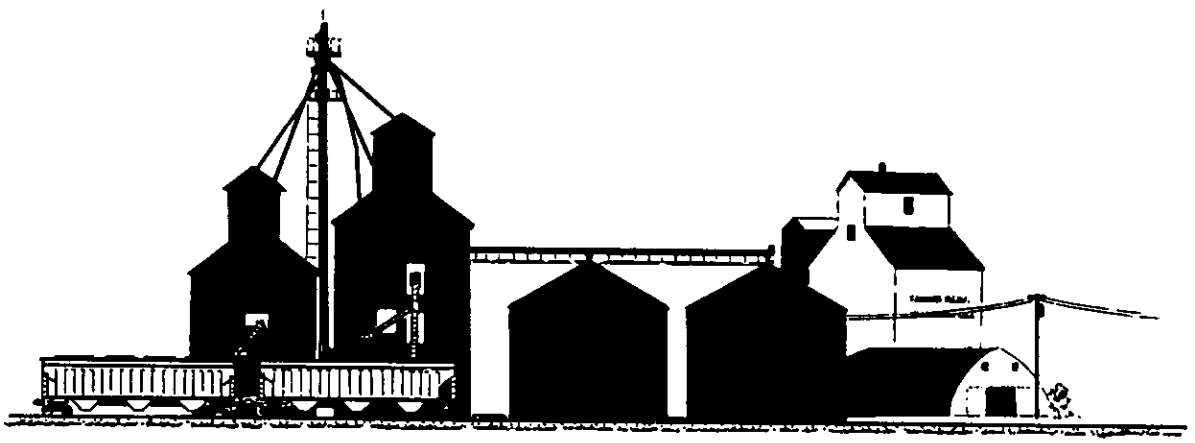
ECONOMIC EVALUATION
of
FIVE SOUTH DAKOTA RAIL LINES



SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
DIVISION OF RAILROADS
PIERRE, S. D. 57501

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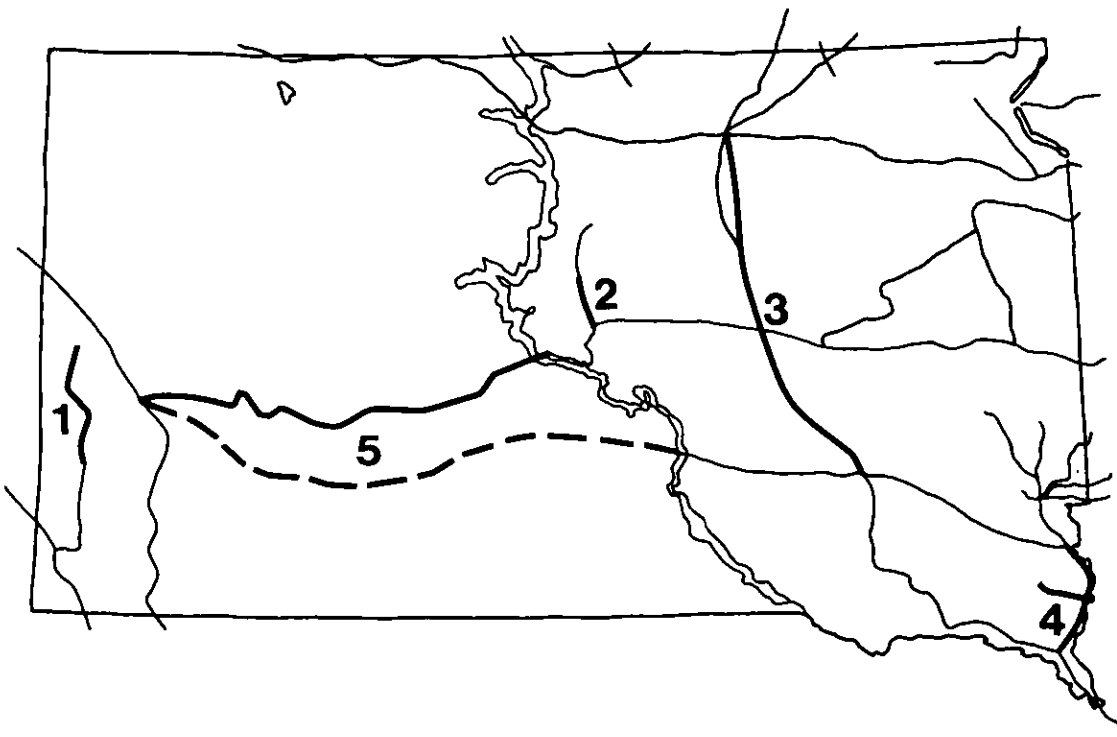

Prepared for the
DIVISION OF RAILROADS
SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

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Executive Summary

Introduction

Economic analyses of five line segments in South Dakota have been conducted to provide the state with a basis for decision-making with regard to abandonment and/or rehabilitation of each line segment. Although non-critical interrelationships between several of the lines were found, the study consisted of five independent analyses, as originally intended. Line segment analyses are described as follows:

1. *Custer to Deadwood.* Projected economic impacts of abandonment.
2. *Blunt to Onida.* Revised benefit-cost analysis for rehabilitation to Class 2 standards.
3. *Mitchell to Aberdeen.* Revised benefit-cost analysis for rehabilitation to Class 2 standards.
4. *Canton to East Wye Switch.* Revised benefit-cost analysis for rehabilitation to Class 2 standards.
5. *Pierre to Rapid City (West River Rail Study).* Projected economic impacts of transportation alternatives to the abandonment of corridor rail service.

Results

Custer to Deadwood

The Burlington Northern Railroad (BN) has announced its intention to abandon this 62.4-mile line segment by October, 1983. The line primarily serves two shippers: the Homestake Mining Company at Lead and the Black Hills Power and Light Company generating station at Kirk. The predominant traffic over the line is coal terminating at Kirk, comprising 1,658 carloads of 1,718 total revenue carloads shipped over the line in 1981. The line is currently rated as Class 2 track with 25 mph maximum speeds and weight limits of 263,000 pounds. The BN estimates that a rehabilitation and maintenance cost of $5,000,000 will be necessary over the next five years to remove 10 mph slow orders and maintain the track at Class 2 standards. BN operating losses for the line in 1981 were $284,000. Rail retention and rehabilitation would result in increased 10-year total system discounted costs ranging between $4,558,000 and $5,960,000 for the most likely range of annual volumes. Distributional effects would include cost increases to

the shipper ranging between $1,339,000 and $2,741,000 and capital costs to the state of $3,219,000 for rehabilitation. The rehabilitation cost estimate of $5,000,000 provided by the BN is a significant contributing factor to the high cost of the rail retention option, and the state may wish to examine a breakdown of the rehabilitation estimate.

Truck transportation of coal would result in a shortened haul distance of 107 miles from Wyodak Mine compared to a 213-mile rail distance. Highway I-90 would be used for all but 14 miles of the move, and truck traffic would be increased by 18 to 23 trucks per day over the most likely range of annual tonnages. Discounted total system costs over a 10-year period were estimated at $994,000 to $4,443,000 over the most likely range of alternatives. Distributional effects would include $482,400 in highway improvement costs to the state and $1,200,000 in loading facility construction costs as well as potential increases in shipping costs for trucking up to a maximum of $4,360,000 for the Black Hills Power and Light Company. Other distributional effects include increased highway maintenance costs to the state, loading dock modification costs at Homestake Mining Company, $420,000 in revenues to the BN Railroad for salvage of the rail line, and increases in trucking jobs.

Trucking options, including required highway improvement, were found to be more cost-effective than rail options under the assumptions used in the analysis, except at the combined upper limits of expected annual tonnage and estimated truck rates. Total transportation costs to the Black Hills Power and Light Company and the Homestake Mining Company will likely be greater than 1981 costs unless very favorable trucking rates can be obtained.

The option of using the Kirk Generating Plant for peaking and emergency power with wheeling of electricity from other plants was not considered feasible at this time by Black Hills Power and Light Company officials, but may become viable in the future. A source of available on-site power is considered essential to the safety of the Homestake Mine. Thus, the Kirk Generating Station cannot be closed.

Blunt to Onida

The 15.3-mile Chicago and North Western Railroad (C&NW) branch line from Blunt to Onida serves two major grain elevators at Onida, which originate a substantial volume of wheat and sunflower seed traffic destined for Minnesota and other eastern markets. The line feeds into the C&NW Class B main line from Rapid City to Wolsey at Blunt. The traffic volume originating at Onida is the highest single station volume of any point along the Rapid City to Wolsey route. Abandonment of the line north of Onida to Gettysburg was approved by the Interstate Commerce Commission in 1982 and will be completed by early 1983.

The Blunt to Onida line is badly deteriorated and needs major rehabilitation estimated at $2,700,000 to remove weight restrictions of 178,000 pounds per car, replace worn rail, and upgrade the track to Class 2 standards (25 mph operation). Allowable loads would be increased to 251,000 pounds per car, which would permit larger, more economical cars to serve Onida. These larger cars would also allow Onida shippers to access West Coast markets.

Productivity of agricultural products in the Sully County area surrounding Onida has increased substantially in recent years, particularly with the development of irrigated farming of corn. However, large volumes of wheat and corn have not been moving because of low market prices; as a result, elevator and on-farm storage in the area has grown substantially.

Cost savings from rehabilitation of the Blunt-Onida line would accrue from (1) use of larger cars for grain products moving to eastern markets, (2) savings from the use of rail rather than trucks for moving westbound corn to the main line by rail rather than by truck to Mobridge or Selby, (3) savings in car replacement costs with use of larger cars, and (4) on-line transportation cost savings resulting from Class 2 conditions. Concerning the latter item, the recent completion of Class 2 rehabilitation between Pierre and Huron, coupled with potential rehabilitation of the Blunt-Onida line, may permit single-crew, one-day service between Huron and Rapid City, including service to Onida.

Primary efficiency benefits of $3,240,000 over a 10-year period (discounted at five percent) would be distributed to the C&NW Railroad as increased revenues, and secondary efficiency benefits of $460,000 would be distributed to the state in the form of a reduced impact of trucking on maintenance of the state highway system. The benefit-cost ratio was computed at 1.37.

Rehabilitation of the Blunt-Onida line may permit Onida shippers to access West Coast markets for corn and wheat at the recently negotiated joint C&NW-BN rate. If, however, rehabilitation is not completed or significantly delayed, trucking will develop to move westbound wheat and corn north to the main line, and adequate loading facilities will be constructed near Selby.

Mitchell-Aberdeen

The Mitchell-Aberdeen route was previously analyzed as a branch line under the assumptions that (1) the line would be operated by a contracted short-line operator rather than a Class 1 railroad and (2) overhead traffic from the core system or from outside the core system would not pass over the line. The analysis provided corrects these two previous assumptions.

The 128.6-mile Mitchell-Aberdeen core system line segment connects the three core system lines serving the heavy agricultural production area of southeastern South Dakota with the state main line at Aberdeen. While some traffic originates and terminates along the Mitchell-Aberdeen line, its ultimate value lies in the potential mileage reduction for westbound grain movements through the Aberdeen gateway. The core system is currently operated as separate branch lines, with all traffic moving through the Sioux City and Sioux Falls gateways. Completion of Class 2 rehabilitation on the Mitchell-Aberdeen line will permit westbound grain movements to use the Aberdeen gateway.

If the BN route through Alliance, Nebraska becomes congested because of increases in coal traffic, rehabilitation of the Mitchell-Aberdeen line will also permit the

rerouting of BN core system bridge traffic between Kansas City and the Pacific Northwest. Savings of $1,090,000 per year would accrue from the diversion of one through train per day in each direction to the core system rather than by diversion to the more circuitous BN route via Willmar, Minnesota. Diversion of one BN through train per day to the north/south core system route will also eliminate the need for present core system way train service, since the through train would pick up and set out non-unit train traffic. The potential also exists in the distant future for upgrading the north/south core system route beyond Class 2 standards if the market for southern Montana coal improves substantially.

Primary efficiency benefits include the following annual savings:

1. Savings attributable to shipper use of rail rather than truck	$ 428,000
2. Savings attributable to reduced car- and ton-miles using the Aberdeen gateway for westbound traffic	$1,109,000
3. Savings attributable to rerouting BN bridge traffic (one train per day per direction)	$1,090,000
4. Savings by elimination of way train service by use of BN through trains	$ 268,000

Using a five percent discount rate, these benefits amount to $22,350,000 and $11,500,000 over a 10-year period, with and without BN bridge traffic, respectively. Net secondary efficiency benefits of $11,076 annually were computed previously and are still valid. The resulting distributional effects over the 10-year period include $3,303,000 in savings to shippers; $8,563,000 or $19,051,000 in profits to the BN Railroad without and with bridge traffic, respectively; and $86,000 to the state in terms of reduced highway maintenance through rail use. Benefit-cost ratios were computed at 1.48 without and 2.78 with BN bridge traffic of one train per day per direction.

Canton-Elk Point

The 49.1-mile Canton-Elk Point local option line was previously analyzed, given the assumptions that (1) the line would be operated by a contracted short-line operator rather than by the BN Railroad and (2) the Hawarden-Beresford line would be abandoned. The analysis provided corrects these two previous assumptions and calculates the benefit-cost ratio for upgrading the line from Class 1 to Class 2 standards.

The Canton-Elk Point line serves local grain traffic originating at nine elevators, five of which have low storage capacities and are not capable of loading unit trains. Three of the nine elevators, including two capable of loading unit trains, are located on the Beresford branch line. The L.G. Everist Company ships overhead rock and crushed stone over the line from its quarry at Dell Rapids and originates sand traffic from its pit north of Hawarden. The D&I Railroad, an L.G. Everist subsidiary, has been given limited authority to operate over state-owned routes between Dell Rapids and Sioux City, Iowa.

Rail service over the route had been discontinued for one and one-half years after the Milwaukee Road service embargo, but was reinstated during 1982. Rail service permits

shippers to access markets other than Sioux City, to which they were captive by truck during the rail embargo. Currently, corn and soybeans are not being shipped in volume because of low market prices, and elevator and on-farm storage capacity has increased substantially. Rehabilitation of both the Canton-Elk Point and Hawarden-Beresford lines to Class 1 standards is underway, with completion expected during 1983.

The cost of upgrading the line further to Class 2 standards was estimated at $2,460,000. Benefits from upgrading to Class 2 from Class 1 would accrue from reduced transit times, computed at $21,600 per year for the BN and $13,500 per year for the D&I Railroad. Primary efficiency benefits of $271,000 over a 10-year period at a discount rate of five percent would be distributed to the two carriers as reduced transportation costs.

No secondary benefits would accrue to the state, since loss of rail service is not at issue. The benefit-cost ratio of 0.1 indicates that further upgrading of the line from Class 1 to Class 2 standards is not warranted, since the costs of improvements exceed the benefits to be gained.

Shipper use of rail service over the line is affected by the demand for corn and soybeans, market prices for commodities, transportation rates, and the adequacy of on-demand service, rather than by the speed of trains. Shipper use of the line, given Class 1 standards, will continue as long as rate or service discrimination does not occur that would give core system shippers a rate advantage or significant service advantage over Canton-Elk Point shippers. If discrimination does occur, farmers will be induced to truck longer distances to take advantage of higher prices offered on commodities produced.

Pierre-Rapid City

The 170.8-mile Ft. Pierre-Rapid City line was recently reclassified from Category 2 to Category 1 for abandonment by the C&NW Railroad. The line originates grain traffic from six elevators (none of which is capable of loading unit trains) and carries overhead traffic from the Black Hills area. The 50-mile segment of track from Midland to Ft. Pierre follows the Bad River, crossing numerous bridges with weight limitations of 210,000 pounds. This alignment adds significantly to both rehabilitation and annual maintenance costs. Within the same corridor, the state has purchased and railbanked the former Milwaukee Road line between Chamberlain and Rapid City. The analysis provided projects the economic impacts of 28 transportation subalternatives to abandonment involving each of the two corridor lines.

The C&NW has experienced a 38 percent decrease in total carload traffic over the route between 1979 and 1981. A 28 percent decrease in originating grain traffic was recorded due to low market prices. Losses of overhead traffic stem from market conditions in the construction industry, which decreased cement, lime, and gravel carloads shipped. Woodchip and log traffic losses stemmed from changes in product procurement policies by three of the four Wisconsin paper mills using South Dakota raw materials.

Projections of traffic volumes and predictions of traffic retention under each alternative were necessary to form the basis for economic analysis. The Summary Table describes traffic retention potential for each major route and carrier alternative. Numerical traffic assignments to route and carrier alternatives were extremely generous, usually allowing assignment of all potential traffic, even in cases listed as "rail possible" or "rail unlikely." A most optimistic view was created for the success of each subalternative considered.

The success of any of the alternatives that propose the retention of rail service is dependent on the retention of overhead traffic, particularly woodchips and cement originating at Whitewood and Rapid City. Neither the C&NW line nor the state-owned railbanked line has sufficient originating and terminating traffic to be self-supporting in the absence of overhead traffic. Partial or complete loss of cement traffic or loss of woodchip traffic would result in (1) loss of railroad profitability in each alternative analyzed, (2) the necessity for shipper subsidies through increased rates or higher truck transportation costs, and (3) sharply increased total system costs to levels above $10,000,000 over a 10-year period for each alternative considered. Thus, only alternatives where the existing overhead traffic is retained produce reasonable total system costs. Therefore, it is vitally important to retain the existing overhead traffic (particularly woodchips and cement) if any selected alternative is to be successful. The Summary Table describes the results of the alternatives under the assumption of total traffic retention. Alternative 3, abandonment, has been included for purposes of comparison.

The line is extremely vulnerable to loss of both cement and woodchip overhead traffic. Retention of cement traffic on the West River line is interrelated with and dependent on the rehabilitation and continued operation of the C&NW Aberdeen-Oakes line and Sioux Valley Junction-Watertown line. Conversely, abandonment of West River line rail service would result in eventual abandonment of the other two C&NW lines. Cement traffic can be retained if (1) current rate structures are retained, (2) state policy regarding cement traffic retention is reflected in state cement company operating philosophy, and (3) a program of retention and rehabilitation to the Aberdeen-Oakes and Sioux Valley Junction-Watertown lines is initiated, or in the case of the latter line, trackage rights are obtained over the BN between Huron and Watertown.

BN operation is practical for cement traffic movements to Sioux Falls and Watertown if trackage rights are granted over the C&NW in Rapid City to serve the cement plant. However, short-line operation would be less practical because of interchange costs on the cement traffic movements.

Retention of woodchip and log traffic depends on the maintenance of the current rate structure. Alternatives involving added mileage or additional rail carriers necessitating interchange are likely to force higher rates and possibly total loss of this business to the State of South Dakota, since alternative sources of supply would most likely be used.

Summary Table

SUMMARY OF ALTERNATIVE SYSTEM COSTS UNDER TOTAL TRAFFIC RETENTION

Alt. No.	Alternative	Total System Cost over 10 Years at 5% Discount ($million)	Distributional Effects			
			Railroad Profit Contrib.	So. Dak. Capital Costs	Shipper Increased Costs	Trucker Added Jobs
1	Ft. Pierre-Rapid City Continued C&NW Oper.	$ 2.71	$5.09	$ 7.80	—	—
3	Abandon C&NW Line	6.67	0	0	$6.67	59
4	South Dakota Ownership Ft. Pierre-Rapid City					
4A	C&NW Operation	3.14	9.46	12.60	—	—
4B	Short-Line Operation	4.04	8.56	12.60	—	—
	South Dakota Ownership Wolsey-Rapid City					
4C	C&NW Operation	10.25	5.75	16.00	—	—
4D	Short-Line Operation	16.10	—	16.00	0.10	—
4E	BN Operation	12.94	3.10	16.00	—	13
5	South Dakota Ownership Chamberlain-Rapid City					
5A	Short-Line Operation	12.30	3.09	12.56	2.83	−8
5B	BN Operation	7.25	8.14	12.56	2.83	−8

If existing traffic levels can be retained, each alternative involving the C&NW or BN operation of either line appears profitable from an operating standpoint. Traffic retention under BN operation, however, is less likely than under C&NW operation because of the need to interchange woodchip traffic and to maintain the current rate structure. It is also very unlikely that the C&NW would allow the BN to operate between Wolsey and Rapid City (Alternative 4E), since the Ft. Pierre-Wolsey line segment has been upgraded and is profitable and since the C&NW would not want BN competition in Rapid City. Although short-line operation was profitable for the Ft. Pierre-Rapid City and Chamberlain-Rapid City lines (Alternatives 4B and 5A), C&NW and BN operations, respectively, were more profitable.

Using the analysis provided in Table 27 (Chapter 5), it may be noted that Alternative 4A (C&NW operation with state ownership) is superior in every cost category to BN operation under Alternative 4E (state ownership, Wolsey-Rapid City) and Alternative 5B (state ownership, Chamberlain-Rapid City). This observation combined with the sensitivity of woodchip traffic retention to interchange costs and increasing rates points to continued C&NW operation as the most viable rail option for comparison to the abandonment alternative.

In addition to the costs of rehabilitation of the rail line, additional cost of rehabilitating or replacing the car and locomotive fleet must be considered, although outside the scope of this study. The distributional effects of these additional costs have not been determined.

The analysis requested by the South Dakota Division of Railroads covered only one rail abandonment option, which assumes transfer of originating grain traffic to 25-ton capacity trucks operating from point of origin to market destination. Prior to a decision regarding abandonment alternatives, it is recommended that further analysis be conducted to determine the economic feasibility of a grain subterminal located at a railhead as well as the economic feasibility of direct trucking to markets using double-bottom trucks.

1.
BN 11—Custer to Deadwood

Introduction and Background

The 106.9-mile Edgemont to Deadwood line is operated as a branch line by the Burlington Northern Railroad (BN), with the 84.8-mile section between Lien Spur and Deadwood classified under Category 1, potentially subject to abandonment within three years. The BN has announced its intention to abandon the 62.4-mile segment between Custer and Deadwood by October, 1983. The line primarily carries terminating coal traffic to the Kirk Power Plant of the Black Hills Power and Light Company. The only other shipper of record is the Homestake Mining Company of Lead, which receives low volumes of heavy machinery and materials and originates scrap metal. A description of this line, designated as South Dakota Segment BN 11, is included in *Railplan South Dakota—1981*. Rail and highway maps of the corridor are shown in Figure 1.

Line Characteristics

Line Description

The Custer to Deadwood line segment serves two only primary shippers located at the north end of the line near Lead, South Dakota. The Black Hills Power and Light Company power plant at Kirk supplies most of the power for the Homestake Mining Company gold mining and refining operations at Lead. The power company receives coal traffic that originates from its Wyodak Mine located on the BN near Gillette, Wyoming, a rail distance of 213 miles.

The alternative of closing the Kirk Generating Station and wheeling electrical power from other Black Hills Power and Light plants is not considered feasible on the basis of mine safety. The deep mining operations at Lead require a reliable on-site source of power that is not subject to transmission line failure.

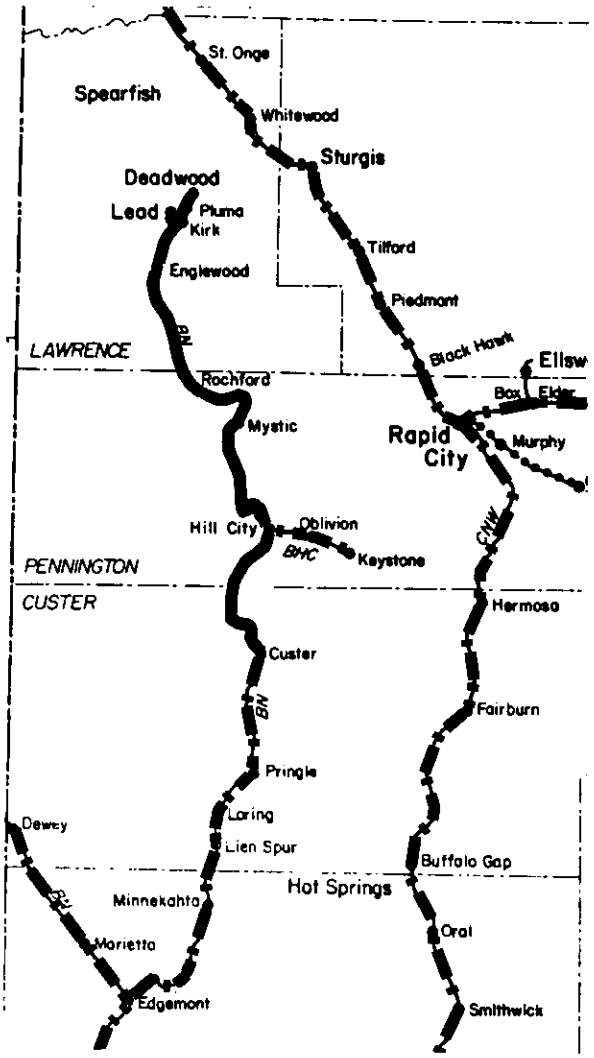
The Homestake Mining Company at Lead receives low carload volumes of cyanide and grinding balls and rods, which are used in the gold refining process. Occasionally, carload quantities of heavy equipment are also shipped by rail to Lead. Low carload volumes of scrap metal are shipped from the Lead complex. Homestake Mining personnel estimated total rail traffic at approximately 60 carloads per year.

Figure 1

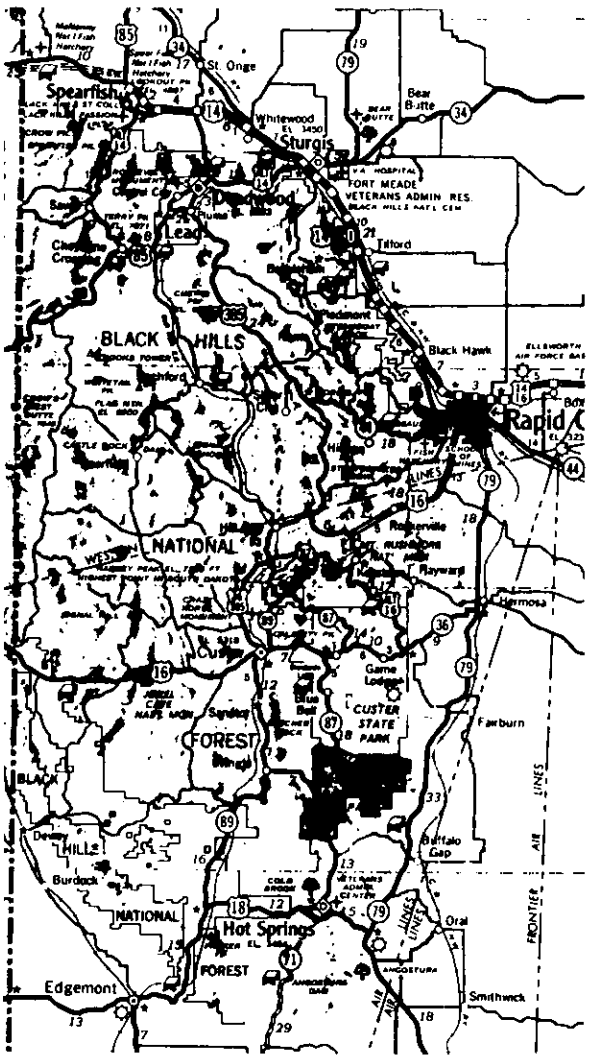
SOUTH DAKOTA SEGMENT BN 11

EDGEMONT TO DEADWOOD

RAILROAD SEGMENT MAP



HIGHWAY LOCATION MAP



Study Segment

Railbanked State-Owned Core System Segment

All Other Lines

Operations and Service

Service over the Edgemont to Deadwood line is provided by a four-man crew, which works three round trips per week. A separate crew, domiciled in Deadwood, provides switching service to the Kirk Generating Station and Homestake Mine five days per week, using a local switch engine stationed at Deadwood. The Kirk plant requires three switches per day because of the existing limited unloading and on-ground storage capacity. The Homestake mine is served by a 3.2-mile industrial spur track, which includes a switchback. Service is provided on an as-needed basis. Maximum speed along the branch line is 25 mph, although the condition of curves and bridges has resulted in the imposition of 10 mph slow orders at several points along the route.

Rail Traffic Volumes

The Burlington Northern Railroad reported the following revenue car loadings over the Custer-Deadwood line segment between 1978 and 1982:

Year	Revenue Carloads
1978	2,100
1979	2,100
1980	1,800
1981	1,718
1982*	1,200

* First nine months only.

The BN indicated that revenue traffic over the Lien Junction-Deadwood segment was 2,867 carloads in 1976 and 2,320 carloads in 1980.

Revenues and Costs

Branch line revenues for the Custer to Deadwood line segment, as well as on-branch and off-branch costs, were supplied by the Burlington Northern Railroad for calendar year 1981. Total revenues of $1,400,000 included only $16,000 not attributable to freight revenue.

Total Revenues		$1,400,000
Expenses (on-branch)		
Transportation and fuel	$285,000	
Maintenance of way and structures	221,000	
Maintenance of equipment	57,000	
Freight train car cost	113,000	
Remainder, including:	150,000	
Return on investment		
Overhead cost		
Fringe benefits		
Meals		
Total On-Branch Expense		826,000
Total Off-Branch Expense		858,000
Net Loss		$ 284,000

The salvage value of the line was estimated at $420,000 by the BN, and the cost for rehabilitation and maintenance of the track to Class 2 standards was estimated at $5,000,000. The combined rehabilitation-maintenance activity and cost would be distributed over a five-year period, as needed by the BN, and for purposes of this analysis was assumed to be dispersed equally over the five-year period.

Project Analysis

Since the Black Hills Power and Light Company is the only major shipper on the line segment, the numerical analysis focuses on the impact of the alternatives on the power company. Economic impacts were evaluated, assuming traffic levels of 1,718 carloads per year and 2,100 carloads per year, which correspond to 1981 and 1979 BN revenue carloadings, respectively. Actual tonnage in 1981 was 145,420, with average carloadings of 85 tons. Based on carloadings of 85 tons per car, the 1979 estimated volume was 178,500 tons. The 1981 tonnage reflects both Homestake Mine and Kirk Generating Station traffic. Elimination of the Homestake Mine traffic yields 1,658 carloads of coal, with an estimated weight of 140,930 tons for 1981. Thus, the latter figures are used in the 1981 analysis for computing costs from the point of view of the power company. Coal consumption at the Kirk power plant in 1981 was 128,716 tons.

The Homestake Mining Company would not incur significant negative impacts from elimination of rail service, as most traffic could be transferred to truck carrier. Only heavy equipment moving into the mining complex would be affected because an additional breakdown of such equipment would be necessary for truck transportation. Some improvements in the truck docks at the plant may be necessary.

The alternative of short-line operation over the Custer to Deadwood line has not been considered since costs and rates charged for such operation and service would be greater than under BN operation. Short-line operation would create a two-carrier movement with additional interchange costs and possible delays. Several locomotives would be necessary for movements over the line because of the terrain. These locomotives would be idle when not in use on the short line, whereas under BN operation, this equipment would be consigned from a pool and would be used more efficiently, resulting in lower equipment costs. Short-line operation would also require the absorption of car hire costs and management overhead for a second railroad within the rate charged the shipper. A short line operating over this route would be in a weak bargaining position since there is little originating traffic.

The following alternatives were evaluated to determine the economic impact on the Black Hills Power and Light Company and the State of South Dakota:

Alternative 1A: Rail Rehabilitation to Class 2 at 140,930 tons per year

Alternative 1B: Rail Rehabilitation to Class 2 at 178,500 tons per year

Alternative 2A: Trucking with Highway Improvements at 140,930 tons per year

Alternative 2B: Trucking with Highway Improvements at 178,500 tons per year

Project Alternative 1A: Rehabilitation to Class 2
145,420 tons per year (1,718 carloads per year)

This alternative assumes that the 58.4-mile rail line segment between Custer and Kirk would be rehabilitated and maintained at Class 2 standards over a five-year period. Table 1 summarizes the cost computations under this alternative. Maintenance costs following rehabilitation have been estimated at $5,000 per mile, per year, and have been included at this level for each year of the 10-year analysis. The remaining $3,540,000 of the $5,000,000 BN-estimated rehabilitation and maintenance cost was allocated to rehabilitation in equal amounts of $708,000 over a five-year period. Shipper transportation costs were computed at a rail rate of $9.18 per ton, which was the 1982 rail rate level for the movement.

Table 1
ALTERNATIVE 1A COST COMPUTATIONS

Subsidy Required

$1,400,000	total railroad revenues
-826,000	railroad on-branch costs
-858,000	railroad off-branch costs
$ (284,000)	subsidy required

Increased Maintenance Cost and Rehabilitation Costs[1,2,3]

$5,000,000	BN estimated maintenance and rehabilitation costs over the next five-year period
$ 221,000	BN actual maintenance cost in 1981

Present maintenance cost per mile = $221,000/62.4 miles = $3,542 per mile

Estimated future maintenance cost Custer-Kirk =
$5,000 per mile X 58.4 miles = $292,000

Increased railroad maintenance costs:

$292,000
-221,000
$ 71,000 per year

Rehabilitation costs:

total maintenance cost = $292,000 per year X 5 years = $1,460,000

$5,000,000	maintenance and rehabilitation cost
-1,460,000	maintenance cost
$3,540,000	rehabilitation cost

annual rehabilitation cost = $3,540,000/5 years = $708,000 per year

[1] Assumes future maintenance cost at $5,000 per mile per year.

[2] Assumes that trackage to Deadwood and Lead will be abandoned or will not receive significant maintenance.

[3] Assumes maintenance and rehabilitation costs will be distributed evenly over a five-year period, according to BN officials.

Project Alternative 1B: Rehabilitation to Class 2
178,500 tons per year (2,100 carloads per year)

Alternative 1B analyzes the results of rehabilitating the railroad between Custer and Kirk at the 1979 traffic level, which may reflect a practical upper limit to potential coal shipments over the line. The additional tonnage affects shipper transportation costs as well as the railroad operating subsidy required. Computation of the subsidy required at this heavier traffic volume included adjustments to revenues, on-branch costs, and off-branch costs. These adjustments and the assumptions used are described in Table 2.

Project Alternative 2A: Trucking with Highway Improvements
145,420 tons per year (5,817 truckloads per year)

This alternative assumes that the rail line between Custer and Deadwood would be abandoned and that the 1981 volume of 145,420 tons per year moved by rail would be transferred to truck carrier. The probable route for coal truck traffic would follow I-90 and US 85 to Deadwood, then US 14A and a 1.2-mile county road to the Kirk Generating Station. The total highway distance is 107 miles, compared to a rail distance of 213 miles.

Table 2
ALTERNATIVE 1B COST COMPUTATIONS

Compute Subsidy Requirement

Revenue at 2,100 carloads per year

$1,400,000 X 2,100 carloads per year/1,718 carloads per year = $1,711,292

Off-branch costs

assume off-branch costs are 50 percent variable

$858,000 X .50 = $429,000 X 2,100/1,718 = $524,389 variable

429,000 fixed

$953,389

On-Branch Costs

Item	*1,718 carloads/year*	*Basis*	*Amount*
Way and structure	$221,000	No increase	$221,000
Equipment and loco.	57,000	Marginal increase	57,000
Transportation	285,000	10% increase of 50% variable	299,250
Freight train car cost	113,000	2,100/1,718 of 50% variable	125,562
Remainder	150,000	10% increase of 50% variable	157,500
	$826,000		$860,312

Subsidy Required

$1,711,292	revenue
-953,389	off-branch cost
-860,312	on-branch cost
($102,409)	

Shipper transportation costs (carrier revenues) were computed at two levels for this analysis: $11.74 per ton, the current truck rate for moving coal from the Wyodak Mine to Rapid City without backhaul, and $9.18 per ton, matching the 1982 rail rate to Kirk. The current published rate for spot truck movements of coal from Wyodak to Kirk is $7.72 per ton, but Black Hills Power and Light officials expect the rate to increase if rail competition is lost and adequate backhaul cannot be obtained. The two rates selected define the most likely range for truck rates if the rail line is abandoned and all coal is transported by truck. Carrier costs for trucking from Wyodak Mine to the Kirk power plant were computed using the RCAI truck costing model. Based on 25 tons per truck and empty backhaul, a carrier cost of $200.23 per truckload was calculated.

Carrier revenues and costs were not computed for the commodities originating and terminating at the Homestake Mine, since quantities shipped fluctuate and are obtained from diverse sources, and since rates were not available. Thus, it is assumed that the net increase in shipping costs to the Homestake Mining Company is $0.00, although Homestake officials expect shipping costs to increase slightly.

New loading facilities for trucks must be constructed at Wyodak Mine if the current volume of coal must be delivered to Kirk by truck. Currently, trucks at Wyodak are loaded from the same silo and chute used to load unit trains, and the additional truck traffic precipitated under this alternative would require the construction of a major loading facility, with $600,000 of the cost allocated to the Kirk traffic. In addition, the Kirk generating station is not set up for coal delivery by truck. New unloading and stockpiling facilities must be constructed at an estimated cost of $600,000. Homestake Mining officials indicate improvement of truck loading facilities will be required if rail service is discontinued. Although the estimated cost of this improvement was not available, a $100,000 improvement cost was assumed for the analysis. Table 3 summarizes the cost computations under this alternative.

Volume delivery of coal by truck will require several highway improvements in the Deadwood-Lead area. A truck climbing lane must be constructed along the southbound lane of US 85 on a grade approximately three miles north of Deadwood at an estimated cost of $233,400. Truck traffic would have the least impact on Deadwood and Lead by using US 14A. However, reconstruction of the intersection of US 14A and the county road leading to Kirk would be necessary to reduce the sharp turning angle of the intersection. The cost of acquisition of railroad right-of-way and fill work was estimated at $144,000. Replacement of drainage pipes along the 1.2-mile county road was estimated at $105,000, but no major roadway improvements would be necessary. Total estimated cost of highway improvements is $482,400.

Project Alternative 2B: Trucking with Highway Improvements
178,500 tons per year (7,140 truckloads per year)

This alternative assumes abandonment of the Custer-Deadwood rail line and truck transport of 178,500 tons per year of coal between Wyodak Mine and Kirk, which is approximately equal to the 1979 volume of coal moved to Kirk by rail.

Table 3
ALTERNATIVE 2A COST COMPUTATIONS

Shipper Transportation Cost[1,2]

at $11.74 per ton

140,930 tons per year X $11.74 per ton = $1,654,518

at $9.18 per ton

140,930 tons per year X $9.18 per ton = $1,293,737

Loading Facility Costs[3]

$ 600,000	construct new truck unloading facility at Kirk
600,000	proportioned cost of truck loading facility construction at Wyodak Mine allocatd to Kirk plant
$1,200,000	

Assuming loading facilities have physical life of 20 years, salvage value at 10 years is $600,000.

Highway Construction Costs[4]

$144,000	truck turnaround US 85
233,400	passing lanes US 85
105,000	county road improvements 1.2 miles
$482,400	

[1] The $11.74 per ton rate is the current truck rate from Wyodak Mine to Rapid City power plant without backhaul. Thus, this rate is conservative.

[2] Computed at matching rail rate of $9.18 per ton, cost is significantly reduced. Current rate from Wyodak to Kirk is $7.72 per ton at low traffic levels; Wyodak to Rapid City rate is $8.91 per ton with backhaul.

[3] Source: Black Hills Power and Light Company.

[4] South Dakota Department of Transportation estimates.

Again, shipper transportation costs were computed at both $11.74 per ton and $9.18 per ton, as in the previous analysis. No incremental expansion of loading, unloading, or highway facilities would be necessary beyond that required for the lower coal tonnage of 140,930 per year. Shipper transportation costs at the higher volume are computed as follows:

at $11.74 per ton: 178,500 tons per year X $11.74 = $2,095,590

at $9.18 per ton: 178,500 tons per year X $9.18 = $1,638,630

Analysis of Alternatives

Table 4 summarizes the increased cost of each alternative analyzed over the actual transportation costs obtained for 1981. Rail operations under Alternatives 1A and 1B, rail rehabilitation, produce net losses of $284,000 and $102,000, respectively, which must be subsidized by the shipper if rail service is to be continued. The shipper must also absorb increased maintenance-of-way costs, estimated at $71,000 per year under each alternative. An estimated capital cost of $708,000 per year for the first five years must be absorbed by either the state or the shippers for rehabilitation of the line. Total costs, discounted at five percent, for a 10-year period under Alternatives 1A and 1B were computed to be $5,959,745 and $4,557,552, respectively.

Alternative 2A, rail abandonment with trucking and highway improvement (at 5,817 truckloads per year), results in net profits to motor carriers of $526,000 and $165,041, respectively, at truckload rates of $11.74 and $9.18 per ton. The shipper must absorb the cost of loading dock construction as well as any increase in rates above the former $9.18 per ton rail rate. The state or shipper must absorb the cost of highway improvements necessary to handle increased truck traffic. Total costs, discounted at five percent for a 10-year period, under Alternative 2A were computed to be $3,780,000 and $994,000, respectively, for truckload rates of $11.74 and $9.18 per ton.

Similarly, Alternative 2B, rail abandonment with trucking and highway improvements (at 7,140 truckloads per year), results in net profits to motor carriers of $665,948 and $208,988, respectively, at truckload rates of $11.74 per ton and $9.18 per ton. Total costs discounted at five percent for a 10-year period under Alternative 2B were computed to be $4,443,000 and $994,000, respectively, for the assumed truckload rates.

The results of Table 4 indicate that the total discounted cost of truck transportation may be significantly less than rail transportation with rehabilitation. Only at the upper levels of annual volume and anticipated rates will the costs of the rail and truck alternatives become approximately equal. At the given rates, however, each alternative will produce total transportation costs greater than those incurred during 1981.

Table 5 summarizes the total annual costs to the Black Hills Power and Light Company and the State of South Dakota for the transportation of coal from Wyodak Mine to Kirk over a 10-year period at a discount rate of five percent. This analysis indicates that the trucking options, including required highway improvements, are more cost-effective for the power company than rail options under the given conditions and assumptions, except near the upper limits of expected annual tonnage and estimated truck rates.

Other suboptions may exist that reduce the differential cost between truck and rail alternatives, but will not overcome the significant difference in costs at either the lower volume or the lower rate. Elimination of the switching crew at Deadwood may be possible if Black Hills Power and Light Company personnel can perform plant switching with existing staff and existing equipment. Black Hills Power and Light crews currently perform plant switching on weekends using a small switch engine capable of moving one car at a

Table 4
ANALYSIS OF ALTERNATIVE COSTS

Alternative	Traffic Base	Annual Tons	Annual Revenue ($million)	Annual Cost ($million)	Annual Net ($million)	Cost over 10 Years at 5% Discount: Profit to Railroad	Capital Cost	Operating Cost Subsidy	Total Cost
1A Continued BN operation Custer-Deadwood	1,718 cl/yr	145,420	$1.400	$1.684	($.284)	—	$3.219	$2.741	$5.960
1B Continued BN operation Custer-Deadwood	2,100 cl/yr	178,500	1.711	1.814	(.102)	—	3.219	1.339	4.558
2A Abandon rail, truck use with highway improvements at truckload rate						Added cost to shipper for use of truck	South Dakota capital costs	BN salvage	Total Cost
$11.74/ton	5,817 tl/yr	145,420	1.655[1]	1.129[1]	.526	3.716[2]	.482	(.420)	3.780[2]
$9.18/ton	5,817 tl/yr	145,420	1.294[1]	1.129[1]	.165	.932[2]	.482	(.420)	.994[2]
2B Abandon rail, truck use with highway improvements at truckload rate									
$11.74/ton	7,140 tl/yr	178,500	2.096	1.430	.666	4.360	.482	(.420)	4.443
$9.18/ton	7,140 tl/yr	178,500	1.639	1.430	.209	.932	.482	(.420)	.994

[1] Revenues and costs do not include miscellaneous commodities shipped and received by Homestake Mining Company.

[2] Increased shipping costs to Homestake Mining Company are not reflected in "added cost to shipper" and "total cost," although $100,000 has been included for improvement of loading docks.

Table 5
SUMMARY OF 10-YEAR COSTS DISCOUNTED AT FIVE PERCENT FROM BLACK HILLS POWER AND LIGHT COMPANY PERSPECTIVE

Alternative	Rate per Ton	Discounted Cost at Annual Coal Tonnage ($million): 140,930	178,500
Rail Improvement	$ 9.18	$15.9	$17.2
Trucking with Highway Improvement	9.18	11.3	14.0
Trucking with Highway Improvement	11.74	14.1	17.5

time. Elimination of the Deadwood switching crew would save approximately $1,000,000 over the 10-year period of analysis. If, however, additional personnel or equipment replacement is necessary, this option would not provide a significant cost reduction.

The rehabilitation and maintenance cost estimate of $5,000,000 supplied by the Burlington Northern Railroad is a significant contributing factor to the railroad alternative cost estimates for the 10-year period. Given the significance of the rehabilitation and maintenance cost estimate, it may be advisable for the state to obtain and examine a breakdown of this estimate.

Selection of the trucking option with rail abandonment will result in increased highway maintenance costs that could not be quantified for the analysis. Table 6 indicates the projected increases in traffic over the anticipated truck route at both levels of coal consumption. Significant percentage increases in commercial vehicular traffic will occur over the non-interstate highway system routes to be used, with additional traffic averaging between 18 and 23 truckloads per day, based on a six-day week.

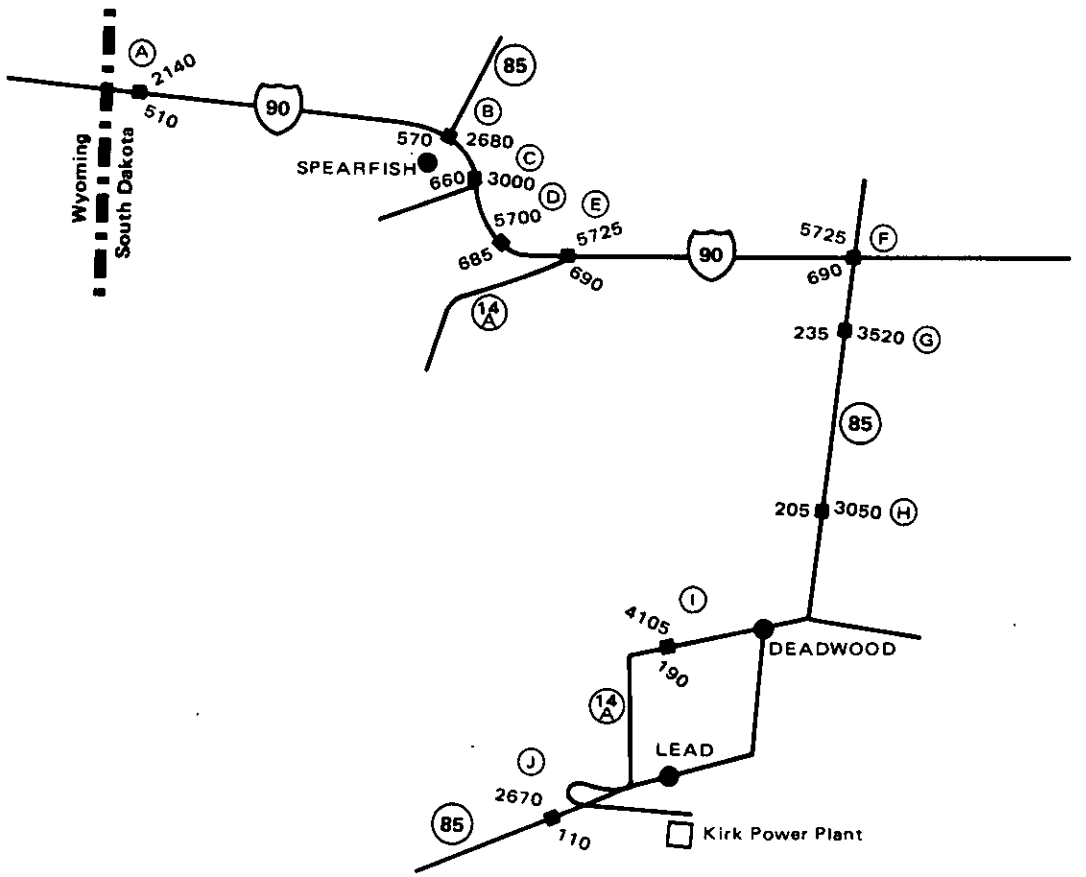
Railroad abandonment would result in the loss of four railroad jobs in the Deadwood area, although the possibility may exist for reassignment of railroad employees within the Burlington Northern system. Utilization of trucking may result in the creation of additional jobs or the increase in productivity and profitability of local motor carriers.

Table 6
TRAFFIC ANALYSIS FOR TRUCK OPTION—CUSTER-DEADWOOD LINE

Location	1980 Traffic	Projected Traffic with Coal Trucks at 18 Loads per Day[1]	Projected Traffic with Coal Trucks at 23 Loads per Day[2]	Percent Increase at 18 Loads per Day	Percent Increase at 23 Loads per Day
A (Total)	2,140	2,176	2,186	1.7%	2.1%
A (Commercial)	510	546	556	7.1	9.0
B (Total)	2,680	2,716	2,726	1.3	1.7
B (Commercial)	570	606	616	6.3	8.1
C (Total)	3,000	3,036	3,046	1.2	1.5
C (Commercial)	660	696	706	5.5	7.0
D (Total)	5,700	5,736	5,746	0.6	0.8
D (Commercial)	685	721	731	5.3	6.7
E (Total)	5,725	5,761	5,771	0.6	0.8
E (Commercial)	690	726	736	5.2	6.7
F (Total)	5,725	5,761	5,771	0.6	0.8
F (Commercial)	690	726	736	5.2	6.7
G (Total)	3,520	3,556	3,566	1.0	1.3
G (Commercial)	235	271	281	15.3	19.6
H (Total)	3,050	3,086	3,096	1.2	1.5
H (Commercial)	205	241	251	17.6	22.4
I (Total)	4,105	4,141	4,151	0.9	1.1
I (Commercial)	190	226	236	18.9	24.2
J (Total)	2,670	2,704	2,716	1.3	1.7
J (Commercial)	110	146	156	32.7	41.8

[1] 140,930 tons per year.
[2] 178,500 tons per year.
* See map on following page for locations.

TRAFFIC COUNTS AND TRAFFIC COUNT LOCATIONS



TRAFFIC COUNT LOCATION

ANNUAL AVERAGE DAILY TRAFFIC

AVERAGE DAILY COMMERCIAL TRAFFIC — 235 — 3520

(G) TABLE 6 REFERENCE LOCATION

(85) HIGHWAY NUMBER

Distributional Effects

The primary impacts of the abandonment/rehabilitation decision will affect the Black Hills Power and Light Company and its customers. Under the rail alternatives, the power company and its customers may be required to absorb a major portion of rehabilitation and maintenance costs as well as provide an operating subsidy to the railroad either directly or indirectly through increased rail rates. Under the highway/trucking option, the power company and its customers must absorb the cost of constructing new loading facilities at Wyodak Mine, new unloading and stockpiling facilities at Kirk, and any highway improvement costs that may be assignable under state statute. However, through negotiations, the power company may be able to obtain a truck rate equivalent to or less than the existing rail rate. Unless a very favorable rate can be obtained, however, Black Hills Power and Light Company costs for coal transportation may increase above the 1981 level. Distributional benefits/disbenefits for each alternative are summarized in Table 7.

Distributional benefits under Alternatives 1A and 1B in Table 7 were assigned, given the assumption that the state would provide all capital costs for rail rehabilitation, and the shippers would subsidize rail operating deficits and increased maintenance costs. A portion of the capital costs for rehabilitation, however, may thus be shifted to the shipper. Similarly, under Alternatives 2A and 2B, the state may be able to assign a portion of its $482,400 highway improvement costs to the Black Hills Power and Light Company.

The option of using the Kirk Generating Station for peaking and emergency standby power coupled with wheeling of power from other, more efficient plants was not considered feasible by Black Hills Power and Light Company officials at this time, but may become more practical in the future as power production and fuel transportation cost relationships change.

Table 7
ANALYSIS OF DISTRIBUTIONAL BENEFITS

Alternative	Traffic Base	Tons	Distributional Benefits over 10-Year Period at 5% Discount ($million) Railroad Profit	South Dakota Capital Costs	Decreased rates/ Costs to Shippers
1A Continued BN operation Custer-Deadwood	1,718 cl/yr	145,420	—	($3.219)	($2.741)
1B Continued BN operation Custer-Deadwood	2,100 cl/yr	178,500	—	(3.219)	(1.339)
2A Abandon rail, truck use with highway improvement at truckload rate					
$11.74/ton	5,817 tl/yr	145,420	$.420	(.482)	(3.718)
$9.18/ton	5,817 tl/yr	145,420	.420	(.482)	(.932)
2B Abandon rail, truck use with highway improvement at truckload rate					
$11.74/ton	7,140 tl/yr	178,500	.420	(.482)	(4.360)
$9.18/ton	7,140 tl/yr	178,500	.420	(.482)	(.932)

2.
CN 16—Blunt to Onida

Introduction and Background

The 15.3-mile Blunt to Onida line, owned and operated by the Chicago and North Western Railroad (C&NW), functions as a feeder connecting the two grain elevators at Onida with the C&NW Huron-Rapid City secondary main line. During the past two years, the C&NW has sought and obtained Interstate Commerce Commission approval to abandon the portion of the line formerly extending from Onida to Gettysburg. A description of the entire line, designated as South Dakota Segment CN 16, is included in the report *Railplan South Dakota—1981*. Rail and highway maps of the corridor are shown in Figure 2.

Line Characteristics

The Blunt-Gettysburg line has been intensively studied by the Division of Railroads. In 1980-81, 12 alternatives were investigated. Table 8 summarizes the alternatives, the project components, estimated annual benefits and costs, and resulting cost-benefit ratios. Detailed descriptions of these alternatives are contained in the report, *Amendment to Railplan South Dakota—1980*. A public hearing on these alternatives was held on February 19, 1981. At that time, shippers expressed their desire for continued rail service coupled with track rehabilitation to achieve Class 2 conditions.

Given the need for rail rehabilitation funding elsewhere in the state, it was not possible to upgrade the Blunt-Gettysburg line at that time. Consequently, the following commitment was made in the above document concerning the improvement of this line:

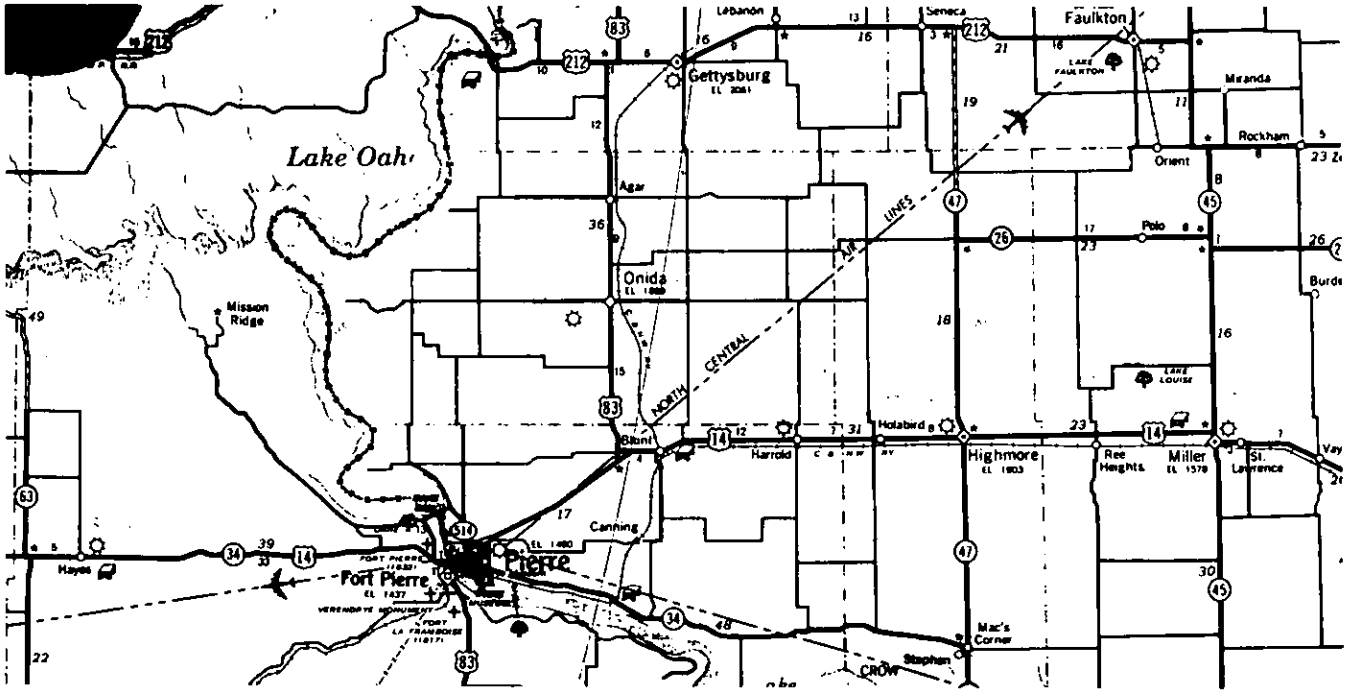
> The South Dakota Division of Railroads will continue to work with the shippers on the Blunt to Gettysburg rail line to assist in alleviating the transportation problem that exists. President Reagan's proposed cut back in rail assistance to states has placed South Dakota in a position of not having any uncommitted funds for rail related projects. The state will consider participating in a project on this line utilizing federal funds if they again become available at some future date. The state recognizes the needs of this area but is not recommending participation in a project at this time.

Figure 2

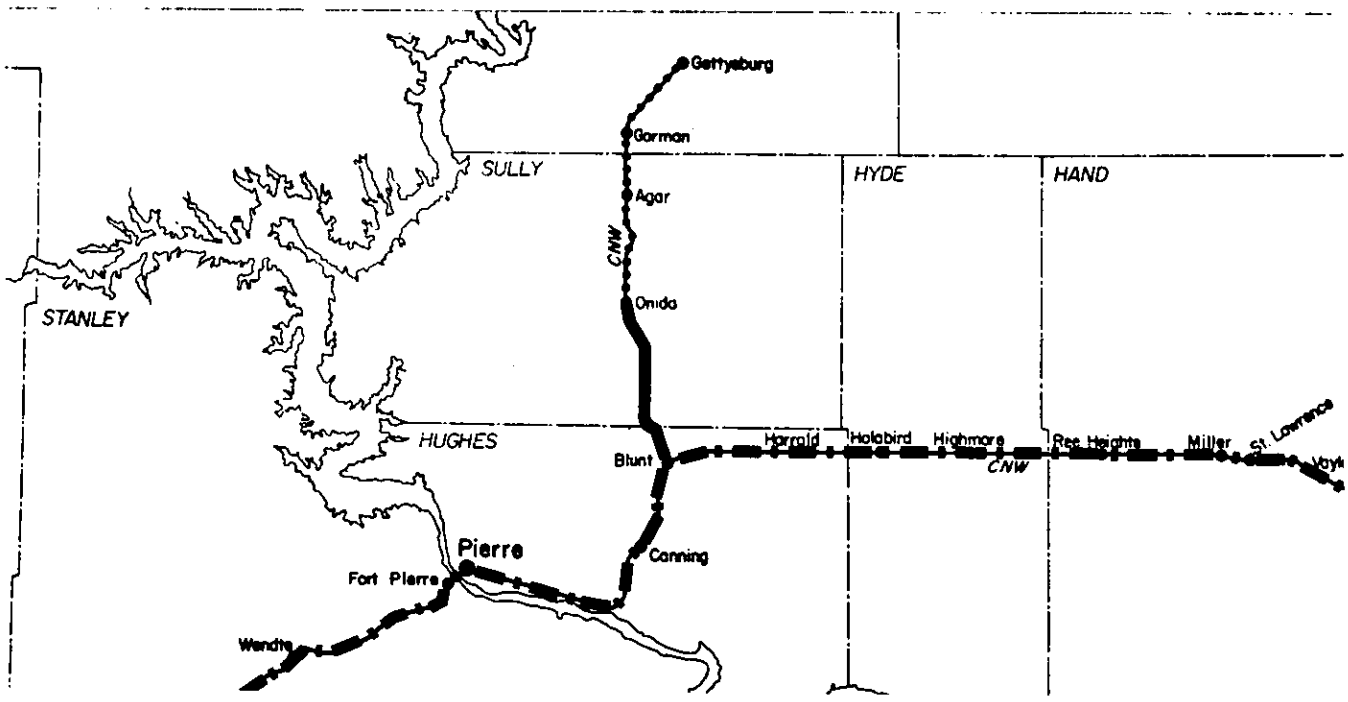
SOUTH DAKOTA SEGMENT CN 16

BLUNT TO GETTYSBURG

HIGHWAY LOCATION MAP



RAILROAD SEGMENT MAP



Study Segment

Pending Abandonment Approval

All Other Lines

Table 8
BLUNT TO GETTYSBURG RAIL LINE ALTERNATIVES

Alternatives	Project Description: Class 2	Rail	Bridges	Loading Facility
1. Abandonment				
2. Abandonment				X
3. Blunt to Onida	X			
4. Blunt to Onida	X	X		
5. Blunt to Onida	X			X
6. Blunt to Onida	X	X		X
7. Blunt to Onida	X	X	X	X
8. Blunt to Onida Rehabilitation and Cont. to Gettysburg	X			
9. Blunt to Gettysburg	X			
10. Blunt to Gettysburg	X	X		
11. Blunt to Gettysburg	X		X	
12. Blunt to Gettysburg	X	X	X	

(See Footnote 1.)

Alternatives	Annual Benefits	Annual Costs	Benefits Less Costs	B/C Ratio	Weight Limit After Project	Project Cost
1. Abandonment	-746,990	0	-746,990			
2. Abandonment	+361,515	62,879	+298,636	+5.75		$ 425,000
3. Blunt to Onida	-391,319	58,218	-449,537	-6.72	178,000 lb	393,500
4. Blunt to Onida	-375,435	289,094	-664,529	-1.30	178,000 lb	1,954,000
5. Blunt to Onida	+261,943	121,097	+140,846	+2.16	178,000 lb	818,500
6. Blunt to Onida	+168,148	351,973	-183,825	+0.48	178,000 lb	2,379,000
7. Blunt to Onida	+157,352	470,333	-312,981	+0.33	251,000 lb[2]	3,179,000
8. Blunt to Onida Rehabilitation and Cont. to Gettysburg	+15,097	58,218	-43,121	+0.26	178,000 lb	393,500
9. Blunt to Gettysburg	+104,508	172,214	-67,706	+0.61	178,000 lb	1,164,000
10. Blunt to Gettysburg	-198,409	766,973	-965,382	-0.26	178,000 lb	5,184,000
11. Blunt to Gettysburg	+35,739	334,959	-299,220	+0.11	210,000 lb	2,264,000
12. Blunt to Gettysburg	-213,929	914,923	-1,128,852	-0.23	251,000 lb[2]	6,184,000

(See Footnote 1.)

Note: The above are preliminary assessments only in order to understand the relationship between the different alternatives. The analysis is based on the 1979 traffic level for the line and preliminary engineering cost estimates.

[1] Table 8 compiles the results of previous studies. Projects 8 to 12 are shown only for information and describe projects considered earlier on the abandoned Onida-Gettysburg segment.

[2] The line would be capable of handling 263,000-pound loads. However, the line it connects with at Blunt is limited to 251,000-pound loads.

Source: *Railplan South Dakota—1981*.

This commitment was made in recognition of the limitations of the line, which include:

- The 178,000-pound load restriction, which limits the line to grain box and small hopper cars.
- The deteriorated condition, which increases operating costs to the C&NW.
- The cost of upgrading the line to eliminate deferred maintenance, increase load limits, and improve service reliability.
- The limited traffic potential of the elevators located on the northern end of the line.
- Intramodal competition from South Dakota purchase of the former Milwaukee main line and the potential of the state line for accessing West Coast markets with BN operation, thus reducing the traffic base of the Blunt-Gettysburg line.

Not having the funds necessary for rehabilitation, and with uncertain governmental interest in improving this line, the C&NW subsequently decided to abandon the portion of this line between Onida and Gettysburg. An abandonment application was filed with the Interstate Commerce Commission on April 30, 1982; Commission approval was obtained on September 7, 1982. However, due to a technicality, cessation of rail service has been postponed until early 1983.

Since completion of the initial study of the line, other changes have taken place that make the previous cost-benefit estimates out of date. These changes are summarized below:

- Expansion of the larger of the two elevators at Onida from 1.7 to 2.4 million bushel storage capacity (under construction).
- The rehabilitation project underway on the Huron-Ft. Pierre line, which by improving track conditions from Class 1 to Class 2, will eventually reduce the costs associated with serving Onida. (Branch line service originates from Huron.)
- The development of irrigation in Sully County, which will increase corn production. While the full potential is unknown, production of 10 million bushels per year is well within reason and is used for the projected corn production in this analysis. Thus, irrigation will significantly improve agricultural productivity in Sully County.
- Multiple car rates now being offered by the C&NW and BN-C&NW, which have provided the railroads with competitive advantages that heretofore did not exist. The latter joint rate is especially significant as it opens up potential West Coast markets for the first time to elevators located in or near Pierre.
- Greater availability of covered hoppers in place of grain boxcars.
- Increased traffic originating at Onida.
- Potential for "pulling" at least a portion of former Agar traffic to Onida.

Based on the desire to use such federal funding as may be available, it becomes necessary to revise the cost-benefit analyses conducted previously to reflect these changes.

Underlying Premises

The major premises involved in making this assessment are listed below:

1. *Definition of the Project.* The project is defined as upgrading the Blunt-Onida line to Class 2 conditions, while at the same time increasing the load limits to 251,000 pounds. The C&NW has estimated the cost of this work at $2.7 million. It involves strengthening existing structures and replacing the rail in additon to tie renewal and ballasting normally associated with track rehabilitation. Lesser alternatives, such as rehabilitation to Class 2 conditions without changing the present load limit, have not been considered, as this would not reduce operating costs or open up the line to West Coast movements. Likewise, alternatives involving construction of a loading facility at Onida have not been considered, given the presence of two elevators capable of loading 27- or 54-car multiple units.
2. *Traffic Base.* The traffic base is comprised of the commodities moving by rail in 1981 and 1982 plus corn. The latter is expected to move by rail or truck-rail through a grain elevator located at a BN station. Much of the irrigated corn grown so far has been stored due to low market prices; however, it will be marketed once prices improve. Growers anticipate that this corn will go to export markets through Seattle.
3. *Alternative Modes/Services.* With respect to wheat, the principal change will be the substitution of 100-ton hoppers (loaded to 94 tons) in place of the small hoppers (loaded to 60 tons) presently being used. No change in present markets (Minneapolis, Mankato, Winona, Duluth) is foreseen, although wheat movements to the West Coast (Portland) are possible if the differential in market prices is large enough. With respect to corn, the principal change will be to allow the two elevators at Onida to compete with existing or proposed elevators located on the BN at Wolsey, Mobridge, and similar locations for movements to the West Coast (Seattle). Improvement of the line is expected to have little or no effect on sunflower seed movements or inbound commodities. The former already uses 100-ton hoppers (due to its low density, the commodity bulks out before it weighs out), while the latter involves a very limited amount of traffic.
4. *Service Life.* A 10-year service live has been used in computing the anticipated cost-benefit ratio of the investment.

Traffic, Revenue, and Cost Projections

Table 11 shows projected rail system traffic and revenue at Onida, both with and without the proposed improvement. The data base is the 1982 traffic estimates, as provided by the two shippers at Onida; volumes shown exceed those for previous years, according to C&NW records. This increase stems from abundant harvests in 1981 and 1982. Table 12, which shows Sully County agricultural production for the most recent five-year period, indicates the significant production potential of the county. Rail service is provided at Blunt (located south of Sully County), Onida, and formerly at Agar. Table 13 shows C&NW-reported originating rail traffic between 1979 and 1981. This table shows the importance of the two elevators at Onida as an outlet for Sully County agricultural products as well as the substantial reliance placed on the rail system to transport locally-produced wheat and sunflower seeds.

Table 9
PROJECTED RAIL SYSTEM TRAFFIC AND REVENUES

Without Improvement (178,000-pound load limit)

		Projected Traffic		Single-Car Service		Multi-Car (25)	
Commodity	Dir.	Cars	Tonnage	Rate ($/cwt)	Revenue	Rate ($/cwt)	Revenue
Wheat	Orig.	1,600	96,000	0.77	1,478,400	0.69	1,324,800
Corn	Orig.	—	—	—	—	—	—
Sunflowers	Orig.	180	7,560	0.87	131,544	N/A	131,544
Millet	Orig.	—	—	—	—	—	—
Misc. Other	Term.	9	237	2.19	10,386	N/A	10,386
Total		1,789	103,797		1,620,330		1,466,730

With Improvement (251,000-pound load limit)

		Projected Traffic		Multi-Car (25 or 27)	
Commodity	Dir.	Cars	Tonnage	Rate ($/cwt)	Revenue
Wheat	Orig.	1,022	96,000	0.69	1,324,800
Corn	Orig.	1,000	94,000	1.646	3,094,480
Sunflowers	Orig.	180	7,560	0.87	131,544
Millet	Orig.	0	0	—	—
Misc. Other	Term.	9	237	2.19	10,386
Total		2,211	197,797		4,561,210

Estimated Corn Traffic

Alternative	Highway Dist.	Rail Rate (54 cars)	Truck Cost	Composite Rate
Load at Onida	0	1.55/cwt[1]	0	1.55/cwt[2]
Truck to and load at Mobridge	78	1.39/cwt[3]	0.29/cwt	1.68/cwt
Truck to and load at Wolsey	99	1.39/cwt	0.36/cwt	1.75/cwt

[1] Assumes capability of loading 54 cars at Onida. Single-, three-, and 27-car rates also available at an additional $0.18/cwt, $0.14/cwt, and $0.08/cwt, respectively.

[2] With a 251,000-pound rather than a 263,000-pound load limit, a carload must not exceed 94 tons. Since a 190,000-pound or 95-ton minimum is typical, the comparable rate then becomes $1.566/cwt.

[3] Zonal rate structure anticipated, reducing present $1.39/cwt rate to approximately $1.27/cwt. Thus, the resulting composite rate would be $1.56.

Since the composite rates are essentially equal, it is reasonable to expect that the corn traffic will divide between Mobridge and Onida. Ten million bushels is equivalent to 280,000 tons or 2,950 carloads. Since location and commercial relationships do affect market shares, assume that the Onida share will be approximately one-third, or 94,000 tons (1,000 carloads).

Table 12 provides revenue and cost estimates for 1980 and 1981 as well as projected revenues and costs with and without line improvement. This table indicates (1) the overall profitability of the line, (2) rate reductions, which apparently have increased the competitiveness of rail transport, but at the same time have reduced unit revenues, and (3) the importance of the improvement in increasing the profitability of the line by allowing the use of larger equipment for existing traffic (wheat) as well as in attracting new traffic (corn).

Project Analysis

Cost-Benefit Computations

Justification for improving the Blunt-Onida line is based on the following component cost savings:

1. *Use of Larger Cars for Transporting Wheat to Midwest Destinations.* Off-line cost computations are based on the procedure used by the C&NW in Docket No. AB-1 (Sub. No. 124), Exhibit H. Using the C&NW procedure, terminal, car-mile, and ton-mile components are computed separately and totaled. Using jumbo hoppers loaded to 94 tons, annual car requirements are reduced from 1,600 to 1,022. This, in turn, reduces terminal and car-mile costs, as indicated below (for off-line movements averaging 399.3 miles):

		Components Costs/Car	
Component	C&NW Unit Cost	Using Small Hoppers (60 tons)	Using Jumbo Hoppers (94 tons)
Terminal	$169.63/car	$169.63	$169.63
Car-Mile	0.79429/car-mile	317.16	317.16
Ton-Mile	0.00601/ton-mile	143.99	225.58
Total cost per car		$630.78	$712.37
Total cost per ton		10.51	7.58
Total cost per cwt		0.526	0.379

Thus, a savings of $2.93 per ton translates into an overall transport cost reduction of $281,000 per year.

2. *Replacement Car Cost Savings.* By using fewer cars, replacement car costs are reduced. Using C&NW data contained in Docket No. AB-1 (Sub. No. 124), Exhibit L, this reduction amounts to the following annual savings:

	Component	C&NW Unit Cost	Estimated Saving
Car Days	578 cars at 7.5 days each	$10.72/car day	$46,471
Car Miles	578 cars at 399.3 miles each	$0.1072/car mile	24,741
	Total Savings		$71,212 or $71,000 per year

Table 12
REVENUE AND COST ESTIMATES ($000)

	Estimated		Projected	
	1980	1981	w/o Impr.	w/Impr.
Attributable Revenue				
1. Freight Originated and/or Terminated On-Line	1,668	1,095	1,620	4,561
2. Bridge Traffic	—	—	—	—
3. All Other Revenue and Income	—	—	—	—
4. Total Revenues Attributable (Lines 1, 2, and 3)	1,668	1,095	1,620	4,561
Avoidable Costs				
5. On-Line Costs				
a. Maintenance of Way and Structures	21	26	29	122
b. Maintenance of Equipment	2	2	4	5
c. Transportation	30	33	61	76
d. General Administrative	—	—	—	—
e. Deadheading, Taxi, and Hotel	1	1	2	2
f. Overhead Movement	—	—	—	—
g. Freight Car Costs	181	123	228	281
h. Return on Investment—Locomotives	3	4	8	10
i. Revenue Taxes	—	—	—	—
j. Property Taxes	—	—	—	—
6. Off-Branch Costs				
a. Freight Originated or Terminated On-Line	905	631	1,172	3,345
b. Bridge Traffic	—	—	—	—
7. Total Avoidable Costs (Lines 5 and 6)	1,143	820	1,504	3,841
Avoidable Loss (Profit)				
8. a. Avoidable Loss (Profit) from Operations	(525)	(275)	(116)	(720)
b. Opportunity Costs	28	28	28	28
c. Total Avoidable Loss (Profit)	(497)	(247)	(88)	(692)
Unit Revenues and Costs				
9. a. Revenue per Car	1,149	1,136	906	2,063
b. Revenue per CWT	0.994	0.983	0.781	1.153
c. Cost per Car	805	879	856	1,750
1. On-Line Cost	182	224	201	237
2. Off-Line Cost	623	655	655	1,513
d. Cost per CWT	0.696	0.761	0.738	0.978
1. On-Line Cost	0.157	0.194	0.171	0.132
2. Off-Line Cost	0.539	0.567	0.567	0.846

Data Source: Revenue and cost data adapted from Docket No. AB-1 (Sub No. 124), Exhibit H, pages 1 and 2, abandonment applications for Onida to Gettysburg. Costs apportioned on a mileage for total carload basis.

3. *Transport Cost Savings from Using Rail Rather than Truck to Transport Corn between Onida and Mobridge.* Although the user may be indifferent to rail versus truck-rail, since transport charges are approximately equal, transport costs do differ. Rail-only and truck-rail composite costs were developed by summing the following cost components:

Rail Only	Truck-Rail
C&NW On-Line (Onida to Blunt)	Truck (Onida to Mobridge via US 83 and US 12)
C&NW Off-Line (Blunt to Aberdeen)	
C&NW Car Ownership	Rail (BN Terminal at Mobridge)
BN Switching (at Aberdeen)	
BN Line-Haul (Aberdeen to Mobridge)	

Trucking costs were estimated using a Truck Costing Model developed by RCAI. C&NW rail costs were estimated using costs from carrier 1981 Rail Form A, presented in Docket No. AB-1 (Sub. No. 124). BN rail costs were computed using costs from carrier Rail Form A, indexed to the fourth quarter of 1981. Since the focus is on overall differences in cost, BN rail costs between Mobridge and Seattle have not been computed, as this movement is common to both the rail-only and truck-rail alternatives.

Rail-only costs per carload were estimated as follows:

Component	C&NW or BN Unit Cost	Estimated Cost
C&NW On-Branch (Onida to Blunt)	$237.00/car	$237.00
C&NW Off-Line (Blunt to Aberdeen)		
Car-Mile (130.8 miles)	0.79429/car-mile	103.89
Ton-Mile (94 tons/car)	0.00601/ ton-mile	73.89
Interchange	46.43/carload	46.43
C&NW Car Ownership (Blunt to Mobridge)		
Car-Day (3 days each direction)	10.72/car-day	64.32
Car-Mile (457.6 miles)	0.10720/car-mile	49.05
BN Switching (at Mobridge)		
I&I Switch (196 car-miles)	0.03283/car-mile	6.43
I&I Car Own (196 car-miles)	0.01429/car-mile	2.80
BN Line-Haul (Aberdeen to Mobridge)		
Way Train GTM (0 GTM)	0.01258/GTM	0
Through Train GTM (12,250 GTM)	0.00532/GTM	65.17
Running Car Own (196 car-miles)	0.06255/car-mile	12.26
Train Sup. & Exp. (196 car-miles)	0.00363/car-mile	0.71
Total Rail-Only Cost		$661.95
		$661.95/car
		7.04/ton
		0.352/cwt

Truck-rail cost per carload were estimated as follows:

Component	Unit Cost	Estimated Cost
Truck (Onida to Mobridge)		
Line-Haul (78 miles each dir.)	$0.9211/truck-mile	$143.69
Terminal (time loading/unloading)	10.00 each	20.00
Equivalent Carload	3.9 truckloads/carload	638.39
BN Terminal (at Mobridge)	60.38/car	60.38
Total Truck-Rail Cost		$698.77
		$698.77/car
		7.43/ton
		0.372/cwt

Thus, a savings of $0.39 per ton translates into an overall transport cost reduction of $37,000 per year. The resulting cost difference between rail-only and truck-rail is relatively small, since efficiencies of rail are reduced by route circuitry and the interchange between the C&NW and BN at Aberdeen. While transporting corn by rail from Onida does not reduce overall transport costs significantly, it does reduce per-unit carload costs on the Blunt-Onida line, since the traffic base is larger.

4. *On-Line Transportation Cost Savings Resulting from Class 2 Conditions on Both the Huron-Pierre and Blunt-Onida Lines.* At present, the Blunt-Onida line is operated by a Huron-based crew taxied to Blunt, with the locomotive and caboose being deadheaded to or from Huron to Blunt in the tri-weekly train operating on this line. The Huron-Pierre line is being upgraded to Class 2 conditions. Once completed, one-way running times should be reduced from approximately eight to five hours. Similarly, upgrading the Blunt-Onida line should reduce one-way running times from two hours to three-quarters of an hour. Once this has been done, it will conceivably be possible to have the Huron-Pierre train crew serve Onida, thus eliminating the need for a separate crew to provide service between Blunt and Onida. If labor agreements permit this (or assuming that this change can be negotiated), it would reduce the on-line transportation component by 40 to 50 percent. This translates into a yearly transport cost reduction of $30,000.

Primary Efficiency Benefits

Primary efficiency benefits stem from (1) cost reductions on existing traffic, (2) consumer surplus on new traffic, and (3) producer surplus on new traffic. Since no new traffic is anticipated, primary efficiency benefits are limited to the sum of the cost savings developed in the previous section.[1] Using a five percent discount rate, these benefits amount to $3.83 million over a 10-year period.

[1] The corn traffic is not new traffic. Barring significant change in relative market prices, this traffic will move west using the rail system. The only uncertainty is whether the two railroads involved are willing to offer a rate at Onida competitive with truck-rail transport through Mobridge or comparable locations. This traffic has developed totally independently of possible improvement to the Blunt-Onida line.

Secondary Efficiency Benefits

Typical secondary efficiency benefits include (1) wage and salary loss, (2) loss of local purchases, (3) unemployment payments, (4) state income tax loss, and (5) the impact of increased trucking on the local highway system. The first four are employment related. Since no job losses are anticipated were the Blunt-Onida line not improved, at least in the short term, secondary efficiency benefits are reduced to estimating the additional public expenditures needed for highway maintenance to offset incremental grain truck movements over US 83 and US 12 between Onida and Mobridge.

Table 13 shows 1980 reported traffic on US 83 and US 12 between Blunt and Mobridge. Also shown is estimated commercial and heavy truck traffic based on traffic classifications at a station located on US 12 west of Glenham (see Table 14). Table 14 also shows anticipated heavy truck traffic both with and without improvement of the Blunt-Onida line. The increase in heavy truck traffic, proportionally large but still relatively small in absolute terms, stems from the projected production of 10 million bushels of corn in Sully County, of which two-thirds would be trucked to an elevator expected to be located near Selby or Mobridge and the remainder marketed through the two existing elevators at Onida. A detailed study of the impacts of increased truck traffic on the above route segments was not possible due to time and data limitations. However, a rough approximation can be made. Assuming a 20 and 30 percent reduction in pavement life with and without the improvement (a 10 percent differential) and a 25-year reconstruction or heavy maintenance cycle, this would result in the need to improve an average of 4.5 and 3.9 route miles per year rather than the 3.1 miles that would be necessary under 1980 traffic conditions. If highway maintenance costs average $100,000 per mile, improvement of the Blunt-Onida line would obviate the need for the South Dakota Department of Transportation to spend approximately $60,000 per year in highway reconstruction or heavy maintenance. Converting this sum to a percent value using a five percent discount rate, the resulting benefits would total $0.463 million over a 10-year period.

Distributional Effects

Table 15 shows the distributional effects that accrue to each major group. It illustrates who gains and who loses as the result of a project to improve the Blunt-Onida line.

Benefit-Cost Ratio

Table 16 shows the resulting benefit-cost ratio. Improvement of the Blunt-Onida line would yield a benefit-cost ratio of approximately 1.4. This ratio reflects the greater efficiencies from (1) using larger cars, made possible by raising the weight limitations on the line from 178,000 to 251,000 pounds, (2) using rail to transport corn directly to market, compared to a truck-rail movement using a more distant elevator, and (3) increased maximum operating speeds on both the Huron-Pierre and Blunt-Onida lines, which is expected to eliminate the need for a local crew to serve Onida. All assumptions and calculations made are deliberately conservative.

In addition to the above, it should also be noted that (1) agricultural production in Sully County is increasing and (2) Onida produces the highest number of cars/tons annually of all C&NW stations located between Huron and Rapid City. Failure to improve the line could eventually lead to its demise. Should this happen, the traffic base and viability of the Huron-Ft. Pierre and Ft. Pierre-Rapid City segments would be adversely affected.

Table 13
TRAFFIC ON HIGHWAYS BETWEEN BLUNT AND ONIDA

Route	Intersecting Highway City or Village	Actual 1980 Traffic: Annual 24-Hour Average Traffic	Actual 1980 Traffic: Commercial Traffic	Actual 1980 Traffic: Heavy Trucks	Anticipated Heavy-Truck Traffic: w/o Impr.	Anticipated Heavy-Truck Traffic: w/Impr.
US 83	Blunt	1,330	165	95	95	95
		1,295	160	95	95	95
	Onida	990	120	70	130	110
		1,040	130	75	135	115
	US 212	700	145	85	145	125
		625	130	75	135	115
US 83 US 12	US 12	1,300	180	105	165	145
	Selby	1,300	180	105	165	145
US 12	US 83	1,575	265	155	215	195
		1,635	275	160	220	200
		715	240	140	200	180
	Mobridge					

Table 14
PERCENT DISTRIBUTION BY VEHICLE TYPE[1]

Vehicle Classification	Percent of All Vehicles		
Automobiles—SD	46.4%		
Out-of-State	5.8		
Buses	0.2		
Two-Axle—Four-Tire	30.9		
Six-Tire	5.8		
Three-Axle	1.2		
Tractor-Semi—Three-Axle	0.3		
Four-Axle	0.4		
Five-Axle	8.7	heavy trucks 9.7%	commercial traffic 16.7%
Tractor-Trailer—Four-Axle	0.1		
Five-Axle	0.2		
Six-Axle	—		

[1] Station 160 located on US 12, west of Glenham.

Table 15
DISTRIBUTIONAL EFFECTS FOR UPGRADING OF RAIL LINE TO CLASS 2 WITH 251,000-POUND LOADING

Group	Annual Benefit (000)	Present Value over 10 Years (000)
Shippers	0	0
Railroad	419	3,237
Truckers	0	0
State Government	60	463

Note: While improvement of the Blunt-Onida line will result in the loss of $540,000 in income to truckers from transporting grain between Onida and Mobridge, this will not result in a negative benefit, since the revenue roughly equals the trucking costs. Grain transport by truck produces, at best, marginal profits.

Table 16
BENEFIT-COST RATIO FOR UPGRADING OF RAIL LINE TO CLASS 2 WITH 251,000-POUND LOADING

	Present Value over 10 Years ($millions)
Benefits	
Primary Efficiency Benefits	$3.24
Secondary Efficiency Benefits	0.46
Net Salvage Value	N/A
Total Public Benefits	$3.70
Costs	
Acquisition	N/A
Rehabilitation/Improvement	$2.70
Total Public Costs	$2.70
Net Benefits	$1.00
Benefit-Cost Ratio	1.37

3.
SD 03 and SD 04—Mitchell to Aberdeen

Introduction and Background

The 128.6-mile Mitchell to Aberdeen segment is part of the 914-mile core system owned by the State of South Dakota and operated by the Burlington Northern Railroad. This segment connects the three core-system lines serving agricultural areas in southeastern South Dakota (Mitchell-Sioux Falls, Mitchell-Sioux City, and Mitchell-Chamberlain) with the former Milwaukee Road main line at Aberdeen. This latter line connects with the BN main line at Terry, Montana (for westbound grain) and with the Milwaukee Road at Ortonville, Minnesota. While some traffic originates and terminates on the Mitchell-Aberdeen line segment, its ultimate value lies more in the (1) mileage reduction for westbound grain moving through the Aberdeen gateway, compared to the Sioux Falls or Sioux City gateways and (2) as a relief or bypass route for traffic moving between the Pacific Northwest and South Central states. A description of the line, designated as South Dakota Segments SD 03 and SD 04, is included in *Railplan South Dakota—1981*. Rail and highway maps of the corridor are shown in Figure 3.

Line Characteristics

Line Description

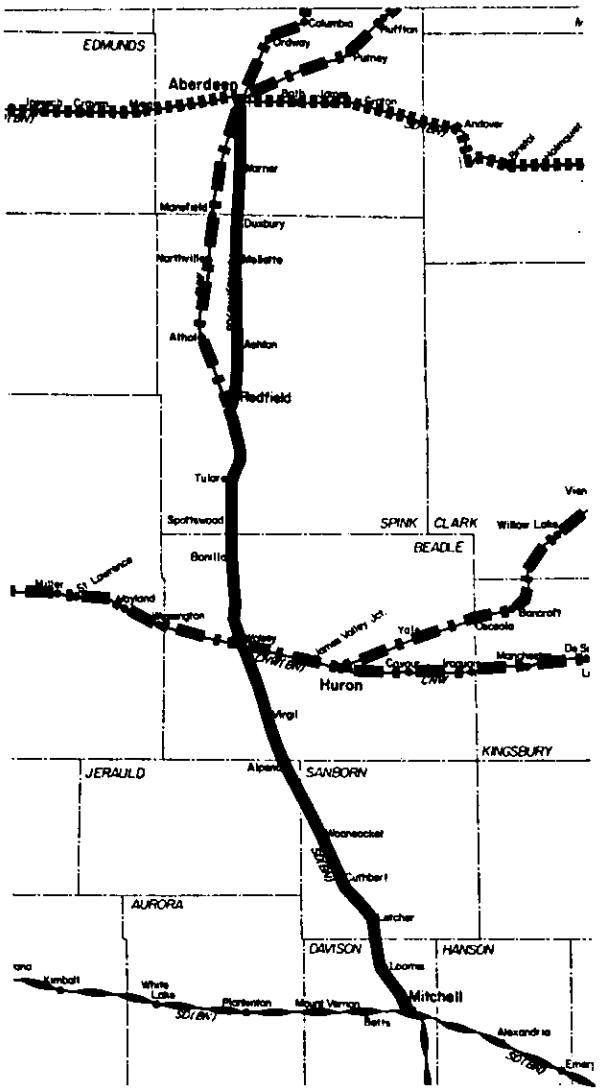
The BN began operating the Mitchell-Wolsey portion of the line in July, 1981 and extended service to Aberdeen in November, 1981. The Mitchell-Wolsey portion had previously been rehabilitated to Class 1 conditions under the Directed Service Program. No track rehabilitation was undertaken under this program for the Wolsey-Aberdeen portion, since service was being provided by the C&NW between the time of the Milwaukee Road abandonment and the BN start-up. The C&NW continues to operate over this portion under a trackage rights agreement. BN service is provided on a weekly basis, with service originating from Sioux City and extending as far north on the Mitchell-Aberdeen line as required by traffic demands. No core system traffic is currently being interchanged through the Aberdeen gateway. The C&NW operates three round-trips per week between Wolsey and Aberdeen, with continuing service to Oakes, North Dakota.

Figure 3

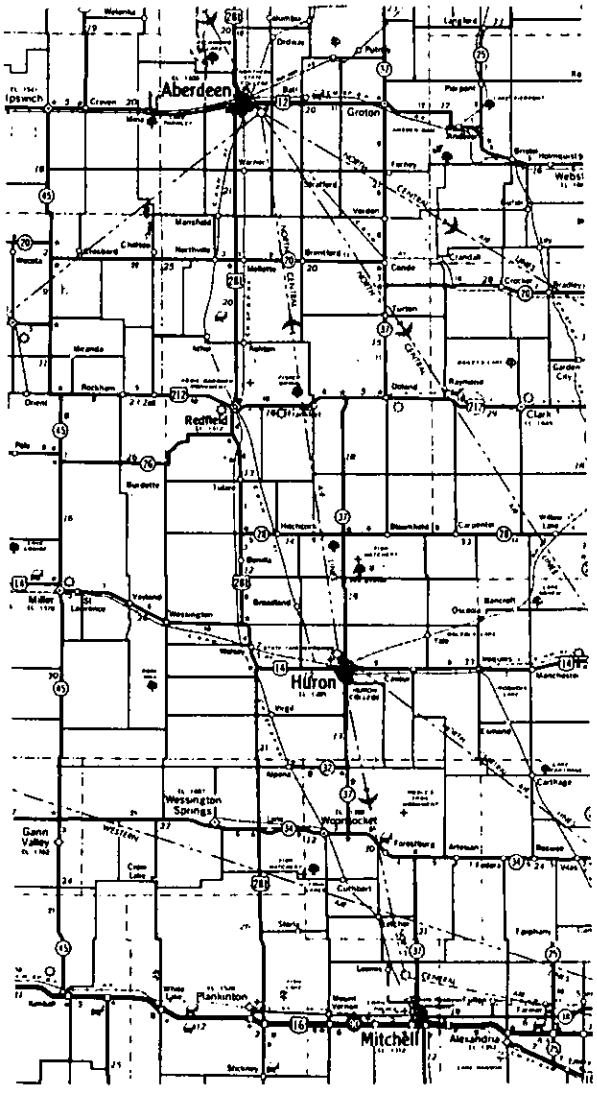
SOUTH DAKOTA SEGMENTS SD 03 AND SD 04

MITCHELL/WOLSEY/ABERDEEN

RAILROAD SEGMENT MAP



HIGHWAY LOCATION MAP



Study Segment

Other State-Owned Core System Routes

State-Owned Mainline

All Other Lines

In the report *Addendum to Railplan South Dakota—1981*, extensive background information was presented on (1) the Milwaukee abandonment, (2) the core system concept, and (3) rail service restoration and track rehabilitation that occurred subsequent to the abandonment by the Milwaukee Road and purchase of the lines by the state.[1] In addition, each of the four study lines (of which Mitchell-Aberdeen is one) was analyzed for (1) originating/terminating traffic potential, (2) present condition and operating characteristics, (3) the degree to which track rehabilitation would attract traffic that would otherwise move by alternative modes, and (4) anticipated efficiency and distributional benefits and capital costs were the line improved from Class 1 to Class 2 conditions. From this information, benefit-cost ratios were developed for each line. These ratios were then used in designing and staging the rehabilitation program for the core system.

The previous benefit-cost assessments assumed that each core system line functioned independently of the others. Based on shipper survey estimates of 793 originating/terminating carloads (73,900 tons), annual benefits and costs for the Mitchell-Aberdeen line were estimated as follows:

Primary Efficiency Benefits	$+ 427,792
Secondary Efficiency Benefits	11,076
Total Benefits	438,805
Costs	1,398,089
Benefits Less Costs	– 959,284
Benefit-Cost Ratio	0.31

While appropriate for isolated lines, the procedure used did not take into account the interdependency of the lines. The benefit-cost analysis completed in 1981 for the Mitchell-Aberdeen line did not consider potential overhead traffic from other core system lines or from the BN rail system. For South Dakota, upgrading the Mitchell-Aberdeen line would permit westbound bridge traffic to move through the Aberdeen gateway to the east-west main line now being operated by the BN. For the BN, immediate upgrading of this and the Mitchell-Sioux City line would provide a valuable addition to the system for:

- Bypassing the heavily-used route between Huntley, Montana and Alliance, Nebraska. This route accesses the Powder River Basin coal resources in Wyoming.
- Interconnecting the South Central states with the Pacific Northwest. Most of the merchandise traffic presently moves through Willmar, Minnesota, a more circuitous route.
- Enlarging the markets for Montana-produced coal in the Central and South Central states.

[1] The Addendum actually updated earlier benefit-cost studies conducted for the core system, which were reported in the *Addendum to Railplan South Dakota—1980*. The earlier studies were based on the premise that the core system would be operated by a short-line carrier, rather than by the BN.

However, the above scenarios are long-term. Necessary prerequisites include an upturn in the nation's economy and demands placed on the rail system, especially for western coal. The potential for growth in overhead traffic exists, although increases may not be realized in the near future.

This assesment extends beyond the one completed in 1981 for the Mitchell-Aberdeen line to include both short- and long-term overhead traffic. It is based on the single alternative of upgrading track to Class 2 standards.

Existing and Projected Operations

At present, the core system is served by two trains; one originates at Sioux Falls and the other at Sioux City. The former train makes one or two round-trips per week between Sioux Falls and Mitchell, with continuing service once a week (or as needed) to Chamberlain. The latter train likewise makes one or two round-trips each week between Sioux City and Mitchell, with continuing service once a week (or as needed) to Wolsey. Both trains operate independently of each other, with no interchange made at Mitchell. Regardless of its ultimate destination, all originating traffic currently passes through the Sioux Falls or Sioux City gateways, as indicated in Figure 4. Similarly, all terminating traffic enters the core system through the Sioux Falls and Sioux City gateways. For grain shipments moving west, this operating pattern results in circuitous travel.

Both the Sioux Falls-Mitchell and Sioux City-Mitchell segments have been, or are being, upgraded to Class 2 conditions. Thus, trains originating in Sioux Falls or Sioux City can reach Mitchell in one day. Given Class 1 conditions and the mileage involved, it takes two days for a train to travel between Mitchell and Aberdeen. Since only limited traffic originates or terminates on this segment, particularly near the southern end, way or through train service to Aberdeen is not being provided on a regular basis. Thus, all traffic passes through either the Sioux Falls or Sioux City gateways, with the core system being operated as two long, separate branch lines.

This situation is expected to change upon completion of the track rehabilitation presently underway on the east-west main line. The BN will probably begin to use the Aberdeen gateway for unit train service between core system elevators and the West Coast. Regularly scheduled way train service south from Aberdeen or north to Aberdeen from Sioux City would require upgrading the Mitchell-Aberdeen segment to Class 2 conditions, however, before such service could become practical.

Figure 5 illustrates expected operating patterns once the track has been rehabilitated. In this case, westbound single-car and multi-car traffic originating on the Sioux Falls-Mitchell, Sioux City-Mitchell, and Chamberlain-Mitchell segments would be interchanged at Mitchell with way trains originating at either Aberdeen or Sioux City.

Traffic Projections

Table 17 lists projected originating and terminating traffic on the core system by segment and commodity type. This traffic has been further divided into (1) traffic originating

Figure 4

CURRENT CORE SYSTEM ROUTINGS, SD 03 AND SD 04

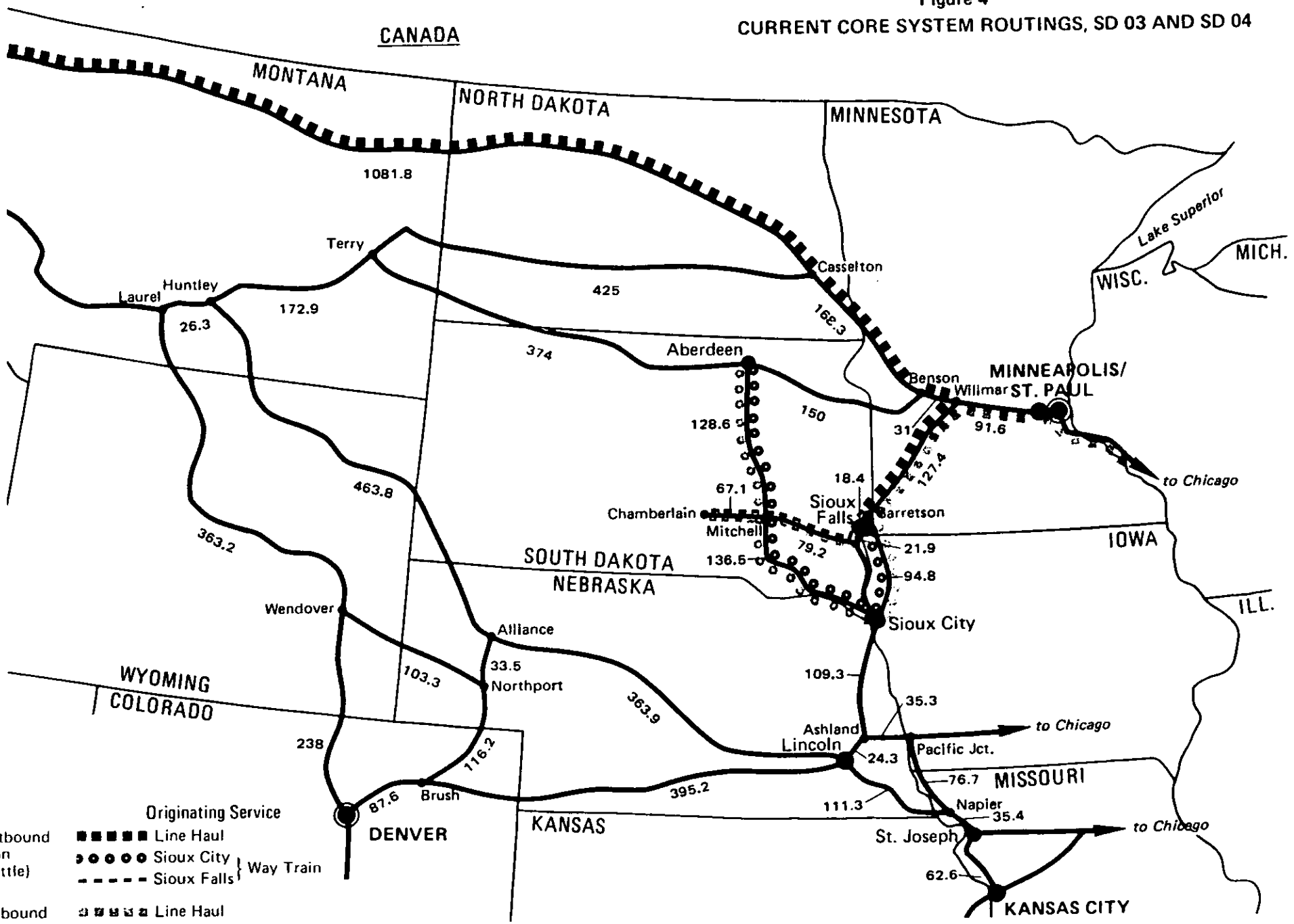


Figure 5
CORE SYSTEM ROUTINGS USING THE ABERDEEN GATEWAY

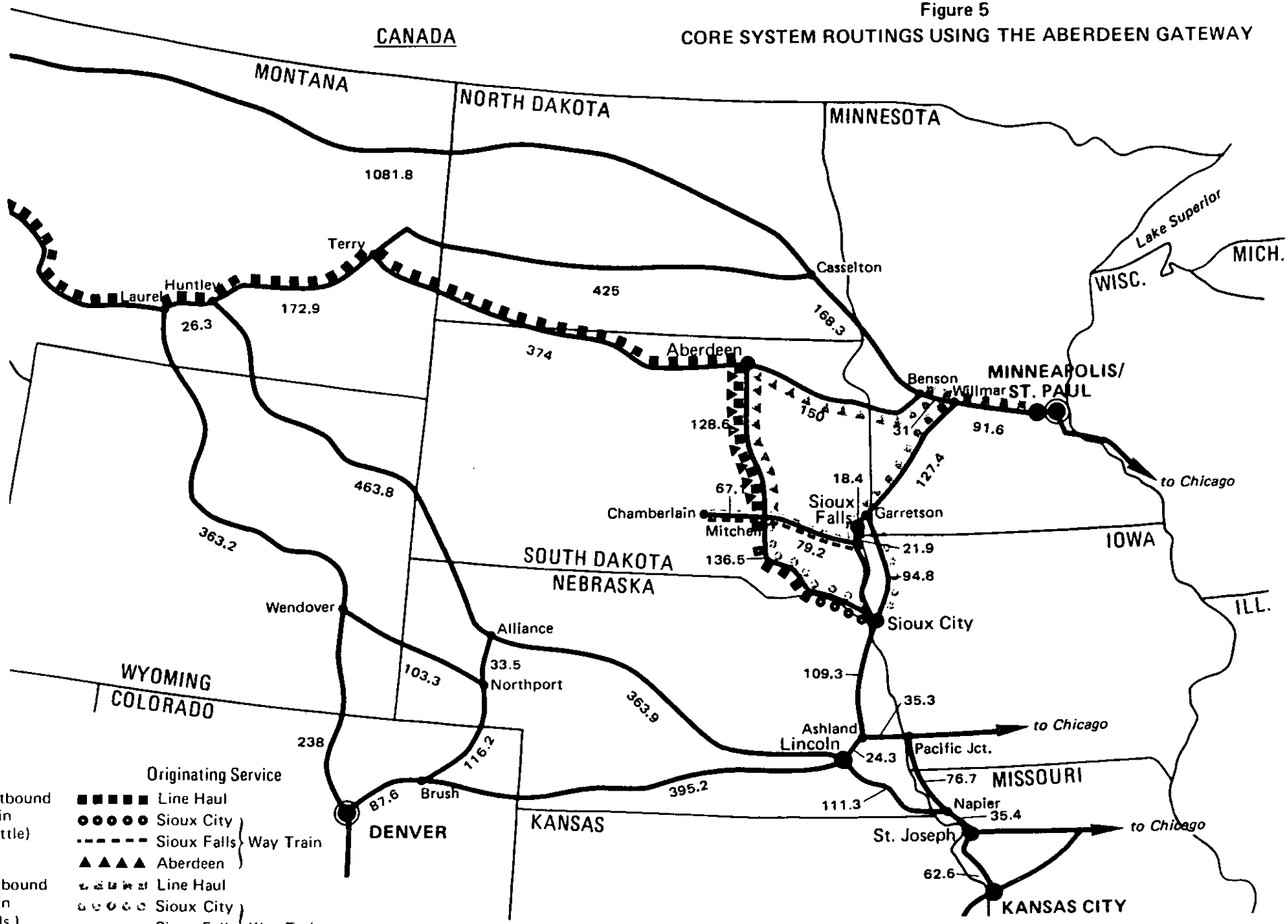


Table 17
CORE SYSTEM ORIGINATING AND TERMINATING TRAFFIC BY SEGMENT, COMMODITY TYPE, AND OFF-CORE SYSTEM ORIGIN OR DESTINATION

			Off-Core System Origin or Destination					
			West		East		Total	
Gateway	Segment	Commodity	Cars	Tons	Cars	Tons	Cars	Tons
Sioux Falls	Sioux Falls-Mitchell	Grain	2,067	202,500	1,372	103,700	3,439	306,200
		Other	76	4,500	564	51,800	640	56,300
Sioux Falls	Chamberlain-Mitchell	Grain	991	55,600	389	23,100	1,380	78,700
		Other	25	1,600	144	8,400	169	10,000
Sioux City	Sioux City-Mitchell	Grain	1,469	145,000	1,247	99,600	2,716	244,600
		Other	107	8,100	321	24,300	428	32,400
Sioux City	Aberdeen-Mitchell	Grain	247	24,100	519	47,100	766	71,200
		Other	—	—	27	2,700	27	2,700
	All Segments	Grain	4,774	427,200	3,527	273,500	8,301	700,700
		Other	208	14,200	1,056	87,200	1,264	101,400
		Total	4,982	441,400	4,583	360,700	9,565	802,100

Source: South Dakota Department of Transportation Shippers' Survey.

or terminating east of the core system (and likely to continue to use the Sioux Falls and Sioux City gateways) and (2) traffic originating or terminating west of the core system (potential Aberdeen gateway traffic). Table 18 indicates that slightly over one-half of the total core system traffic could shift to the Aberdeen gateway when this option becomes available. Table 19 shows projected savings in car- and ton-miles for traffic using the Aberdeen gateway, compared to continued use of the Sioux Falls and Sioux City gateways. Annual savings have been estimated at 842,000 car-miles and 72,152,000 ton-miles, respectively.

At present, no BN overhead traffic moves over the core system. This situation is likely to continue, at least in the short term, even after the opening of the Aberdeen gateway and improvement of the Mitchell-Aberdeen segment to Class 2 conditions. Diversion of BN traffic from existing routes through Alliance and Willmar depends on (1) capacity constraints on the BN line through Alliance and the need to reroute traffic away from that line (to improve service and/or obviate the need for extensive capital investment to upgrade the capacity of that line), (2) the development of south central markets for Montana-produced coal, coupled with the need to reroute traffic away from the southern main line across North Dakota, and (3) the cost associated with further upgrading of the Sioux Falls-Mitchell and Mitchell-Aberdeen segments to fully handle bridge traffic (i.e., is this cost appreciably less than that associated with increasing the capacity of the route through Alliance?). As illustrated in Figure 6, the core system route is only 98 miles longer than the Alliance route and 69 miles shorter than the Willmar route between Kansas City and Sandpoint, Idaho. However, the core system route bypasses most of the BN heavy-density coal routes, as indicated in Figure 7. For this reason, eventual diversion of merchandise traffic and some coal traffic to the core system route is anticipated over the long term. In this analysis, it has been assumed that one regularly scheduled merchandise train per day in each direction will use the core system route, with traffic diverted from the route through Alliance.

Table 18
PRESENT AND PROJECTED TRAFFIC BY GATEWAY

		Traffic Through Gateway		
		Sioux Falls	Sioux City	Aberdeen
Present	Cars	5,628	3,937	—
	Tons	451,200	350,900	—
Projected	Cars	2,469	2,114	4,982
	Tons	187,000	173,700	441,400

Table 19
SAVINGS IN CAR- AND TON-MILES FOR TRAFFIC USING THE ABERDEEN GATEWAY vs. THE SIOUX FALLS AND SIOUX CITY GATEWAYS

	Distance to Sandpoint, Idaho (miles)			Estimated Traffic		Savings in Net	
Origin Station[1]	via SF, SC	via Aberdeen	Difference	Cars	Tons	Car-Miles	Ton-Miles
Chamberlain	1,564.1	1,330.1	234.0	1,016	57,200	237,744	13,384,800
Mitchell	1,497.0	1,263.0	234.0	247	24,100	57,798	5,639,400
Emery	1,474.8	1,285.0	189.8	689	67,500	130,772	12,811,500
Parker	1,446.3	1,313.7	132.6	689	67,500	91,361	8,950,500
Canton	1,417.8	1,342.2	75.6	765	72,000	57,834	5,443,200
Yankton	1,533.8	1,338.0	195.8	788	76,600	154,290	14,998,280
Vermillion	1,507.3	1,364.5	142.8	788	76,500	112,526	10,924,200
Total				4,982	441,400	842,326	72,151,880[2]

[1] Segment traffic was assigned to originating stations as follows: Chamberlain-Mitchell to Chamberlain, Mitchell-Mitchell to Aberdeen, Emery-Mitchell to Sioux Falls, Yankton and Vermillion-Mitchell to Sioux City.

[2] Assuming a car tare weight of 30.5 tons and an empty return, gross ton-miles (GTM) = 121,828,139.

Figure 6

BN SYSTEM OVERHEAD TRAFFIC ROUTING

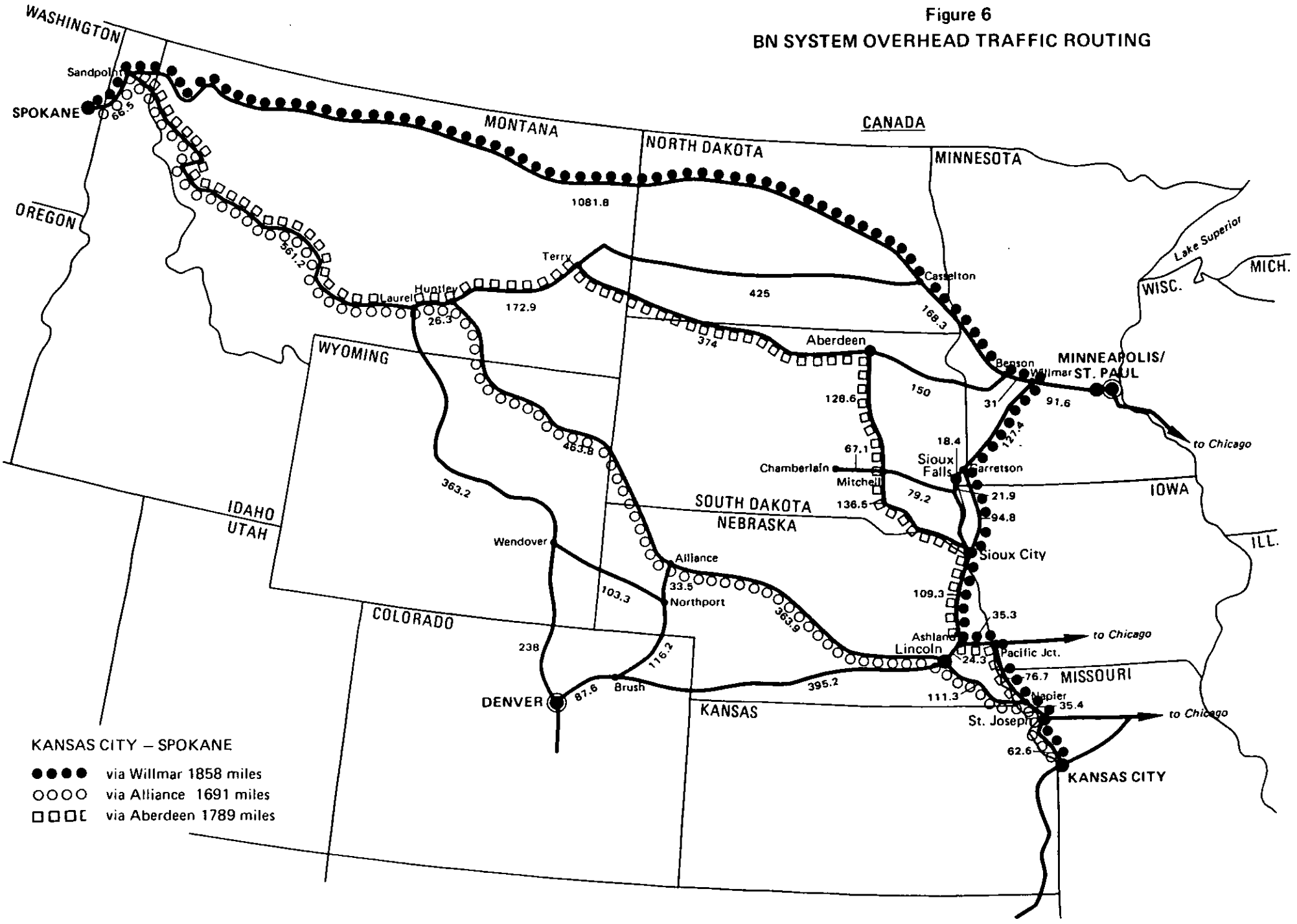
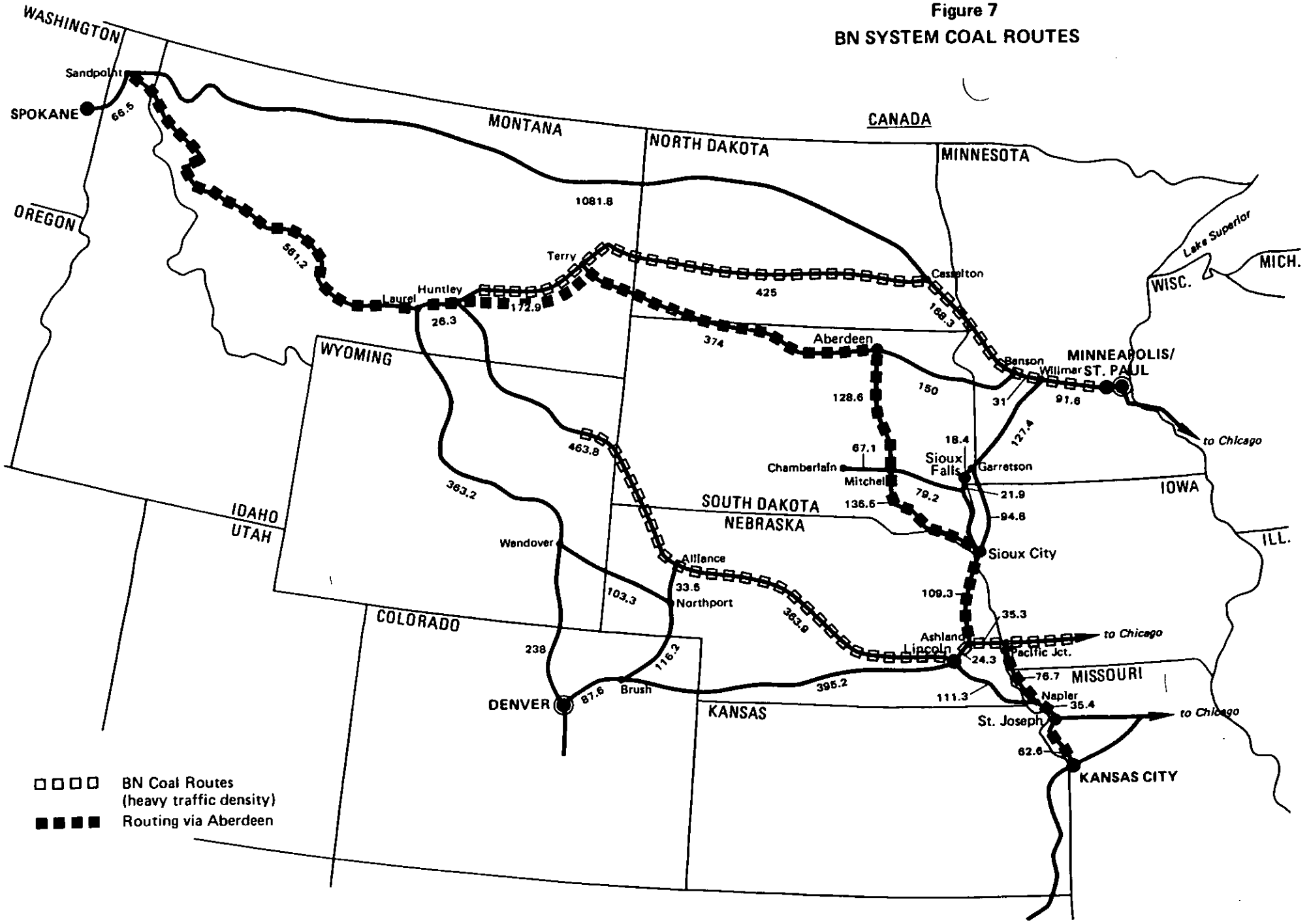


Figure 7
BN SYSTEM COAL ROUTES



Project Analysis

Benefit-Cost Computations

Additional justification for upgrading the Mitchell-Aberdeen line stems from the following potential scenarios, which would produce cost savings:

1. *Routing of Core System Westbound Traffic Through the Aberdeen Gateway.* BN rail costs for core system traffic moving through present and projected gateways were computed using carrier Rail Form A costs indexed to the fourth quarter of 1981. Since the focus is on cost savings resulting from using the Aberdeen gateway, the computations are based on the gross ton-mile savings shown in Table 22. Furthermore, it was assumed that approximately one-half of westbound grain will move in unit grain trains, with the remaining single- and multi-car grain traffic and other miscellaneous traffic being handled by scheduled way trains, with interchanges occurring at Mitchell and Aberdeen.

Component	BN Unit Cost	Estimated Saving
Core system unit train carloads (50 percent of westbound grain)	0.00532/GTM	$ 310,568
Core system way train carloads (remaining carloads)	0.01258/GTM	798,330
	Total Savings	$1,108,898 $1,109,000 per year

2. *Rerouting BN Bridge Traffic Over the Core System.* This scenario tests the assumption that the BN finds it is operationally necessary to remove traffic from its route through Alliance and proposes to run one merchandise-type train a day in each direction between the Pacific Northwest and Kansas City over either the existing rail line through Willmar or the core system (Sioux City to Mitchell to Terry). Further assumptions include:

   - The average train consists of 75 cars, 45 of which are loaded and the remaining 30 are empty.
   - The average load is 60 tons; average tare weight is 30 tons.
   - Average trailing load is then 4,950 gross tons.
   - The train operates 300 days per year.

   The core system route is 69 miles shorter than the exiting route through Willmar. Using the same computation procedure as before, estimated annual savings resulting from using the core system are:

   Savings = through train GTM cost X train GTM X no. trains/year X miles saved
   = $0.0053206 X 4,950 X (300 X 2) X 69
   = $1,090,351 or $1,090,000 per year.

3. *Eliminating Way Trains on the Sioux City-Mitchell and Aberdeen-Mitchell Segments.* If the BN were to reroute bridge traffic over the core system, then it should be possible to eliminate existing way trains on the Sioux City-Mitchell and Aberdeen-Mitchell segments by using through trains to perform pick-ups and set-outs of non-unit train traffic. Using the same computation procedure as before and assuming that 50 percent of the grain moves by unit trains, annual savings are estimated as follows:

Savings = way train GTM unit cost X GTM saved

= $0.0125806 X 21,301,765

= $267,988 or $268,000 per year.

Primary Efficiency Benefits

Primary efficiency benefits stem from (1) cost reductions related to existing traffic, (2) consumer surplus on new traffic, and (3) producer surplus on new traffic. Since no new traffic is anticipated, primary efficiency benefits are limited to cost reductions on existing traffic. Primary efficiency benefits consist of:

- Those attributable to shipper use of the rail system instead of truck transport—previously estimated to be $428,000 annually.
- Those attributable to reduced car- and ton-miles from using the Aberdeen gateway in addition to the Sioux Falls and Sioux City gateways—estimated at $1,109,000 annually.
- Those attributable to the rerouting of BN bridge traffic over the core system—estimated at $1,090,000 per year based on one train in each direction.
- Elimination of the existing way train on the Sioux City-Mitchell and Aberdeen-Mitchell segments by having the through train pick-up and set-out non-unit train traffic—estimated at $268,000 annually.

Using a five percent discount rate, these benefits amount to $22.35 million and $11.87 million annually over a 10-year period, with and without the BN bridge traffic, respectively.

Secondary Efficiency Benefits

Typical secondary efficiency benefits include (1) wage and salary loss, (2) loss of local purchases, (3) unemployment payments, (4) state income tax loss, and (5) the impact of increased trucking on the local highway system. Net secondary efficiency benefits were previously estimated at $11,076 per year. Again using a five percent discount rate, these benefits amount to $0.86 million annually.

Distributional Effects

Table 20 shows the distributional benefits that accrue to each major group affected by Mitchell-Aberdeen rail operations. This table illustrates which groups gain or lose from a project to improve the Aberdeen-Mitchell line.

Table 20
DISTRIBUTIONAL EFFECTS FOR UPGRADING OF RAIL LINE TO CLASS 2

Group	Annual Benefits ($000)	Present Value over 10 Years ($000)
Shippers	$ 428	$3,303
Railroad[1]	1,109	8,563
State Government	11	86

[1] Including BN bridge traffic, annual benefits would total $2,467,000, and the present value over 10 years would be $19,051,000.

Benefit-Cost Ratio

Table 21 shows the resulting benefit-cost ratio. Improvement of the Aberdeen-Mitchell line without BN bridge traffic would yield a benefit-cost ratio of approximately 1.5. Improvement of this line with BN bridge traffic would produce a benefit-cost ratio ranging between 1.5 and 3.0, depending on the additional investment made by the BN to further improve the line to handle bridge traffic. The resulting ratios reflect the cost savings from (1) a reduction in gross ton-miles made possible by using the Aberdeen gateway and (2) use of the Sioux City-Mitchell and Aberdeen-Mitchell segments for overhead traffic.

Table 21
BENEFIT-COST RATIO FOR UPGRADING OF RAIL LINE TO CLASS 2

	Present Value over 10 Years ($million)	
	w/o Bridge Traffic	w/Bridge Traffic
Benefits		
Primary Efficiency Benefits	$11.87	$22.35
Secondary Efficiency Benefits	0.09	0.09
Net Salvage Value	N/A	N/A
Total Public and BN Benefits	$11.96	$22.44
Costs		
Acquisition	N/A	N/A
Rehabilitation/Improvement	$ 8.07	$ 8.07 +
Total Public Costs	$ 8.07	$ 8.07
Net Benefits	$ 3.89	$14.37
Benefit-Cost Ratio	1.48	2.78

4.
SD 13—Canton to East Wye Switch

Introduction and Background

The 49.1-mile line between Canton and East Wye Switch is a local option line purchased by the State of South Dakota and administered by the Sioux Valley Rail Authority. Two separate railroad companies operate over this line: the Burlington Northern, which serves local shippers on an as-needed basis from Sioux City, and the D&I Railroad, a subsidiary of L.G. Everist, Inc. The D&I has limited authority to transport quartzite rock and crushed stone from Dell Rapids and sand from Hawarden, Iowa in shipper-owned equipment to Sioux City, where the D&I interchanges with the BN, C&NW, and ICG. The line is not part of the state core system, although it interconnects with that system at Canton and Elk Point. The Canton-East Wye Switch line also provides access to the Hawarden-Beresford line at Hawarden, Iowa, the latter also being a local option line. A description of the line, designated as South Dakota Segment SD 13, is included in *Railplan South Dakota—1981*. Rail and highway maps of the corridor are shown in Figure 8.

Line Characteristics

The Canton-East Wye Switch line serves seven elevators and two fertilizer distributors and provides connecting rail service for three elevators and a fertilizer distributor located on the Beresford-Hawarden line. The area tributary to the line is the most productive agricultural area in the state. Principal crops are corn and soybeans, which at various times have been shipped to the Gulf, West Coast, or to local markets (e.g., Sioux City). Depending on market price and transport rates, grain movements vary appreciably over time. In recent years, most of the grain produced locally has been trucked to the Sioux City market because of the lack of rail service. Economically, area elevator operators and farmers are experiencing difficult times brought about by low prices and oversupply. Future markets and grain movements are quite uncertain. Currently, very little corn is being shipped to traditional markets due to low market prices. Even though the demand is high, farmers have chosen to stockpile corn rather than accept low prices for their grain. This is reflected in the additions being made to elevator storage capacities and on-farm storage. During the past year, originating rail traffic was limited to one 75-car unit train originating from Hawarden and one 54-car unit train from Beresford, both destined to the West Coast. Some corn is being trucked to feed lots in Nebraska, although the major portion is being stored awaiting higher prices.

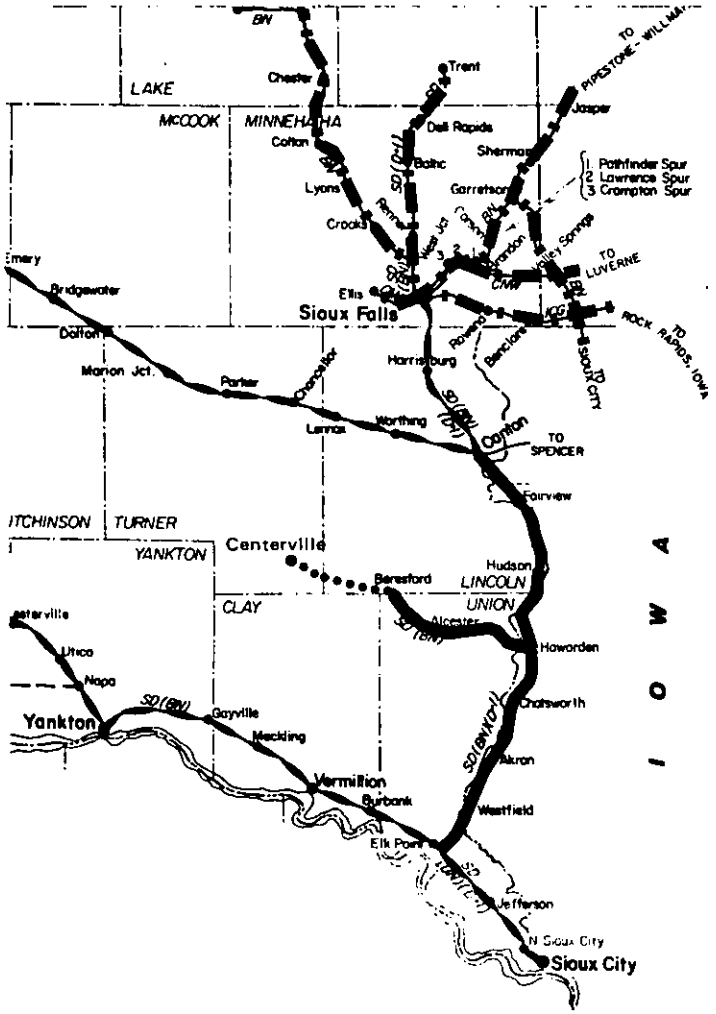
Figure 8

SOUTH DAKOTA SEGMENTS SD 13 AND SD 14

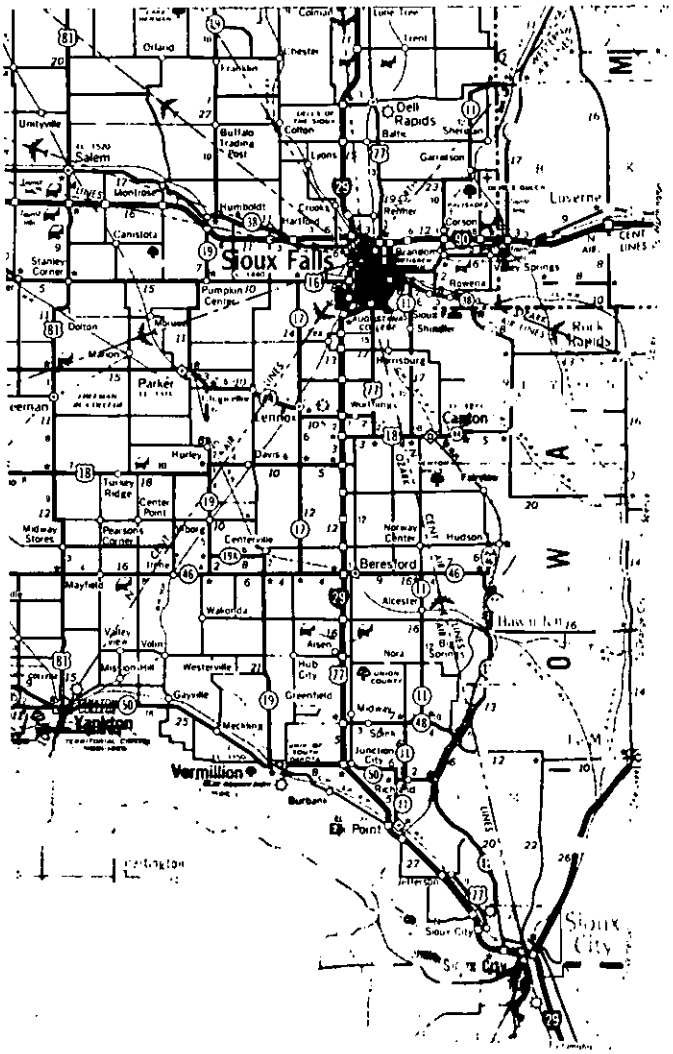
CANTON TO EAST WYE SWITCH

HAWARDEN TO BERESFORD

RAILROAD SEGMENT MAP



HIGHWAY LOCATION MAP



Study Segments

Abandoned Segment

State-Owned Core System

All Other Lines

The present turmoil stems in part from local decisions made in the 1970s to truck grain to the Sioux City market rather than use the rail system. Admittedly, the decision was caused by the non-competitive single-car rate in existence prior to present-day multi-car and unit-train rate structures. This diversion, in turn, lead to track abandonment by both the C&NW and the Milwaukee Road, the latter also reflecting the bankruptcy of that railroad. Service over the Canton-East Wye Switch line was shut down for one and one-half years and is currently unavailable to shippers on the Beresford-Hawarden line pending its rehabilitation to Class 1 conditions. Only recently has it become economical to (1) again use rail for the relatively short haul to the Sioux City market and (2) ship corn to markets other than Sioux City. The latter is presently thwarted due to low prices in these other markets. At present, the most attractive corn market is Kansas City, where the corn is either transferred to barges or consolidated with corn from other origins for movement to the Gulf Coast. Soybean shipments are made primarily by truck to a processing plant located in Sioux City. One elevator operator expects this traffic to shift to rail in 1983 due to the availability of covered hopper cars. Current rail rates are lower than truck rates for this relatively short run.

During 1982, the Sioux Valley Railroad Authority, the L.G. Everist company, and the State of South Dakota began an $812,000 rehabilitation project that included ties and ballast to bring both the Canton-East Wye Switch and Hawarden-Beresford lines up to "better than Class 1" conditions. This rehabilitation project has not been completed; rehabilitation work is underway between Canton and Fairview and is scheduled for the Beresford-Hawarden line in 1983. This upgrading exceeds minimum Class 1 conditions, but will not achieve Class 2 conditions.

A benefit-cost analysis of the Canton-East Wye Switch line was conducted in 1980 using the assumptions that (1) a short-line railroad would operate the line, (2) the connecting Beresford-Hawarden line would not be operated, and (3) the base case was abandonment with use of trucks to transport grain rather than reinstatement of rail operations on the Canton-East Wye Switch line. These assumptions are no longer valid given (1) BN operation of both lines and (2) the track rehabilitation that has been scheduled and is partially completed. The question is no longer whether economic justification exists for restoring rail service and rehabilitating the line, but rather whether the cost savings resulting from operation under Class 2 conditions is enough to justify the added investment. Thus, this assessment focuses on the incremental benefits of improving the track structure to Class 2 conditions in comparison with the costs of such a project.

Underlying Premises

1. *Definition of the Project.* The project is defined as upgrading the full Canton-East Wye Switch line to Class 2 conditions. The South Dakota Department of Transportation has estimated the cost of this work at $2,461,921. It involves additional tie renewal, ballast, surfacing, and aligning to achieve a maximum operating speed of 25 mph.
2. *Alternative Modes/Services.* The practical effect of continuing on-demand rail service is that operating times are longer and, thus, on-branch costs could be higher than

under Class 2 conditions. There is no indication that the BN will seek to impose higher rates on the line to compensate for the slower speeds.

3. *Service Life.* A 10-year service life has been used in computing the anticipated benefit-cost ratio of the proposed investment.

Traffic Projections

Given the present turmoil that exists in the marketing of grain, reliable projections of future rail traffic simply cannot be made. In 1981, Union and Lincoln Counties together produced nearly 25 million bushels of corn and six million bushels of soybeans. While only a portion of this traffic would normally be handled at elevators located on the Canton-East Wye Switch line, that which is lost to elevators on other lines is at least partially offset by the handling of corn and soybeans grown in adjacent Iowa counties. Taking into account elevator tributary areas and variations in crop yields, a potential of 12 million bushels of corn and three million bushels of soybeans can be assigned to elevators located on this line. This is equivalent to 336,000 and 90,000 tons of corn and soybeans, respectively. If two-thirds of this corn is transported by rail, this would result in potential traffic of approximately 2,230 carloads annually. If two-thirds of the corn is transported by unit train from the elevators at Hawarden and Beresford and the remainder from other elevators in 10-car units, this would result in 20 unit trains and 61 10-car units annually, or roughly 60 round-trips per year over the line to handle locally-produced grain. (The 50 to 100 cars of dry fertilizer received each year at Hawarden and Beresford would be handled by the same trains and thus would not require additional train movements.)

In addition to the above, the D&I Railroad generally operates two round-trips per week over the line during a six-month period centered around the summer months. With the slowdown in the construction industry in recent years, these overhead movements have become somewhat sporadic.

Project Analysis

Benefit-Cost Computations

Justificiation for further upgrading the Canton-East Wye Switch line stems from the following cost savings:

1. *A Reduction in Round-Trip Transit Time for BN Trains Serving the Line.* The rail distance to Hawarden from Sioux City is 44.2 miles, of which 19.8 miles are served by Class 2 track and the remainder by Class 1. Running times are approximately one hour for the Class 2 portion and three hours for the Class 1 portion, or a total of eight hours for the round-trip movement. If the Canton-East Wye Switch line were improved to Class 2 conditions, round-trip running times would be reduced to four and one-half to five hours. The effect of this running time reduction is the elimination of overtime hours in serving the branch. Assuming that, on the average, three hours of overtime are saved, annual savings were estimated as follows:

Savings = No. round-trips/year X 3 hours X crew rate/hour X overtime factor
= 60 X 3 X $80 X 1.5
= $21,600 per year.

2. *A Reduction in Round-Trip Transit Time for D&I Trains Traveling over the Line.* The rail distance from Dell Rapids to Sioux City is 110.3 miles, of which 43.4 miles are served by Class 2 track and the remaining 66.9 miles by Class 1. Railroad officials reported an overall running time of 9.5 hours one way. If the Canton-East Wye Switch line were improved to Class 2, one-way running time would be reduced to approximately six hours. Obviously, this would eliminate overtime operation. However, this reduction in time would not permit the round-trip to be completed in one day, since allowance must be made for switching at the sand pit north of Hawarden and at Sioux City. Thus annual savings were estimated as follows:

Savings = No. one-way trips/yr. X 1½ hours X crew rate/hr. X overtime factor
= 100 X 1.5 X $60 X 1.5
= $13,500 per year.

Primary Efficiency Benefits

Primary efficiency benefits stem from (1) cost reductions related to existing traffic, (2) consumer surplus on new traffic, and (3) producer surplus on new traffic. Since no new traffic is anticipated as a consequence of further upgrading this line, primary efficiency benefits are limited to cost reductions in existing traffic. Using a five percent discount rate, the previously calculated savings result in benefits of $271,000 over a 10-year period.

Secondary Efficiency Benefits

Typical secondary efficiency benefits include (1) wage and salary loss, (2) loss of local purchases, (3) unemployment payments, (4) state income tax loss, and (5) the impact of increased trucking on the local highway system. The first four benefits are employment-related, and the latter benefit presumes a diversion to truck transport if the improvements are not made. Since no job losses are involved and the retention of rail service is not at issue, there are no secondary efficiency benefits to be gained from additional upgrading of this line.

Distributional Effects

In this case, the beneficiaries of additional upgrading of the line are the two operating railroads. Since the proposed improvement is not expected to result in increased rail traffic (i.e., diversion from trucks) nor any change in existing rate structures, there are no benefits or disbenefits to shippers, the community, other modes, or the government.

Benefit-Cost Ratio

Table 22 shows the resulting benefit-cost ratio. Improvement of the Canton-East Wye Switch line would yield a benefit-cost ratio of 0.1. This ratio reflects the finding that the

Table 22
BENEFIT-COST RATIO FOR UPGRADING OF RAIL LINE TO CLASS 2

	Present Value over 10 Years ($million)
Benefits	
Primary Efficiency Benefits	$ 0.27
Secondary Efficiency Benefits	0
Net Salvage Value	N/A
Total Public and Railroad Benefits	$ 0.27
Costs	
Acquisition	N/A
Rehabilitation/Improvement	$ 2.46
Total Public Costs	$ 2.46
Net Benefits	$ – 2.19
Benefit-Cost Ratio	0.11

costs of the improvement exceed the benefits to be gained. It reflects the following premises: (1) shipper use of the line is primarily affected by the demands for corn and soybeans, market prices and transportation rates, and the rates offered and service provided by the BN, compared to other modes, and not by the speeds at which trains are operated, (2) except for specialized D&I trains, no overhead traffic will be routed over this line in the future (i.e., the line functions as a collector), and (3) rate or service discrimination will not occur, which would give core system shippers a rate advantage or significant service advantage. Discussions held with the Sioux Valley Rail Authority, L.G. Everist, and the major elevator operators have not revealed any major concerns about what might happen if the line is not upgraded beyond that being undertaken.

5.
CN 03—Pierre to Rapid City

Introduction and Background

The 170.8-mile line between Pierre and Rapid City is operated as a secondary main line by the Chicago and North Western Railroad and originates grain shipments and carries overhead traffic from the Black Hills area. Overhead traffic includes grain mill products, pulpwood and woodchips, stone, sand, gravel, cement, bentonite, and clay. The C&NW recently reclassified the line from Category 2 to Category 1—potential abandonment within three years. A description of this line, designated as South Dakota Segment CN 03 is included in *Railplan South Dakota—1981*. Rail and highway maps of the corridor are shown in Figure 9.

A short branch line extends north from the C&NW main line at Box Elder to serve Ellsworth Air Force Base approximately 10 miles east of Rapid City. Ordinance and petroleum products are moved over this 10-mile portion of the C&NW main line from Rapid City, but no Ellsworth Air Force Base traffic is currently moved over the Pierre to Box Elder portion of the line. It is assumed that the branch line, as well as the 10-mile portion of the main line that connects Rapid City to Box Elder, will not be subject to abandonment on the basis of national defense. The analysis that follows thus addresses primarily the impact on the main line segment east of Box Elder.

The former Milwaukee Road secondary main line from Rapid City to Chamberlain is located in the same region. The State of South Dakota has purchased this line and railbanked it for potential future operation. The 219.2-mile state-owned line runs parallel to the C&NW line, is located approximately 10 to 35 miles south of the C&NW line, and extends approximately 50 miles farther eastward to Chamberlain. Rail and highway maps of the corridor are shown in Figure 9. This state-owned railbanked segment is important to the South Dakota West River analysis, since the state retains the option of upgrading the line and reinstating service to Rapid City.

Line Characteristics

Line Description—Originating Traffic

The 170.8-mile C&NW line from Pierre to Rapid City serves six commercial grain storage and handling facilities located at New Underwood, Wall, Philip, and Midland. Small

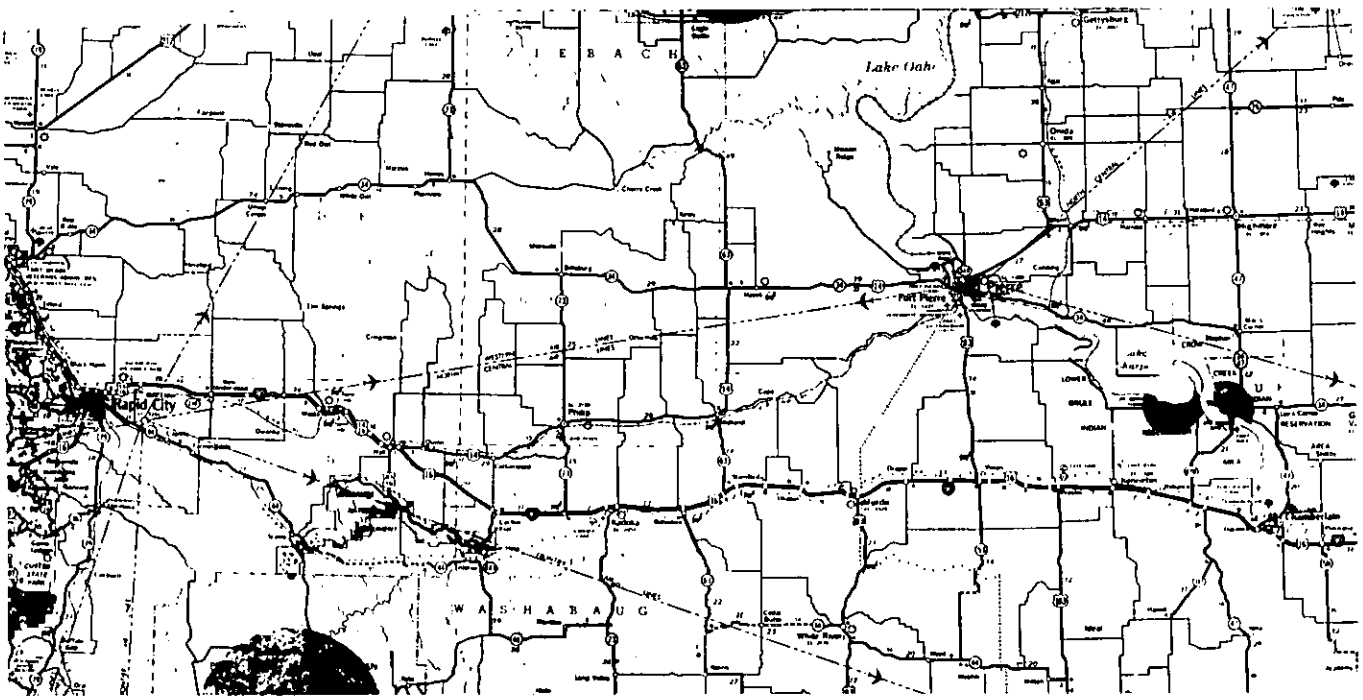
Figure 9

SOUTH DAKOTA SEGMENTS CN 03, SD 08 AND SD 09

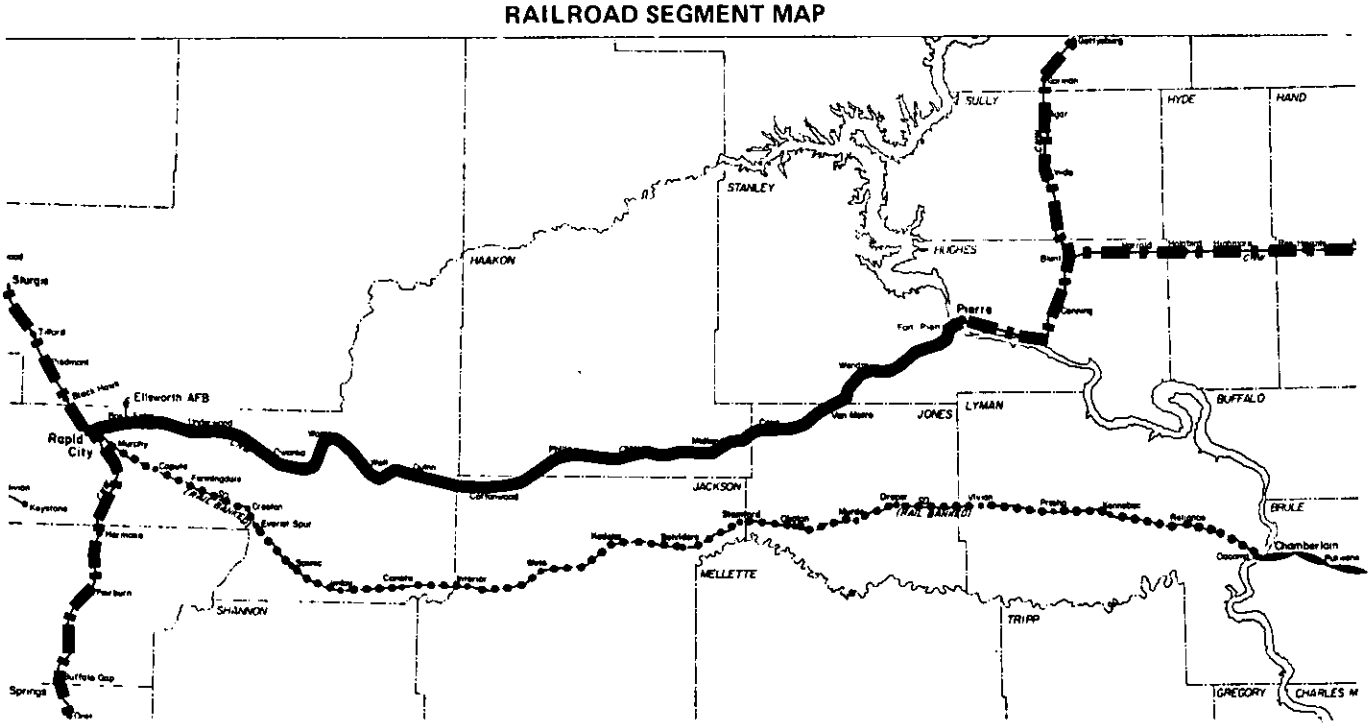
PIERRE TO RAPID CITY

CHAMBERLAIN/KADOKA/RAPID CITY

HIGHWAY LOCATION MAP



RAILROAD SEGMENT MAP



Study Segment

Railbanked State-Owned Segment

State-Owned Core System

All Other Lines

storage facilities are located at Wasta, Quinn, and Cottonwood. Grain product shipments represent the only originating traffic on the line, with wheat the predominant commodity. Primary movements of wheat are eastward to Minneapolis and Mississippi River ports, although all wheat from New Underwood is moved by rail to the Hubbard Milling Company Rapid City flour mill. In 1982, wheat also was shipped by rail to Rapid City from Wall and Philip for milling. Grain shipments have become less seasonal during the last several years because of increases in on-farm and elevator storage capacity and increases in shipments for export (export-related movements tend to be less seasonal). A limited amount of feed grain is shipped into the Philip and Midland areas by both truck and rail.

The 50-mile segment of tracks from Midland to Fort Pierre follows the Bad River through an isolated area with no grain handling facilities. The line segment crosses numerous bridges, which limit maximum car loadings to 210,000 pounds and add significantly to the cost of both line improvements and annual maintenance.

Wheat production in the West River area is more limited than in eastern South Dakota because of light rainfall, with production averaging approximately 15 bushels per acre.[1] Annual production of wheat in the region has increased over the last several years because additional acreage has been brought into production. However, this trend is not expected to continue. Significant weather-related production variations have occurred in the region during the last several years, with a bumper crop recorded in 1982 due to unusually heavy rainfall during the growing season.

Because of the low average yields per acre, grain elevators are relatively small, although many have added storage capacity recently. Most elevators draw from longer distances than in eastern South Dakota, with drawing radii up to 50 miles. Elevators located along the C&NW line, however, have not obtained any substantial portion of the grain traffic that previously moved over the parallel former Milwaukee Road line. None of the elevators has adequate facilities for rapid loading of multiple-car units, and the C&NW offers no multiple-car rates for wheat originating on the line.

Line Description—Overhead Traffic

Overhead traffic from the Black Hills area comprises a major portion of the traffic carried over the C&NW West River line, although the major portion of traffic originating in Rapid City and the Black Hills area moves south to Chadron, then east over a parallel C&NW main line through northern Nebraska. Although the route via Chadron is in better physical condition than the West River route and can carry 263,000-pound carloads, it is too circuitous to carry the commodities shipped from the Black Hills region.

Flour milled in Rapid City is moved to several points in eastern South Dakota and to the Chicago area by rail and to one location in eastern South Dakota by truck. Because of circuitous routing, the rail shipment of flour to eastern South Dakota is restricted to the Rapid City-Pierre route.

[1] Data obtained through an interview with the South Dakota Wheat Commission.

Cement manufactured by the South Dakota Cement Plant in Rapid City is shipped over the Rapid City-Pierre rail line to distribution centers in Watertown, Sioux Falls, and Bismarck, North Daktoa.

To access Bismarck and Watertown, cars carrying cement also must traverse two other C&NW routes. These have light rail, low speeds, and weight restrictions, which make them prime candidates for abandonment. Access to Sioux Falls is provided by a circuitous routing whereby cars containing cement are moved east to Mankato, Minnesota, then west to Sioux Falls. Thus, a close interrelationship is formed between these lines and the West River line; the elimination of service over any of these three lines will directly affect overhead traffic levels on the C&NW West River route. Conversely, abandonment or elimination of cement traffic on the West River line will significantly impact traffic on the C&NW Aberdeen-Oakes, North Dakota line (CN 05) and the C&NW Sioux Valley Junction to Watertown line (CN 12). The impacts of the loss of cement traffic on each of the lines are indicated in Table 23.

Because of circuitous routing, it is not possible to transfer this cement traffic to the C&NW Chadron route, and abandonment of the West River route would shift all annual traffic to truck transport.

Currently, lime is shipped from Rapid City to eastern South Dakota and Minnesota by Peter Lien and Sons using rail. Again, circuity of the Chadron route would prevent the transfer of this traffic to the Chadron route should abandonment of the West River line occur. Abandonment would cause a shift to truck transport as well as possible loss of business.

Substantial shipments of bentonite clay originating in Bentonite, Wyoming and Belle Fourche historically have moved over the Chadron route to eastern and midwestern destinations because of the heavier carloadings permitted over the Chadron route. However, the Rapid City-Pierre route has been used to move limited quantities of clay to points in Iowa and Minnesota and, more frequently, for the return of empty cars.

Table 23
IMPACT ON TRAFFIC DENSITY FROM LOSS OF SOUTH DAKOTA CEMENT TRAFFIC

Line Segment	Annual Carloads of Cement	Annual Cement Tonnage	Cement Traffic Density	Traffic Density (1980)	Percent Decrease in Tonnage with Loss of Traffic	Percent Impact of Traffic Loss on Pierre-Rapid City Line
Sioux Valley Junct.-Watertown	720	55,296	91,296	230,000	40%	8%
Aberdeen-Oakes	780	59,904	98,904	380,000	26	8
Worthington-Ellis	780	59,904	98,904	2,100,000	5	8
Total Impact on Pierre-Rapid City Line	2,280	175,104	289,104	1,200,000	—	24%

Logs and woodchips have been transported from several Black Hills origins over the Rapid City-Pierre route to four paper manufacturing mills in Wisconsin. The characteristic long fibers of the ponderosa pine native to the Black Hills area are desirable for production of certain types of finished and construction papers, and such fibers are not found in most available Midwest species. Three of the four mills have significantly reduced shipments via the West River line. One mill, Consolidated Paper of Wisconsin Rapids, has entered into a contract rate with the C&NW for woodchip shipments based on movement from Whitewood via the Rapid City-Pierre line.

The Nekoosa-Edwards Paper Company has reduced its need for ponderosa pine by constructing a new facility designed to use species of trees from the upper Midwest. Shipments to Nekoosa, Wisconsin have thus been greatly reduced. The Mosinee Paper Company plant located at Mosinee, Wisconsin is served only by the Milwaukee Road Railroad, and the company has maintained a loading facility at Rapid City prior to the embargo of service by the Milwaukee Road. Since the embargo, shipments of woodchips and logs have been reduced because of the relatively high rate imposed as a result of the required C&NW-Milwaukee Road interchange. Thilmany Paper Company of Kaukauna, Wisconsin also has reduced its reliance on the C&NW Pierre-Rapid City route, but is studying the potential for using sources along the Burlington Northern main line in Wyoming.

Shipments of sand and gravel over the line have not been recorded over the last two years.

Operations and Service

Service over the Pierre to Rapid City line is provided by a four-man crew, which works three round-trips per week. The crew is domiciled in Rapid City, works eastward during the first day, stays overnight in Pierre, and works westward to Rapid City during the second day.

Rail Traffic Volumes

Rail traffic volumes over the C&NW West River line are shown in Table 24. The total estimated traffic decreased by 38 percent between 1979 and 1981, with the largest losses of traffic recorded for pulpwood logs, woodchips, and cement overhead traffic.

The decrease in overhead traffic can be attributed to poor overall economic conditions in both the cement and paper industries and to changes in policies for obtaining raw materials by three of the four major paper companies that use Black Hills woodchips and pulpwood. Originating traffic over the line dropped 28 percent over the two-year period, primarily because of fluctuations in growing conditions and market prices for wheat and the loss of sand and aggregate traffic originating at Wasta.

Line Description—Railbanked State-Owned Route

Service along the former Milwaukee Road main line between Chamberlain and Rapid City was embargoed in 1980, and the line was subsequently purchased by the state and

Table 24
WEST RIVER LINE TRAFFIC VOLUMES—ORIGINATING AND TERMINATING TRAFFIC

		Year					
		1979		1980		1981	
Commodity	STCC Code	CL	Tons	CL	Tons	CL	Tons
Wheat	**01137**	**944**	**54,719**	**937**	**55,589**	**811**	**51,321**
Other Farm Products	01	6	353	6	290	8	348
Machinery and Transportation Equipment	35-37	17	350	13	164	21	312
Agricultural Chemicals	287	7	413	2	106		
Gravel or Sand and Crushed Stone	14	179	12,383	120	8,747		
Mineral Wool	32961	2	16	1	10		
Petroleum Refining Products	29119	1	20				
Prepared Feed	2042	6	170				
Total		1,162	68,424	1,079	64,906	840	51,981
		Estimated Overhead Traffic					
Pulpwood Logs	**24114**	**1,323**	**64,162**	**996**	**48,334**	**667**	**32,310**
Pulpwood and Other Woodchips	**24115**	**2,843**	**149,457**	**1,927**	**99,881**	**1,866**	**98,213**
Hydraulic Cement	**32411**	**3,147**	**240,193**	**2,264**	**173,045**	**2,036**	**158,815**
Grain Mill Products	204	523	24,384	514	23,995	262	12,495
Lime	32741	419	25,573	195	12,876	144	9,508
		8,255	503,769	5,896	358,131	4,975	311,341
Total Volume		9,417	572,193	6,975	423,037	5,815	363,322

railbanked for future consideration. The 219.2-mile line served 10 grain elevators located along the eastern one-half of the route. The 98.5-mile segment between Rapid City and Kadoka passes through a relatively isolated area with no agricultural shippers. Wheat and sorghum are the principal crops grown along the route, with lesser amounts of corn and milo grown near Chamberlain.

The loss of rail service to grain handling facilities along the route has not substantially reduced grain production in the area and has not greatly affected the business of the elevators along the route. The major portion of the grain is now moved at competitive rates over the interstate highway system by truck to Minnesota destinations. Initially upon abandonment, however, a significant reduction in elevator business occurred because

of direct trucking from farms. However, much of the grain handling business has come back to the local elevators. Since embargo of service, there has been no significant truck movement of grain to the C&NW Chadron line through northern Nebraska, the C&NW Rapid City-Pierre line, or the railhead at Chamberlain. Only one truck-rail movement was noted, with all remaining shipments made by truck from originating elevator to market destination. Owner-operators and agriculturally-exempt truckers have been able to obtain a reasonable percentage of westbound backhaul traffic, which has allowed them to offer rates relatively competitive to rail.

Project Analysis

Project analyses for the West River corridor included five major alternatives: (1) continued operation by the C&NW, (2) subsidization of C&NW operations, (3) abandonment of the C&NW line and non-operation of the state-owned line, (4) purchase and operation of the C&NW line by the state, and (5) abandonment of the C&NW line with reinstatement of service on the South Dakota Chamberlain-Rapid City line. Each of these alternatives was divided into a number of subalternatives on the basis of line operator (C&NW, BN, or short line) and traffic assumptions (continued use for transporting woodchips and cement traffic). In total, 28 subalternatives were analyzed. These are described in Table 25. Alternative 2 assumes a subsidy of C&NW operation by South Dakota, with no change in rate structure or traffic.

Traffic Projections

It was necessary to project traffic levels under each of the project alternatives in order to form the basis for economic analysis of the alternatives. Originating and terminating traffic volume projections used in analyzing C&NW route alternatives were established by averaging 1979 to 1981 traffic on a station-by-station basis, except for traffic originating at Onida. Data on this traffic was obtained from the Blunt-Onida line analysis, but excludes projected corn traffic. Potential originating and terminating traffic over the railbanked, state-owned route was projected by adjusting 1977 station traffic levels upward in proportion to the increased wheat production between 1977 and 1981 for each county along the route. The projection also assumes a partial diversion of traffic from Philip and Midland, given the assumption that the state-owned route would be operated if the C&NW route were abandoned. Overhead traffic was projected on the basis of shipper interviews coupled with C&NW traffic data.

Traffic Retention Potential

The potential for retention of the existing traffic base under each alternative was determined on the basis of shipper and carrier interviews and is summarized in Table 26.

Brief explanations of traffic retention assignments for each alternative are provided below:

- *Alternatives 1 and 2: Continued C&NW Operations.* Retention of Bismarck- and Watertown-destined cement traffic depends on retention and improvement of the C&NW Aberdeen-Oakes and Watertown-Sioux Valley Junction lines, respectively. A viable alternative to improvement of the Watertown-Sioux Valley Junction line may be trackage rights over the BN Huron-Watertown line. Retention of flour traffic destined to Watertown similarly depends on these alternatives.

Table 25
WEST RIVER CORRIDOR PROJECT ALTERNATIVES

Alternative No.	Line Operated	Line Owner	Line Operator	Traffic Assumptions: Loss of Watertown-Bismarck Cement	Traffic Assumptions: Loss of All Cement	Traffic Assumptions: Loss of All Woodchips	Other Assumptions
1 and 2A	Ft. Pierre-Rapid City	C&NW	C&NW				
1 and 2B	Ft. Pierre-Rapid City	C&NW	C&NW	X			
1 and 2C	Ft. Pierre-Rapid City	C&NW	C&NW		X		
3	Abandonment	—	—			X	State-owned line not operated
4A1	Ft. Pierre-Rapid City	State	C&NW				
4A2	Ft. Pierre-Rapid City	State	C&NW	X			
4A3	Ft. Pierre-Rapid City	State	C&NW		X		
4B1	Ft. Pierre-Rapid City	State	Short line op.				
4B2	Ft. Pierre-Rapid City	State	Short line op.	X			
4B3	Ft. Pierre-Rapid City	State	Short line op.		X		
4C1	Wolsey-Rapid City	State	C&NW				
4C2	Wolsey-Rapid City	State	C&NW	X			
4C3	Wolsey-Rapid City	State	C&NW		X		
4D1	Wolsey-Rapid City	State	Short line op.				
4D2	Wolsey-Rapid City	State	Short line op.	X			
4D3	Wolsey-Rapid City	State	Short line op.		X		
4E1	Wolsey-Rapid City	State	BN				
4E2	Wolsey-Rapid City	State	BN			X	
4E3	Wolsey-Rapid City	State	BN		X		
4E4	Wolsey-Rapid City	State	BN		X	X	
5A1	Chamberlain-Rapid City	State	Short line op.				
5A2	Chamberlain-Rapid City	State	Short line op.			X	
5A3	Chamberlain-Rapid City	State	Short line op.		X		
5A4	Chamberlain-Rapid City	State	Short line op.		X	X	
5B1	Chamberlain-Rapid City	State	BN				
5B2	Chamberlain-Rapid City	State	BN			X	
5B3	Chamberlain-Rapid City	State	BN		X		
5B4	Chamberlain-Rapid City	State	BN		X	X	

Table 26
RETENTION OF EXISTING TRAFFIC BASE UNDER ALTERNATIVES

Alternative	On-Line Originating/Terminating (primarily wheat)			Overhead Traffic				
	Wolsey-Ft. Pierre C&NW	Ft. Pierre-Rapid City C&NW	Chamberlain-Rapid City C&NW	Roundlogs Woodchips	Cement	Flour	Lime	Rapid City-Bentonite Wheat
1. Continued C&NW operation		rail		rail	rail possible	rail possible	rail	rail
2. Subsidized C&NW operation		rail		rail	rail possible	rail possible	rail	rail
3. Abandonment/no rail service		truck		alternative supply source	truck	truck	truck	rail Chadron
4. South Dakota purchase of C&NW line								
A. C&NW operation		rail		rail	rail possible	rail possible	rail	rail
B. Short-line operation		rail		rail unlikely	rail unlikely	rail unlikely	rail unlikely	rail unlikely
South Dakota purchase of Wolsey-Rapid City Line								
C. C&NW operation	rail	rail		rail	rail possible	rail possible	rail	rail
D. Short-line operation	rail	rail		rail unlikely	rail unlikely	rail unlikely	rail unlikely	rail unlikely
E. BN operation	rail	rail		rail unlikely	split	rail possible	rail	rail
5. Chamberlain-Rapid City operation								
A. Short-line operator	—	split	rail	rail unlikely	rail unlikely	rail unlikely	split	rail unlikely
B. BN operator	—	split	rail	rail unlikely	split	rail possible	split	rail

- *Alternative 3: Abandonment—No Rail Service.* All traffic would be shifted to truck transport, except for woodchips and logs. Rerouting of woodchips and logs via Chadron would add 324 rail miles and would likely reduce or eliminate the market for Black Hills materials. It was assumed that grain traffic originating between Belle Fourche and Rapid City would move via Chadron.

- *Alternative 4A: South Dakota Purchase of C&NW Line with C&NW Operation.* Same as Alternatives 1 and 2.

- *Alternative 4B: South Dakota Purchase of C&NW Line with Short-Line Operation.* Originating and terminating traffic would remain if the existing rate structures are maintained. If rates were to increase, some traffic would be diverted to truck transport. It is unlikely that woodchip and log traffic would continue, given that the movement would require interchanges with the C&NW at both ends of the short line, thus increasing transportation costs. Retention of cement traffic under this alternative would depend on the continued existence and improvement of the Aberdeen-Oakes and Watertown-Sioux Valley Junction lines. However, the movement of cement would become a two-carrier move, with potentially higher costs, and is thus considered unlikely. Similarly, flour, lime, and overhead grain traffic would become two-carrier movements, and the retention of such traffic is unlikely.

- *Alternative 4C: South Dakota Purchase of Wolsey-Rapid City Line with C&NW Operation.* Same as Alternatives 1, 2, and 4A.

- *Alternative 4D: South Dakota Purchase of Wolsey-Rapid City Line with Short-Line Operation.* Same as Alternative 4B, except that diversion of originating grain traffic to truck transport might occur between Wolsey and Pierre if rates were to increase.

- *Alternative 4E: South Dakota Purchase of Wolsey-Rapid City Line with BN Operation.* The potential exists for increased originating grain traffic because of single-line access to Minneapolis and the West Coast. Woodchip and log traffic would probably be lost because of a two- or three-carrier movement with higher costs. Retention of cement traffic to Watertown and Sioux Falls would depend on maintenance of the current rate structure. Bismarck cement traffic would be lost. Flour, lime, and overhead wheat traffic from Rapid City would be retained.

- *Alternative 5A: Reinstatement of Chamberlain-Rapid City Rail Line with Short-Line Operation.* The proximity of I-90 and the current reliance on truck transport would limit the amount of former Milwaukee Road grain traffic that could be diverted back to rail. Diversion of grain from truck carriers as well as from the Philip and Midland areas would depend on the rate structure offered. Retention of woodchip and log traffic would be unlikely because the movement would involve multiple interchanges among three or four carriers. Cement traffic to Bismarck would be lost, as this would become a three-carrier move. Cement traffic to Watertown and Sioux Falls would become a two-carrier move, retention of which is unlikely. Retention of cement traffic also would depend on maintenance of the current rate structure; otherwise, truck transport would be less costly. Retention of flour and overhead grain traffic is unlikely because of two-carrier movement. Lime traffic may be partially diverted to I-90.

- *Alternative 5B: Reinstatement of Chamberlain-Rapid City Rail Line with BN Operation.* The existence of I-90 may limit diversion of grain traffic back to rail. However, BN operation provides single-carrier access to West Coast markets and to Minneapolis. Woodchip and log traffic would become a three-carrier movement (C&NW, BN, Green Bay and Western) with a higher rate structure due to interchange costs. Construction of a loading facility at Rapid City would eliminate an interchange, but truck transport would be necessary from the western Black Hills to Rapid City. Rail movement is thus unlikely, and higher rates could force Wisconsin paper mills to seek alternative sources of pulpwood. The Bismarck cement traffic would be lost to truck carrier, but Watertown and Sioux Falls traffic could be retained, provided BN is allowed access to the South Dakota Cement Plant and the rate structure remains unchanged. Rapid City flour and overhead wheat traffic would be diverted to the rail line, but a portion of the lime traffic would move over I-90.

The actual numerical assignments of traffic to route alternatives were extremely generous, usually allowing assignment of all potential traffic, even in the cases listed in Table 27 as "rail possible" or "rail unlikely." The resulting revenue analysis produced the highest potential revenues for each possible alternative, and thus created the most optimistic view for the success of each alternative considered.

Project Revenue and Cost Computation

Project revenues for originating, terminating, and overhead traffic were determined on a station-by-station basis by multiplying traffic commodity components by the applicable commodity transportation rates. Revenues for each alternative were computed by adding station revenues by commodity, in accordance with the traffic retention matrix shown in Table 27.

Computation of on-branch and off-branch costs required the separation of each origin-to-destination movement into on-branch and off-branch component mileages. On- and off-line ton-miles, car-miles, and train-miles were next computed for each origin-to-destination movement, using the component mileages. On-branch and off-branch costs were computed by applying unit cost data for BN and C&NW operations (obtained from branch line accounting data and Rail Form A) to the appropriate traffic components (ton-miles, car-miles, or train-miles). Cost components were further modified where appropriate to reflect the cost typically incurred by a short-line operator. Truck costs for movement along I-90 under Alternative 3 and for traffic components diverted to truck transport under other alternatives were computed using the RCAI proprietary truck costing model.

Analysis of Alternatives

- *Alternatives 1 and 2: Continued C&NW Operation with Subsidy if Necessary.* Table 27 summarizes system costs for Alternatives 1 and 2 under three possible traffic conditions: (1) existing traffic volumes are maintained, (2) Bismarck and Watertown cement traffic is lost, and (3) all cement traffic is lost. Net revenue to the railroad under Alter-

Table 27 SUMMARY OF SYSTEM COSTS $Millions ($M)

1 Alt. No.	2 Alternative	3 Traffic Base	Rail System 4 Cars	5 Tons	6 Revenue (000)	7 Cost (000)	8 Net (000)	Over 10 yrs.–5% disc. 9 Profit to R.R.	10 Capital Cost	11 Oper. Cost (Subdy)	12 Total Cost	Highway System 13 Heavy Trucks	14 Tons	15 ($thous) Add'l. Cost to Shipper use of Trucks	16 ($M) Add'l Cost Over 10yrs.–5%disc.	17 ($M) Total System Cost 10yrs.–5%disc.	($M) 18 R.R. Profits Contrib	19 Capital Costs	20 Shippers Incrs'd. Cost	21 Distributional Effects 22 Truckrs. Add'l. Jobs
1,2	Ft. Pierre–Rapid City Cont'd. CNW Operation	Total	5455	361,800	7883	7224	659	5.09	7.80	–	2.71	2842	71,067	–	–	2.71	5.1	7.8	–	–
		w/o B.W. cement	3955	246,600	5629	5935	-306	–		2.36	10.16	5848	186,267	+74	.57	10.73	–		2.9	24
		w/o all cement	3175	186,696	4551	5215	-664	–		5.13	12.93	7327	246,171	-9	-.08	12.85	–		5.1	36
3	Abandon CNW Line		60	3,884	0	23	-23	0	0	0.18	0.18	7816	322,783	840	6.49	6.67	0	0	6.67	59
4a	Ft. Pierre–Rapid City SD Ownership CNW Oper.	Total	5455	361,800	7883	6658	1225	9.46	12.60	–	3.14	2842	71,067	–	–	3.14	9.5	12.6	–	–
		w/o B.W. cement	3955	246,600	5629	5369	260	2.01		–	10.59	5848	186,267	+74	.57	11.16	2.0		0.6	24
		w/o all cement	3175	186,696	4551	4649	-98	–		0.76	13.36	7327	246,171	-9	-.08	13.28	–		0.7	36
4b	Ft. Pierre–Rapid City SD Ownership Short Line Op.	Total	5455	361,800	3790	2681	1109	8.56	12.60	–	4.04	2842	71,067	–	–	4.04	8.6	12.6	–	–
		w/o B.W. cement	3955	246,600	1902	2386	-484	–		3.74	16.34	5848	186,267	+74	.57	16.91	–		4.3	24
		w/o all cement	3175	186,696	1525	2354	-829	–		6.40	19.00	7327	246,171	-9	-.08	18.92	–		6.3	36
4c	Wolsey–Rapid City SD Ownership CNW Oper.	Total	9324	622,485	11857	11112	745	5.75	16.00	–	10.25	2842	71,067	–	–	10.25	5.8	16.0	–	–
		w/o B.W. cement	7824	507,285	9604	9790	-186	–		1.44	17.44	5848	186,267	+74	.57	18.01	–		2.0	24
		w/o all cement	7044	447,381	8525	9195	-670	–		5.17	21.17	7327	246,171	-9	-.08	21.09	–		5.1	36
4d	Wolsey–Rapid City SD Ownership Short Line Op.	Total	9324	622,485	4991	5004	-13	–	16.00	0.10	16.10	2842	71,067	–	–	16.10	–	16.0	0.1	–
		w/o B.W. cement	7824	507,285	3817	4527	-710	–		5.48	21.48	5848	186,267	+74	.57	22.05	–		6.1	24
		w/o all cement	7044	447,381	2161	4448	-2287	–		17.66	33.66	7327	246,171	-9	-.08	33.58	–		17.6	36
4e	Wolsey–Rapid City SD Ownership BN Operation	Total	8424	556,381	10383	9987	396	3.06	16.00	–	12.94	4483	130,971	–	–	12.94	3.1	16.0	–	13
		w/o wd. chips	6758	456,381	7509	8693	-1184	–		9.14	25.14	4483	130,971	–	–	25.14	–		9.1	13
		w/o cement	6924	441,181	8309	8870	-561	–		4.33	20.33	7327	246,171	-9	-.08	20.25	–		4.3	36
		w/o chips cement	5258	341,181	5436	7630	-2194	–		16.94	32.94	7327	246,171	-9	-.08	32.88	–		16.9	36
5a	Chamberlain–Rapid City SD Ownership Short Line Op.	Total	4889	325,420	2847	2447	400	3.09	12.56	–	9.47	2809	88,752	+366	2.83	12.30	3.1	12.6	2.8	-8
		w/o wd. chips	3223	225,420	1816	2397	-581	–		4.49	17.05	2809	88,752	+366	2.83	19.88	–		7.3	-8
		w/o cement	3389	210,220	1757	2336	-579	–		4.47	17.03	5653	203,952	+357	2.75	19.78	–		7.2	15
		w/o chips cement	1723	110,220	726	2137	-1411	–		10.90	23.46	5653	203,952	+357	2.75	26.21	–		13.7	15
5b	Chamberlain–Rapid City SD Ownership BN Operation	Total	4889	325,420	7105	6051	1054	8.14	12.56	–	4.42	2809	88,752	+366	2.83	7.25	8.1	12.6	2.8	-8
		w/o wd. chips	3223	225,420	4232	5016	-784	–		6.05	18.61	2809	88,752	+366	2.83	21.44	–		8.9	-8
		w/o cement	3389	210,220	5032	5231	-199	–		1.54	14.10	5653	203,952	+357	2.75	16.85	–		4.3	15
		w/o chips cement	1723	110,220	2158	3952	-1794	–		13.85	26.41	5653	203,952	+357	2.75	29.16	–		16.6	15

Column	Title	Explanation
1.	Alt. No.	See Table 26.
2.	Alternative	Abbreviations: CNW—Chicago & North Western RR BN—Burlington Northern RR SD—South Dakota (state) Short Line—unspecified Class 3 rail carrier
3.	Traffic Base	Includes originating, terminating, and overhead traffic unless otherwise indicated by the following abbreviations: w/o B, W cement—without Bismarck and Watertown-destined cement w/o wd chips—without woodchips w/o all cement—without Bismarck, Watertown, and Sioux Falls cement w/o chips, cement—self-explanatory
4.	Cars	Total originating, terminating, and overhead carloads per year. Excludes empties.
5.	Tons	Revenue tonnage carried by originating, terminating, and overhead cars.
6.	Revenue	Revenue attributable to participating rail carriers from above traffic.
7.	Cost	Avoidable costs to rail carriers incurred by above traffic.
8.	Net	Column (7) + Column (8).
9.	Profit to RR	Present value of (8) over a 10-year period at a five percent discount rate, assuming (8) is positive. $ in millions.
10.	Capital Cost	Required investment in rehabilitating track to sustain rail service. $ in millions.
11.	Oper. Cost (Subsidy)	Present value of (8) over a 10-year period at a five percent discount rate, assuming (8) is negative. $ in millions.
12.	Total Cost	Column (9) + Column 10 + Column 11.
13.	Heavy Trucks	Equivalent number of annual truckloads for traffic no longer expected to move by rail.
14.	Tons	Annual tonnage corresponding to (13).
15.	Add'l Cost to Shipper for Use of Trucks	[(Truck Rate) − (Rail Rate)] X tonnage where truck rate is greater than rail rate for traffic not expected to move by rail.
16.	Add'l Cost	Present value of (15) over a 10-year period at a five percent discount rate.
17.	Total System Cost	Column (12) + Column (16).
18.	R.R. Profits Contrib.	Equals Column (9). Assumes profits earned by R.R. on movement will be used by carrier.
19.	Capital Costs	Equals Column (10). Cost to be borne by either government or shippers.
20.	Shipper Increased Cost	Equals Column (11) + Column (16). Additional cost over and above present rail rates to be paid by shippers through higher rates.
21.	Truckers Add'l Jobs	Additional jobs created by traffic no longer expected to move by rail.
22.	Distributional Effects	Ten years, five percent discount.

native 1 at the existing level of traffic is $659,000 per year or $5,090,000 over a 10-year period when discounted at five percent. Thus, no operating subsidy would be necessary if all traffic were retained. However, loss of cement traffic would require that subsidy payments be made to the railroad, as net costs to the railroad with the loss of Bismarck/Watertown cement traffic and all cement traffic, respectively, would be $306,000 and $664,000. Corresponding operating subsidies for the 10-year period would be $2,360,000 and $5,130,000, respectively. Capital costs for rehabilitation of the line were estimated at $7,800,000. Total system costs over the 10-year period, discounted at five percent, for the three traffic assumptions are as follows:

Traffic Retention	Total System Cost
Total	$ 2,710,000
Without Bismarck/Watertown Cement	10,730,000
Without All Cement	12,850,000

Assuming total traffic retention, distributional effects would include $5,100,000 in profit contributions to the C&NW Railroad and $7,800,000 in capital costs for rehabilitation to the state. Distributional effects under the assumptions that cement traffic would be lost would include $2,900,000 and $5,100,000, respectively, in increased rates to shippers for partial and complete loss of cement traffic. Truckers would gain 24 and 36 new jobs, respectively, under these assumptions.

- *Alternative 3: Abandonment of the C&NW Line, Diversion to All Trucking.* Table 27 also summarizes system costs for Alternative 3, abandonment of the C&NW line. This alternative also assumes that all rail service would be terminated within the West River corridor and that all commodities would move by truck. Additional costs to shippers from the use of truck would be $840,000 per year or $6,490,000 over the 10-year period at a five percent discount rate. A small amount of grain originating in Rapid City would be transported by rail through Chadron at higher cost to the shipper. Total system costs of $6,670,000 were computed over the 10-year period at a five percent discount rate.

  Distributional effects under this assumption would include a $6,670,000 increase in costs to shippers and the addition of 59 trucking jobs.

Table 28 summarizes the impact of rail abandonment on highway truck traffic over state routes. Most traffic would be routed over I-90, except for cement traffic destined to Bismarck, North Dakota, which would be routed over State Highway 79 and US 85. Traffic also would increase on State Highways 73 and 63, serving Philip and Midland, respectively.

- *Alternative 4A: Pierre-Rapid City, South Dakota Ownership, C&NW Operation.* Alternative 4A, summarized in Table 27, assumes the purchase of the C&NW line by the State of South Dakota and operation of the line by the C&NW Railroad. Traffic volumes under state ownership would be the same as under C&NW ownership in Alternatives 1 and 2. Operating costs to the railroad would be reduced by state ownership;

Table 28
CHANGE IN TRUCK VOLUMES ON SELECTED ROUTES

Commodity	Tons	Equivalent Trucks	Highway Affected	Comment
Originating grain	54,089	2,164	I-90	
Terminating other	520	35	I-90	
Overhead woodchips	106,200	—	—	lost traffic, alternative source of material
Overhead cement				
to Bismarck	59,904	1,997	State 79, US 85	
to Watertown	55,296	1,365	I-90, I-29	
to Sioux Falls	59,904	1,478	I-90	
Overhead flour	12,495	382	I-90, I-29	
Overhead lime	9,508	380	I-90	
Overhead wheat	3,884	—	—	Rail via Chadron
Total	361,800	7,801		

thus, net profits to the railroad over the 10-year period would increase over Alternative 1 to $9,460,000 with retention of all traffic and $2,010,000 with loss of Bismarck and Watertown terminating cement traffic. With loss of all cement traffic, a subsidy of $760,000 over 10 years would be necessary. Capital costs to the state for purchase and rehabilitation of the line would be $12,600,000. Total system costs over the 10-year period, discounted at five percent, for the three traffic assumptions would be as follows:

Traffic Retention	Total System Cost
Total	$ 3,140,000
Without Bismarck/Watertown Cement	11,160,000
Without All Cement	13,280,000

Distributional effects with retention of all traffic would include $9,500,000 in C&NW Railroad profits and $12,600,000 in state capital costs for purchase and rehabilitation of the line. With the loss of Bismarck and Watertown cement traffic, railroad profits would drop to $2,000,000, and shippers would absorb $600,000 in increased rates for truck transportation over the 10-year period. With the loss of all cement traffic, shippers must subsidize rail operations at $700,000. Truckers would gain 24 jobs under partial loss of cement traffic and 36 jobs under total loss of cement traffic.

- Alternative 4B: Pierre-Rapid City, South Dakota Ownership, Short-Line Operation. Alternative 4B, summarized in Table 27, assumes state purchase of the C&NW line and

short-line contract operation. Traffic levels for such operations were assumed to be the same as for Alternatives 1, 2, and 4A, and the same cement traffic retention conditions were used. Under short-line operation, rail system revenues and costs would be reduced, with net profits ($8,560,000) accruing only under the assumption that all cement traffic would be retained. As in Alternative 4A, capital costs of $12,600,000 for purchase and rehabilitation would be incurred by the state. Total system costs over the 10-year period, discounted at five percent, for the three traffic assumptions are as follows:

Traffic Retention	Total System Cost
Total	$ 4,040,000
Without Bismarck/Watertown Cement	16,910,000
Without All Cement	18,920,000

Distributional effects with retention of all traffic would include $8,600,000 in profits to the short-line operator and $12,600,000 in capital costs to the state. Under the assumptions of partial and complete loss of cement traffic, shippers would absorb an additional $4,300,000 and $6,300,000, respectively, as a result of rail operating subsidies and increasing truck rates. The state would contribute $12,600,000 in capital costs. Additional truck carrier employment with partial and complete loss of cement traffic would be 24 and 36 jobs, respectively.

- *Alternative 4C: Wolsey-Rapid City, South Dakota Ownership, C&NW Operation.* Alternative 4C, summarized in Table 27, assumes the purchase of the C&NW line between Wolsey and Rapid City, with continued C&NW operation. Traffic volumes over the line under state ownership would equal existing traffic levels under C&NW operation and ownership. Net profits to the C&NW Railroad over the 10-year period were computed to be $5,750,000. Railroad profits under this alternative would be less than under Alternative 4A for the Ft. Pierre-Rapid City line. Since a large volume of traffic on the longer line originates near Wolsey, railroad costs would increase more than revenues for the relatively short haul. Capital costs to the state were estimated at $16,000,000 for purchase and rehabilitation of the line. Under the assumptions of partial and complete loss of cement traffic, railroad operating cost subsidies of $1,440,000 and $5,170,000, respectively, would be necessary. Total system costs over the 10-year period, discounted at five percent, for the three traffic assumptions would be as follows:

Traffic Retention	Total System Cost
Total	$10,250,000
Without Bismarck/Watertown Cement	18,010,000
Without All Cement	21,090,000

Distributional effects under total traffic retention would be $5,750,000 in profits to the C&NW and $16,000,000 in capital costs to the state. With the partial and complete loss of cement traffic, state capital costs would remain at $16,000,000, but shipper costs would increase to $2,000,000 and $5,100,000, respectively. Trucking employment would increase by 24 and 36 jobs, respectively.

Alternative 4D: Wolsey-Rapid City, South Dakota Ownership, Short-Line Operation. Alternative 4D, summarized in Table 27, assumes state purchase of the Wolsey-Rapid City C&NW line, with short-line contract operations. The analysis indicates that such operations would result in net losses to the operator, regardless of the traffic assumptions. The short-line must share revenues with connecting carriers and must cover interchange costs. Capital costs to the state remain at $16,000,000 for this alternative. Total system costs, discounted at five percent, over the 10-year period were estimated as follows:

Traffic Retention	Total System Cost
Total	$16,100,000
Without Bismarck/Watertown Cement	22,050,000
Without All Cement	33,580,000

Distributional effects include $100,000, $6,100,000, and $17,600,000 in shipper subsidies under the three traffic retention assumptions, respectively. State capital costs were estimated at $16,000,000 over the 10-year period. Trucking employment was estimated at 24 and 36 jobs, respectively, for partial and complete loss of cement traffic.

- *Alternative 4E: Wolsey-Rapid City, South Dakota Ownership, BN Operation.* Alternative 4E, summarized in Table 27, assumes state purchase of the Wolsey-Rapid City C&NW line with BN operation. BN operation would result in the loss of cement traffic to Bismarck and some woodchip traffic. This option would result in net profits of $396,000 per year, or $3,060,000 over the 10-year period to the BN if all traffic is retained. Loss of cement or woodchip traffic, however, would precipitate substantial net losses to the railroad, which would have to be replaced by shipper subsidies for the 10-year period, as summarized below:

Traffic Retention	Required Rail Shipper Subsidy
Without Woodchips	$ 9,140,000
Without Cement	4,330,000
Without Cement and Woodchips	16,940,000

Such subsidies would be adjusted downward slightly by lower costs for truck shipment of cement and elimination of the cost of trucking woodchips to Rapid City. Total system costs for Alternative 4E, discounted at five percent, are summarized for the 10-year period as follows:

Traffic Retention	Total System Cost
Total	$12,940,000
Without Woodchips	25,140,000
Without Cement	20,250,000
Without Woodchips and Cement	32,800,000

Distributional effects include $3,100,000 in profits for the BN Railroad if all traffic is retained. The state would absorb capital costs of $16,000,000, regardless of traffic re-

tention assumptions over the 10-year period. Shippers would absorb higher costs for transportation totaling $9,100,000 with loss of woodchip traffic, $4,300,000 with loss of cement traffic, and $16,900,000 with loss of woodchip and cement traffic. Trucking employment would increase by 13 jobs under retention of total traffic. Trucking employment would increase by 36 jobs with loss of cement traffic by the railroad.

Alternative 5A: Chamberlain-Rapid City, South Dakota Ownership, Short-Line Operation. Alternative 5A, summarized in Table 27, assumes reinstatement of service and rehabilitation of the state-owned railbanked line between Chamberlain and Rapid City and short-line operation. Under the assumption of total traffic retention, the short-line operator would retain profits of $3,090,000 over the 10-year period. However, the state must provide capital expenditures of $12,560,000 for rehabilitation. Loss of woodchip traffic, cement traffic, or both, would result in significant additional expenses to shippers for rail subsidies and additional costs to shippers for truck transport. Total system costs, discounted at five percent, over the 10-year period are as follows:

Traffic Retention	Total System Cost
Total	$12,300,000
Without Woodchips	19,880,000
Without Cement	19,780,000
Without Woodchips and Cement	26,210,000

Distributional effects include $3,100,000 in profits to the short-line over the 10-year period under the assumption of total traffic retention. Capital costs incurred by the state would be $12,600,000, regardless of traffic retention. Costs incurred by shippers over the 10-year period and trucking employment would be affected as follows:

Traffic Retention	Increased Shipper Cost	Truckers Additional Jobs
Total	$ 2,800,000	– 8
Without Woodchips	7,300,000	– 8
Without Cement	7,200,000	15
Without Woodchips and Cement	13,700,000	15

Loss of trucking jobs under total traffic retention stems from diversion of shipments from existing truck transport on the interstate system in South Dakota.

- *Alternative 5B: Chamberlain-Rapid City, South Dakota Ownership, BN Operation.* Alternative 5B, summarized in Table 27, assumes reinstatement of service over the railbanked state-owned line between Chamberlain and Rapid City, with the BN serving as the operator. Under the assumption of total traffic retention, the BN would retain profits of $8,140,000 over the 10-year period. However, with loss of either woodchip or cement traffic, shippers would have to subsidize rail operations as well as pay increased trucking costs. The state would absorb $12,600,000 in rehabilitation costs, regardless of the traffic retention assumption. Total system costs, discounted at five percent, over a 10-year period are summarized as follows:

Traffic Retention	Total System Cost
Total	$ 7,250,000
Without Woodchips	21,440,000
Without Cement	16,850,000
Without Woodchips and Cement	29,160,000

Distributional effects include railroad profits of $8,100,000 under the assumption of total traffic retention and $12,600,000 in state capital costs for line rehabilitation, regardless of traffic retention assumption. Increased shipper costs and additional trucking jobs under each traffic assumption are summarized as follows:

Traffic Retention	Increased Shippers Cost	Additional Truckers Jobs
Total	$ 2,800,000	−8
Without Woodchips	8,900,000	−8
Without Cement	4,300,000	15
Without Woodchips and Cement	16,600,000	15