ADDENDUM TO RAILPLAN SOUTH DAKOTA -1981-

MILBANK TO SISSETON & HURON TO PIERRE BENEFIT / COST STUDIES

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

MAY 1982

NOTICE

OF

PUBLIC MEETING

THE S.D. DIVISION OF RAILROADS WILL PRESENT A PROGRAM TO DISCUSS -

★ AN ADDENDUM TO RAILPLAN SOUTH DAKOTA -1981 WHICH DESCRIBES A PROPOSED PROJECT TO REHABILITATE THE HURON TO PIERRE RAIL LINE OF THE CHICAGO AND NORTH WESTERN TRANSPORTATION COMPANY.

MILLER, S.D.   APR. 14, 1982   2:00 PM   CITY HALL
COMMUNITY ROOM

PUBLIC OFFICIALS, ORGANIZATIONS, AND INDIVIDUALS ARE URGED TO APPEAR AND EXPRESS THEIR VIEWS EITHER IN WRITING OR ORALLY.

SEND WRITTEN COMMENTS BY APRIL 23, 1982 TO

JAMES R. MYERS, DIRECTOR
DIVISION OF RAILROADS
TRANSPORTATION BUILDING
PIERRE, SOUTH DAKOTA 57501

Addendum to

RAILPLAN SOUTH DAKOTA 1981

Update Of Benefit-Cost Studies

SOUTH Dakota

Department of Transportation

Division of Railroads

May 1982

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INTRODUCTION

The purpose of this Addendum is to examine the benefits and costs associated with rehabilitating two South Dakota rail lines. The Pierre to Huron and Milbank to Sisseton lines were studied as part of the 1980 Railplan, and applications for the funding of rehabilitation projects were approved by the Federal Railroad Administration (FRA).

Because of uncertain long-term service on the Milwaukee Railroad's main line, which connects with the Milbank to Sisseton line, the project was not performed. Recent developments now make it possible to consider a permanent solution for this line.

The Pierre to Huron segment of the Chicago and North Western Transportation Co.'s line to Rapid City is part of South Dakota's essential rail system. Rehabilitation of this line segment was also deferred, primarily because of uncertainties that existed before the State's selection of its core system operator. In the time that has passed, the entire line has been placed in Abandonment Category 2, indicating that the North Western believes the line is potentially subject to abandonment. Thus, the line is being reanalyzed to update information on the traffic, operation, and rehabilitation need. The revised study will permit a rehabilitation project to be performed.

Participation by the public strengthens the rail planning process, and is necessary to establish and maintain a useful dialogue between South Dakota, its citizens, and rail users. Communication of needs and concerns enables state rail planners to function more effectively. Comments or questions on this Addendum should be addressed to:

Mr. James R. Myers, Director
Division of Railroads
South Dakota Department of Transportation
Transportation Building
Pierre, South Dakota 57501
(605) 773-3710

I. LINE SELECTION PROCESS AND CONSISTENCY WITH RAIL SERVICE AND PLANNING POLICIES, OBJECTIVES, AND GOALS [266.15(c)(1)(4)]

In this Addendum, lines were selected for intensive study according to the following criteria:

A. Lines that are a part of South Dakota's essential rail system.

B. Lines whose abandonment could have potentially significant impacts on shippers and the community.

C. Light density lines threatened by physical deterioration or requiring rehabilitation to permit more efficient operations.

D. Light density lines providing accessibility to the regional and national railroad network.

E. Project locations where significant shipper interests in improving or maintaining local rail operations are demonstrated.

These criteria focus on lines that have an important role in South Dakota's transportation system. The State is interested in providing these lines with one-time assistance that will result in continuing benefits to the railroads, shippers, and the South Dakota economy. The assistance projects address specific problems without encouraging the continuation of uneconomic rail service. The criteria that apply to each study line and the alternatives to be studied are shown in Exhibit I-1. Exhibit I-2 shows the location of the lines.

In conformity with Title 49 of the Code of Federal Regulations, the State of South Dakota has established, as part of the planning process, rail service planning policies, objectives, and goals. These are reprinted below.

<u>Rail Service and Planning Policies</u>:

- Rail users, railroad companies, local governments, and the State need to coordinate their efforts to solve transportation problems in South Dakota.

- The South Dakota DOT encourages the continuation of financially solvent, privately owned and operated rail services in the State. The South Dakota DOT

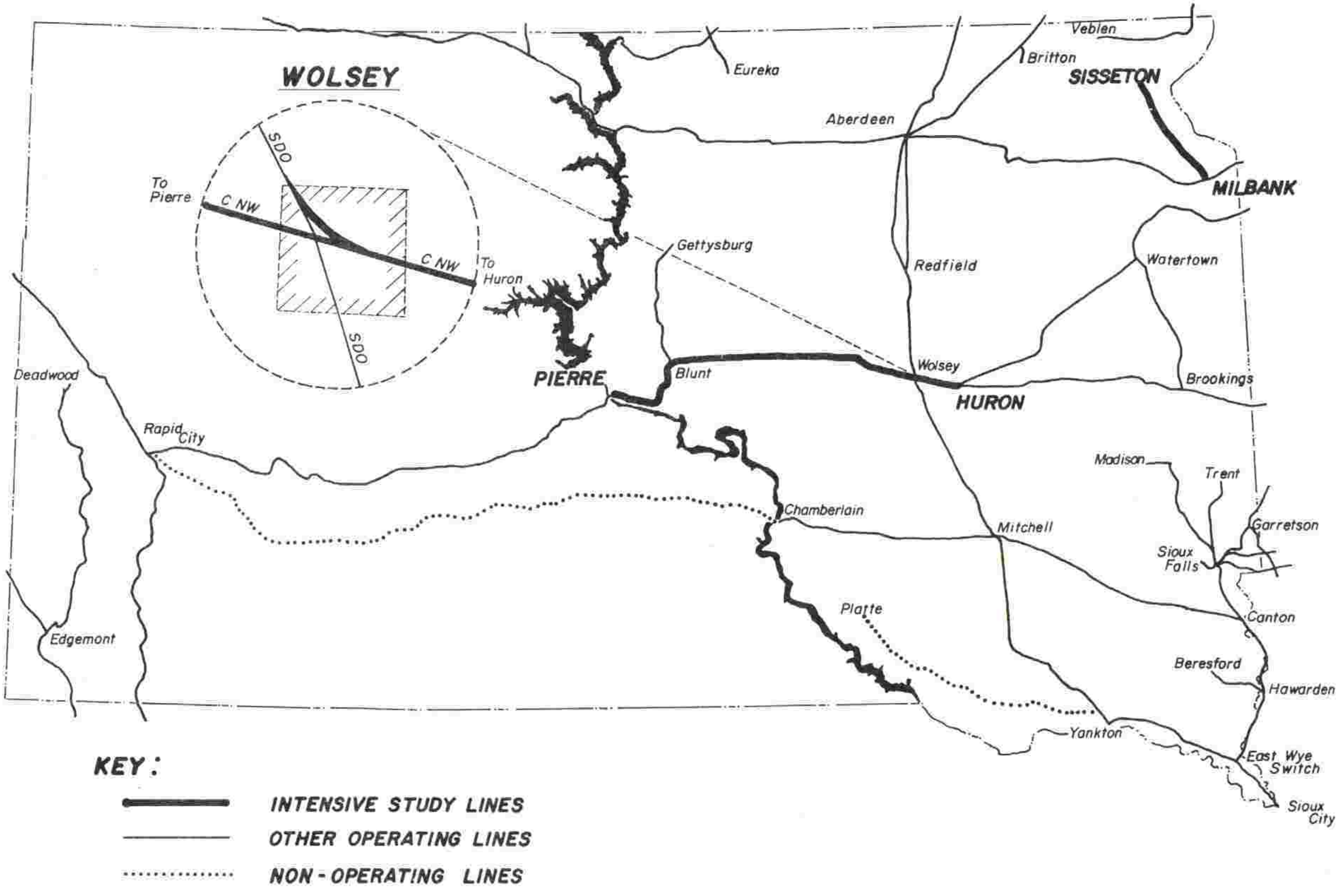
EXHIBIT I-1

INTENSIVE STUDY LINES AND PROJECT ALTERNATIVES

Study Number	Intensive Study Line*	Selection Criteria
1.	Milbank to Sisseton ** Abandon Line – Rehabilitate Line to Class I and Establish Short Line Railroad	(B), (C), (D), (E)
2.	Pierre to Huron ** Continue Service – Rehabilitate Line to Class II and Continue Service – Abandon Line	(A), (B), (C), (D)

*See listing of criteria on page I-1
**Base Case
– Alternative Case

EXHIBIT I-2
INTENSIVE STUDY LINES



will not openly oppose all railroad abandonment applications, but first will consider the potential viability of the line, the social and economic impacts of line abandonment, the local interest in the line, the potential for substitute service, and other factors which may be unique to the line or its service area.

- The South Dakota DOT will support essential rail services which are threatened by abandonment through the use of available public and private funds, where the public interest justifies such assistance. Possible assistance includes acquisition, service continuation, rehabilitation, rail banking, operations improvement, or substitute service.

- The South Dakota DOT will foster the coordination and consolidation of rail services in the State where opportunities exist for improving the efficiency of rail operations.

- The South Dakota DOT will strive to increase the public awareness of rail service issues as they affect the State and to facilitate public involvement in the ongoing State rail planning process.

Rail Service and Planning Objectives:

- Foster adequate, safe, efficient, and economical transportation services for the movement of persons and goods in South Dakota.

- Integrate the State's transportation system with that of neighboring states and with the national transportation system in order to facilitate interstate and nationwide travel, while also considering state and local needs, desires, and the inherent social, economic, environmental and land use impacts.

- Integrate the various carriers and modes of transportation in order that they might safely, efficiently, and economically supplement and complement each other in the movement of persons and goods, recognizing the inherent advantages of each mode.

- Maintain essential rail services and facilities in South Dakota which serve the public interest but which cannot otherwise be profitably continued by private carriers.

- Coordinate the available resources of rail users, railroad carriers, and governments (local, state, and federal) for the purpose of maintaining essential transportation accessibility within South Dakota.

Rail Service and Planning Goals:

- Identify the essential rail system for South Dakota which is needed to serve the State's current and potential agricultural, natural resource, industrial, and energy-related activities.

- Retain a viable core rail system to serve South Dakota, made up of essential lines which serve the primary traffic-producing areas of the State and which provide accessibility to State and national markets.

- Encourage the elimination of nonprofitable rail lines which are nonessential and whose services could be more economically provided by an alternative rail line or transportation mode.

- Develop competitive transportation options for those communities which lose rail service.

- Promote increased use of rail service in those ways in which it is best suited.

- Provide for the transportation needs of communities where the loss of current rail service will cause severe economic or socioeconomic hardships.

- Promote financial stability and operational efficiency within the rail system serving South Dakota.

- Develop, maintain, and improve the institutional capability for implementing State railroad policy by legislation, funding, program administration, and project implementation.

II. BENEFIT-COST ANALYSIS OF INTENSIVE STUDY LINES [266.15(c)(5)]

The analysis of each intensive study line involved the determination of the quantitative and qualitative effects of the project alternatives on the rail users, State, and Nation. This section describes the types of effects considered and the method of calculating the results as part of a benefit-cost analysis for each line. The methodology is similar to that used in the 1980 Railplan and the 1981 Addendum, which were approved by the Federal Railroad Administration.

BENEFIT-COST ANALYSIS METHODOLOGY

Federal regulations [CRF 266.15(c)(5) and (c)(8)] require project applications for federal funding under Section 803 of the 4-R Act (the LRSA Program) to be accompanied by a benefit-cost analysis of the project's quantitative effects. This section describes South Dakota's benefit-cost analysis methodology as it is applied to the assessment of intensive study lines for this Addendum.

The South Dakota benefit-cost analysis methodology is based upon the suggested guidelines of the Federal Railroad Administration (FRA) for benefit-cost analysis of rail assistance projects. Briefly, the methodology consists of developing the primary and secondary efficiency benefit and cost factors that result from a particular line alternative, and allocating the effects by affected party. The benefit-cost ratio is arrived at by summing the total monetary benefits and dividing this sum by the total project costs, discounted to an annualized value, assuming a 10-year time frame and a 15 percent discount rate. The resulting ratio provides a measure of the project's viability, whereby a ratio in excess of 1.0 means that the project produced more benefits than costs in a 10-year period. Nonmonetary and nonquantitative effects of each alternative are then added to the line analysis results to complete the assessment.

The primary efficiency benefits are used to measure the change in consumer and producer surplus for shippers and railroads caused by changes in the availability of transportation service. These benefits result from changes in rail service which, in turn, cause changes in the quantity, price, and cost of moving commodities, by station, to and from each line. The primary efficiency benefits are defined by the following equation:

$$(B_n-B_o)_p = Q_o\ (C_o-C_n) + 1/2\ (P_o-P_n)\ (Q_n-Q_o) + (P_n-C_n)\ (Q_n-Q_o)$$

where

$(B_n-B_o)_p$ = primary (p) efficiency benefit ($), alternative (n) versus base case (o)

Q_o = quantity shipped, base case (tons)

Q_n = quantity shipped, alternative (tons)

P_o = transportation revenue, base case ($/ton)

P_n = transportation revenue, alternative ($/ton)

C_o = transportation costs, base case ($/ton)

C_n = transportation costs, alternative ($/ton)

An important assumption in the study resulted in the shipping quantity being equal in most base and alternative cases. When this occurs, the equation reduces and becomes:

$$(B_n-B_o)_p = Q(C_n-C_o).$$

The assumption causing the change is based on the belief that shipping data quantifies rail shipping demand and that the traffic volumes represented by that demand will move by an alternative transportation mode if the rail option is unavailable. When an alternative case represents traffic that historically has not been part of rail demand, the shipping quantity in the alternative case is not equal to the base case. In these instances, the full primary efficiency benefit equation is used.

South Dakota is designing its rail system to transport 100 percent of rail demand. Therefore, the difference between rail shipping under the alternative case and shipping under the base case is the volume that must be transported by truck or by a combination of truck and rail. Thus:

C_o = rail transportation cost and/or truck transportation cost (weighted for the base case composite volumes); and

C_n = rail transportation cost for the alternative.

The costs reflect the composite costs of the alternative being considered, based on estimated rail and truck costs. The rail costs are based on estimated on-branch costs, as discussed in the appendix. Off-branch rail costs are developed from the individual railroads' Rail Form A costs. Truck costs are estimated on a truck-mile and trip basis, using average owner-operator driver costs. The quantity information is based on the shipper and railroad information.

A separate primary efficiency calculation was made for each station, commodity, and destination/origin combination, by alternative, relative to the base case.

Secondary efficiency benefits considered in the intensive study line analyses included the following:

- Jobs - The loss or creation of jobs because of rail service improvement, including rail user, railroad, and truck jobs;

- Income - The income of additional jobs filled by previously unemployed persons, less the income of persons losing jobs because of rail service improvement, adjusted for the amount of unemployment compensation. This affects not only rail service employees but also railroad and truck employees.

- Highway Capital/Maintenance Costs - The increase or decrease in highway capital or maintenance costs that results from the diversion of traffic between rail and truck.

- Taxes - Change in tax revenues caused by truck diversion and rail service improvement.

- Other Benefits - Other monetary benefits unique to a line, or additional profit made by elevators on lines whose rehabilitation would result in higher grain volumes.

The above benefits are calculated and assembled according to affected party, including the railroad carrier, motor carrier, rail user, State, and Nation, and discounted to an annualized value.

Project costs are defined as the actual program outlays associated with each project, including both federal and local matching funds. These could involve outlays for land, labor, and capital inputs employed. The costs that have been associated with the projects considered by the update include the rehabilitation costs of upgrading the intensive study lines to the level proposed by the project. Project costs are considered an annualized value.

Nonmonetary results of rail service changes are also assessed in analyzing each project alternative. These include changes in:

- fuel consumption caused by diversion of traffic between rail and truck;
- air pollution emissions caused by diverting traffic between rail and truck;
- accessibility to regional and national markets;
- availability of competitive transportation services within the state; and
- economic development potential of the State.

The final benefit-cost ratio for each alternative is tempered by the projected nonmonetary outcomes. In certain cases, the primary justification for a project is based on these outcomes. Therefore, their assessment is made an important part of South Dakota's benefit-cost analysis and project evaluation methodology.

EVALUATION METHODOLOGY

The intensive study lines were evaluated on the basis of the benefit-cost ratio and the assessment of nonmonetary results. Because of the qualitative nature of many of the results being considered, this process required the application of judgment on the part of the evaluators.

Each intensive study line was further evaluated to determine its priority ranking. This evaluation required the consideration of both the incremental benefit-cost ratios and the nonmonetary assessments for each line.

The results of the detailed benefit-cost analyses of each intensive study line and project are presented in the following section. Included in the discussion is a description of the line, a description of the project alternative and its benefits and costs as compared with the base case, and a summary of the benefit-cost ratio and nonmonetary outcomes.

III. INTENSIVE STUDY LINE ANALYSES

This section contains benefit-cost analyses of the intensive study lines: Milbank to Sisseton and Pierre to Huron. Each line is examined separately and discussions include the background of each line and a description of the scenarios being studied. Traffic volume, operational characteristics, expected project costs, and study results are also discussed. Additional detail on the study methodology is contained in the appendix.

MILBANK TO SISSETON

The Milbank to Sisseton branch line has a unique role in South Dakota's transportation system. The line begins on the Milwaukee Road's main line that terminates at Miles City, Montana. The major shippers are two grain elevators at Sisseton that use rail service primarily to transport barley to malters in Minnesota and Wisconsin. The Miwaukee Road has maintained a barley rate that is less than the rate charged by either of its competitors, the Burlington Northern (BN) and the Soo line. The rate differential has permitted barley shippers to offer producers a higher price and to capture a large share of the market in an area that extends into North Dakota and Minnesota. Because malters usually require that barley be shipped by rail, this commodity is less vulnerable than others to competition from motor carriers. This, in turn, allows the Milwaukee to be a major barley transporter. In recent years, the amount of barley grown in the region and shipped by rail has increased. This has occurred because barley's yield per acre and the Sisseton elevators' offered prices have combined to make barley an attractive alternative crop to wheat.

As part of the 1980 Railplan, the benefits and costs of several service alternatives were studied. Funds were requested for a project that would have moved the Sisseton elevators to Milbank and constructed a public loading facility. The request was approved, but the project was not initiated because of its unacceptability to the shippers and the uncertainty of continued service on the Milwaukee's main line. The funds were reallocated to other South Dakota rail projects. A commitment, however, was made to the shippers to analyze a project that they would select when questions on the main line were resolved. Shippers have selected for analysis the project described as the alternative case.

The alternative case is a result of the Milwaukee's abandonment, on March 31, 1982, of the line between Ortonville, Minnesota, and Miles City, Montana. This included cessation of service on the Sisseton branch line. The State of South Dakota is in the process of purchasing the main line and leasing it to the BN for operations. Pending final agreements, the BN began service between Ortonville, Minnesota, and Terry, Montana. The BN will not operate the Sisseton branch line. The Milwaukee plans to operate from Ortonville to Milbank, South Dakota, through a trackage rights agreement with the BN. Shippers expect to form a short line railroad, operate the branch line, and deliver traffic to the Milwaukee at Milbank.

The base case (described in detail below) reflects what is anticipated will result if no action to preserve rail service on the Sisseton line is taken and the Milwaukee abandons the line. The track is in poor condition and requires significant tie and ballast replacement to permit safe operations. The 60-pound rail is badly worn and is of insufficient weight to support fully loaded jumbo covered hopper cars. A weight limit of 220,000 pounds exists, and the Milwaukee prohibits movement of more than 25 loaded cars at a time. Box cars are used for all grain traffic. A description of the line was prepared for the State's current Railplan and is reprinted in Exhibit III-1.

Base Case Analysis

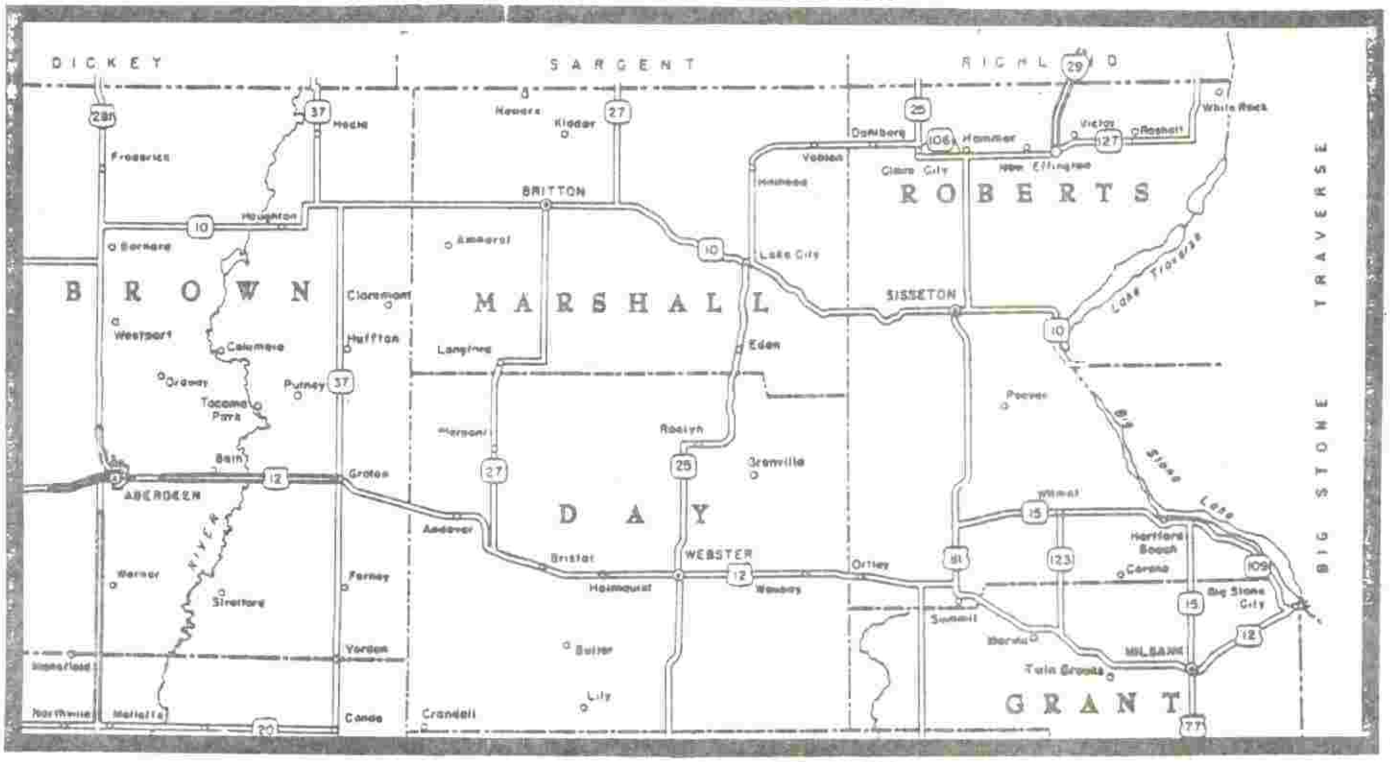
The base case was developed for use in the benefit-cost analysis to represent the result of taking no action to preserve rail service on the Sisseton line. The Milwaukee's plans for abandonment necessitated that the base case consider the effect of diverting rail traffic to motor carriers and to other railroads. On the basis of discussions with shippers, the following alternatives were developed for the movement of current rail traffic if the line is abandoned:

- truck from existing elevator to final destination;
- rail from Ortonville, Minnesota, through a new facility;
- rail from New Effington, South Dakota, through an existing facility; and
- rail from Fargo, North Dakota, through an existing facility.

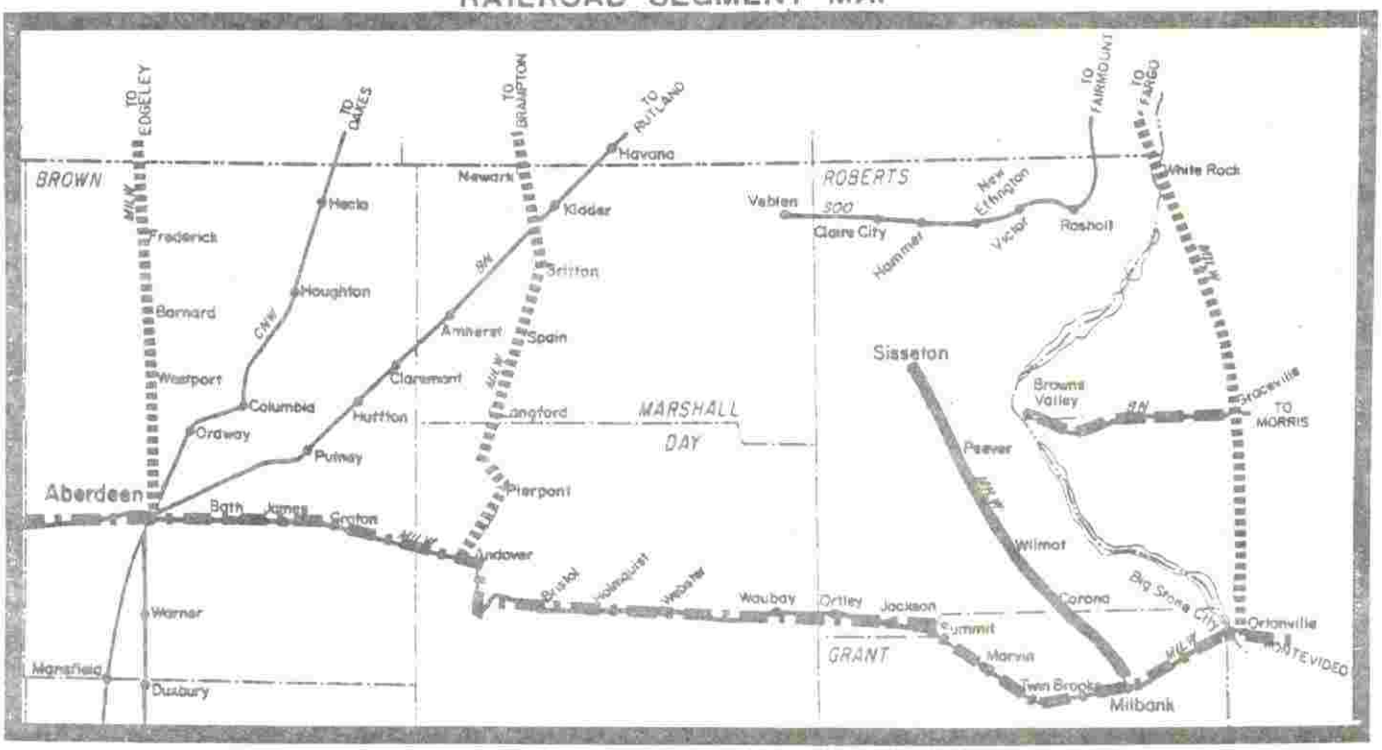
The traffic volumes used in the analysis were developed from Milwaukee road data and detailed 1980 and 1981 shipping records supplied by the grain elevators. An average of the two years was calculated and used as the estimate of rail service demand. Demand totaled 215,875 tons (3,607 cars) annually. For the base case, it was necessary to allocate this demand to the

LINE SEGMENT DESCRIPTION: MILBANK TO SISSETON

HIGHWAY LOCATION MAP

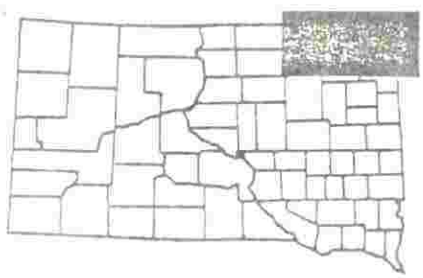


RAILROAD SEGMENT MAP



KEY

- Study Segment
- Abandoned Line
- Potentially Subject to Abandonment Within 3 Years
- Pending Abandonment Approval
- All Other Lines



South Dakota Segment - MW 04 MILBANK TO SISSETON

Line Description

OWNERSHIP – MILWAUKEE ROAD

DIVISION / SUBDIVISION – Minnesota - Dakota Division - 26th Subdivision

LINE STATUS – Category 3 Pending Abandonment approval

TYPE OF LINE – Branch

LINE LENGTH IN MILES – 37.1 miles

MAXIMUM SPEED LIMIT – 20 mph **MAXIMUM WEIGHT LIMIT** – 220,000 lbs.

SERVICE FREQUENCY – Two round trips per week, three round trips per week in peak period

YARDS – Milbank and Sisseton

CONNECTING LINES – Milwaukee Road main line at Milbank

HIGHWAYS – Sisseton is on US 81 and SD 10 and near I-29; Peever is on a hard surfaced road and near I-29; Wilmot and Corona are on hard surfaced roads.

RAIL WEIGHT – About 1.5 miles of 75 lbs., mostly at Milbank, balance is 60 lbs. rail

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Milbank	0.0				
Corona	10.1				
Wilmot	17.0				
Peever	27.4				
Sisseton	37.1				

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.12 MGT	0.21 MGT	0.38 MGT
TRAFFIC DIRECTION –	88% Orig.	97% Orig.	99% Orig.

COMMODITIES – Primarily forwarded grain (barley) destined for Minneapolis also received fertilizer, petroleum products, lumber, and stone clay, and glass. (1979)

Other Information

Barley is trucked to Sisseton from eastern South Dakota, North Dakota and Minnesota. This traffic enjoys a significant rate advantage over other non-Milwaukee locations or shippers.

The South Dakota Rail Line Inventory Study found that limited impacts would result from abandonment of this line, based on 1977 traffic data.

shipping alternatives listed above. Allocations were made based on discussions with shippers and the Division of Railroads. The results are shown in Exhibit III-2

Selection of a diversion alternative was made based on an analysis of probable traffic routings if rail service on the Sisseton line were unavailable. One of the two large barley shippers owns a grain elevator at New Effington, South Dakota, and is served by the Soo line. Thus, it was assumed that if the Sisseton line were abandoned, crops now handled at Sisseton would be handled at New Effington. It was also assumed that the other barley shipper, in an effort to retain access to the Milwaukee's barley rates, would relocate on another Milwaukee line. After the abandonment, Ortonville would be the closet Milwaukee shipping station and was therefore chosen as the most probable site for the business. It was assumed that a portion of this elevator's barley volume would be lost because of greater trucking distance. The lost volume (from North Dakota) would therefore be routed through existing Fargo, North Dakota, elevators that are served by the BN. The final assumption was that remaining rail demand would be served by motor carriers.

Barley rates at the non-Milwaukee shipping locations are higher than those at Sisseton or other Milwaukee stations in the area. The rate differential results in approximately 20 cents less per bushel being offered to the farmer by elevators not served by the Milwaukee because shippers purchase grain at a lower price, thus passing on the higher shipping rate.

Rail Form A and truckload cost calculators were used to develop transportation costs for all diverted traffic. A summary of the results of this analysis is shown in Exhibit III-3. Only variable costs were calculated.

Alternative Case Analysis

The alternative case analysis examines the assumption of service on the branch line by a short line railroad and interchange of traffic with the Milwaukee at Milbank. This scenario, proposed by shippers, would maintain rail service and enable continued access to the Milwaukee's barley rates. Negotiations between the Milwaukee and a shipper group for purchase of the Sisseton line have been proceeding. An agreement appears to be likely if other issues, such as rehabilitation, can be resolved. A schematic illustrating the proposed short line operation appears in Exhibit III-4.

EXHIBIT III-2

ALLOCATION OF RAIL SERVICE DEMAND TO
BASE CASE SHIPPING ALTERNATIVES:
MILBANK TO SISSETON
(TONS)

COMMODITY	TRUCK TO DESTINATION	RAIL FROM ORTONVILLE	RAIL FROM NEW EFFINGTON	RAIL FROM FARGO
Wheat	12,992	1,152	4,544	-
Rye	1,302	-	-	-
Oats	2,025	-	-	-
Corn	374	-	-	-
Soybeans	64	-	-	-
Sunflowers	672	1,428	462	-
Barley	3,780	67,909	91,080	28,091
Total	21,209	70,489	96,086	28,091

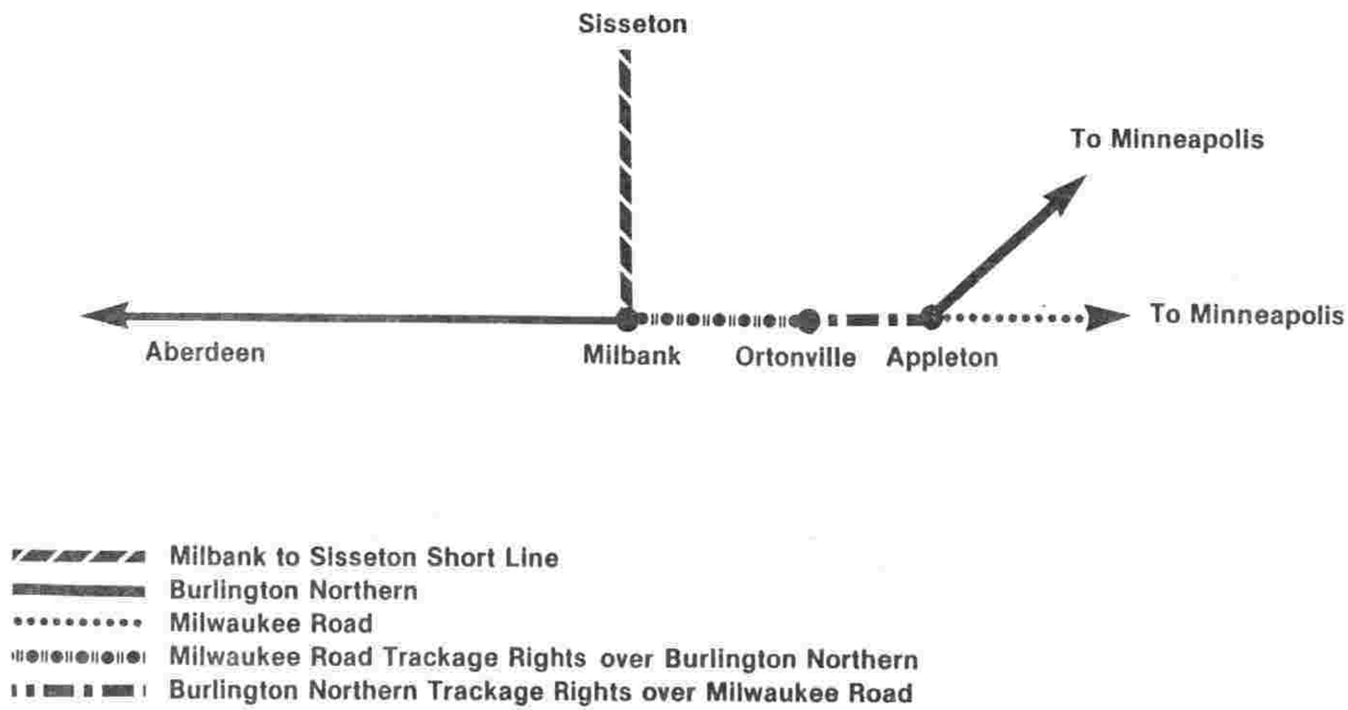
EXHIBIT III-3

BASE CASE TRANSPORTATION COSTS:
MILBANK TO SISSETON

	Volume (Tons)	Cost Per Ton	Total Cost
Rail	194,666	11.69	$2,276,565
Truck	21,209	17.90	379,744
Total	215,875	14.80	$2,656,309

EXHIBIT III-4

PROPOSED MILBANK TO SISSETON SHORT LINE OPERATION



Rail service demand, as measured in the base case, was used as the projected traffic volume for the alternative case. This approach assumes a continuation of past shipping patterns, as summarized in Exhibit III-5. The destinations for this traffic vary widely, but are concentrated in the Minneapolis/Milwaukee/Duluth areas.

The short line is expected to be operated by an organization formed by the shippers. Three round trips a week are planned, and will be needed to serve expected demand as long as the existing restriction exists on the size of loaded trains. Rehabilitation is needed to restore the line to a stable Class I condition, and it is hoped that this will be achieved with a combination of federal and shipper funds. In the future, shippers plan to replace the existing rail to allow movement of fully loaded covered hoppers at Class II speeds. This rehabilitation will permit the same volume of grain to be moved with fewer train trips through the use of the larger capacity cars and longer trains. Shippers plan to implement this more efficient operation within three to five years.

Transportation costs for the alternative case were calculated for both the on- and off-branch portion of each movement. On-branch costs represent the short line operation and were developed using material provided by shippers involved in forming the short line. All traffic was assumed to share equally (on a per-ton basis) in the short line's operating costs. Off-branch costs were calculated using Rail Form A. The results of the cost analysis are shown in Exhibit III-6.

The rehabilitation project planned for the Milbank to Sisseton line would upgrade tie and ballast conditions on the railroad. The short line organizers intend, within five years, to renew the rail on the entire line and to restore a 263,000-pound weight limit.

The 1982 project would:

. install 28,000 new cross ties;

. resurface 14 miles with 77,000 tons of ballast; and

. install other track materials as needed.

It is estimated that the 1982 project would cost $1,261,619, of which 70 percent would be requested from the FRA. The remainder of the project would be funded by the shippers.

Present physical deterioration endangers operation of the track. Substantial rehabilitation is needed, and this project will enable a significant first step to be taken toward a permanent rail service solution. After rehabilitation, the line will require only annual maintenance that shippers plan to finance in their annual operating budgets.

EXHIBIT III-5

ALTERNATIVE CASE RAIL SERVICE DEMAND: MILBANK TO SISSETON

COMMODITY	CARS	TONS
Wheat	292	18,688
Rye	21	1,302
Oats	45	2,025
Corn	6	374
Soybeans	1	64
Sunflowers	61	2,562
Barley	3,181	190,860
Total	3,607	215,875

EXHIBIT III-6

ALTERNATIVE CASE TRANSPORTATION COSTS: MILBANK TO SISSETON

	Volume (Tons)	Cost Per Ton	Total Cost
On-Branch Cost (Short Line)	215,875	4.09	$ 883,807
Off-Branch Cost	215,875	9.59	2,069,967
Total Cost			$2,953,774

Benefit-Cost Analysis Results

Annual benefits and costs of the Sisseton line project were calculated using the cost of upgrading the entire line to the desired standard. Benefits that accrue to the project include creating jobs on the short line railroad and avoiding highway maintenance costs that would be required by the additional truck traffic resulting from abandonment. The cost of relocating an elevator at Ortonville would also be avoided if the short line is operated.

If the rail line is preserved, a bridge for an interstate highway would have to be built. State officials have indicated that the proposed project would be evaluated on its merits, without considering the effect of building the bridge. Federal benefit-cost analysis guidelines require that the bridge cost be considered, and the effect of its inclusion is indicated in a footnote to each summary table.

Summary Tables 1 and 2 show the project's benefits and costs based on two scenarios. Summary Table 1 illustrates the results of examining only the relative transportation costs of the base and alternative cases. The probability that the Milwaukee's barley rates will continue to be lower than those of other railroads in the area is not assessed. This is consistent with South Dakota's benefit-cost methodology which examines only the transportation cost savings made possible by a proposed rehabilitation project.

Shippers have organized the short line based on the belief that the Milwaukee's rates will remain lower than its competitor's. For this reason, Table 2 has been included to illustrate the shipper's assumption that the rate differential would be preserved for the life of the project. Because of the long-term uncertainty of any rates, there can be no guarantee that the barley differential will be maintained. It is South Dakota's belief that differentials should not constitute the primary basis for a project's justification.

PIERRE TO HURON

The Pierre to Huron intensive study line is part of the North Western's line that extends from the Minnesota-South Dakota border to Rapid City, South Dakota. The entire line is part of the State's essential rail system. The Pierre to Huron segment was studied as part of the 1980 Railplan, and a rehabilitation project was given preliminary approval by the FRA. The project was not performed, but the State and the North Western have agreed that the line should be rehabilitated to enable service to continue. This study is being conducted because an updated benefit-cost analysis is required before the FRA will approve expenditure of the project funds.

Milbank to Sisseton Benefit-Cost Analysis: Summary Table 1

- Base Case: abandonment
- Alternative Case: establish short line operation and rehabilitate
- Rate Assumption: rail rate advantage is not preserved

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)				$ -315,027	$ -315,027
Secondary Efficiency Benefits					
Income ($)	$ +33,229	$ - 9,494	--	+ 23,735	+ 23,735
Highway Costs ($)	--	--	--	+ 19,747	+ 19,747
Taxes ($)	--	- 7,312	--	- 7,312	- 7,312
Net Salvage Value ($)	--	--	--	--	--
Other: Highway Bridge*	--	--	--	--	--
Rail Rate Advantage	--	--	--	--	--
Elevator Construction			$ +259,895	+259,895	+259,895
Total Benefits ($)	$ +33,229	$ -16,806	$ +259,895	- 18,962	- 18,962
Costs ($)	--	--	--	+218,592	$ +218,592
Other:					
Jobs	+7	-2	--	+5	+5
Energy (Gallons)	+30,482	-56,244	--	- 25,762	- 25,762
Air Pollution (lbs.)	+20,942	-38,640	--	- 17,698	- 17,698
Benefits Minus Costs					-237,554
Benefit/Cost Ratio					- 0.09

* Inclusion of bridge cost results in benefit-cost ratio of -1.28.

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 1,261,619
Project Benefit-Cost Ratio	-0.09
Estimated Payback of Project	None Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

Milbank to Sisseton Benefit-Cost Analysis: Summary Table 2

- Base Case: abandonment
- Alternative Case: establish short line railroad and rehabilitate line
- Rate Assumption: rail rate advantage is preserved

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)				$ -315,027	$ -315,027
Secondary Efficiency Benefits					
Income ($)	$ +33,229	$ - 9,494		+ 23,735	+ 23,735
Highway Costs ($)	--			+ 19,747	+ 19,747
Taxes ($)	--			- 7,312	- 7,312
Net Salvage Value ($)	--			--	--
Other: Highway Bridge*	--			--	--
Rail Rate Advantage	--			+993,092	+993,092
Elevator Construction	--		$ +259,895	+259,895	+259,895
Total Benefits ($)	$ +33,229	$ - 9,494	$ +259,895	$ +974,130	$ +974,130
Costs ($)				$ +218,592	$ +218,592
Other:					
Jobs	+7	-2	--	+5	+5
Energy (Gallons)	+30,482	-56,244	--	- 25,762	- 25,762
Air Pollution (lbs.)	+20,942	-38,640	--	- 17,698	- 17,698
Benefits Minus Costs				$ +755,538	$ +755,538
Benefit/Cost Ratio					+ 4.46

* Inclusion of bridge cost results in benefit-cost ratio of + 3.27.

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 1,261,619
Project Benefit-Cost Ratio	+ 4.46
Estimated Payback of Project	2.2 Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

The Pierre to Huron segment has deteriorated to Class I condition over most of its 117.7-mile length. In 1981, to keep the track serviceable, the North Western installed approximately 11,000 ties and re-surfaced 9.9 miles. A significant amount of rehabilitation is required to restore the line to Class II standards. Improvement in train speeds would result in lower operating costs through improved freight car and locomotive use.

A description of the line was prepared for the State's current Railplan (Exhibit III-7). The North Western has placed the Wolsey to Rapid City line in Category 2 on its system diagram map. This means that the railroad believes the line is potentially subject to abandonment, and it alerts the State to the possibility that service could be discontinued. The Huron to Wolsey segment is not in this category because it is the route used by the North Western to serve the Redfield to Mansfield and Aberdeen to Oakes lines. Access to these line is made possible by trackage rights on the State core system.

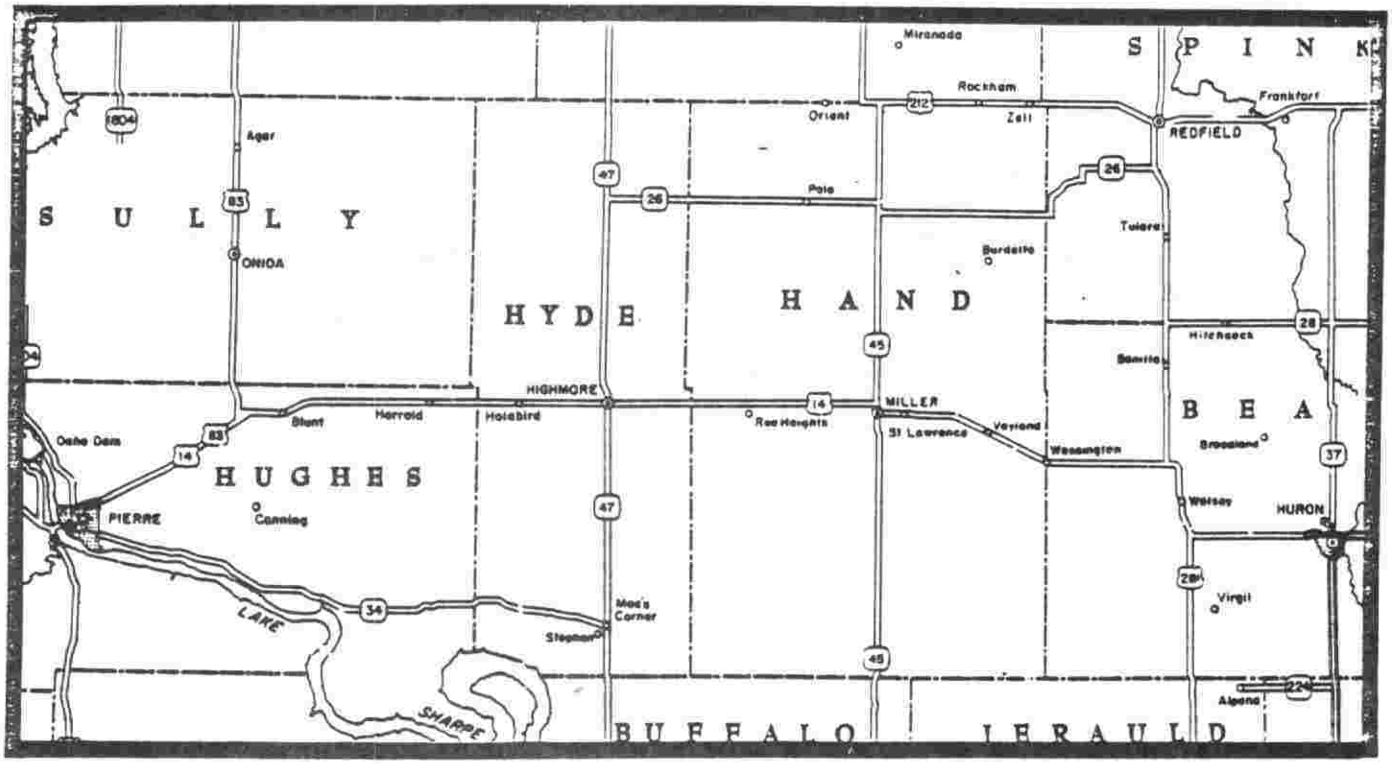
The Oahe Dam and reservoir has made more irrigation available to the farmlands in the Pierre area. Normally, increased irrigation means more corn and less wheat production. Because corn is often shipped to the West and Gulf Coasts for export, the length of these movements makes rail an attractive shipping alternative. The transition to growing corn in Pierre would probably result in more rail volume, and the State therefore would like to preserve service to the Pierre area.

Exhibit III-8 shows the irrigation water rights permits in South Dakota that existed January 1, 1981, and proposed irrigation projects near the Pierre to Huron line market area. The area around Pierre (Stanley, Sully, and Hughes Counties) accounts for 172,692 acres of land that could be irrigated by surface water. This acreage represents 27.8 percent of the entire State total and illustrates the magnitude of irrigation potential in the Pierre region. With an average yield of 140 bushels per acre, the area could annually produce over 24 million bushels of corn. This yield would fill approximately 133 unit trains of 54 cars each. Realization of this rail traffic potential depends on the availability of competitive unit train rates to the export markets. The North Western does not directly serve either the Gulf Coast or the West Coast, and the need to interchange traffic with other carriers increases the cost and thereby the rate of these shipments. The BN began service on the South Dakota core system during 1981 and is scheduled to begin service on the former Milwaukee main line between Ortonville, Minnesota, and Terry, Montana, in April 1982. The North Western and BN could interchange traffic at either Aberdeen or Wolsey (if certain track improvements were made) and provide the Pierre area with economical access to export markets. It is hoped that the BN and North Western will institute a unit train rate for movements of this type, thus enabling the rail traffic and agricultural potential to develop.

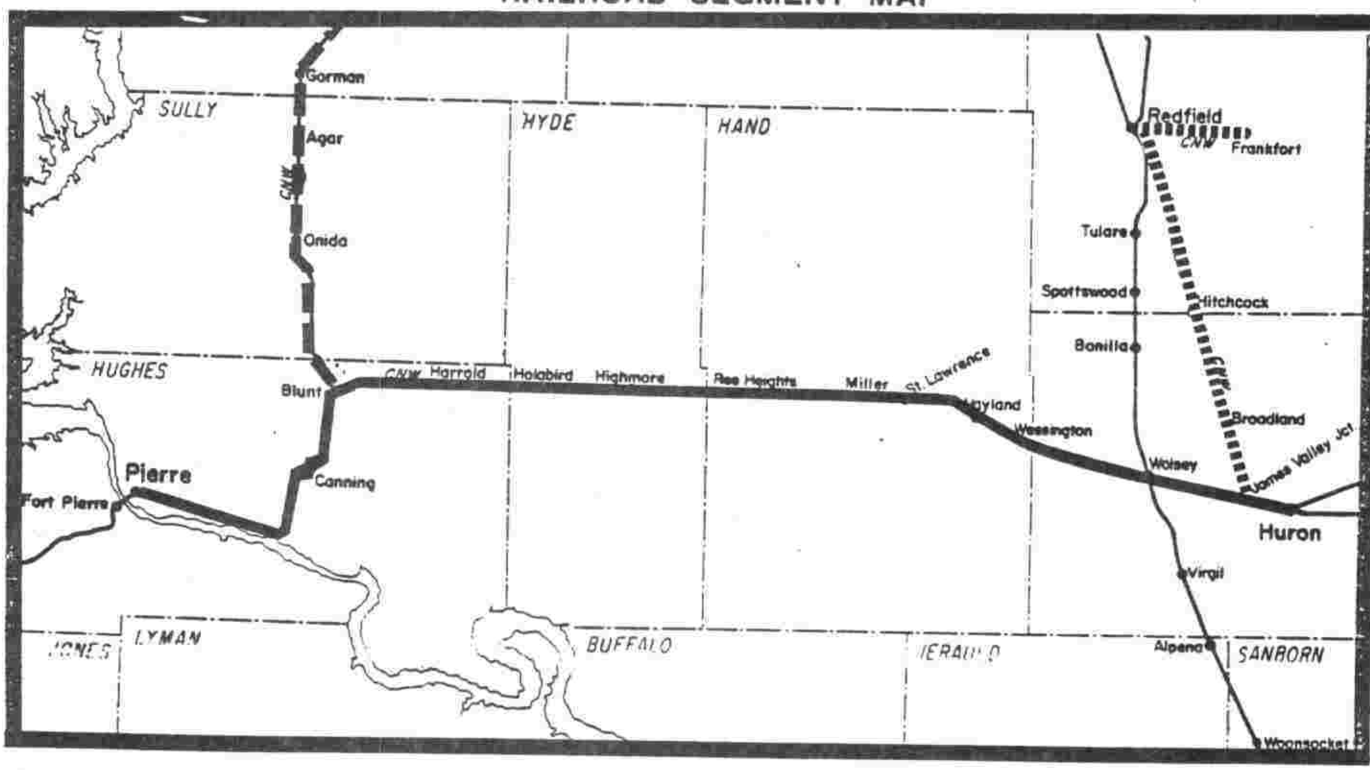
EXHIBIT III-7

LINE SEGMENT DESCRIPTION
PIERRE TO HURON

HIGHWAY LOCATION MAP

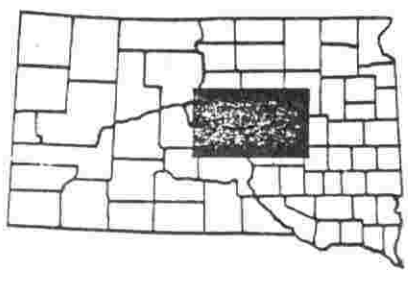


RAILROAD SEGMENT MAP



KEY

- Study Segment
- Abandoned Line
- Potentially Subject to Abandonment Within 3 Years
- Pending Abandonment Approval
- All Other Lines



South Dakota Segment - CN 02 HURON TO PIERRE

Line Description

OWNERSHIP – CHICAGO & NORTH WESTERN

DIVISION / SUBDIVISION – Western Division - Pierre Subdivision

LINE STATUS – Category 5: Continued Operation

TYPE OF LINE – Main

LINE LENGTH IN MILES – 117.7 miles

MAXIMUM SPEED LIMIT – 35 mph **MAXIMUM WEIGHT LIMIT** – 251,000lbs.

SERVICE FREQUENCY – Daily, 3 to 7 round trips per week depending on traffic.

YARDS – Huron, Wolsey, Blunt and Pierre

CONNECTING LINES – Chicago & North Western at Huron, Blunt, and Pierre. Burlington Northern at Huron. State owned line at Wolsey

HIGHWAYS – US 14 serves all stations except James Valley Jct. and Canning which are served by local roads. Additionally Huron is served by SD 37, Wolsey by US 281, Miller by SD 45, Highmore by SD 47 and Pierre by US 83 and SD 34.

RAIL WEIGHT – 110 lbs. and 112 lbs. from Huron to James Valley Jct. and the remainder 72 lbs.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Huron	0.0	Miller	40.1	Canning	98.2
James Valley Jct.	4.2	Ree Heights	50.6	Pierre	117.7
Wolsey	13.3	Highmore	62.4		
Wessington	24.7	Holabird	70.2		
Vayland	30.4	Harrold	77.2		
St. Lawrence	37.6	Blunt	90.0		

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	1.54 MGT	1.82 MGT	1.56 MGT
TRAFFIC DIRECTION –	N/A	45% Orig. (1977)	68% Orig.

COMMODITIES – Forwarded grain; received fertilizer, stone, sand, gravel clay, and glass. (1979)

Other Information

This line serves both Chicago & North Western local and overhead traffic from points west and north. Locomotive and car repair shops are located at Huron.

The South Dakota Rail Inventory Study found that significant impacts would result from abandonment of this line, based on 1977 traffic data.

EXHIBIT III - 8

IRRIGATION WATER RIGHTS PERMITS AND PROPOSED IRRIGATION PROJECTS

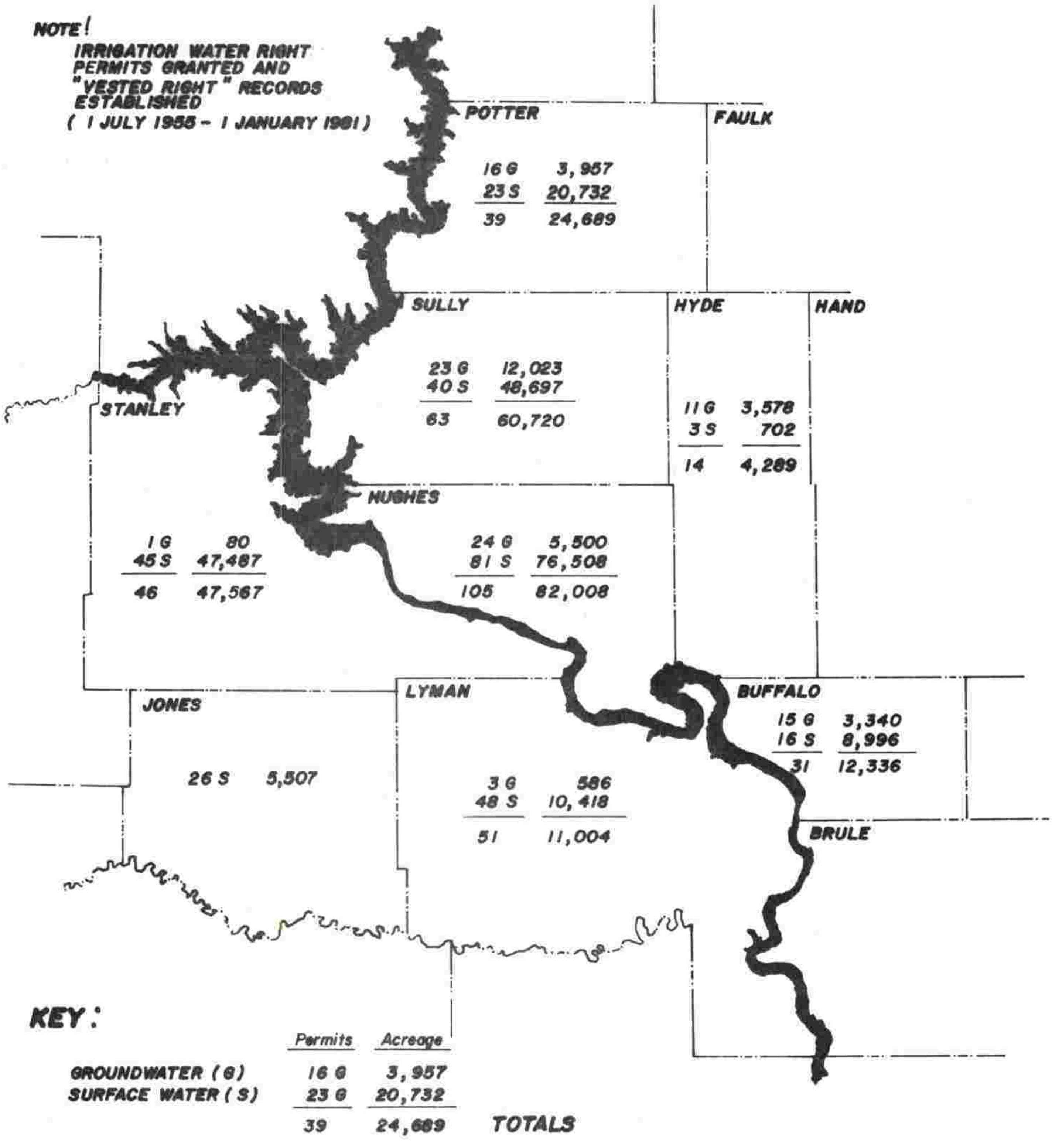
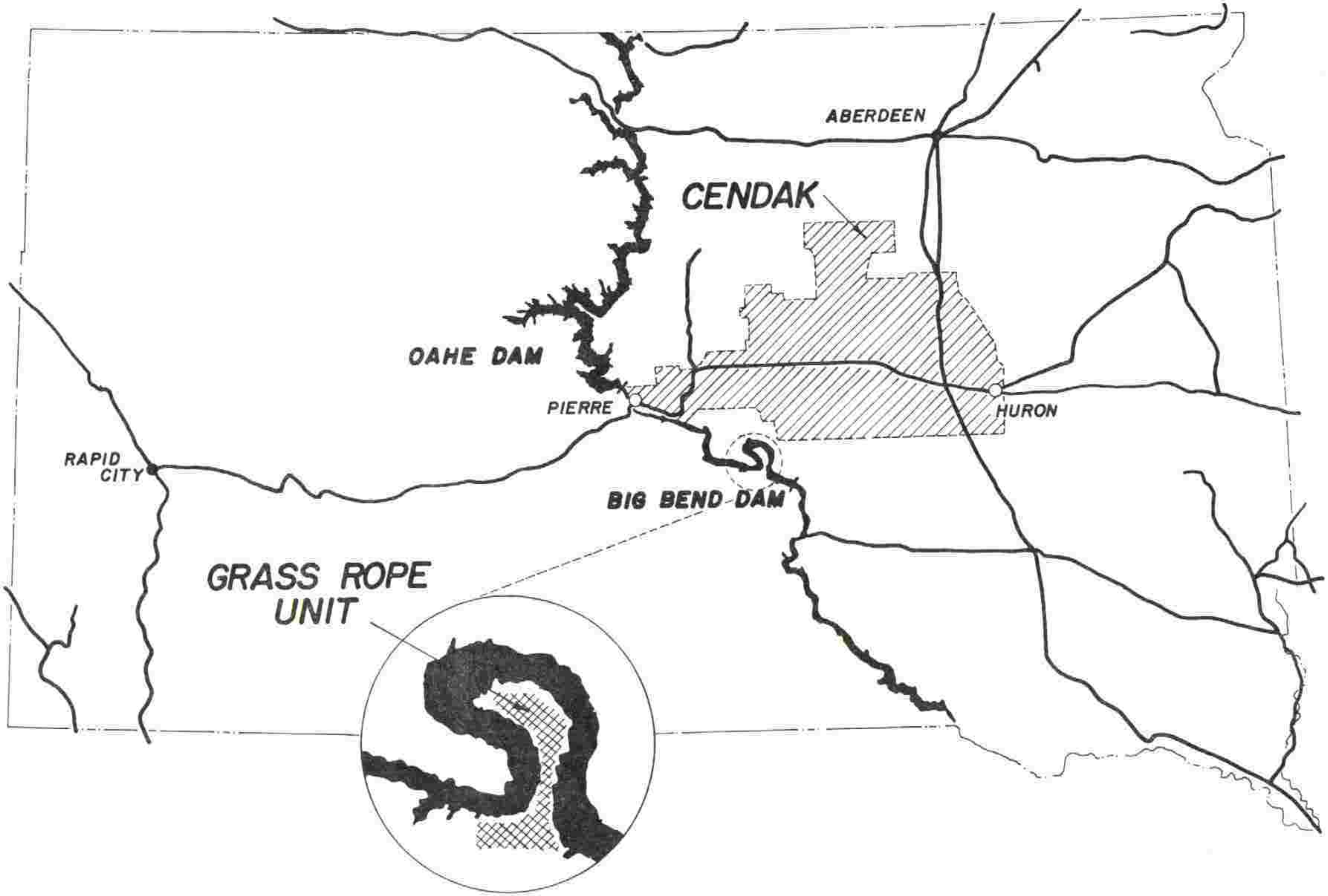


EXHIBIT III - 8 (CONTINUED)

PROPOSED IRRIGATION PROJECTS
NEAR THE
PIERRE TO HURON LINE MARKET AREA



This study examines several scenarios for the Pierre to Huron line. The impact of abandonment is analyzed, and several service options associated with rehabilitating the line to Class II standards are compared with continuing service at present levels. The base and alternative cases are described below. Additional details are given in the appendix.

Base Case Analysis

Because of the possibility that service between Pierre and Rapid City could be discontinued during the ten-year analysis period, two base case scenarios were used. These are:

- continuation of service to Rapid City; and
- truncation of the line at Pierre.

The difference between the cases is the amount of traffic originated at Pierre and the type of train operation required when the line is truncated. It is expected that one million bushels of grain now shipped from stations west of Pierre would be shipped from Pierre if the line were truncated. Modifications in train operations would also be possible, since through traffic would be eliminated. Comparison of each alternative case with the two base cases does not assess the effect of abandoning the Pierre to Rapid City segment. It does, however, assess the benefits and costs of each alternative relative to both conditions that are likely to exist at the time the project would occur.

To perform the base case traffic analysis, data from the North Western and shippers were used. The North Western provided the number of cars that were originated and terminated at each station on the line during 1980. A shipper survey, conducted in 1980 for the previous benefit-cost study, supplied information on each shipper's traffic patterns (origin-destination pairs). By applying the number of cars handled at each station to the previously defined traffic patterns, a detailed traffic profile was developed. Fort Pierre traffic was included with the study segment because of the North Western's expressed willingness to continue to serve the station if the Pierre to Rapid City line is abandoned. This information provided the basis for calculating transportation costs. Exhibit III-9 summarizes the traffic volumes used for both base cases.

Five round trips a week are operated on the line for about six months a year, and three round trips are operated during the remainder of the year. The train originates at Adams, Wisconsin, proceeds to Rapid City, and returns to Adams. Three locomotive units (usually GP-7s or GP-9s) are used. The trip from Huron to Pierre requires 11.5 hours, with an additional 12 hours needed to proceed to Rapid City. For the most part, over-

EXHIBIT III-9

BASE CASE TRAFFIC VOLUMES: PIERRE TO HURON

		Base Case A*		Base Case B**	
		Cars	Tons	Cars	Tons
ORIGINATING					
Commodity	Destination				
Grain	Minneapolis	1,354	100,642	1,521	115,672
Grain	Duluth	377	31,994	544	47,024
Miscellaneous	Various	83	5,108	83	5,108
Total Originating		1,814	137,744	2,148	167,804
TERMINATING					
Commodity	Origin				
Fertilizer	Minneapolis	109	9,810	109	9,810
Fertilizer	Canada	114	10,260	114	10,260
Fertilizer	Florida	160	14,400	160	14,400
Fertilizer	Various	56	5,040	56	5,040
Total Terminating		439	39,510	439	39,510
Total for Line		2,253	177,254	2,587	207,314

*Base Case A assumes continued service to Rapid City.
**Base Case B assumes line truncation at Pierre.

head traffic consists of cement and wood products from the Rapid City area, originating traffic consists of grain from intermediate points, and terminating traffic consists of fertilizer.

Using the traffic analysis and operating scenarios, transportation costs were calculated for both base cases. The results are shown in Exhibit III-10 on a per-ton and total-cost basis. The two cases are not directly comparable because of the traffic increase expected when the line is truncated and some abandoned traffic is captured at Pierre.

Alternative Case Analysis

Three alternative cases were analyzed in this study to address the effect of:

- rehabilitating the line to Class II standards (alternative I);
- rehabilitating the line to Class II standards and instituting unit train service to the West Coast through a routing agreement with the BN (alternative II); and
- abandoning the line (alternative III).

The first two alternatives were compared with both base cases, and the third alternative (abandonment) was compared only with the base case that represented continuing operations to Rapid City. Exhibit III-11 shows the alternative cases and the base cases to which they are compared. Alternatives I and II are subdivided to allow use of the proper traffic volumes when each is contrasted with the two base cases. The use of a range of alternative and base cases reflects the most likely possibilities that exist for the study line. The traffic volumes used for each alternative case are shown in Exhibit III-12.

Truncation of the line at Pierre is expected to result in additional traffic volume of 334 cars or 30,060 tons. An additional 1,120 cars or 100,800 tons of traffic could result if an agreement can be reached between the BN and the North Western to move corn to the West Coast in unit trains. This estimate is based on capture of approximately 50 percent of the corn that would be grown in the Pierre trade area if all acres currently being irrigated were planted with corn. Actual rail volume could be significantly higher if additional acres are irrigated or rail can capture a higher proportion of the market.

If the Pierre to Huron line is abandoned, it is assumed that all traffic originating or terminating on the line will move, either by truck for the entire length of haul, or through

EXHIBIT III-10

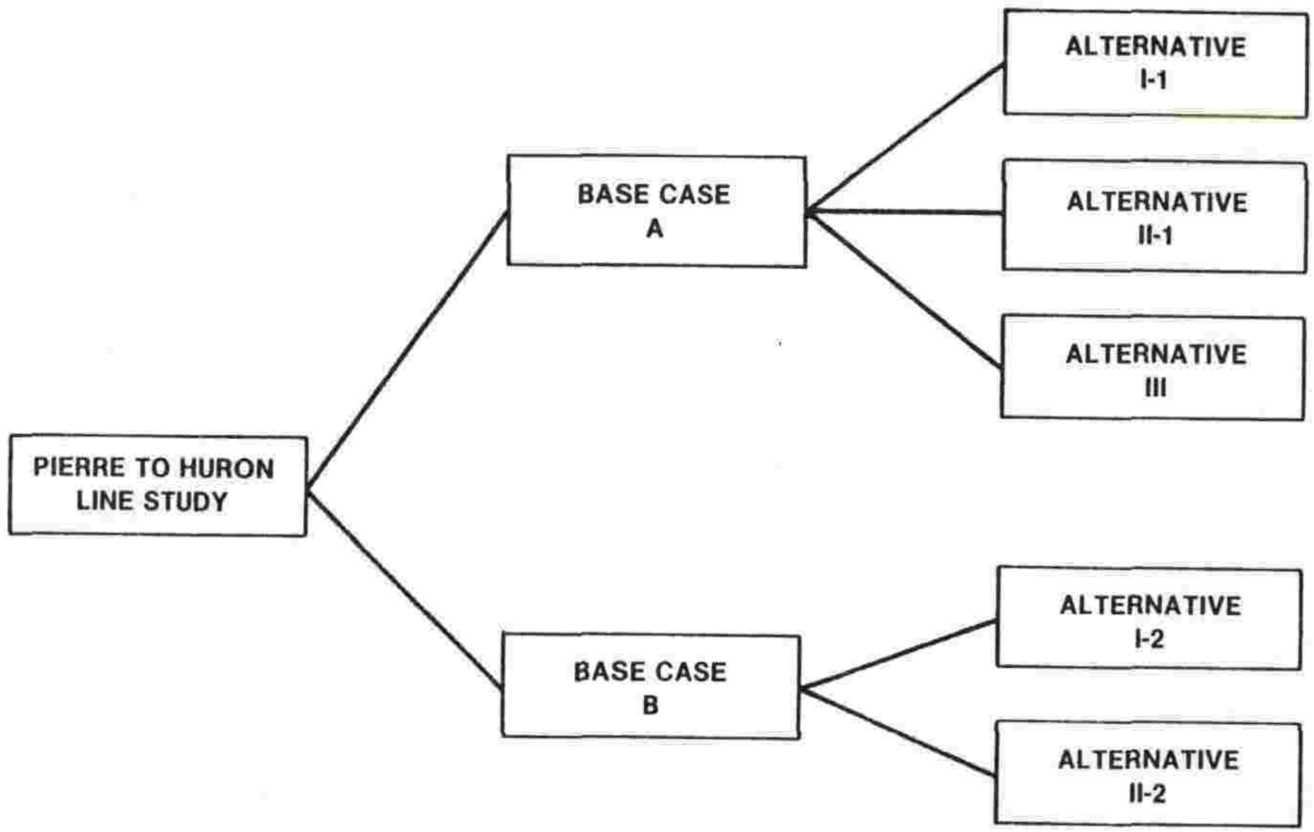
BASE CASE TRANSPORTATION COSTS: PIERRE TO HURON

	Base Case A*	Base Case B*
Rail On-Branch Cost Per Ton	$ 4.93	$ 4.60
Rail Off-Branch Cost Per Ton	9.66	9.29
Truck Cost Per Ton	-	-
Average Cost Per Ton	$ 7.30	$ 6.95
Rail On-Branch Cost	$ 873,315	$ 954,584
Rail Off-Branch Cost	$1,711,570	1,925,898
Truck Cost	-	-
Total Cost	$2,584,885	$2,880,482

*Base Case A assumes continued service to Rapid City.
**Base Case B assumes line truncation at Pierre.

EXHIBIT III-11

COMPARISON OF BASE AND ALTERNATIVE CASES: PIERRE TO HURON



Base Case A: Continued service to Rapid City
Base Case B: Truncation of line at Pierre
Alternative Case I-1: Rehabilitation to Class II, continued service to Rapid City
Alternative Case I-2: Rehabilitation to Class II, truncation of line at Pierre
Alternative Case II-1: Rehabilitation to Class II, continued service to Rapid City, capture of West Coast corn traffic
Alternative Case II-2: Rehabilitation to Class II, truncation of line at Pierre, capture of West Coast corn traffic
Alternative Case III: Abandonment of Pierre to Huron line

EXHIBIT III-12

ALTERNATIVE CASE RAIL TRAFFIC VOLUMES
PIERRE TO HURON

		Alternative I-1		Alternative I-2		Alternative II-1		Alernative II-2		Alternative III*	
		Cars	Tons	Cars	Tons	Cars	Tons	Cars	Tons	Cars	Tons
ORIGINATING											
Commodity	Destination										
Corn	West Coast	-	-	-	-	1,120	100,800	1,120	100,800	-	-
Grain	Minneapolis	1,354	100,642	1,521	115,672	1,354	100,642	1,521	115,672	532	50,692
Grain	Duluth	377	31,994	544	47,024	377	31,994	544	47,024	166	16,172
Miscellaneous	Various	83	5,108	83	5,108	83	5,108	83	5,108	107	2,870
Total Originating		1,814	137,744	2,148	167,804	2,934	238,544	3,268	268,604	805	69,734
TERMINATING											
Commodity	Origin										
Fertilizer	Minneapolis	109	9,810	109	9,810	109	9,810	109	9,810	50	4,950
Fertilizer	Canada	114	10,260	114	10,260	114	10,260	114	10,260	102	10,260
Fertilizer	Florida	160	14,400	160	14,400	160	14,400	160	14,400	144	14,400
Fertilizer	Various	56	5,040	56	5,040	56	5,040	56	5,040	38	3,780
Total Terminating		439	39,510	439	39,510	439	39,510	439	39,510	334	33,390
Total for Line		2,253	177,254	2,587	207,314	3,373	278,054	3,707	308,114	1,139	103,124

* Traffic is transported to Huron by truck and transloaded to rail.

a truck/rail transfer operation at Huron. The quantity of traffic using each option is considered to be almost equal.

The alternative case operating plans are the same as the base case plan with which they are compared. The abandonment alternative is contrasted only with the base case that assumes continued operation of the line to Rapid City. It was not compared with the truncation base case. That case includes traffic that would be drawn from the stations west of Pierre and therefore would not offer a correct measurement of the effect of abandoning the Pierre to Huron segment.

Transportation costs were calculated for each alternative case. The abandonment case (alternative III) includes trucking cost as well as rail cost and is included in the total cost of the alternative. Exhibit III-13 contains the transportation costs of each alternative. Total cost and per-ton cost are shown.

The project proposed for this line is its rehabilitation to Class II standards. The North Western estimates that $4,500,000 will be required to replace defective cross ties over the entire line, renew nine miles of rail between Wolsey and James Valley Junction, and rebuild the interchange track at Wolsey. The rail is needed to allow movement of fully loaded cars along the Huron to Aberdeen route. (The North Western has trackage rights over the South Dakota core system from Wolsey to Aberdeen.) The transfer track at Wolsey is badly worn and inadequate for the train length the North Western would like to operate.

One element of the North Western's estimate is based on inserting 62,560 ties of which one third will be new and two thirds used. This approach represents the only alternative for achieving the goal for rehabilitating the entire line to Class II condition while staying within the budgets of the railroad and the State. Unless used ties are installed, available funds will allow restoration of only 54 percent of the line.

The tie renewal portion of the proposed project plan is to insert two select used ties for every new tie. The used ties will be plugged and inspected to meet standards for a good used tie. Special considerations for placement of ties are as follows:

- Only new ties will be placed in intersections with highways.
- Only new ties will be placed in the James Valley Junction to Wolsey segment of this line.

EXHIBIT III-13

ALTERNATIVE CASE TRANSPORTATION COSTS:
PIERRE TO HURON

	Alternative I-1	Alternative I-2	Alternative II-1	Alternative II-2	Alternative III
Rail On-Branch Cost Per Ton	$ 4.40	$ 4.17	$ 3.81	$ 3.71	$ -
Rail Off-Branch Cost Per Ton	9.66	9.29	12.52	12.00	12.64
Truck Cost Per Ton	-	-	-	-	17.57
Average Cost Per Ton	$ 7.03	$ 6.73	$ 8.17	$ 7.86	$ 15.11
Rail On-Branch Cost	$ 779,882	$ 863,519	$1,059,098	$1,142,734	$ -
Rail Off-Branch Cost	1,711,570	1,925,898	3,481,618	3,695,946	1,303,429
Truck Cost	-	-	-	-	3,113,803
Total Cost	$2,491,452	$2,789.417	$4,540,716	$4,838,680	$4,417,232

- Preference will be given to new ties when a joint tie is replaced.

- There will be no more than three used ties installed in a series.

Based on the railroad's experience for this part of its system, the average life of a new tie is expected to be about 35 years and the average life of a good used tie is expected to be about 13 to 15 years. Therefore, the average life of ties installed for this project will be about 21 years. This is significantly greater than the project life of 6.9 years that results from rehabilitating the line and instituting unit train grain service.

Benefit-Cost Analysis Results

Shown below are summary tables of the benefit-cost analysis of the Pierre to Huron line. The analysis indicates that significant disbenefits would occur if the line were abandoned, and the ability to capture the unit train corn market would result in benefits sufficient to return the rehabilitation investment within 7 years. If this market cannot be captured, only marginal benefits accrue to the proposed project. Benefits andcosts of the project are minimally different, depending on whether Base Case A or Base Case B is used in the comparison. However, none of the analyses evaluate the effect of abandoning the Pierre to Rapid City segment.

Pierre to Huron Benefit-Cost Analysis: Summary Table 1

- Base Case A: continued service to Rapid City
- Alternative Case I-1: rehabilitation of Pierre to Huron line to Class II standards, continued service to Rapid City

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	--	--	--	$ +78,310	$ +78,310
Secondary Efficiency Benefits					
Income ($)	--	--	--	--	--
Highway Costs ($)	--	--	--	--	--
Taxes ($)	--	--	--	--	--
Net Salvage Value ($)	--	--	--	--	--
Other:	--	--	--	--	--
Total Benefits ($)	--	--	--	$ +78,310	$ +78,310
Costs ($)	--	--	--	$ +779,684	$ +779,684
Other:					
Jobs	--	--	--	--	--
Energy (Gallons)	--	--	--	--	--
Air Pollution (lbs.)	--	--	--	--	--
Benefits Minus Costs					$ -701,374
Benefit/Cost Ratio					+0.11

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 4,500,000
Project Benefit-Cost Ratio	+0.11
Estimated Payback of Project	90.9 Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

Pierre to Huron Benefit-Cost Analysis: Summary Table 2

- Base Case B: line truncation at Pierre
- Alternative Case I-2: rehabilitation of Pierre to Huron line to Class II standards, line truncation at Pierre

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	--	--	--	$ +75,951	$ +75,951
Secondary Efficiency Benefits					
Income ($)	--	--	--	--	--
Highway Costs ($)	--	--	--	--	--
Taxes ($)	--	--	--	--	--
Net Salvage Value ($)	--	--	--	--	--
Other:	--	--	--	--	--
Total Benefits ($)	--	--	--	$ +75,951	$ +75,951
Costs ($)	--	--	--	$ +779,684	$ +779,684
Other:					
Jobs	--	--	--	--	--
Energy (Gallons)	--	--	--	--	--
Air Pollution (lbs.)	--	--	--	--	--
Benefits Minus Costs					$ -703,733
Benefit/Cost Ratio					+0.09

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 4,500,000
Project Benefit-Cost Ratio	+0.09
Estimated Payback of Project	111 Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

Pierre to Huron Benefit-Cost Analysis: Summary Table 3

- Base Case A: continued service to Rapid City
- Alternative Case II-1: rehabilitation of Pierre to Huron line to Class II standards, continued service to Rapid City, unit train grain service

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	--	--	--	$+1,129,654	$+1,129,654
Secondary Efficiency Benefits					
Income ($)	--	--	--	--	--
Highway Costs ($)	--	--	--	--	--
Taxes ($)	--	--	--	--	--
Net Salvage Value ($)	--	--	--	--	--
Other:	--	--	--	--	--
Total Benefits ($)	--	--	--	$+1,129,654	$+1,129,654
Costs ($)	--	--	--	$ +779,684	$ +779,684
Other:					
Jobs	--	--	--	--	--
Energy (Gallons)	--	--	--	--	--
Air Pollution (lbs.)	--	--	--	--	--
Benefits Minus Costs					$ +349,970
Benefit/Cost Ratio					+1.45

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 4,500,000
Project Benefit-Cost Ratio	+1.45
Estimated Payback of Project	6.9 Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

Pierre to Huron Benefit-Cost Analysis: Summary Table 4

- Base Case B: line truncation at Pierre
- Alternative Case II-1: rehabilitation of Pierre to Huron line to Class II standards, line truncation at Pierre, unit train grain service

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	--	--	--	$+1,127,295	$+1,127,295
Secondary Efficiency Benefits					
Income ($)	--	--	--	--	--
Highway Costs ($)	--	--	--	--	--
Taxes ($)	--	--	--	--	--
Net Salvage Value ($)	--	--	--	--	--
Other:	--	--	--	--	--
Total Benefits ($)	--	--	--	$+1,127,295	$+1,127,295
Costs ($)	--	--	--	$ +779,684	$ +779,684
Other:					
Jobs	--	--	--	--	--
Energy (Gallons)	--	--	--	--	--
Air Pollution (lbs.)	--	--	--	--	--
Benefits Minus Costs					$ +347,611
Benefit/Cost Ratio					+1.45

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 4,500,000
Project Benefit-Cost Ratio	+1.45
Estimated Payback of Project	6.9 Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

Pierre to Huron Benefit-Cost Analysis: Summary Table 5

- Base Case A: continued service to Rapid City
- Alternative Case III: abandonment of Pierre to Huron line

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	--	--	--	$-1,832,387	$-1,832,387
Secondary Efficiency Benefits					
Income ($)	$-75,951	$+28,481	--	$ -47,470	$ -47,470
Highway Costs ($)	--	--	--	$ -56,549	$ -56,549
Taxes ($)	--	$+30,614	--	--	$ +30,614
Net Salvage Value ($)					
Other:					
Total Benefits ($)				$-1,936,406	$-1,905,792
Costs ($)				--	--
Other:					
Jobs	-16	+6	--	-10	-10
Energy (Gallons)	-51,100	+235,489	--	+184,389	+184,389
Air Pollution (lbs.)	-35,105	+161,781	--	+126,676	+126,676
Benefits Minus Costs					$-1,905,792
Benefit/Cost Ratio					--

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ --
Project Benefit-Cost Ratio	--
Estimated Payback of Project	-- Years

The statements and projections presented above have been prepared on the basis of the information and assumptions set forth in this section. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variation could be material.

IV. RECOMMENDED RAIL ASSISTANCE PROGRAM

Both intensive study lines were assigned priority rankings as a result of benefit-cost analyses conducted in 1980. The Milbank to Sisseton project was not performed because of the uncertainty of continued service on the Milwaukee Road's main line and its unacceptability to shippers. The Pierre to Huron project was not performed because of uncertainties regarding selection of the State's core system operator during the period in which the 1980 Railplan and benefit-cost analysis were in effect. Of the projects studied in 1980, the Pierre to Huron project was ranked third, and the Sisseton project was ranked fourth. The current Railplan anticipated that the benefit-cost analysis of the Pierre to Huron line would be updated, and ranked it third among the projects scheduled to be funded in 1982. The Sisseton line was not assigned a priority in 1982 and will be considered only after the Federal Railroad Administration reviews the benefit-cost analysis of the proposed project.

APPENDIX A
BENEFIT-COST ANALYSIS METHODOLOGY

This appendix discusses in detail the benefit-cost analysis methodology employed in assessing and comparing the economic effects of alternative dispositions that can be made of the Milbank to Sisseton and Pierre to Huron branch lines. It addresses the economic theoretic basis of the methodology as well as the practical problems of applying the methodology. In addition to the concepts, methods, and techniques used in estimating the primary economic effects, the discussion addresses the secondary economic and nonmonetary benefits and costs.

Some methodological issues are basic and therefore common to both lines under study; others are particular to the individual line. Unless the line is identified, the discussion applies to both branch lines.

BENEFIT-COST ANALYSIS MODEL

The first step in the benefit-cost analysis was to identify and specify the base cases, that is, the expected scenarios if the proposed projects are not undertaken. The benefit and cost consequences of these base cases were then estimated and compared with those of the alternative cases, that is, the expected scenarios if theproposed projects are undertaken. Exhibit A-1 summarizes the basic steps of the benefit-cost analysis in a flow diagram.

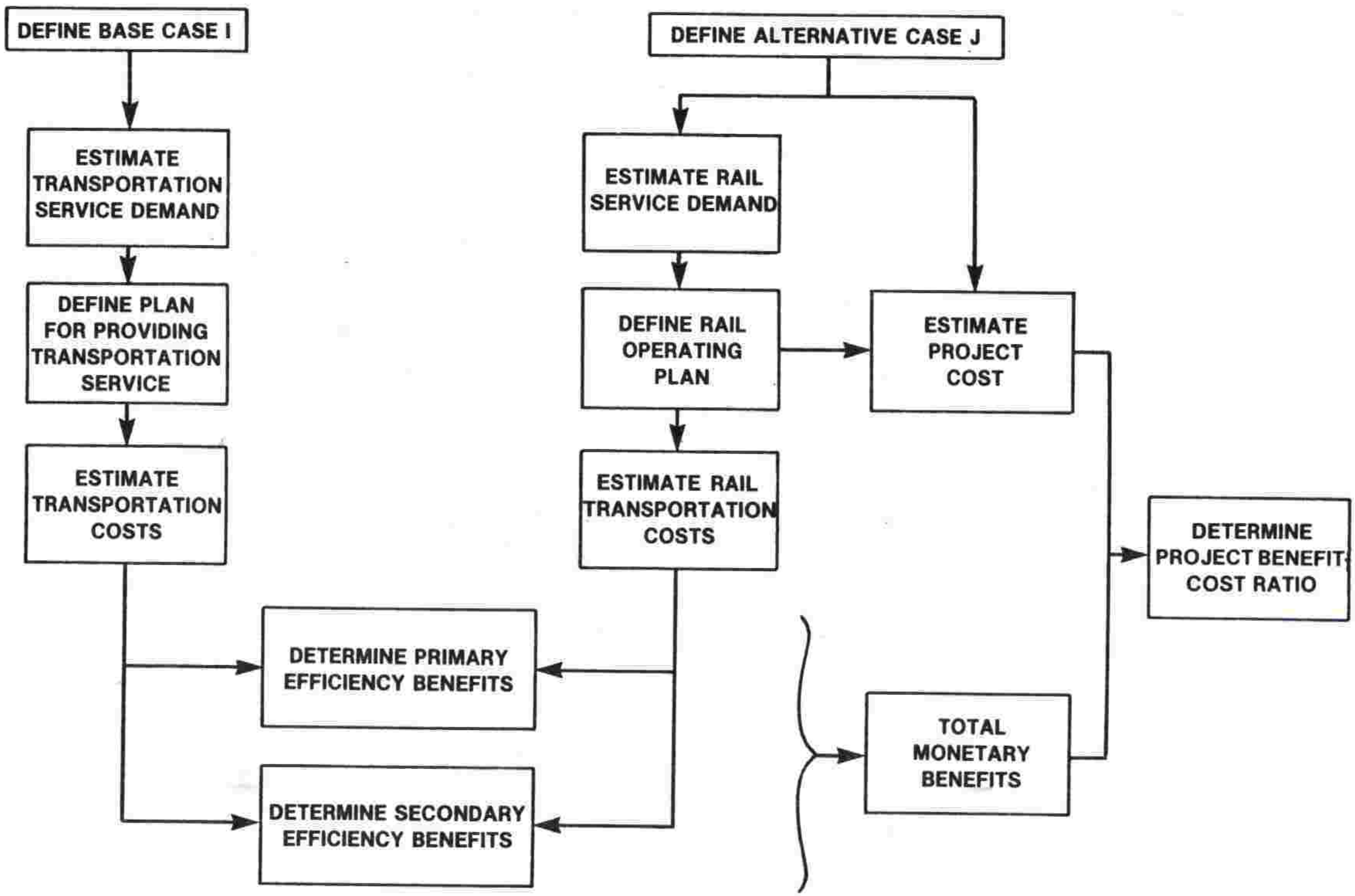
Define Base and Alternative Cases

For the Milbank to Sisseton branch line, the base case represents what is anticipated will happen if the Milwaukee abandons the line and no action is taken to preserve service. Should the base case materialize, current rail traffic will be diverted, according to the shippers, to the following four alternative means of transportation:

- truck from existing elevator to final destination;
- rail from Ortonville, Minnesota, through a new facility;
- rail from New Effington, South Dakota, through an existing facility; and
- rail from Fargo, North Dakota, through an existing facility.

EXHIBIT A-1

BENEFIT-COST ANALYSIS MODEL



handled at each station to the previously defined traffic patterns, a detailed traffic profile was developed. Fort Pierre traffic was included with the study segment because of the North Western's expressed willingness to continue to serve the station if the Pierre to Rapid City line was abandoned.

It was estimated that truncation of the line at Pierre would result in additional traffic volume of 334 cars or 30,060 tons. An additional 1,120 cars or 100,800 tons of traffic could result if an agreement can be reached between the BN and the North Western to move corn to the West Coast in unit trains. This estimate was based on capture of approximately 50 percent of the corn that would be grown in the Pierre trade area if all acres currently being irrigated were planted with corn. Actual rail volume could be significantly higher if additional acres were irrigated or rail would capture a higher proportion of the market.

It is assumed that if the Pierre to Huron line were abandoned, all traffic originating or terminating on the line would move either by truck for the entire length of haul or through a truck/rail transfer operation at Huron. The quantity of traffic using each option was considered to be almost equal.

Define Operating Plans

Operating plans were developed for the rail service cases only. Truck service cases were developed on the basis of small companies providing service as needed. Rail service operating plans defined the following characteristics for each case:

- operating limits (stations served);
- operating speed;
- round-trip travel time;
- locomotive consist;
- crew consist; and
- service frequency.

For the Milbank to Sisseton base case, if was assumed that all traffic was either diverted to one of the three nearby railheads or trucked to its final destination, as described earlier and no direct rail service was provided to the line.

For the alternative case analysis of the Milbank to Sisseton line, it is anticipated that the short line railroad would be operated by an organization formed by the shippers. Three round trips a week would be needed to serve expected demand as long as the existing restriction exists on the size of loaded trains. Rehabilitation would be needed to restore the line to a stable Class I condition, and it was hoped that this will be achieved with a combination of federal and shipper funds. Shippers would replace the existing rail to allow movement of fully loaded covered hoppers at Class II speeds. This rehabilitation would permit the same volume of grain to be moved with fewer train trips through the use of the larger capacity cars and longer trains. Shippers plan to implement this more efficient operation within three years.

For the base case analysis of the Pierre to Huron line, it was estimated that five round trips would operate on the line for about six months a year, and three round trips would operate during the remainder of the year. The train originates at Adams, Wisconsin, proceeds to Rapid City, and returns to Adams. Three locomotive units (usually GP7S or GP9S) are used. The trip from Huron to Pierre requires 11.5 hours, with an additional 12 hours needed to proceed to Rapid City. For the most part, overhead traffic consists of cement and wood products from the Rapid City area, originating traffic consists of grain from intermediate points, and terminating traffic consists of fertilizer.

The alternative case operating plans were the same as the particular base case plan with which they are compared. Alternative case III, abandonment of the line, did not require a rail operating plan.

Develop Transportation Costs of Traffic Movements

An important element of the benefit-cost analysis methodology was determining the costs of transporting commodities according to the base and alternative cases for each line. For these analyses, both rail and truck costs were developed on a per-ton basis, depending on the transportation mode, the commodity type, and the origin-destination pair. The analytical models used to develop these costs are described in this section. All costs developed in this study were applicable to the fourth quarter 1981 time frame.

Rail Costs

The costs of providing short line railroad service to the Milbank to Sisseton line in the alternative case were determined from engineered costs developed by the shippers involved in forming the short line railroad. The off-branch rail costs of traffic for both base and alternative cases were determined using Rail Form A-based costs for the appropriate connecting rail carrier.

In the Pierre to Huron line analysis, the on- and off-branch rail costs of the base and alternative cases were determined using Rail Form A-based costs for the appropriate carrier(s) involved in the traffic movements.

On-Branch Short Line Rail Costs

An engineered approach was used to develop short line on-branch costs for operating the Milbank to Sisseton line. Operating expense projections were obtained from the shippers forming the railroad. These projections were broken down into the following major categories:

- maintenance of way;
- maintenance of equipment;
- transportation;
- administration;
- insurance;
- car costs; and
- other.

These cost categories were reviewed and in certain instances were modified to reflect more recent conditions and updated cost information. For instance, the locomotive ownership cost was adjusted to reflect the shippers' recent acquistion of three F-7 locomotives. In addition, shipment costs were developed on the basis of using either box car or covered hopper equipment and adjusting the traffic volumes to account for the difference in capacity. The costs resulting from the proposed track rehabilitation were arranged to reflect to gradual transition in the use of equipment from box cars to covered hoppers. Because of the dedicated nature of the short line alternative, the full costs of its operation were considered avoidable.

On- and Off-Branch Rail Form A Costs

The on-branch costs of operating the Pierre to Huron line and the off-branch costs of moving traffic to and from both the Milbank to Sisseton and Pierre to Huron lines were developed using Peat Marwick's Rail Form A calculator.

Rail Form A is a formula procedure for developing functional unit costs from accounting and other data. Applications of unit costs are technically not a part of Rail Form A. The development of unit costs in Rail Form A is based on the assignment of functional costs incurred by a railroad in performing a given service over each functional unit of that service. The historical number of service units incurred in a specific movement is part of the basis for determining historical unit costs which, in turn, become the basis for calculating unit costs for the future.

Rail Form A provides methods for allocating expenses (shown in railroad annual reports) among the various components of rail operations, that is, yard switching, train switching, road haul, station, special services, and general overhead. The formula uses related revenue units of service, such as car-miles, gross ton-miles, net ton-miles, tons originated and terminated in the construction of unit variable and constant costs. The formula also provides for developing unit costs for each type of train service (local, way, and through train) and combining these to produce cost scales for various weight shipments moving in different types of cars, by various lengths of haul. The costs include allowances for capital and federal income taxes, and are developed on variable and fully allocated bases.

A current cost of capital of 20.8 percent was used for the costing analysis, based on the most recent cost of capital experienced by a Class I railroad. Long-term variable costs were based on average traffic density experienced during the year in which costs were developed. For fourth quarter 1981 costs, the 1977 expenses were indexed to reflect the effects of inflation. Costing information for each line was developed for a mixture of car types most frequently using the line. For the lines under study, this included some combinations of covered hoppers, box cars, and tank cars. Actual tare weights by car type were used in the analysis. Adjustments were also made in the switching factors and way- and through-train miles to reflect the operating philosophy of the participating railroads and the length of haul involved in the movement.

The Rail Form A program was run for each traffic movement by line using the actual Form A data for the railroad providing the service. The output of the Rail Form A program lists the cost per ton and hundredweight for the movement at various lengths of haul and load weights. These variable costs involved terminal (single for all rail service and dual for truck-to-nearest railhead service alternative), line-haul, and interchange costs, in accordance with the RSPO methodology. For this study, the cost per ton was applied to the number of tons moved over each line by alternative. This was based on the average length of haul by orgin-destination pair and traffic volume per station in the railroad- or shipper-supplied data.

For this study, the off-branch costs per ton for each core system interline rail movement were added to the on-branch costs. This was done to determine the total rail variable costs per ton, based on commodity type and length of haul by orgin-destination pair. By applying rail cost-per-ton factors to the traffic volume by station and aggregating the results by line segment, cost of providing rail service to each line could be determined. In the case of the Milbank to Sisseton line, the on-branch costs were the short line costs described earlier. In the case of the Pierre to Huron line, the on-branch costs were Rail Form A-produced costs. The products of the economic analysis of rail service alternatives provided the input costs to the primary efficiency calculation of project benefits.

Motor Carrier Costs

The base case for the Milbank to Sisseton line analysis and alternative III for the Pierre to Huron line analysis assumed the use of motor carriers to transport traffic either to or from the nearest railroad to the line, or to or from the ultimate destintion or origin. The Peat Marwick truckload cost model was used to develop the cost per ton of moving diverted traffic by truck. Costs were developed based on the assumption that service would be provided by small trucking companies. These costs related primarily to line-haul costs, but additional factors were included to allow for cost of pickup and delivery.

The truckload cost model produces both variable and fully allocated costs, based on certain specified information describing the movement. The model requires 14 categories of information which define the type of movement in terms of:

- carrier type (small fleet);
- equipment type (tank);
- driver type (nonunion);
- length of haul;
- payload weight;
- operating region (North Central);
- domicile state (South Dakota);
- states involved in movement; and
- inflation rates.

Additional movement specifications can be made by providing up to 119 other pieces of information. Such data include:

. line-haul empty backhaul ratio;

. average speed;

. fuel consumption;

. drivers wages, benefits, and expenses;

. pickup and delivery time;

. loading and unloading time;

. state and federal use taxes;

. equipment costs;

. licensing costs;

. insurance costs;

. tax basis and rate; and

. variability factors.

These data have associated default values that are specified by the mandatory input data listed above. In this study, the only optional data specified were:

. line-haul empty backhaul ratio;

. driver wages per hour;

. domicile license cost;

. permit cost; and

. trailer purchase price.

Because of the assumed limited nature of the motor carrier operation (small company with a small fleet), the total costs produced by the model were used to cost the individual truck moves. The model produced full costs per hundredweight for each origin-destination pair and commodity grouping. These were converted to cost per ton for subsequent inclusion in the primary efficiency calculation by line.

Composite Transportation Costs

Where both truck and rail modes were involved in a move to or from a line, a composite transportation cost per ton was developed. In such cases, a weighted average cost per ton of both modes was developed.

Determine Project Benefits

Economic benefits of the proposed projects (the alternative cases) are called project benefits, and the costs of implementing the projects are called project costs. The project benefits are the outcomes that occur relative to the base case. Several types of project benefits are considered by the benefit-cost analysis methodology used by South Dakota in this study. These include:

monetary benefits

- primary efficiency benefits.
- secondary efficiency benefits:
  - income effects;
  - tax effects;
  - highway maintenance cost effects; and
  - elevator relocation cost effects.

nonmentary benefits

- employment;
- energy consumption;
- air pollution emissions; and
- other.

Exhibit A-2 illustrates the relationships among project benefits which are discussed in detail in the following pages.

Monetary Benefits

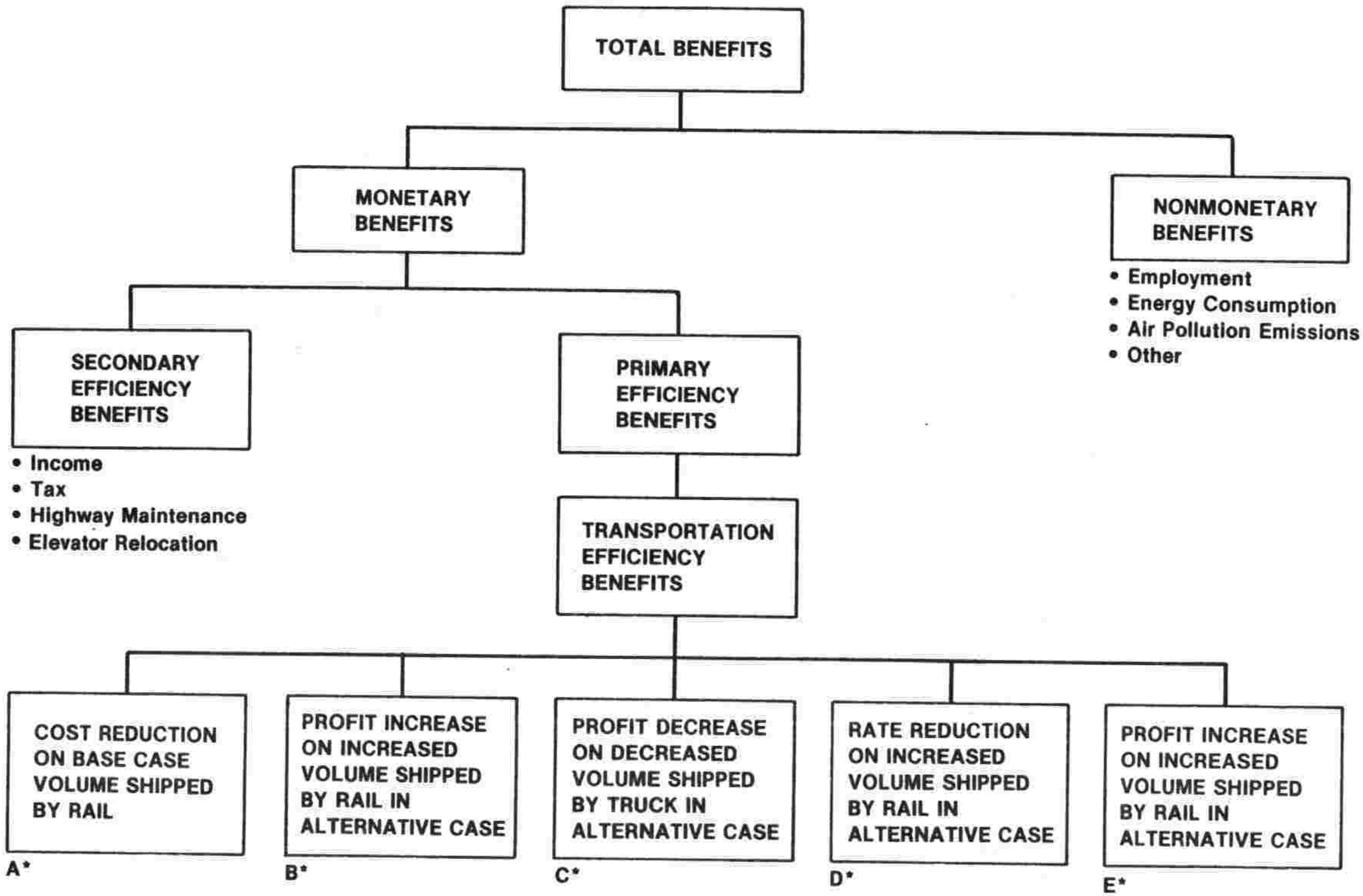
Monetary benefits of a rail project consist of the dollar-valued outcomes that result over the term of the project. These benefits are divided into two categories: primary and secondary.

Primary Efficiency Benefits

The primary efficiency benefits of a rail project (defined in this methodology as transportation effiency benefits) consist

EXHIBIT A-2

RAIL PROJECT BENEFITS



Note: *Areas A,B,C,D, and E are illustrated in Exhibit A-3.

of the economic effects on the transportation provider and user that occur as a result of the project.

The transportation efficiency benefits of the alternative cases consist of five components, outlined in Exhibit A-2 and illustrated in Exhibit A-3. These include:

- change in transportation cost associated with preserving and/or improving rail service to the study line, using the original quantity moved by rail in the base case;
- profit earned by the rail carrier on traffic diverted from truck to rail;
- profit decrease by the truck carrier on traffic diverted from truck to rail;
- transportation cost savings to shippers for traffic diverted from truck to rail;
- profit earned by the rail carrier on new traffic generated by the rail project.

To calculate the transportation efficiency benefits of a rail assistance project, the Federal Railroad Administration suggests the following equation:

$$(B_n-B_o)_T = Q_o\ (C_o-C_n) + 1/2\ (P_o-P_n)\ (Q_n-Q_o) + (P_n-C_n)(Q_n-Q_o)$$

where

$(B_n-B_o)_T$ = Transportation Efficiency Benefit, Alternative Case Versus Base Case ($)

Q_o = Quantity Shipped, Base Case (Tons)

Q_n = Quantity Shipped, Alternative Case (Tons)

P_o = Transportation Revenue, Base Case ($/Ton)

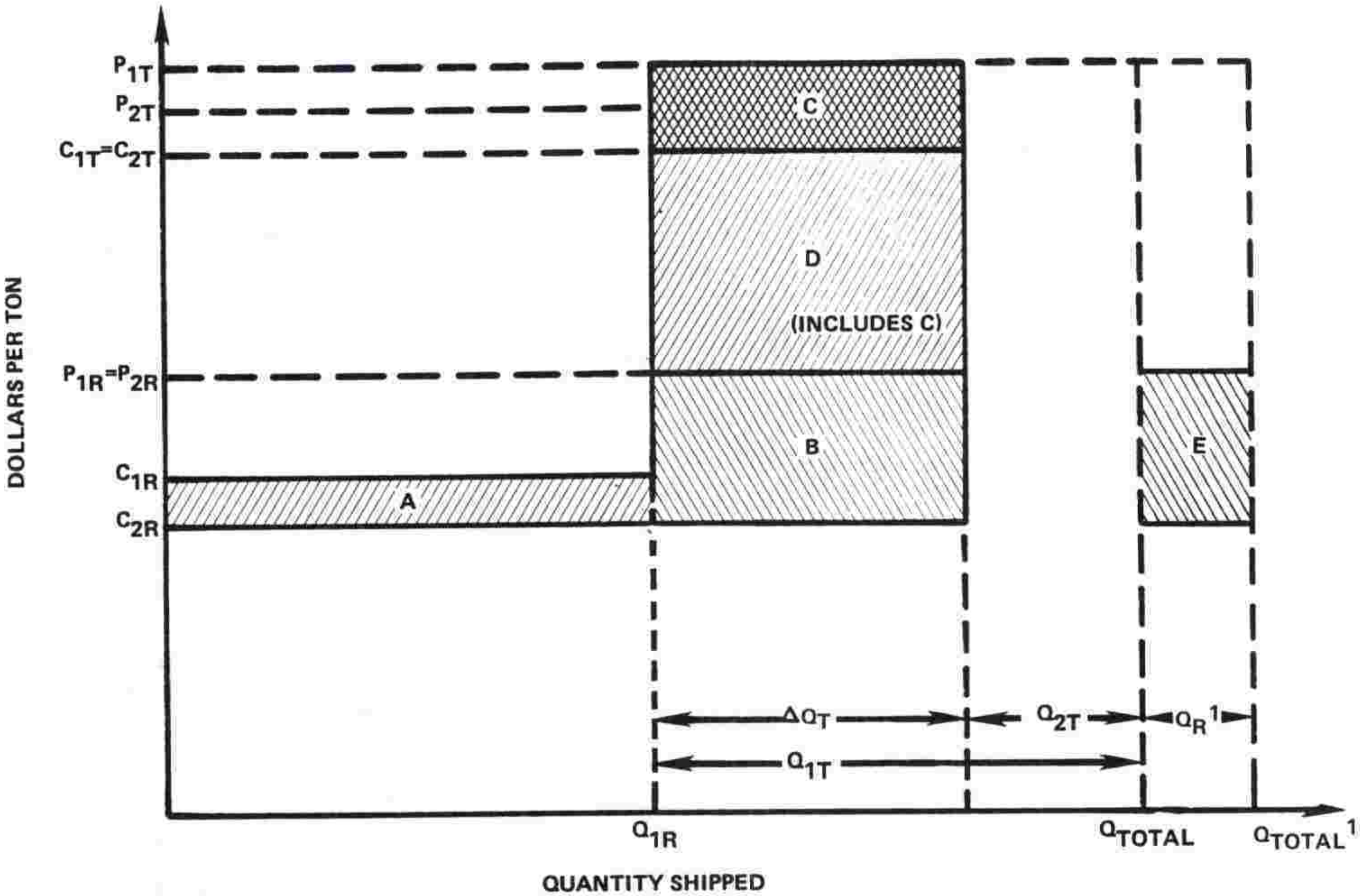
P_n = Transportation Revenue, Alternative Case ($/Ton)

C_o = Transportation Cost, Base Case ($/Ton)

C_n = Transportation Cost, Alternative Case ($/Ton)

EXHIBIT A-3

TRANSPORTATION EFFICIENCY BENEFITS



WHERE:

- $A = (C_{1R} - C_{2R})\, Q_{1R}$
- $B = (P_R - C_{2R})\,(Q_{2R} - Q_{1R})$
- $C = (P_{1T} - C_T)\,(Q_{2T} - Q_{1T})$
- $D = (P_{1T} - P_R)\,(Q_{2R} - Q_{1R})$
- $E = (P_{2R} - C_{2R})\, Q_R{}^1$
- $P_{1T} > P_{2T}$
- $C_T = C_{1T} = C_{2T}$
- $Q_{1T} > Q_{2T}$
- $P_R = P_{1R} = P_{2R}$*
- $Q_{2R} = Q_{1R} + \Delta Q_T + Q_R{}^1$
- $C_{1R} > C_{2R}$*
- $Q_{1R} < Q_{2R}$
- $Q_{TOTAL} = Q_{1T} + Q_{1R}$
- $Q_{TOTAL}{}^1 = Q_{2T} + Q_{2R}$

KEY

- P_{1T} = Truck Rate Per Ton, Base Case
- P_{2T} = Truck Rate Per Ton, Alternative Case
- P_{1R} = Rail Rate Per Ton, Base Case
- P_{2R} = Rail Rate Per Ton, Alternative Case
- C_{1T} = Truck Cost Per Ton, Base Case
- C_{2T} = Truck Cost Per Ton, Alternative Case
- C_{1R} = Rail Cost Per Ton, Base Case
- C_{2R} = Rail Cost Per Ton, Alternative Case
- Q_{1T} = Truck Quantity Shipped, Base Case
- Q_{2T} = Truck Quantity Shipped, Alternative Case
- Q_{1R} = Rail Quantity Shipped, Base Case
- $Q_R 1$ = Rail Quantity Shipped, New Traffic
- Q_{2R} = Rail Quantity Shipped, Alternative Case
- Q_{TOTAL} = Total Quantity Shipped, Base Case
- $Q_{TOTAL}{}^1$ = Total Quantity Shipped, Alternative Case

NOTE: * In cases where the alternative case makes available a more profitable, though more distant market to the shipper, $P_{1R} < P_{2R}$ and $C_{1R} < C_{2R}$.

If the total quantity shipped under the base and alternative cases does not change, the above equation is reduced to the following:

$$(B_n - B_o)T = Q_T(C_o - C_n)$$

$$= Q_{1R}\ (C_{1R} - C_{2R}) + (Q_{2R} - Q_{1R})(C_{1T} - C_{2R}) + Q_{2T}(C_{1T} - C_{2T})$$

= Area (A) + Areas (B+D-C) + 0 (see Exhibit A-3)

where

Q_T = Total Quantity Shipped (Tons), where $Q_T = Q_o - Q_n$

Q_{1R} = Quantity Shipped by Rail, Base Case (Tons)

Q_{2R} = Quantity Shipped by Rail, Alternative Case (Tons)

Q_{2T} = Quantity Shipped by Truck, Alternative Case (Tons)

C_{1R} = Transportation Cost by Rail, Base Case ($/Ton)

C_{2R} = Transportation Cost by Rail, Alternative Case ($/Ton)

C_{1T} = Transportation Cost by Truck, Base Case ($/Ton)

C_{2T} = Transportation Cost by Truck, Alternative Case ($/Ton)

When an alternative case represents traffic that historically has not been part of rail demand, the shipping quantity in the alternative case is not equal to the base case. In these instances, the full primary efficiency benefit equation is used.

Secondary Efficiency Benefits

Primary efficiency benefits of the rail assistance projects, discussed above, measure the direct economic effects of changes in quantity, cost, and rates of transportation services used by rail lines' shippers. Secondary efficiency benefits measure indirect economic effects of the proposed projects on shippers, local communities, and the State. These include:

- changes in local (community) income caused by job losses or gains;
- changes in taxes resulting from the closing or opening of shipper facilities and the diversion of traffic to or from trucks, whose fuel is taxed by the State;

- changes in highway capital or maintenance costs because of potential traffic diversion to or from trucks; and

- elevator relocation costs.

<u>Income Effects</u> - The income effects of implementing the various cases studied in this addendum were measured by the following equations:

$$B_{iL} = J_L \text{ Tuc } (\text{Ruc}-R)$$

$$B_{iG} = J_G \text{ Tuc } (R-\text{Ruc})$$

where

B_{iL} = Secondary Employee Income Loss (One-Time)

B_{iG} = Secondary Employee Income Gain (One-Time)

J_L = Lost Jobs

J_G = Gained Jobs

Tuc = Average Term of Unemployment (11 weeks)

Ruc = Average Unemployment Compensation Rate ($100.54/week)

R = Average Wage Rate ($431.54/Week)

Under the allocation of secondary efficiency benefits to the State, the effect on the income equations became:

$$B_{iL} = J_L \text{ Tuc } R$$

$$B_{iG} = J_G \text{ Tuc } R$$

because the amount of unemployment compensation is a state responsibility.

<u>Tax Effects</u> - The only tax effects of the various cases studied in this addendum resulted from changes in the quantity of traffic moved by truck. Unlike railroads, trucks pay State tax of 15 cents per gallon of fuel. The annual tax effect was therefore calculated as the per-gallon state fuel tax multiplied by the increase or decrease in traffic fuel consumption.

In the Milbank to Sisseton line analysis, the base case assumption was for local truck delivery to nearby rail-served facilities. The alternative case assumption was for short line rail service from stations on the line.

In the Pierre to Huron line analysis, the only case involving truck delivery was alternative III, in which traffic from the line would be either trucked to its final destination, trucked to Huron for subsequent delivery by rail, or trucked to Sioux City for subsequent delivery by water or rail.

Even though it was anticipated that our elevator would be relocated, no shipper facilities were expected to open or close as a result of the various cases studied, so no shipper taxes were affected.

Highway Maintenance Cost Effects - The diversion of traffic between truck and rail modes produced a net change in the deterioration of the State's highways over which traffic would move. Because of the relatively low volume of truck traffic affected, it was assumed that no significant highway capital costs would be incurred as a result of the traffic diversion. It was assumed, however that highway maintenance costs would change. This was quantified by using an equation developed by the South Dakota Transportation System's Planning Division, with costs inflated to January 1982 dollars, and listed as follows:

$$M_H = T_i V_i L_i \times 0.001843094$$

where

M_H = Annual Highway Maintenance Cost ($)

T = Number of One-Way Truck Trips per Year

V = Number of Average Gross Tons per Round Trip

L = Length of Haul in South Dakota per Trip (Round-Trip Miles)

i = Type of Trip

This equation assumes that the trucks return empty, and that the average load weight is 25 tons while the average vehicle tare weight is 15 tons.

Highway cost effects were considered only for the roadways located in South Dakota and were calculated on an annualized basis. Effects beyond the State border would result from the estimated truck diversions; this was not quantified as part of this Addendum, however. Traffic diverted to or from an interstate highway was assumed to result in negligible cost effects.

In the Milbank to Sisseton line analysis, it is assumed that traffic is diverted from truck mode to short line railroad for the alternative case.

For alternative III in the Pierre to Huron line analysis, traffic would be diverted to truck for short-haul delivery to local railheads.

Elevator Relocation Cost Effects - The analysis recognizes that the cost of relocating an elevator at Ortonville under the base case would be avoided under the alternative case. This relocation would result in a benefit to the rail assistance project, and is shown as the replacement cost of the existing elevator, annualized over 10 years.

Nonmentary Benefits

Nonmentary benefits both quantifiable and nonquantifiable, of a local rail assistance project consist of the non-dollar-valued effects that result over the term of the project.

Employment

In the Milbank to Sisseton line analysis, seven jobs were gained by the formation of the short line railroad. This included five crew positions and two management positions. Two truck driver jobs were lost as a result of diversion of truck traffic to the short line railroad. The net change in direct employment was five jobs gained in the alternative case.

In the Pierre to Huron line analysis, it was assumed that 16 railroad jobs would be lost as a result of abandonment of the line. This would include seven crew positions, eight maintenance positions, and a station agent position. Six truck driver jobs would be added because of the diversion of traffic to the truck mode. The net change in direct employment would be ten jobs lost in alternative III.

Energy Consumption

For each line alternative, the quantity of diesel fuel consumed was estimated based on the net traffic volume, haul length within South Dakota, and modal composition of each traffic movement. The energy intensity estimates for rail and for truck were based on data prepared by A.B. Rose and varied by commodity.[1] The energy intensities (Btu/ton-miles) by commodity class are shown in Exhibit A-4 for truck and Exhibit A-5 for rail. Once the energy consumption estimates were made in Btus, they were converted to gallons of diesel fuel using the conversion factor of 138,700 Btus/gallon of diesel fuel. The

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[1] A.B. Rose, Energy Intensity and Related Parameters of Selected Transportation Modes: Freight Movements. Prepared for Department of Energy by Oak Ridge National Laboratory, Oak Ridge, Tennessee, June 1979; pp. 5-16, 6-11.

EXHIBIT A-4

TRUCK FREIGHT ENERGY INTENSITY BY COMMODITY CLASS

Commodity	Average truckload (tons)	Energy Intensity		
		mpg	Btu route-TM[b]	Btu GC-TM[b]
Farm products	19.45	4.42	2330	2680
Forest products	18.59	4.47	2410	2770
Fresh fish, other marine products	13.56	4.79	3080	3540
Metallic ores	19.87	4.39	2290	2630
Coal	20.30	4.37	2260	2590
Crude petroleum and natural gas	26.81	4.02	1860	2130
Nonmetallic minerals, except fuels	20.05	4.38	2280	2620
Ordinance and accessories	16.62	4.59	2620	3012
Food and kindred products	17.36	4.54	2540	2914
Tobacco products	16.29	4.61	2670	3060
Basic textiles	13.13	4.82	3160	3630
Apparel and other finished textiles	10.11	5.04	3530	4506
Lumber and wood, except furniture	19.13	4.43	2360	2710
Furniture and fixtures	9.56	5.09	4120	4730
Pulp, paper, and allied products	15.55	4.66	2760	3170
Printed matter	14.45	4.73	2930	3361
Chemicals and allied products	18.02	4.50	2470	2830
Petroleum and coal products	24.45	4.14	1980	2270
Rubber and miscellaneous plastics	12.13	4.89	3370	3870
Leather and leather products	10.66	5.00	3750	4310
Stone, clay, and glass	19.91	4.39	2290	2630
Primary metal products	18.98	4.44	2370	2720
Fabricated metal products	13.53	4.79	3090	3540
Machiney, except electrical	13.39	4.80	3110	3570
Electrical machinery	11.21	4.96	3600	4130
Transportation equipment	11.77	4.92	3460	3970
Instruments, photo, optical, etc.	14.00	4.76	3000	3450
Miscellaneous manufactured products	12.04	4.90	3390	3900
Waste and scrap material	17.28	4.55	2550	2920
Miscellaneous freight shipments	13.16	4.82	3160	3620
Containers, shipping, empty return	9.65	5.08	4080	4690
Mail and express				
Freight forwarder traffic	12.19	4.90	3560	3860
Shipper association	22.73	4.23	2080	2389
Miscellaneous mixed shipments	13.95	4.76	3010	3460
Total	18.04	4.50	2470	2830

[a]The values in this table are not intended for intermodal comparisons, as they do not include route structures and are not at a sufficient level of disaggregation.

[b]TM — Ton-mile.
GC — Great-circle.

SOURCE:

A.B. Rose. Energy Intensity and Related Parameters of Selected Transportation Modes: Freight Movements. Prepared for Department of Energy by Oak Ridge National Laboratory Oak Ridge, Tennessee, June 1979; p. 6-11.

EXHIBIT A-5

RAIL FREIGHT ENERGY INTENSITY BY COMMODITY CLASS

Commodity	1976 Ton-miles[b] (10^8)	1976 Average carload weight (tons)	1976 Average length of haul[b] (miles)	1972 Mean empty car weight (tons)	1972 Mean empty over loaded car miles	Energy intensity in Btu/ton-mile: By route-miles[b]	Energy intensity in Btu/ton-mile: By great-circle miles
Coal	1,005.1	86.2	320	28.1	0.91	340	450
Food and kindred products	644.0	49.8	721	36.3	0.84	750	990
Chemicals and allied products	620.2	73.4	699	33.9	0.95	470	620
Farm products	582.6	66.9	489	35.5	0.87	520	680
Lumber and wood, except furniture[c]	454.6	46.8	512	34.3	0.74	720	960
Pulp, paper and allied products	339.0	43.1	771	33.3	0.95	920	1220
Nonmetallic minerals, except fuels	251.1	76.1	194	31.0	0.91	410	540
Stone, clay and glass	242.5	56.8	451	33.5	0.82	580	770
Primary metal products	239.8	63.1	500	33.9	0.78	500	670
Transportation equipment	210.5	23.3	782	36.8	0.69	2070	2740
Metallic ores	200.3	81.5	153	30.9	0.93	390	510
Petroleum and coal products	194.8	59.4	466	34.6	1.02	650	860
Miscellaneous mixed shipments[d]	162.8	22.6	1,018	32.7	0.70	1940	2560
Freight and forwarding traffic[d]	45.4	22.2	1,592	32.7	0.70	2000	2640
Fabricated metal products	42.5	34.2	659	34.1	0.76	1130	1500
Machinery, except electrical	25.1	24.8	944	38.1	0.69	1950	2570
Electrical machinery	23.5	17.2	902	34.3	0.70	3200	4220
Rubber and miscellaneous plastic products	22.4	18.8	773	33.5	0.70	2680	3540
Basic textiles	8.9	19.6	875	34.2	0.69	2530	3350

[a]The values in this table are not designed for intermodal comparisons, as they do not include route structures and are not at a sufficient level of disaggregation.

[b]All mileage-related data from the source are based on short-line distances rather than the actual routings.

[c]Furniture accounts for only a small portion of the ton-miles for the combined category of lumber and furniture in Table 5.8. Therefore the car-mile-weighted values are left unchanged.

[d]All movements are assumed to occur in box cars.

SOURCE: Ross. Energy Intensity - Ibid.; p. 5-16 energy consumption estimates were then summed for all traffic movements for all modes by line alternative. Next, the totals were compared with the base cases to arrive at an estimate of the incremental energy consumption by line. The effects of energy consumption were considered only for movements in South Dakota, although additional effects would occur beyond the State borders.

Air Pollution Emissions

The effects of air pollution emissions were quantified by pounds of pollutants a year for the rail, truck, and truck/rail alternatives.

The three major pollutants emitted by trucks and rail locomotives are carbon monoxide, hydrocarbons, and oxides of nitrogen. Supplemental emissions include oxides of sulfur, particilates, aldehydes, and organic acids. It was assumed for this analysis that the effects of the last two pollutants would be negligible.

The emission factors used for this analysis were developed by the EPA.[1] Exhibit A-6 presents emission factors (pounds of pollutants/1,000 gallons of diesel fuel) for heavy-duty truck and locomotive diesel engines. Calculation of air pollution emissions involved multiplying the estimated rail and truck fuel consumption by appropriate air pollution factors. Summing the results for each movement in the alternative cases and comparing them with the base cases produced an estimate of the incremental air pollution emissions for each alternative case. Emissions by type of air pollution were summed for each line. Only the effects that would occur in South Dakota were quantified by this study, although effects beyond the State borders would also occur.

Other

Other nonmonetary benefits of the various cases were addressed by this study, including:

- competitive nature of transportation services to the State;
- connectivity of the South Dakota rail system to that of the Midwest and the national rail system;

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[1] U.S. EPA, Compilation of Air Pollution Emission Factors. Washington, D.C., March 1975; pp. 3.1, 3.2.

EXHIBIT A-6

EMISSION FACTORS FOR HEAVY-DUTY TRUCK AND LOCOMOTIVE DIESEL ENGINES (1)

POLLUTANT	HEAVY-DUTY TRUCK lbs./10^3 gal.	LOCOMOTIVE lbs./10^3 gal.
Carbon Monoxide (CO)	225	130
Hydrocarbons (HC)	37	94
Oxides of Nitrogen (NO_2)	370	370
Oxides of Sulfur (SO_2)	27	57
Particulates	13	25
Aldehydes	3	4
Organic Acids	3	7

(1) Data are based on weighting factors applied to actual tests conducted at various load and idle conditions with an average gross vehicle weight of 30 tons and fuel consumption of 5 miles/gal.

SOURCE: U.S. EPA Compilation of Air Pollution Emission Factors. Washington, D.C., March 1975; pp. 3.1, 3.2.

- economic development potential of the State; and
- accessibility of natural and energy resources of South Dakota to the State's freight transportation systems.

Each of these issues is an important area of concern to the State. Effects of the various cases on these issues are noted in the text as part of the discussion of project benefits, where applicable.

Determine Project Costs

In the Milbank to Sisseton line analysis, the project costs associated with the alternative case were the costs to rehabilitate the line to Class II standards with a 263,000-pound weight limit. These costs were estimated by shippers responsible for organizing the short line railroad.

In the Pierre to Huron line analysis, the project costs associated with each of the rail service alternatives were the costs to rehabilitate the line to Class II standards. These costs were provided by the Chicago and North Western.

Evaluate Project Benefit-Cost Criteria

The economic benefits and costs for each line and case were evaluated on an annualized basis, with one-time benefits and costs converted to annualized values using a 10-year time frame and a 15-percent discount rate, assuming project costs were incurred during the first year and considered as end-of-year costs.

The benefits were also allocated among the groups to which they applied, including:

- railroads;
- truck companies;
- communities (including shippers); and
- the State.

This allocation determined how much each of the above groups would be affected by the proposed projects. The sum of the maximum benefits (whether positive or negative) equaled the total efficiency benefits for each line. Projects costs were not allocated.

The various alternative cases were evaluated by comparing the difference between the annualized benefits and cost, and the ratio of the annualized benefits and costs for each line study. The decision rules associated with each evaluation criterion were as folows:

Criteria	General Decision Rule
Benefit-Cost Difference	Accept if $B_n - C_n \geq 0$
	Reject if $B_n - C_n < 0$
Benefit-Cost Ratio	Accept if $\frac{B_n}{C_n} \geq 1$
	Reject if $\frac{B_n}{C_n} < 1$

where

B = Annualized Value of Monetary Project Benefits ($)

C = Annualized Value of Project Costs ($)

n = Number of Monetary Project Benefits and Costs

These decision rules are primary guidelines because they do not include important nonmonetary effects associated with the alternatives considered in this study. These effects are taken into consideration by the State in the final project evaluation.

CONCLUSIONS

The benefit-cost analysis methodology described in this appendix attempts to address the intent of the Local Rail Service Assistance Act which first called for benefit-cost assessment of local rail assistance projects. The methodology employed for this Addendum incorporates many of the guidelines suggested by the Federal Railroad Administration for conducting benefit-cost analyses. It also reflects the nature of the data available to perform these analyses. The quality of supporting information is the most important variable in determining the type of benefit-cost methodology that can be used. The high quality of data maintained by the Division of Railroads and provided by the North Western and shippers associated with the study lines was an important aid to the study team.

The benefit-cost methodology is intended to be both meaningful and workable and yet conform to the requirements of the Federal Railroad Administration. Significant judgment is involved in applying the available data to the methodology. The statements and projections contained in this study result from the analysis methodologies, information, and assumptions set forth in this appendix. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent on the occurrence of other future events which cannot be assured. The actual results achieved, therefore, may vary from the projections, and such variation could be material. The enclosed results, however, reflect the best estimates of the consequences of operating the Milbank to Sisseton line as a short line railroad and rehabilitating the line to permit maximum operating speeds of 25 miles per hour with a 263,000-pound weight limit, and rehabilitating the Pierre to Huron line to permit maximum operating speeds of 25 miles an hour.