 5.5% recycling surtax were added. The recycling surtax has a $9,800 cap. Therefore, the proper computation of income taxes for Wisconsin would impose a 7.9% tax rate and $9,800 additional recycling surtax. Both parties incorrectly compute these taxes. BN computed the surtax but did not consider the $9,800 cap. McCarty took the cap into account, but applied it in each quarter, which resulted in an annual tax liability $39,200. Our calculations incorporate a $9,800 annual cap.

L. Required Capital Carrying Charge

The calculation of the FRR's required capital carrying charge distributes the return on and the return of the FRR's investment over the 20-year analysis period. The spreadsheet used to make this calculation, when adjusted for inflation and applied to the tonnages that would be shipped over the FRR, determines the capital carrying charge needed to recover the total investment in road property. BN and McCarty generally used the same procedure to determine the amount of revenue necessary to recover this road property investment. There are, however, several differences between the presentations. McCarty used 80 quarters, while BN used 20 years to develop the DCF model. Because we use BN's annual model, we use annual capital carrying charges for the FRR.[140]

M. Results of DCF Analysis

The table displays the results of our DCF analysis. It demonstrates that the FRR would not have generated sufficient revenues over the 20-year analysis period to cover all the costs that would have been incurred during that same period.

Table D-1

DISCOUNTED CASH FLOW - FRR
(000)

Year	Group Tons	Group Revenues	Road Property Capital Costs	Operating Expenses	Total Annual Expenditures	Overpayment or (Shortfall)	Present Value of Overpayments and Shortfalls
1979	43,253	$653,121	$307,301	$352,789	$660,090	($6,969)	($6,603)
1980	48,164	788,922	387,505	401,122	788,628	294	250
1981	46,901	863,252	417,886	419,422	837,309	25,944	19,555
1982	42,665	845,022	403,763	400,416	804,179	40,842	26,832
1983	43,065	884,752	421,174	396,166	817,340	67,413	38,754
1984	45,406	989,382	457,531	434,341	891,872	97,510	49,375
1985	42,180	913,376	434,028	424,183	858,212	55,164	24,742
1986	43,651	961,881	457,900	455,074	912,974	48,907	19,632
1987	54,394	1,075,535	575,824	537,281	1,113,105	(37,570)	(13,574)
1988	60,796	1,163,928	675,257	560,891	1,236,148	(72,220)	(23,531)
1989	64,070	1,195,527	738,412	583,059	1,321,472	(125,945)	(37,025)
1990	67,277	1,268,433	807,042	621,383	1,428,425	(159,993)	(42,414)
1991	67,220	1,277,887	894,371	624,066	1,518,437	(240,550)	(57,429)
1992	67,679	1,295,526	988,714	642,410	1,631,124	(335,598)	(72,134)
1993	69,152	1,343,309	1,025,507	651,706	1,677,214	(333,905)	(64,563)
1994	73,484	1,431,751	1,102,218	700,570	1,802,788	(371,037)	(64,400)
1995	73,828	1,442,684	1,139,710	737,909	1,877,620	(434,936)	(67,728)
1996	76,602	1,501,462	1,235,051	784,115	2,019,166	(517,704)	(72,432)
1997	78,231	1,538,004	1,338,903	802,581	2,141,484	(603,480)	(75,890)
1998	80,633	1,589,970	1,452,074	854,345	2,306,419	(716,449)	(80,979)
Cumulative Present Value of Overpayments And Shortfalls							($499,562)

[140] McCarty also included several columns of data (interest and depreciation for road property) that were not used in the calculations. We exclude them from our model.