AMENDMENT TO

RAILPLAN SOUTH DAKOTA 1980

JANUARY 1981

Peat, Marwick, Mitchell & Co.

1990 K Street, N.W.
Washington, D.C. 20006

March 13, 1981

Mr. James R. Myers
Director, Division of Railroads
South Dakota Department of
Transportation
Transportation Building
Pierre, South Dakota 57501

Dear Mr. Myers:

Enclosed are three copies of the final report entitled, Amendment to Railplan, South Dakota, 1980. An appendix that explains the benefit-cost methodologies used has been prepared and is included. These methodologies are similar to those contained in the 1980 Railplan but have been modified slightly to reflect current costs and the unique nature of the lines studied.

Peat, Marwick, Mitchell & Co. appreciates the opportunity to have been of assistance to the Division of Railroads in this project and looks forward to working together in the rail planning process that is now beginning.

Very truly yours,

PEAT, MARWICK, MITCHELL & CO.

Donald M. Hill, Principal

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AMENDMENT TO RAILPLAN SOUTH DAKOTA 1980

INTRODUCTION

The rapidly changing rail transportation environment in South Dakota and the continuing need to closely coordinate State rail planning efforts requires that Railplan South Dakota 1980 be periodically amended to reflect current conditions. This amendment addresses important issues confronting the State. It also allows the desired updating of the 1981 RAILPLAN to be postponed pending the development of other issues. These issues, which will be resolved early in 1981, will substantially affect the theme and direction of the 1981 plan. Primary among these expected developments are the following:

- a legislative decision regarding whether rail operations will be permitted over lines purchased by the State from the Milwaukee Road; and

- a decision by the Federal Railroad Administration on the State's application for directed service over some of these lines.

In the interim, the South Dakota Division of Railroads has selected two rail lines for intensive study. This study's purpose is to assess the economic viability and the feasibility of retaining service on the following lines which are located by the map in Exhibit I.

- Blunt - Gettysburg; and

- Watertown - Clark.

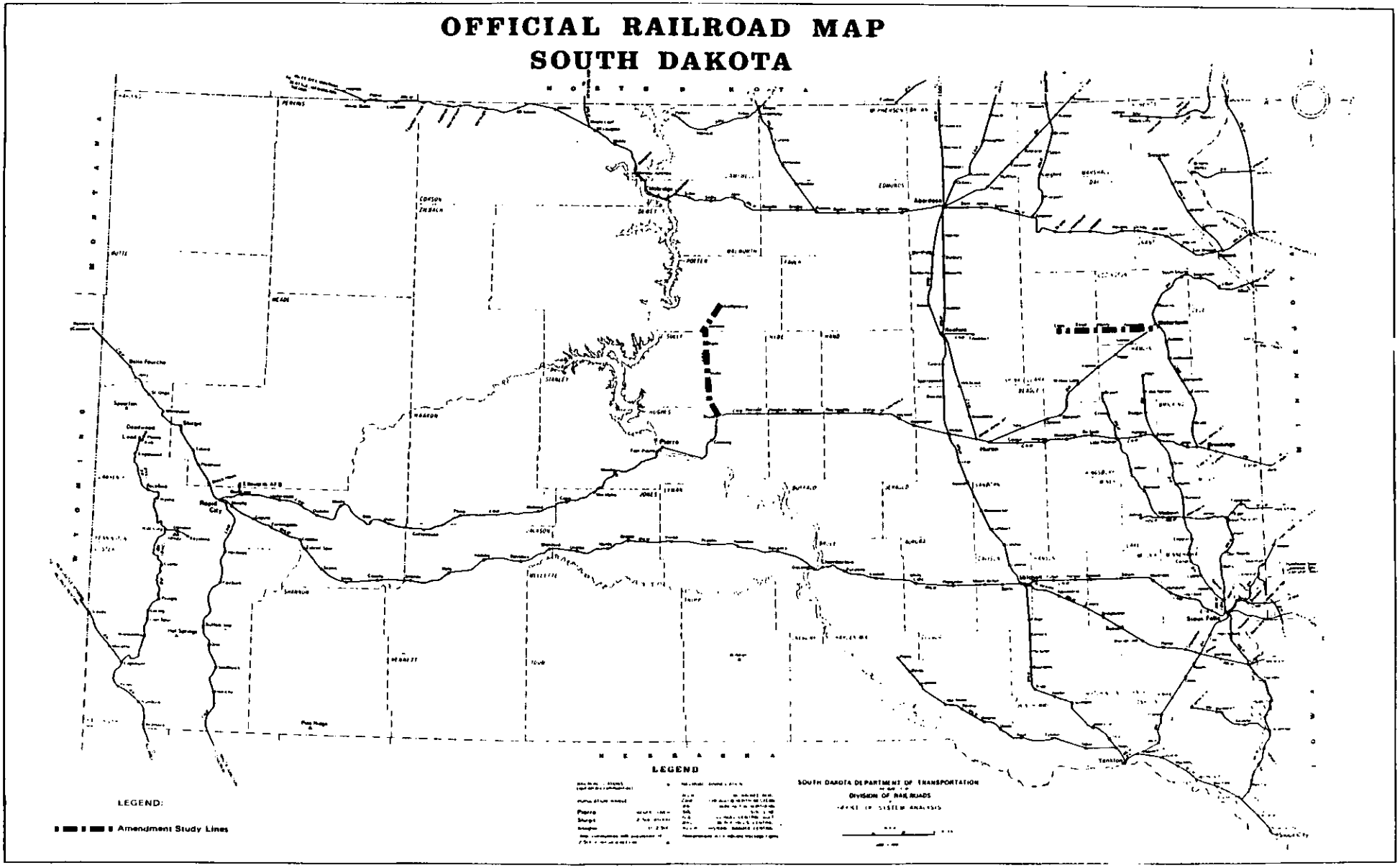
In an attempt to effectively utilize available financial resources and to take all necessary and possible steps to ensure the provision of rail service over essential lines, the State has found it necessary to simultaneously address several issues and crises. Primary among these are:

- Milwaukee Road bankruptcy and abandonment of most lines in South Dakota;

- physical deterioration of Class I railroad lines in South Dakota, endangering their viability as operating lines;

EXHIBIT I

RAIL PLAN SOUTH DAKOTA – 1980
AMENDMENT STUDY LINES



- effective use of federal funds made available through the Section 803 program; and

- directed service application under Milwaukee Road Restructuring Act.

This Amendment reflects the need to coordinate several ongoing efforts. 1980 Section 803 funds were approved for South Dakota by the FRA to ease the effect of rail abandonment (the Milbank-Sisseton line) and address the physical deterioration of Class I railroad owned lines (Miles City-Gascoyne, Madison-Sioux Falls, and Pierre-Huron). Directed service funds are planned (pending application approval) for partial rehabilitation work and a 10-day period of service over some lines purchased by the State. Service is expected to be restored to these lines in 1981 if the State legislature approves a rail operations plan. An operator for this system has not yet been selected.

The Blunt to Gettysburg line was studied as part of the 1980 rail planning process, and additional project alternatives were studied in this Admendment in an effort to find an economically viable alternative since the taking of steps leading to abandonment by the Chicago & North Western (C&NW) is considered imminent. Significant shipper interest in continued service exists. An abandonment application for the C&NW's Watertown to Clark line is currently pending before the Interstate Commerce Commission and the affected shippers and communities expressed a desire for an economic assessment of the line and two rail service continuation options. The effect of abandonment was also studied.

CONSISTENCY WITH STATE RAIL SERVICE AND PLANNING POLICIES, OBJECTIVES, AND GOALS

In conformity with Title 49 of the Code of Federal Regulations, the State of South Dakota established rail service planning policies, objectives, and goals as part of the rail planning process and included them as part of the RAILPLAN South Dakota 1980 document. These criteria, which are reprinted below, guide rail planning activities until they are revised by a subsequent railplan update or amendment. No such revision was conducted at this time.

Rail Service and Planning Policies

- 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. Therefore, the South Dakota DOT 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 on-going State rail planning process.

The State's objectives define more specific courses of action relating to the operation of the South Dakota DOT and the Division of Railroads.

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; and

- 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.

Established, workable goals are necessary for t[illegible] state rail planning process to outline courses of action and to define the desired future characteristics of the railroad system within the State of 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 non-profitable rail lines which are non-essential 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 socio-economic hardships;

- promote financial stability and operational efficiency within the rail system serving South Dakota; and

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

The selection of these rail lines for intensive study in this Amendment is consistent with the above criteria in several respects, primarily in relation to the identification and support of essential rail lines in South Dakota. The State has consistently taken the position that it will not openly oppose all rail abandonments, and will base its position on the economics of that particular line, its traffic potential, other transportation alternatives available to shippers, the anticipated impacts of abandonment, and other unique factors as they exist. The analysis of lines before they are abandoned allows action to be taken to support the continuation of service before the line is actually abandoned, physical deterioration accelerates, and shippers make commitments to provide for their transportation needs.

PROJECT SELECTION PROCESS

The selection of individual projects for study in this Amendment, and, indeed, the basic decision to proceed with an Amendment before updating the State RAILPLAN for 1981, were the result of the policy of studying lines that are in danger of being abandoned, where significant shipper or community interest in preserving rail service exists. The Blunt to Gettysburg and Watertown to Clark lines were selected for these reasons and because of shipper interest in an economic study of the viability of alternatives for continued rail service.

The objective of this Amendment is to address these interim issues without precluding the ultimate focus of the upcoming RAILPLAN, which must necessarily be the State-owned rail system, assuming that the legislature approves a plan for operation of these lines. Nothing contained in this Amendment in any way prevents or presumes any course of action that the legislature might select.

STUDY APPROACH

The approach used to evaluate the lines studied in this Amendment parallels the methodology followed in RAILPLAN South Dakota-1980. Federal Railroad Administration guidelines for assessing the benefits and costs of rail service were followed, which principally involved the analysis of relative economic effects of varying alternatives, such as line abandonment and varying levels of track rehabilitation. Traffic information was collected and shippers were contacted regarding their expected rail shipping volumes under each project alternative. The effect on other factors such as employment, highway maintenance, environment, and taxes were calculated, as were the net salvage value of the line, normalized maintenance requirements, and rehabilitation costs. The carrier's costs of providing rail service and the shipper's cost of utilizing it were obtained for all modes being used.

INTENSIVE STUDY LINES

CN16 BLUNT TO GETTYSBURG

BACKGROUND

The 40.3 mile Blunt to Gettysburg branch line lies to the north of the Pierre to Huron segment of C&NW's secondary main line, which traverses the State from Rapid City to Elkton. A description of this line, designated as South Dakota Segment CN16 in the State's RAILPLAN, was prepared and is reprinted here as Exhibit II. The alternatives studied and the results of the benefit-cost analysis for this line are shown below:

Project Alternative	Benefit/Cost Analysis	
	Benefits Minus Cost*	Benefit/Cost Ratio
Abandonment	$ - 746,990	-
Rehabilitation of entire line to Class II (no rail renewal);	$ - 67,706	+0.61
Line truncation at Onida and rehabilitation to Class II (no rail renewal);	$ - 449,537	-6.72
Line truncation at Onida and rehabilitation to Class II (including rail renewal);	$ - 664,529	-1.30
Rehabilitation to Class II to Onida, continued service to Gettysburg	$ - 43,121	+0.26

* Annual benefit

Because none of the above ratios equal or exceed 1, none of the alternatives studied can be expected to pay back the project costs within the 10 year planning period. Those ratios less than 0 indicate the project will never repay its original cost. The results that are between 0 and 1 indicate that the project will pay back its cost, but will require a period of more than 10 years. The exact number of years required can be calculated by dividing 10 years by the benefit-cost ratio.

The C&NW has recently placed the portion of the line from Blunt to Onida in Category 2, meaning that it is under study for possible abandonment. The Onida to Gettysburg segment has been

EXHIBIT II

SOUTH DAKOTA SEGMENT - CN16

BLUNT TO GETTYSBURG
CHICAGO & NORTH WESTERN - WESTERN DIVISION - GETTYSBURG SUBDIVISION

LINE DESCRIPTION

LINE STATUS - Category 5: Continued Operation
TYPE OF LINE - Branch LINE LENGTH IN MILES - 40.3
MAXIMUM WEIGHT LIMIT - 178,000 lbs. MAXIMUM SPEED LIMIT - 10 mph
SERVICE FREQUENCY - As needed, 0 to 6 round trips per week.
YARDS - Blunt and Gettysburg
CONNECTING LINES - Chicago & North Western at Blunt.
HIGHWAYS - Blunt is served by US 14, Onida, Agar and Gorman by US 83 and Gettysburg by US 212.
RAIL WEIGHT - 60 lbs.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 9° at Blunt and 4° elsewhere on the line.
BALLAST - Mostly 1910 gravel or dirt.
BRIDGES AND TRESTLES - 26 pile trestles ranging in length from 1-17 spans and totaling 167 spans.

STATION LOCATIONS

STATIONS	MILES
Blunt	0.0
Onida	15.6
Agar	25.3
Gorman	31.5
Gettysburg	40.3

TRAFFIC CHARACTERISTICS	1975	1979
TRAFFIC DENSITY -	0.11 MGT	0.08 MGT
TRAFFIC DIRECTION -	N/A	73% Orig./27% Term. (1977)

COMMODITIES - Forwarded grain; received fertilizer and farm machinery.

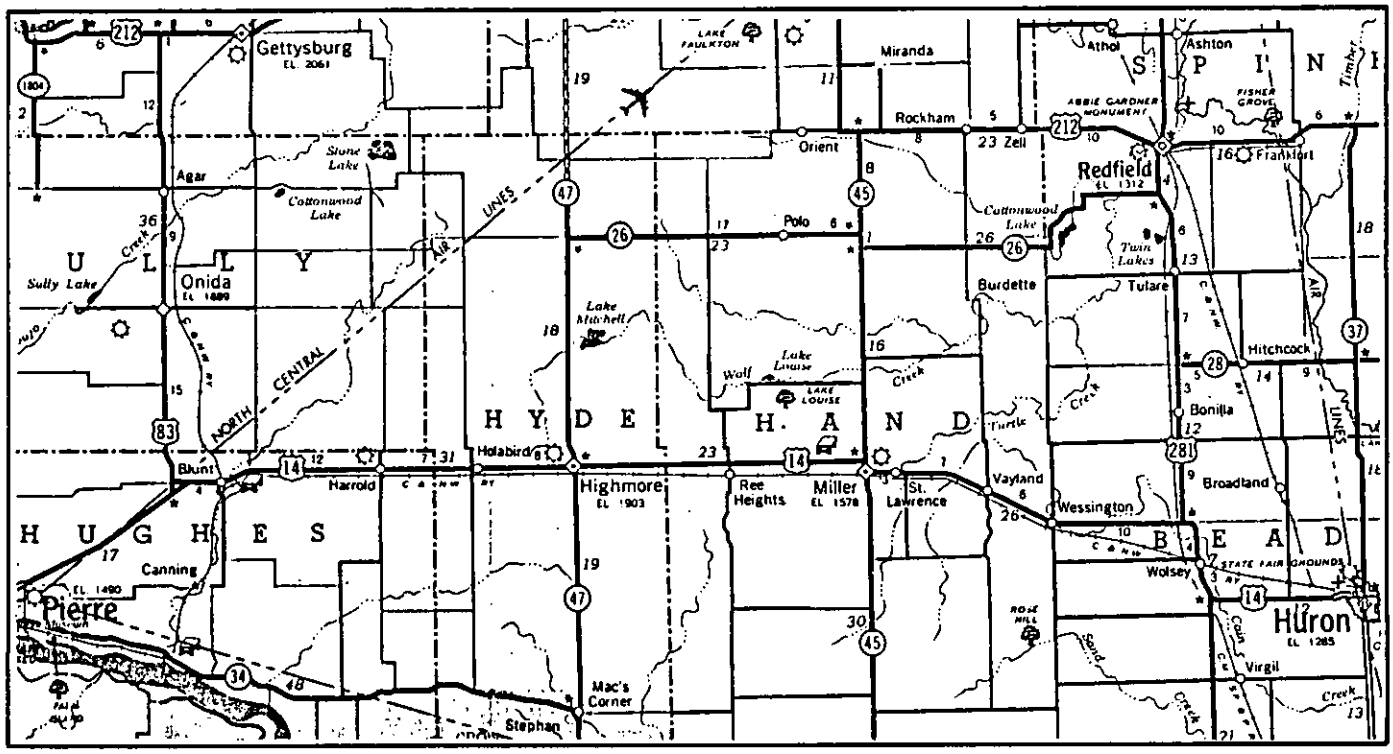
OTHER INFORMATION

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

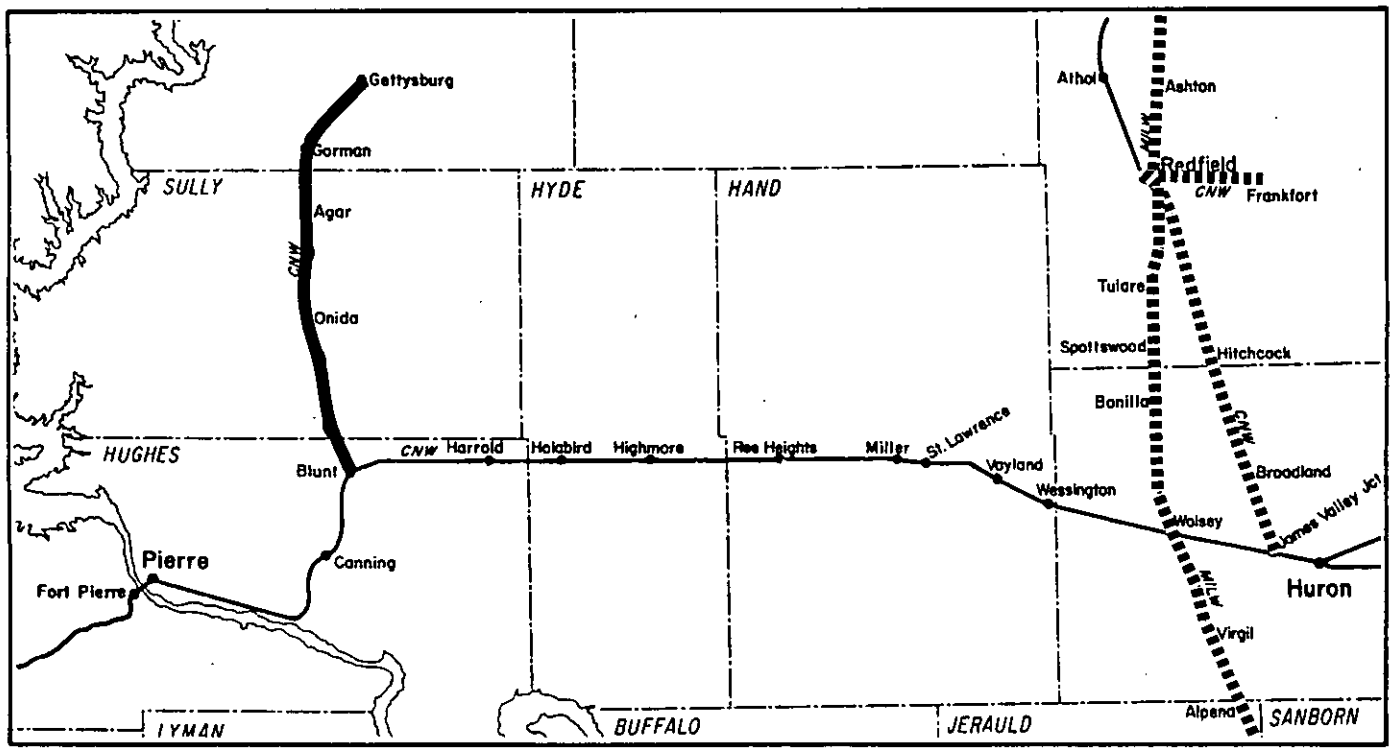
EXHIBIT II (Continued)

SOUTH DAKOTA SEGMENT CN16
BLUNT TO GETTYSBURG

RAILROAD-HIGHWAY LOCATION MAP

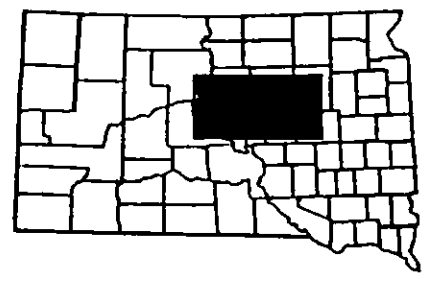


RAILROAD SEGMENT MAP



KEY

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



placed in Category 1. This means that the railroad has designated as potentially subject to abandonment within 3 years, and the northern portion of the line makes the filing of an abandonment application possible within as little as four months. This four month period begans on the date of classification. The short time period, the fact that no economically viable project alternative emerged from the previous study, and continuing shipper interest in preserving rail service resulted in the decision to analyze a new set of alternatives which fall into these categories: continuing service over the entire line; truncating the line at Onida; and abandonment with provisions for continuing rail usage.

Alternatives for continued service to Gettysburg:

- rehabilitation to Class II with rail renewal;
- rehabilitation to Class II without rail renewal with bridge rebuilding; and
- rehabilitation to Class II with rail renewal and bridge rebuilding.

Alternatives for truncation at Onida:

- rehabilitation to Class II without rail renewal and construction of a regional rail loading facility at Onida;
- rehabilitation to Class II with rail renewal; and
- rehabilitation to Class II with rail renewal, bridge rebuilding, and construction of a regional rail loading facility at Onida.

Alternative for abandonment and continued rail usage:

- abandonment and construction of a regional rail loading facility at Blunt.

Subsequent to completion of work on the 1980 RAILPLAN update, an application by shippers to rehabilitate the Blunt to Onida portion of the line was rejected by the Farmers Home Administration (FmHA) on the grounds that the applicant did not control the property for which the loan application was intended. Shippers

at Onida have since indicated their willingness to contribute funds to the rehabilitation of the line. Also, the South Dakota Rail Advisory Commission has indicated its willingness to commit funds to a rehabilitation project should one be found that can be justified by the benefit-cost analysis and other qualitative criteria. The State, railroad, and shippers hope that any project which is selected can be completed in 1981.

When the line was studied as part of RAILPLAN South Dakota 1980, the Commission assigned a priority ranking of 6 to the Blunt to Gettysburg branch line and, specifically, to a project to rehabilitate the portion to Onida to Class II (without rail renewal). This was estimated to be a $393,500 project. Line priorities 1 through 4 were funded during Fiscal Year 1980, and three of these projects are now in various stages of final approval before actual construction during 1981. (The Miles City to Gascoyne project was approved and construction was completed in 1980.)

LINE CHARACTERISTICS - BASE CASE

Line Description

The 40.3-mile Blunt to Gettysburg branch line serves a total of eight grain elevators located at the stations of Onida, Agar, and Gettysburg. These elevators employ a total of 45 people and serve a heavily agricultural area of the State. The Oahe Grain elevator at Onida is one of the State's largest. The line formerly extended from Gettysburg east to Redfield and on to Clark and Watertown, but intermediate segments have been abandoned over the past several years.

Operations and Service

Service is currently provided only on an intermittent basis, and the period between train trips can be as long as 30 days due to track conditions and the associated problems of operations. Current traffic consists solely of originated grain products and terminated fertilizer. Minneapolis is the primary destination for outbound commodities, with incoming traffic originating at a variety of points.

As part of the survey shippers were requested to rate their rail service based on several criteria. A scale of one to five was used, with one signifying an excellent and five indicating an unsatisfactory level of service. The aggregated results for the entire line are as follows:

Service Characteristic	Rating	Service Characteristic	Rating
Local Service Frequency	3.9	Car Supply	4.1
Total Transit Time	3.1	Loss or Damage Frequency	3.3
Service Reliability	4.5	Customer Service	2.8

Overall Rating 3.6

Rail Traffic Volume - 1979

Originating Commodity	Destination	Amount Tons	Cars
Grain	Minneapolis	55,700	928
	Duluth	3,787	63
Grain	Other	813	14
		60,300	1,005

Terminating Commodity	Origination	Amount Tons	Cars
Fertilizer	Miscellaneous	1,147	31

Grand Total for Line	61,447	1,036

Revenues and Costs

The costs of providing rail service were based on estimated on-branch costs, using system average costs, normalized maintenance-of-way costs, and net salvage values. Off-branch rail costs were developed from the individual railroad's Rail Form A costs, depending on the particular origin or destination. Revenues were obtained by calculating the average revenue per ton and multiplying by the number of tons. Both revenues and costs are indexed to an October, 1980 level using the Index of Railroad Prices and Wage Rates published by the Association of American Railroads, and the Price Indexes for Total Railroad Freight published by the Bureau of Labor Statistics of the Department of Commerce.

Revenues:	$1,113,827	Car Day Cost	$ 45,616
Expenses (on-branch):		Car Mile Cost	4,311
Transportation	2,552	Locomotive Ownership	22,105
Fuel	50,074	Return on Investment	9,616
Maintenance of Way	245,000	Total On-Branch Expenses	557,680
Maintenance of Equipment	5,682	Total Off-Branch Expenses	582,872
Train Supplies & Expenses	19,015	Total Expenses	1,140,552
Train Labor	93,318	Profit (Loss)	(26,725)
Miscellaneous	69,799		

Track Conditions

Because of an apparent long history of deferred maintenance, the overall condition of the rail line is extremely poor. The last significant maintenance-of-way work was undertaken in 1974 or 1975. These conditions make regularly scheduled service inadvisable and threaten the safety of train operations over these tracks. Ties originally installed in 1907 are still in place, but have become ineffective. Conditions are particularly poor on the section north of Onida. Ties are buried in either badly fouled ballast or sod, and great numbers have either broken or have rotted away. Tie plates are installed in the curves and on the bridges only, and this results in frequent variations in guage. The line has a 178,000 lb. loading restriction due to bridge conditions, and a 10 mile per hour speed restriction due to track conditions.

Project Alternatives

The following project alternatives are presented as studied. Final selection is based on consideration of both qualitative and quantitative criteria. The result of this is that the alternatives chosen do not necessarily have the highest ratio of benefits to costs. In such cases, qualitative considerations form the primary basis for selecting the recommended alternative.

ALTERNATIVES FOR CONTINUED SERVICE TO GETTYSBURG

Three alternatives were studied for maintaining train service over the entire branch line. In each case, operations would be at a Class II level after the rehabilitation was performed. This would allow an enhanced traffic level to be attained through improved train service. The three alternatives vary by the amount of rehabilitation to be performed, although. Alternative III (which provides for rail renewal and bridge rebuilding) is the only one that would allow long-term operation of the line at Class II speeds with a full 263,000 pound weight. The service and traffic levels shown below are applicable to all three project alternatives which would retain service over the entire line.

Branch Line Rail Service Level

Service frequency dependent on shipper demand.

Branch Line Rail Traffic Level

Originated - 66,331 tons

Terminated - 1,147 tons

Total - 67,478 tons

PROJECT ALTERNATIVE I - REHABILITATION TO CLASS II TO GETTYSBURG WITH RAIL RENEWAL

Description

The economic feasibility of rehabilitating the entire Blunt to Gettysburg branch line (including rail renewal) is analyzed in this Amendment to help complete full consideration of the range of alternatives that exist. The 1980 RAILPLAN included the study of an alternative that also proposed rehabilitation to Class II, but that did not provide for the replacement of the existing light rail. The rail presently in place has a limited useful life expectancy, especially if heavier loading of cars is undertaken. Replacement would enhance the attractiveness of utilizing the rail option because of the increased service frequency and safety which would probably result. Due to bridge conditions on the line, rail renewal would not result in an increase in the line's present weight limit of 178,000 pounds. Cost of the project is estimated at approximately $5,184,000.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$-206,113	$-206,113	$-206,113
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	+1,224	+1,224
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$-199,633	$-198,409	$-198,409
Costs ($)	-	-	-	-	$+766,973
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+10,200	+10,200
Air Pollution (lbs.)	-	-	-	+6,900	+6,900
Benefits Minus Costs *					$-965,382
Benefit/Cost Ratio					-0.26

*Annual Benefit

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.

PROJECT ALTERNATIVE II - REHABILITATION TO CLASS II TO GETTYSBURG (WITHOUT RAIL RENEWAL, WITH BRIDGE REBUILDING)

Description

This alternative would provide for the rehabilitation of the road bed to Class II standards without replacement of the rail. It would, however, include extensive upgrading of the bridges to allow their weight limit to be raised to 263,000 pounds. Operation with heavier cars could not be continued for a long period of time because of the inadequacy of the 60 pound rail to safely support the increased weights. The opportunity to fully utilize jumbo hoppers would be an important incentive for shippers to utilize the rail option, but unless this alternative were accompanied by a program to replace the rail, full advantage of the bridge rebuilding could not be realized. Total cost of the road bed rehabilitation and bridge upgrading is estimated at $2,264,000.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+28,035	$+28,035	$+28,035
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	+1,224	+1,224
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$+34,515	$+35,739	$+35,739
Costs ($)	-	-	-	-	$+334,959
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+10,200	+10,200
Air Pollution (lbs.)	-	-	-	+6,900	+6,900
Benefits Minus Costs*					$-299,220
Benefit/Cost Ratio					+0.11

*Annual Benefit

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.

PROJECT ALTERNATIVE III - REHABILITATION TO CLASS II TO GETTYSBURG (WITH RAILROAD BRIDGE REBUILDING)

Description

This alternative analyzes a project which would incorporate all rehabilitation needed to place the line in Class II operating condition for an extended period of time. Specifically, this project would include replacement of the rail, rebuilding of the bridges, and extensive upgrading of the road bed. When completed, safe operation at Class II speeds with fully loaded covered hoppers would be possible. The cost of this project is estimated at approximately $6,184,000.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$-221,633	$-221,633	$-221,633
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	+1,224	+1,224
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$-215,153	$-213,929	$-213,929
Costs ($)	-	-	-	-	$+914,923
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+10,200	+10,200
Air Pollution (lbs.)	-	-	-	+6,900	+6,900
Benefits Minus Costs *					$-1,128,852
Benefit/Cost Ratio					-0.23

*Annual Benefit

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.

ALTERNATIVES FOR TRUNCATION AT ONIDA

Three alternatives were studied for truncating the line at Onida and abandoning the portion between Onida and Gettysburg. Each alternative included construction of a regional rail loading facility at Onida to provide abandoned stations with an accessible rail shipping option. For this analysis, it was assumed that the existence of this facility would attract traffic at an enhanced level equal to that if the entire line to Gettysburg were operated. The basis for this assumption was the belief that the improved service to the regional facility would represent an economical incentive to ship by rail. The advantages of this range of alternatives would be a reduction in both operating expenses and project costs. The service and traffic levels are shown below.

Branch Line Rail Service Level

Service frequency dependent on shipper demand.

Branch Line Rail Traffic Level

Originated - 66,331 tons

Terminated - 1,147 tons

Total - 67,478 tons

PROJECT ALTERNATIVE IV - LINE TRUNCATION AT ONIDA, REHABILITATION TO CLASS II (WITHOUT RAIL RENEWAL), AND CONSTRUCTION OF A REGIONAL RAIL LOADING FACILITY AT ONIDA

Description

This alternative would include abandoning the Blunt to Gettysburg branch line north of Onida, rehabilitating the remaining segment, and constructing a regional rail loading facility at Onida to serve shippers on the abandoned portion of the line. The portion of the line that would be abandoned under this alternative has suffered more physical deterioration than the portion that would be retained. Nevertheless, $393,500 is the expected cost to rehabilitate the remaining track to Class II standards. This estimate does not include provisions for any rail renewal. The estimated cost of constructing the regional rail loading facility is $425,000. Two shippers located at Onida have indicated a willingness to participate in the financing of a rehabilitation project in an attempt to preserve their rail service. A large concrete grain elevator, one of the largest in South Dakota, is located at Onida.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+251,081	$+251,081	$+251,081
Secondary Efficiency Benefits					
Income ($)	-	-	+6,408	+6,408	+6,480
Highway Costs ($)	-	-	-	+2,673	+2,673
Taxes ($)	-	-	-	+1,561	+1,561
Net Salvage Value ($)	$+148	-	-	-	+148
Other:	-	-	-	-	-
Total Benefits ($)	$+148	-	$+257,561	$+261,795	$+261,943
Costs ($)	-	-	-	-	$+121,097
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+13,006	+13,006
Air Pollution (lbs.)	-	-	-	+4,380	+4,380
Benefits Minus Costs *					$+140,846
Benefit/Cost Ratio					+2.16

*Annual Benefit

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.

PROJECT ALTERNATIVE V - LINE TRUNCATION AT ONIDA, REHABILITATION TO CLASS II (WITH RAIL RENEWAL), AND CONSTRUCTION OF A REGIONAL RAIL LOADING FACILITY AT ONIDA

Description

This alternative would include all the work proposed under Project Alternative IV with the addition of rail renewal. This is one of three steps needed to allow the operation of fully loaded covered hoppers at Class II speeds. The other steps are rehabilitation of the road bed and rebuilding of the bridges. This project alternative would perform two of the steps, but would not provide for bridge rebuilding. Until this is done, the current weight limitation would remain in effect. The cost of this project is estimated at approximately $2,379,000.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+157,286	$+157,286	$+157,286
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	+2,673	+2,673
Taxes ($)	-	-	-	+1,561	+1,561
Net Salvage Value ($)	$+148	-	-	-	+148
Other:	-	-	-	-	-
Total Benefits ($)	$+148	-	$+163,766	$+168,000	$+168,148
Costs ($)					$+351,973
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+13,006	+13,006
Air Pollution (lbs.)	-	-	-	+4,380	+4,380
Benefits Minus Costs*					$-183,825
Benefit/Cost Ratio					+0.48

*Annual Benefit

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PROJECT ALTERNATIVE VI - LINE TRUNCATION AT ONIDA, REHABILITATION TO CLASS II (WITH RAIL RENEWAL AND BRIDGE REBUILDING), AND CONSTRUCTION OF A REGIONAL LOADING FACILITY AT ONIDA

Description

This project includes performing all rehabilitation work required to place the Onida line in Class II operating condition for an extended period of time. Upon completion of the work, fully loaded covered hoppers could be operated at Class II speeds. The cost of this project is estimated at approximately $3,179,000.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+146,490	$+146,490	$+146,490
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	+2,673	+2,673
Taxes ($)	-	-	-	+1,561	+1,561
Net Salvage Value ($)	$+148	-	-	-	+148
Other:	-	-	-	-	-
Total Benefits ($)	$+148	-	$+152,970	$+157,204	$+157,352
Costs ($)					$+470,333
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+13,006	+13,006
Air Pollution (lbs.)	-	-	-	+4,380	+4,380
Benefits Minus Costs *					$-312,981
Benefit/Cost Ratio					+0.33

*Annual Benefit

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ALTERNATIVE FOR ABANDONMENT AND CONTINUED RAIL USAGE

PROJECT ALTERNATIVE VII - ABANDONMENT AND CONSTRUCTION OF A REGIONAL RAIL LOADING FACILITY AT BLUNT

Description

This project would involve abandoning the Blunt to Gettysburg branch line and continuing the rail option for shippers through the construction of a regional rail loading facility at Blunt, on the C&NW secondary main line. The loading facility is estimated to cost approximately $425,000.

The regional rail loading facility would be designed as a gathering point for grain shipments moving from stations currently served by the line. Under this project, grain would be shipped via motor carrier to the facility where it would be held for loading in rail cars. The Pierre to Huron line segment currently has a weight limit of 251,000 pounds, thereby allowing the use of light-loaded covered hoppers. A major rehabilitation project is planned for this line in 1981, using Section 803 and C&NW funds. South Dakota has received Federal Rail Administration approval of its project application for this, and the State is now awaiting a final decision by the C&NW to participate. This project will improve train operating speeds and may also improve the quality of service provided to on-line shippers (including this regional facility).

This project is designed to avoid the large expense of rehabilitating the branch line and at the same time enable retention of the traffic for South Dakota's operating railroads. Because the regional facility will receive a higher level of rail service than is currently provided over the branch line, it was assumed that a level of rail shipments exceeding the 1979 volume would result. Another significant advantage to this project alternative is the avoidance of on-branch rail costs. This factor, combined with the expected retention of shipments through the regional facility, results in making this an attractive alternative from the benefit/cost analysis perspective. Because on-branch rail costs generally exceed the cost of transporting the same volume to the interchange point via motor carrier, a project of this type would typically be attractive if the traffic can be retained as rail traffic.

Branch Line Rail Service Level

None.

Branch Line Rail Traffic Volume

None.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+358,775	$+358,775	$+358,775
Secondary Efficiency Benefits					
Income ($)	-	-	+6,480	+6,480	+6,480
Highway Costs ($)	-	-	-	+7,754	+7,754
Taxes ($)	-	-	-	+3,718	+3,718
Net Salvage Value ($)	+296	-	-	-	+296
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$+365,255	$+361,219	$+361,515
Costs ($)	-	-	-	-	$+62,879
Other:					
Jobs	-	-	+20	+20	+20
Energy (Gallons)	-	-	-	+30,982	+30,982
Air Pollution (lbs.)	-	-	-	+13,820	+13,820
Benefits Minus Costs *					$+298,636
Benefit/Cost Ratio					+5.75

*Annual Benefit

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SUMMARY OF BENEFITS AND COSTS

Alternatives for Continued Service to Gettysburg

TYPE OF IMPACT	Rehabilitation with Rail Renewal	Rehabilitation with Bridge Rebuilding	Rehabilitation with Rail & Bridge		
Primary Efficiency Benefits ($)	$-206,113	$+28,035	$-221,633		
Secondary Efficiency Benefits					
Income ($)	+6,480	+6,480	+6,480		
Highway Costs ($)	-	-	-		
Taxes ($)	+1,224	+1,224	+1,224		
Net Salvage Value ($)	-	-	-		
Other:	-	-	-		
Total Benefits ($)	$-198,409	$+35,739	$-213,929		
Costs ($)	$+766,973	$+334,959	$+914,923		
Other:					
Jobs	+20	+20	+20		
Energy (Gallons)	+10,200	+10,200	+10,200		
Air Pollution (lbs.)	+6,900	+6,900	+6,900		
Benefits Minus Costs	$-965,382	$-299,220	$-1,128,852		
Benefit/Cost Ratio	-0.26	+0.11	-0.23		

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Alternatives for Truncation at Onida and Alternative for Abandonment and Continued Rail Usage

TYPE OF IMPACT	Rehabilitation without Rail Renewal	Rehabilitation with Rail Renewal	Rehabilitation with Rail Renewal & Bridge Rebuilding	Abandon Blunt Loading Facility	
Primary Efficiency Benefits ($)	$+251,081	$+157,286	$+146,490	$+358,775	
Secondary Efficiency Benefits					
Income ($)	+6,480	+6,480	+6,480	+6,480	
Highway Costs ($)	+2,673	+2,673	+2,673	+7,754	
Taxes ($)	+1,561	+1,561	+1,561	+3,718	
Net Salvage Value ($)	+148	+148	+148	+296	
Other:	-	-	-	-	
Total Benefits ($)	$+261,943	$+168,148	$+157,352	$+361,515	
Costs ($)	$+121,097	$+351,973	$+470,333	$+62,879	
Other:					
Jobs	+20	+20	+20	+20	
Energy (Gallons)	+13,006	+13,006	+13,006	+30,982	
Air Pollution (lbs.)	+4,380	+4,380	+4,380	+13,820	
Benefits Minus Costs	$+140,846	$-183,825	$-312,981	$+298,636	
Benefit/Cost Ratio	+2.16	+0.48	+0.33	+5.75	

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IMPACTS ASSESSMENT

Of the project alternatives studied, two offer the potential of returning their cost within the 10-year analysis period. Alternative VII, abandoning the line and constructing a regional loading facility at Blunt, is the strongest option based solely on the criteria of quantitative analysis. Alternative IV, however, also appears to be economically justified and offers a pay-back period of 4.6 years. The differences in analysis results are primarily a function of varying project costs which not only directly affect the ratio of benefits to costs but also affect the primary efficiency benefits. The truncation projects differ from the continued service cases in the areas of project costs, rail service costs, and the truck costs that are incurred to transport commodities formerly moved by rail. All projects were analyzed relative to a constant base case of rail service continuing at the present level. The abandonment alternative analysis results show that substantial benefits can be gained by avoiding on-branch rail costs while continuing to ship by rail from another station. These benefits are due to the fact that the on-branch costs exceed the cost of shipping the same commodities the same distance via motor carrier. If provisions were not made to maintain the rail option, significant disbenefits would result from having to utilize long haul trucking. Because two alternatives have benefit/cost ratios exceeding 1.0, the choice of the preferred option must reflect qualitative criteria such as the value placed on at least a partial retention of train operations on the branch line.

CN13 WATERTOWN TO CLARK

BACKGROUND

The Watertown to Clark branch line extends west from Watertown for a total of 29.5 miles through a largely agricultural region of South Dakota. A description of the line was prepared as part of the 1980 rail planning process, and is reprinted here as Exhibit III. On June 10, 1980, the Chicago and North Western railroad filed an application with the Interstate Commerce Commission to abandon the Watertown to Clark line. Cited as the reasons for the application were the poor physical condition of the line, the current traffic level, and the unprofitability of operations. The C&NW does not expect any of these conditions to change.

On November 25, 1980, a study team composed of representatives of the South Dakota Division of Railroads; Peat, Marwick, Mitchell & Co.; and T.K. Dyer Inc. surveyed the line. To gather data necessary to perform the benefit/cost analysis, frequent inspections of track conditions were made, and shippers were surveyed. A copy of the report prepared by T.K. Dyer, Inc., as a result of this inspection is included as an Appendix to this report. A meeting was then held with interested citizens and shippers in which local concerns were communicated to the study team.

Shippers believe that the continued operation of the railroad is necessary to enable them to compete in the marketplace. The vast majority of traffic consists of forwarded grain destined for the primary markets of Minneapolis and Duluth, and elevator operators claim that a market penalty of approximately $0.15 per bushel exists when commodities traditionally shipped by rail must instead be shipped by motor carrier. This penalty is finally borne by the farmer, because higher transportation costs are passed on by the grain elevator in the form of lower prices paid to the producers. When other elevators in the same area are able to retain their rail service and offer the farmer better prices, the abandoned elevator is often placed at a competitive disadvantage. For instance, area elevators located at Vienna, Willow Lake, and Watertown will retain their rail service for the foreseeable future, and each is able to ship in multiple car lots, further improving the price which can be offered to the farmer.

Faced with rail abandonment, elevators in South Dakota have taken a variety of options, including closing, trucking grain to a nearby railhead, and converting to truck for the entire length of haul. In some cases, the destination of traffic may change when the conversion to truck is made. This is especially so in

EXHIBIT III

SOUTH DAKOTA SEGMENT - CN13

WATERTOWN TO CLARK
CHICAGO & NORTH WESTERN - CENTRAL DIVISION - WATERTOWN SUBDIVISION

LINE DESCRIPTION

LINE STATUS - Category 3: Pending Abandonment Approval
TYPE OF LINE - Branch LINE LENGTH IN MILES - 31.1
MAXIMUM WEIGHT LIMIT - 210,000 lbs. MAXIMUM SPEED LIMIT - 10 mph
SERVICE FREQUENCY - Irregular
YARDS - Watertown
CONNECTING LINES - Chicago & North Western and Burlington Northern at Watertown.
HIGHWAYS - US 212 parallels and serves the stations.
RAIL WEIGHT - 72 lbs.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 3°
BALLAST - About 12 miles dirt and the remainder gravel which was placed in 1916 and 1917.
BRIDGES AND TRESTLES - 3 pile trestles which are 4 or 6 spans each and one bridge which is a combination I Beam and 4 spans of pile trestles.

STATION LOCATIONS

STATIONS	MILES
Watertown	0.0
Kampeska	8.1
Henry	18.0
Elrod	23.5
Clark	31.1

TRAFFIC CHARACTERISTICS	1975	1979
TRAFFIC DENSITY -	0.02 MGT	0.01 MGT
TRAFFIC DIRECTION -	81% Orig./19% Term.	79% Orig./21% Term. (1977)

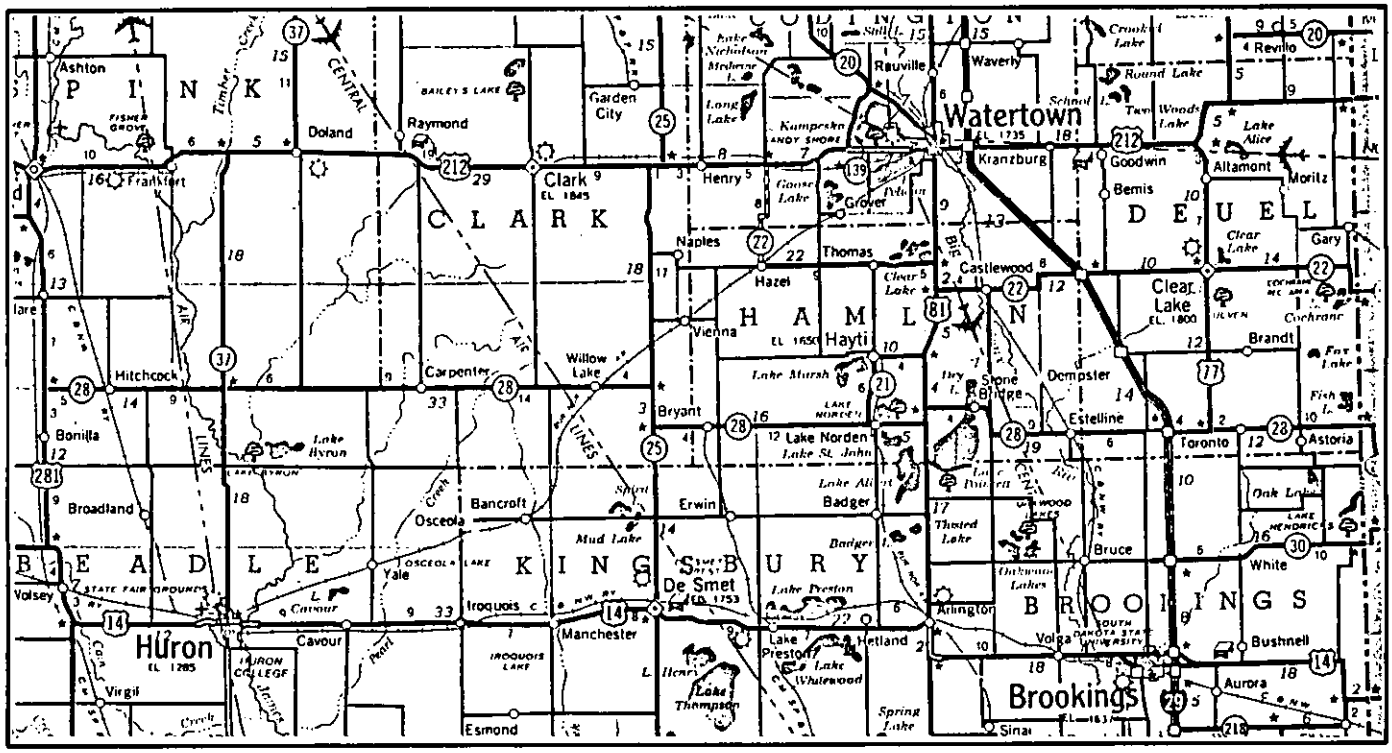
COMMODITIES - Forwarded grain; received fertilizer.

OTHER INFORMATION

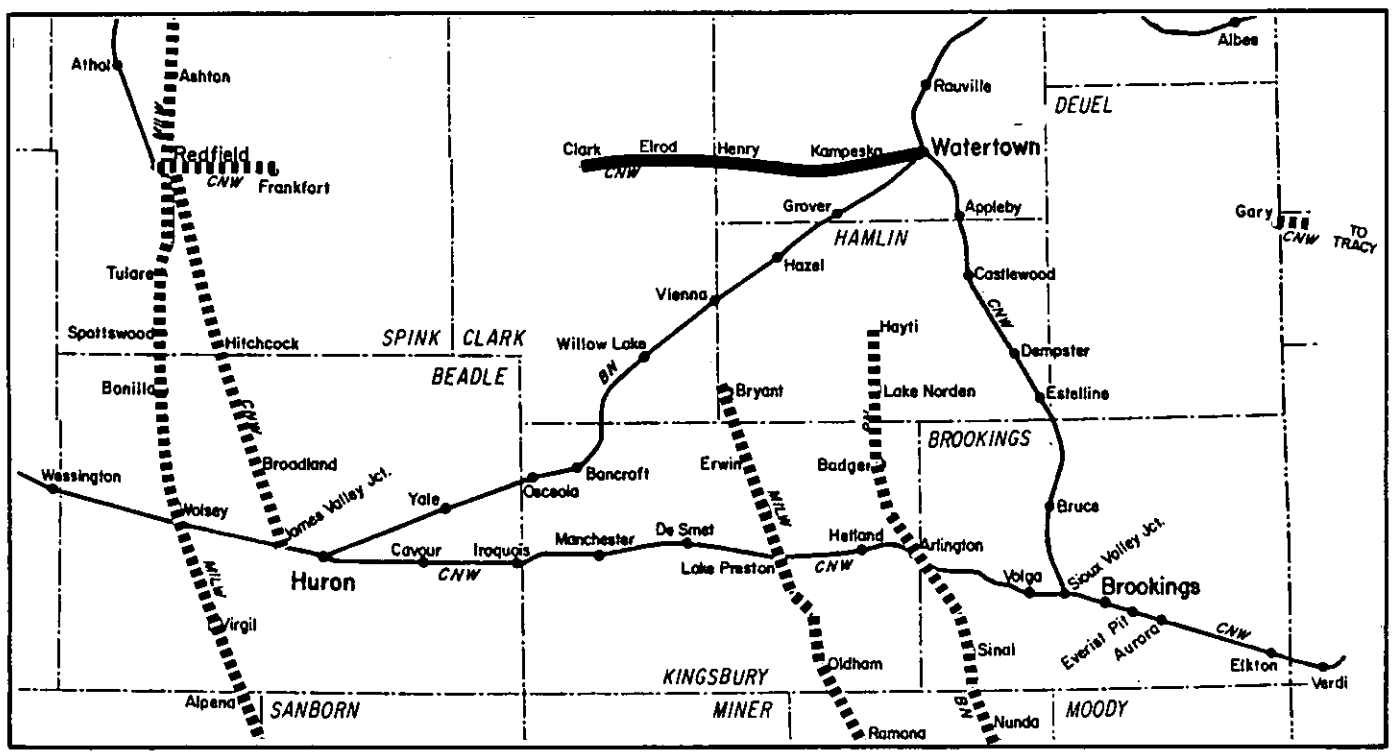
The ICC issued an abandonment certificate for the Clark to Doland portion of this line, but denied the petition for abandonment of the Clark to Watertown portion. The South Dakota Rail Line Inventory Study found that minimal impacts would result from abandonment of this line, based on 1977 traffic data.

EXHIBIT III (Continued)
SOUTH DAKOTA SEGMENT CN13
WATERTOWN TO CLARK

RAILROAD-HIGHWAY LOCATION MAP

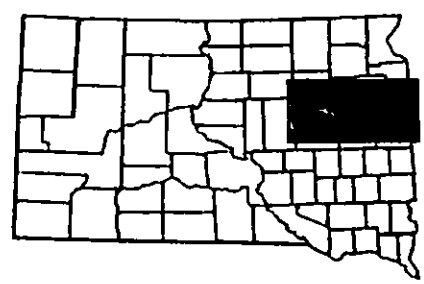


RAILROAD SEGMENT MAP



KEY

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



the case of corn which might normally be shipped by rail to ports in the Pacific Northwest, but which is sent to cities such as Sioux City, Minneapolis, or Duluth when the rail option is lost. Elevators located on the Watertown to Clark line indicated that in most cases motor carriers will be used to replace rail service if the line is abandoned. In many cases, conversations with the elevators and other rail users indicate that traffic has been diverted to motor carriers as rail service has declined over the past several years. Consequently, several shippers continue to use the railroad only for commodities that have a clear economic advantage to be shipped by rail and then only if service criteria can be met.

LINE CHARACTERISTICS - BASE CASE

Line Description

The Watertown to Clark line serves shippers located at Clark and Henry. A grain elevator is also located at Kampeska and originated some traffic during 1979 as an overflow facility for a Watertown elevator. The owner of this elevator indicated that he does not plan to use it further. The base case scenerio has been adjusted to reflect these plans to accurately portray a possible base case traffic level, if service is continued. The service area is overwhelmingly agricultural and the location of an industry on the line that would use rail service is not anticipated. Chef Reddy foods, a shipper of frozen french fries via motor carrier, is located at Clark and does not use the line because of the lack of a refrigerated box car supply.

Operations and Service

Service is provided over the line at an average frequency of less than once per week. Traffic consists of originated grain and received fertilizer, farm machinery, and a small amount of miscellaneous commodities. The primary destination for orignated traffic is Minneapolis, while terminated traffic comes from areas such as Iowa, Pennsylvania, Nebraska and Kansas.

Shippers were requested to rate their rail service based on general criteria. A scale of one to five was used, with one signifying excellent and five indicating an unsatisfactory level of service. The aggregated results were as follows:

Service Characteristics	Rating	Service Characteristics	Rating
Local Service Frequency	3.3	Car Supply	3.7
Total Transit Time	2.9	Loss or Damage Frequency	2.8
Service Liability	3.1	Customer Service	3.4

Overall Rating 3.2

Rail Traffic Volume - Base Case

Originating

Commodity	Destination	Tons	Cars
Grain	Minneapolis	6634	109
	Miscellaneous	2387	41
	Total	9021	150

Terminating

Commodity	Origination	Tons	Cars
Fertilizer	Miscellaneous	697	10
Implements	Miscellaneous	105	9
Miscellaneous	Miscellaneous	231	6
	Total	1033	25

Grand Total For Line - 10,054 Tons
- 175 Cars

Revenues and Costs

The costs of providing rail service were based on estimated on-branch costs, using system average costs, normalized maintenance-of-way costs, and net salvage values. Off branch rail

costs were developed from the individual railroad's Rail Form A costs depending on the particular origin or desintation. Revenues were obtained by calculating the average revenue per ton and multiplying this by the number of tons. Both revenues and costs were indexed to an October 1980 level using the Indexes of Railroad Material Prices and Wage Rates, published by the Association of American Railroads, and the Price Indexes for Total Railroad Freight, published by the Bureau of Labor Statistics of the De- Department of Commerce.

Revenues:	$188,117	Car Day Cost	$16,512
Expense (on-branch):		Car Mile Cost	534
Transportation	436	Locomotive Ownership	3,751
Fuel	8,498	Return on Investment	37,157
Maintenance of Way	206,500	Total On Branch Expenses	323,974
Maintenance of Equipment	970	Total Off-Branch Expenses	94,582
Train Supplies of Expenses	6,453	Total Expenses	418,556
Train Labor	31,672	Profit (Loss)	(230,439)
Miscellaneous	11,491		

Track Conditions

The physical condition of this branch line has deteriorated below FRA Class I standards which limit operating speeds to a maximum of 10 miles per hour. There is a need for approximately 190 ties per mile, plus 103 switch ties, additional ties in auxiliary track, and occasional replacement of defective rail to restore the line to a minimum operating condition. Many second-hand ties have been installed during the past few years, but the failure of other ties which were not replaced caused the majority of the line's deterioration.

Project Alternatives

The following project alternatives are presented as studied. Final selection is based on consideration of both qualitative and quantitative criteria. The result of this is that the alternatives chosen do not necessarily have the highest ratio of benefits to costs. In such cases, qualitative considerations form the primary basis for selecting the recommended alternative.

PROJECT ALTERNATIVE I - ABANDONMENT

An alternative available to affected shippers, communities, and the State of South Dakota would be to allow the Watertown to Clark branch line to be abandoned and to take no action to preserve service. The abandonment should be considered to occur within a short period of time. This alternative was studied to measure the economic impact of abandonment and to understand its effect. The line exists in an area of the State that has other operating rail lines within a reasonable distance, primarily at Watertown, Vienna, and Willow Lake, where multiple car grain loading facilities exist. It was indicated by some receivers of traffic that Watertown would probably be used as a railhead and that the traffic would be sent via motor carrier for the remaining distance. Some outbound traffic is also expected to be trucked to Watertown or another railhead, and transferred to rail cars.

Branch Line Service Level

None.

Branch Line Traffic Volume

None.

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+137,869	$+137,869	$+137,869
Secondary Efficiency Benefits					
Income ($)	-	-	-1,346	-1,346	-1,346
Highway Costs ($)	-	-	-	-1,269	-1,269
Taxes ($)	-	-	-	+381	+381
Net Salvage Value ($)	+52,860	-	-	-	+52,860
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$+136,523	$+135,635	$+188,495
Costs ($)	-	-	-	-	-
Other:					
Jobs	-	-	-6	-6	-6
Energy (Gallons)	-	-	-	+3174	+3174
Air Pollution (lbs.)	-	-	-	+1062	+1062
Benefits Minus Costs *	-	-	-	-	$+188,495
Benefit/Cost Ratio					-

* Annual Benefit

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PROJECT ALTERNATIVE II - REHABILITATION TO CLASS I

This project alternative provides for sufficient rehabilitation of the Watertown to Clark branch line track to restore it to a FRA Class I condition and allow continued operations at a maximum speed of 10 miles per hour. All traffic contained in the base case would be retained under this option, but service would not be at a level high enough to attract traffic that has been diverted to motor carriers. The project cost is estimated to be approximately $411,510.

Branch Line Service Level

One round trip weekly.

Branch Line Traffic Volume

Originated	- 9,021 tons
Terminated	- 1,033 tons
Total	- 10,054 tons

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$ +14,491	$+14,491	$+14,491
Secondary Efficiency Benefits					
Income ($)	-	-	-	-	-
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	-	-
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$ +14,491	$+14,491	$+14,491
Costs ($)	-	-	-	-	$+60,883
Other:					
Jobs	-	-	-	-	-
Energy (Gallons)	-	-	-	-	-
Air Pollution (lbs.)	-	-	-	-	-
Benefits Minus Costs *	-	-	-	-	$-46,392
Benefit/Cost Ratio					+0.24

* Annual Benefit

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PROJECT ALTERNATIVE III - REHABILITATION TO CLASS II

This alternative includes a significant upgrading of the Watertown to Clark branch line to allow 25 mile-per-hour speeds and a 263,000 pound weight limit. This would permit fully loaded covered hoppers to be operated and the service level increased so that additional traffic could be captured. The 210,000 pound limit, a result of the line condition, results in the predominant use of box cars for the transport of grain. The line is currently laid with 72 pound rail which, in the opinion of T.K. Dyer, Inc., is not capable of supporting an operation at the above speeds and weight limits. Thus, the entire line would have to be re-laid with 100-112 pound rail. The estimated cost of this project would be approximately $4,980,533.

Branch Line Service Level

Service frequency determined by service demand.

Branch Line Traffic Volume

Originated	-	23,532 tons
Terminated	-	1,033 tons
Total	-	24,565 tons

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$-113,607	$-113,607	$-113,607
Secondary Efficiency Benefits					
Income ($)	-	-	+1,594	+1,594	+1,594
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	+636	+636
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$-112,013	$-111,377	$-111,377
Costs ($)	-	-	-	-	$+736,870
Other:					
Jobs	-	-	+4	+4	+4
Energy (Gallons)	-	-	-	+5,304	+5,305
Air Pollution (lbs.)	-	-	-	+1,793	+1,793
Benefits Minus Costs *	-	-	-	-	$-848,247
Benefit/Cost Ratio					-0.15

*Annual Benefit

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SUMMARY OF BENEFITS AND COSTS

TYPE OF IMPACT	ABANDON	Rehabilitation I	Rehabilitation II		
Primary Efficiency Benefits ($)	$+137,869	$+14,491	$-113,607		
Secondary Efficiency Benefits					
Income ($)	-1,346	-	+1,594		
Highway Costs ($)	-1,269	-	-		
Taxes ($)	+381	-	+636		
Net Salvage Value ($)	+ 52,860	-	-		
Other:	-	-	-		
Total Benefits ($)	$+188,495	$+14,491	$-111,377		
Costs ($)	-	$+60,883	$+736,870		
Other:					
Jobs	-6	-	+4		
Energy (Gallons)	+3,174	-	+5,305		
Air Pollution (lbs.)	+1,062	-	+1,793		
Benefits Minus Costs *	$+188,495	$-46,392	$-848,247		
Benefit/Cost Ratio	-	+0.24	-0.15		

*Annual Benefit

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IMPACTS ASSESSMENT

The most economically attractive alternative resulting from the benefit/cost analyses is the abandonment of the Watertown to Clark branch line. Although analysis of line rehabilitation option to FRA Class I standards resulted in a positive ratio of benefits to costs, a period of over 41 years would be required to pay back the project cost. Rehabilitation to higher, Class II standards would never result in a return of the project cost. A benefit/cost ratio for the abandonment alternative cannot be computed due to the absence of a project cost, but a study of the diversion of rail traffic to other modes (based on the shipper survey) shows that, when all factors are considered, on economic benefit of utilizing other transportation modes exists. This is due to low rail traffic volumes, high on-branch rail costs and competitive motor carrier rates. The truck to rail head option is also economically attractive.

APPENDIX A

FIELD INSPECTION
Watertown to Clark

TABLE OF CONTENTS

THOMAS K. DYER, INC.

Memorandum

A field inspection of the Chicago and North Western Transportation Company trackage between Watertown and Clark, South Dakota was conducted November 25, 1980.

The field inspection was conducted by:

Mark Roddvold	State of South Dakota Division of Railroads
Tobius Wolf	State of South Dakota Division of Railroads
C. M. Randall	Peat, Marwick, Mitchell & Company
B. J. Kersey	Thomas K. Dyer, Inc.

The inspection methodology was periodic sampling of track segments. The sampling was obtained by driving in a State owned automobile to open public grade crossings. From the road crossings, the track inspection was conducted by walking the track section a minimum of 500 feet in at least one direction from the crossing. Photographs were taken to support the inspection findings and to assist in memory recall.

Field notes apropos to the inspection are as follows:

M.P. 322.1 - 72.01 lb. rail rolled in 1903, laid this line segment 1920. Mostly sawed 28 ft. sections. Rail exhibits less than 1/32 inch end batter, minimal head flow and less than five percent loss of head secton to wear.
Dirt ballast section 100 percent infested with grasses and weeds.
Five nondefective ties per rail panel average.. Tie condition meets FRA Track Safety Standards Class 1.
Line and surface meet FRA Track Safety Standards Class 1.

M.P. 324-324.1 - 16 ties per 30 ft. panel - 11 to 12 defective ties per panel. Maximum four defective ties in a row. Tie condition less than FRA Track Safety Standards Class 1.
Vertical split head rail in public grade crossing. Meets FRA Track Safety Standards Class 1. 2 to 3 inch elevation in 2 degree curve with a designated elevation of 1/2 inch. Meets FRA Track Safety Standards Class 1.
Flange rail and asphalt crossing in fair condition. Line segment has been recently mowed in track section.

Kampeska - No. 10 - 72 lb. turnout. 15 ft. rigid frog and 15 ft. switch points. Right hand point (open) 75 lb. 60 percent switch ties defective. Cracked heal filler block on frog. Four defective ties in a row. Average 11 defective ties per panel. Tie condition does not meet FRA Track Safety Standards Class 1.
Line and surface meet FRA Track Safety Standards Class 2.

Bridge D-375 (M.P. 330) - 4 panel ODPT. Framed bents using second hand 14 inch by 14 inch caps. 3 ply chord using 10 inch by 18 inch stringers. Bridge deck in fair to good condition.

M.P. 330.3 - 8 to 9 defective ties in a row. Tie condition less than FRA Track Safety Standards Class 1. Cinder ballast evident. Track section filled to top of rail with dirt.
Track drainage ditches partially blocked. 2 to 3 inches cross level noted in tangent track. Surface meets FRA Track Safety Standards Class 1. Line of the track meets FRA Track Safety Standards Class 2.

M.P. 332.0 - U.S. Highway 212 crossing. 100 lb. jointed rail through the crossing. Flange rail and asphalt crossing in good condition. Crossing equipped with flashing light signals and bell in good operating condition. Equipment is old style General Railway Signal (GRS).

Bridge D-384 1/2 (M.P. 335.2) - 4 panel ODPT and 22 ft. I Beam Span over county road. Piling in good condition. Stringers exhibiting splitting and cracking. Helper stringers evident. Deck ties spliting and exhibiting spike hole rot. Bridge humped in relation to track section. 3 inch cross level in tangent track easterly of the bridge. Track surface meets FRA Track Safety Standards Class 1. 4 defective ties in a row noted. Average of 11 defective ties per panel. Tie condition less than FRA Track Safety Standards Class 1.

Henry - Rail swinging 4 inch above bedded ties. Track surface less than FRA Track Safety Standards Class 1. 8 defective ties per panel average. Tie condition meets FRA Track Safety Standards Class 2.
Vertical split head rail in joint area, rail head partially broken out. This rail condition does not meet FRA Track Safety Standards Class 1. No. 10 - 72 lb. turnouts. 65 percent of the switch ties defective. Switch tie condition less than FRA Track Safety Standards Class 1.

M.P. 340.1 - 6 and 7 defective ties in a row. Tie condition less than FRA Track Safety Standards Class 1. Average 12 defective ties per panel.

M.P. 340.2 - Markings on surface of public grade crossing indicate locomotive "pilot" striking crossing surface when train operated at this location. Track ties found to be hollow. Average 12 defective ties per panel. Tie condition less than FRA Track Safety Standards Class 1.
6 to 8 inches of longitudinal rail movement in both directions evidenced by slewed tie condition.

M.P. 342.1 - Rail through public grade crossing loose, indicating track structural subsidence and/or defective ties.
Stripped joint noted. This condition less than FRA Track Safety Standards Class 1. 9 defective ties per panel. Tie condition meets FRA Track Safety Standards Class 1. Gravel ballast evident, however it is heavily fouled and muddy when wet.
Track section 100% infested with weeds and grasses. Line segment has been recently mowed in the track section. Flange rail and asphalt crossing constructed to railroad's latest standard in very good condition on the surface.

M.P. 346.2 - Flange rail and asphalt public grade crossing in good condition. 9 defective ties per panel average. Tie condition meets FRA Track Safety Standards Class 1. Gravel ballast evident. Heavily fouled. Track section 100% infested with weeds and grasses.

Clark - Vertical split head rail in U.S. Highway 212 crossing. This condition less than FRA Track Safety Standards Class 1. 50% switch ties defective. 8 track ties defective per panel. Tie condition meets FRA Track Safety Standards Class 1.
Gravel ballast evident, heavily fouled. Track 60% infested with weeds and grasses.

SUMMARY

The rail line between Watertown and Clark, South Dakota is a single track railroad over which trains operate in both directions. The line segment consists of 29.5 miles (M.P. 321.5-M.P. 351.0) of main track and 1.9 miles of auxiliary tracks.

The line is not equipped with either a signal system or a communication line used to govern train movements. Trains operate per train order, time table instructions, general orders and special instructions.

The line segment has a current maximum speed restriction of 10 MPH. The line segment is further restricted to a maximum weight of 210,000 lbs. for rolling stock.

The line segment is constructed predominately of 72.01 lb. rail rolled between 1903 and 1907 and laid between 1917 and 1920. 100 lb. and 90 lb. rail of various ages and laid in different years is in use through the significant public grade crossings. The auxiliary tracks are laid with 52 lb. and 60 lb. rail which predates the 72 lb.

The existing rail is satisfactory for the current level of operations. However, to increase the weight restriction on the line to 263,000 lb. it will be necessary to relay the line with heavier rail.

Rail joints for the line segment are 95 percent fully and tightly bolted (four hole joint bars).

There are no rail anchors on the line segment. Consequently, longitudinal rail movement is evident in some areas.

The line segment is approximately 80% tie plated using single shoulder type. 6 inch by 7 1/2 inch and 7 inch by 9 1/4 inch plates noted.

Four track spikes per tie is the normal spiking pattern for the line segment.

Track ties for the line segment are 6 inch by 8 inch by 8 feet 6 inch predominately. 7 inch by 9 inch by 8 feet 6 inch ties were noted. These latter ties were second hand when applied to this line segment. It is estimated that 8 percent of the existing ties are recoverable for reuse in railroad track structure. It is further estimated that 32 percent of the existing ties are recoverable for reuse in landscaping or related usage.

Existing tie condition varies from less than FRA Track Safety Standards Class 1 up to Class 2. The majority of the line being Class 1 or sub Class 1.

The line segment averages 60 percent defective switch ties. This tie condition varies between FRA Track Safety Standards Class 1 and sub Class 1 over the entire line segment. It is estimated that 8 percent of the existing switch ties are recoverable for reuse in railroad track structure.

Turnouts on the line segment are No. 10 - 72 lb. These turnouts are adequate for present rail operations. However, these must be relaid with the rail to increase the line segment weight restriction to 263,000 lb.

The condition of the grade crossings on the line segment varies from good to very poor. There is evidence at some of the crossings that the supporting track structure is failing, but the condition has not progressed sufficiently to adversely affect the crossing surface. Vertical split head rail was noted in several of the public grade crossings. This condition FRA Track Safety Standards Class 1 or sub Class 1.

Bridges on the line segment are Open Deck Pile Trestle with one 22 ft. I-Beam Span over a county roadway. The original structures on this line segment were constructed using cedar four pile bents. These piling have been cut off at the ground line and framed bents using second hand bridge caps installed, e.g. Bridge D-375. Cracking and splitting of bridge stringers necessitating the use of helper stringers noted, e.g. Bridge D-384 1/2. The existing structures are adequate for the present level of operations. However, to increase the speed of operation or to increase the line segment weight restriction necessitates the reconstruction of all the pile trestle structures and the partial reconstruction of the pile trestle and steel structure.

95 percent of the line segment is infested with weeds and grasses. The track section has been mowed recently, which will facilitate rail operations into the 1980-81 winter season.

60 percent of the line segment is ballasted with gravel which is heavily fouled and in some areas muddy. Cinder ballast is evident in isolated areas. This ballast is also heavily fouled. The remainder of the line consists of a dirt ballast section.

There are five sets of automatic grade crossing signals on the line segment. These systems are all older style General Railway Signal equipment. Each of the systems appear to be of the AC-DC circuitry type. Each of the systems appears to be functioning satisfactorily at the present. It is estimated there is no salvagable material from these systems for reuse in railroad track structure.

The line segment is currently operated on an as needed basis which averages less than one round trip per week. The line segment currently averages approximately 12,000 gross tons per annum.

RESOLUTION

It is estimated the net liquidation value of the line segment is $(357,277). Detailed estimate attached hereto.

It is estimated the normalized annual maintenance cost is $ 206,500 ~~Detailed estimate attached hereto.~~

It is estimated the cost of rehabilitation of the line segment to FRA Track Safety Standards Class 1 is $411,510. Detailed estimate attached hereto.

It is estimated the cost of rehabilitation of the line segment to FRA Track Safety Standards Class 2 is $968,734. Detailed estimate attached hereto.

It is estimated the cost of rehabilitation of the line to raise the weight restriction to 263,000 lbs. is $4,980,533. Detailed estimate attached hereto.

B. J. Kersey
December 23, 1980

WATERTOWN TO CLARK, SOUTH DAKOTA

Estimated Net Liquidation Value

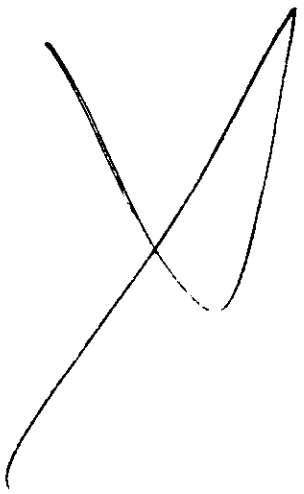
Land			
590.33 acres at $125.00/acre			$(73,791)
Bridges, Trestles and Culverts			
Bridge timber, usable 4.7 MBM at $100.00			(470)
Bridge steel, scrap 5.8 NT at $86.61			(502)
Ties			
Track ties, usable 7,074 at $4.00			(28,296)
Switch ties, usable 3.58 MBM at $100.00			(358)
Track ties, landscape 28,296 at $2.00			(56,592)
Rail			
Usable			
100#	1.6 NT	at $319.00	(510)
90#	4.5 NT	at $319.00	(1,436)
Scrap			
100#	1.6 NT	at $98.21	(157)
90#	4.5 NT	at $98.21	(442)
72#	3881.54NT	at $98.21	(381,206)
60#	45.52NT	at $98.21	(4,471)
52#	13.92NT	at $98.21	(1,367)
Other Track Material			
Switches, frogs and guard rail complete			
Scrap	26.36NT	at $90.18	(2,377)
Tie plates (Gross less 5% for wear)			
Scrap	600.5 NT	at $90.18	(54,153)
Joint bars			
Scrap	273.34NT	at $90.18	(24,650)
Bolts, washers, spikes, etc. (Gross less 8% for wear and 10% for loss)			
Scrap	123.73NT	at $90.18	(11,158)
Total Estimated Gross Liquidation Value			$(641,936)

Estimated cost of labor and material recovering and dismantling property.

Bridges	$ 7,500
Track	145,166
Ties	44,213
Restore grade crossings	71,280
Land disposal	6,000
Signals	9,000
Buildings	1,500
Total Estimated Cost of Labor and Material Recovering Property	$ 284,659
Total Estimated Net Liquidation Value	$(357,277)

ESTIMATE
NORMALIZED ANNUAL MAINTENANCE COST

*$1000/mile (1981)



ESTIMATE
REHABILITATION TO FRA TRACK SAFETY STANDARDS CLASS 1

Repair Rail	0.34 T.M. @ 39,912	$ 13,570
Switch Ties	103 @ 81.25	8,369
Ties Main Track	190 @ 30.20 x 29.5 T.M.	219,716
Ties Aux. Track	190 @ 39.20 x 1.9 T.M.	14,151
Surfacing (Spot)	3 T.M. @ 4,175	12,525
Roadway Crossings	357 L.F. @ 265	94,605
Weed Spray	31.4 T.M. @ 207	6,500
Bridges - Job		8,330
	Subtotal	$377,946
	Contingencies 10%	37,795
	Subtotal	$415,741
	Salvage	(4,231)
	Total	$411,510
	Cost/Track Mile	$ 13,105

12/23/80

Estimate is based on minimum requirements to restore 29.5 miles main track and 1.9 miles auxiliary tracks to FRA Track Safety Standards Class 1. Unit costs are based on 1980 material and labor prices and credit for scrap rail only is given.

ESTIMATE
REHABILITATION TO FRA TRACK SAFETY STANDARDS CLASS 2

Repair Rail	0.34 T.M. @ 39,912	$ 13,570
Switch Ties	155 @ 81.25	12,594
Ties Main Track	494 @ 39.20 x 29.5 T.M.	571,262
Ties Aux. Track	190 @ 39.20 x 1.9 T.M.	14,151
Surfacing (Spot)	7 T.M. @ 4,175	29,225
Roadway Crossings	581 L.F. @ 265	153,965
Weed Spray	31.4 T.M. @ 207	6,500
Drainage Correction	0.25 T.M. @ 4,000	1,000
Bridges - Job		78,400
	Subtotal	$880,667
	Contingencies 10%	88,067
	Subtotal	$968,734
	Salvage	(4,231)
	Total	$964,503
	Cost/Track Mile	$ 30,717

12/23/80

Estimate is based on minimum requirements to restore 29.5 miles main track to FRA Track Safety Standards Class 2 and 1.9 miles auxiliary tracks to FRA Track Safety Standards Class 1. Unit costs are based on 1980 material and labor prices and credit for scrap rail only is given.

ESTIMATE
REHABILITATION TO RAISE LINE TO 263,000 LBS. WEIGHT RESTRICTION

Rail Relay Main Track	29.5 T.M. @ 100,000	$2,950,000
Rail Relay Aux. Track	1.9 T.M. @ 84,330	160,227
Relay Turnouts	13 @ 12,769	165,997
Surface Turnouts	13 @ 1,938	25,194
Ties Main Track	523 @ 39.20 x 29.5 T.M.	604,797
Ties Aux. Track	494 @ 39.20 x 1.9 T.M.	36,793
Switch Ties	406 @ 81.25	32,987
Surfacing	31.4 T.M. @ 5,300	166,420
Roadway Crossings	1,333 L.F. x 265	353,245
Anchors	16 x 270 x 29.5 x 2.25	286,740
Weed Spray	31.4 T.M. @ 207	6,500
Drainage Correction	0.25 T.M. @ 4,000	1,000
Bridge - Job		176,400
	Subtotal	$4,966,300
	Contingencies	496,630
	Subtotal	$5,462,930
	Salvage	(482,397)
	Total	$4,980,533
	Cost/Track Mile	$ 158,615

12/23/80

Estimate is based on track rehabilitation requirements necessary to raise line segment to 263,000 lbs. weight restriction and provide track meeting FRA Track Safety Standards Class 2. Unit costs are based on 1980 material and labor prices. Credit for all track metal and bridge timber recovered is given. See Net Liquidation Estimate for salvage development.

APPENDIX B

BENEFIT-COST ANALYSIS METHODOLOGIES

APPENDIX B

BENEFIT-COST ANALYSIS METHODOLOGIES

BACKGROUND

As part of its effort to prevent further decline of railroad services and to reduce the effects of deterioration that has already occurred, the State of South Dakota is seeking to initiate local branch line assistance projects with Federal funding authorized by the Local Rail Service Assistance Act of 1978. To become eligible for assistance under this Act, the State must develop and implement a methodology to conduct a benefit-cost analysis of alternative courses of action for each project under consideration. This analysis then becomes a part of the overall evaluation to determine appropriate strategy for the implementation of rail projects.

OBJECTIVE AND SCOPE

The objective of this appendix is to provide the State of South Dakota with a practical and meaningful benefit-cost methodology which is acceptable to the FRA, and which will enable the State to determine if proposed branch line project expenditures are in the public interest. A system for evaluating courses of action is incorporated in the methodology. Also included are descriptions of the analysis procedures used to develop the impacts incorporated in the project evaluation methodologies.

Procedures and equations used for the benefit-cost analysis are simplified so that they are suitable not only for use by experienced practitioners, but for application by those who have minimal formal training in economic analysis, and for presentation to public forums. The methodology is also programmable.

BENEFIT - COST ANALYSIS MODEL

The model for the benefit-cost analysis is a series of equations defining primary and secondary efficiency benefits and cost factors in terms of a specified set of readily available data. These benefits and costs result from the implementation of rail service changes involving intensive study lines under consideration for assistance. This section defines the types of assistance projects which can receive Federal funds under the Section 803 program of the 4-R Act and Local Rail Service Assistance Act, the types of benefits and costs being considered in the model and their derivation and the methodological considerations associated with the analysis of project benefits and costs. The data sources for the benefit-cost analysis are listed as part of the description of benefit and cost impacts.

Classes of Alternatives

As defined under Section 5 of the Department of Transportation Act, federal funds for local branch line projects are limited to the following uses by the states:

Lines Abandoned Since February 5, 1976

- Subsidy - Payments to the operator of the rail service to cover the negative difference between revenues attributable to the line and cost of line operation.

- Acquisition - The cost of acquiring, by purchase, lease, or other manner appropriate to the state, a line of railroad or other rail properties, or any interest therein, to maintain existing or provide for future rail service.

- Substitute Service - The cost of reducing the effects of lost rail service in a manner less expensive than continuing rail service, including (but not limited to) the acquisition, construction or improvement of facilities (such as highway or highway bridges) for the provision of substitute freight transportation services.

Light Density Lines With Traffic Density Less Than or Equal to Three Million Gross Tons[1]

- Rehabilitation - The cost of rehabilitation and improving rail properties on a line of railroad to the extent necessary to permit adequate and efficient rail freight service on such line.

- New Construction - The cost of constructing rail related facilities (including connections between two or more existing lines of railroad), intermodal freight terminals, sidings, and relocation of existing lines.

A schedule showing the purposes or outcomes possible from the five alternatives plus a null option is included as Exhibit D-1. To facilitate evaluation of the potential combinations, the purposes have been sub-divided into those directed toward maintaining rail service and those aimed at abandonment of rail service.

Of the 48 possible combinations, only 22 prove to be appropriate for adoption. The remaining 26 are not feasible and can be eliminated from further consideration. As examples, it would not be practicable to provide subsidies for activities directed toward the abandonment of rail service.

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[1] Or less than or equal to five million gross tons with approval by the Administrator of the FRA.

Reference to Exhibit D-1 provides a ready tabulation of the appropriate uses of federal funds given the specific project objectives of the state. Only those uses that apply need be included as part of the analysis.

Project Benefits

Project benefits relate to the impacts which result from the implementation of a proposed alternative. Such benefits are measured as the incremental differences in primary and secondary efficiency benefits between the proposed alternative and the base case. The base case is always the current status of the line being studied, whether it is operating or already abandoned. The scope of the impacts being measured extends to the area directly impacted by each proposed alternative.

Primary Efficiency Benefits

The primary efficiency benefits of rail service changes consist of the consumers' and producers' surpluses produced by these changes. These surpluses result from the differences in transportation rates and costs and the associated quantities involved in converting from the base case to the proposed alternative.

The primary efficiency benefits are calculated by the following equation:

$$(Bn-Bo)p = Qo\ (Co-Cn) + 1/2\ (Po-Pn)\ (Qn-Qo) + (Pn-Cn)\ (Qn-Qo)$$

where

(Bn-Bo)p = Primary Efficiency Benefit, Alternacive n Versus Base Case ($)
Qo = Quantity Shipped, Base Case (Tons)
Qn = Quantity Shipped, Alternative n (Tons)
Po = Transportation Revenue, Base Case ($/Ton)
Pn = Transportation Revenue, Alternative n ($/Ton)
Co = Transportation Costs, Base Case ($/Ton)
Cn = Transportation Costs, Alternative n ($/Ton)

The data for determining the primary efficiency benefits are obtained from a transportation demand curve of the shipper for each commodity. (See Exhibit D-2). This curve is a composite which includes components for each mode involved. In this case, railroad and truck transportation are considered. The areas defined by the curve for each commodity and origin-destination pair, corresponding to the difference between the consumers' (shipper) surplus and producers' (transportation carrier) surplus for the alternative being analyzed and the base case make up the primary efficiency benefit. This may be positive or negative, depending on the relative values of the rates, costs, and quantities transported according to each alternative. These are determined as follows:

Quantities Shipped by Alternative - The responses from the shipper surveys provide estimates of the relative quantities to be shipped by rail or

EXHIBIT D-1

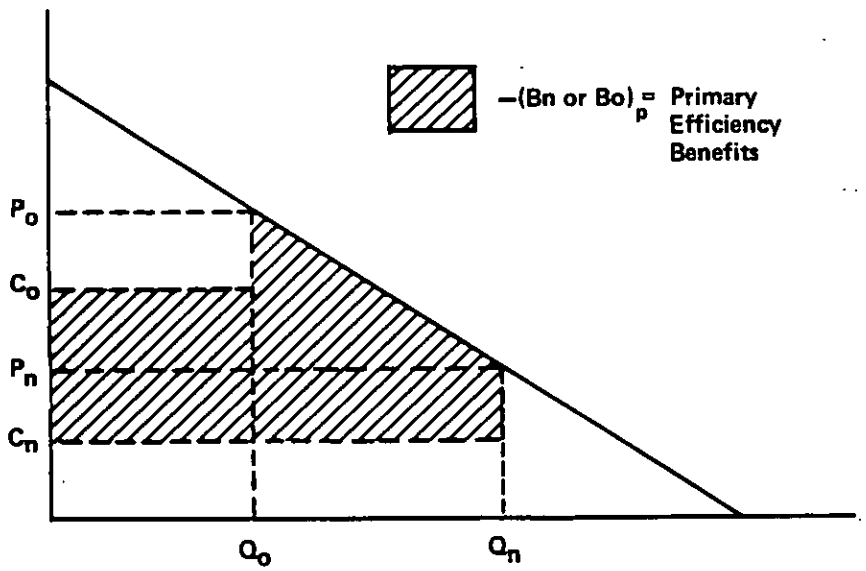
ALTERNATIVE ASSISTANCE PROJECTS

PURPOSE OR OUTCOME

	MAINTAIN RAIL SERVICE				ABANDON RAIL SERVICE			
	MAINTAIN CURRENT FREQUENCY		INCREASE FREQUENCY		RAIL BANKING		NO RAIL BANKING	
USE OF FEDERAL FUNDS	MAINTAIN CURRENT LOAD	INCREASE LOAD	MAINTAIN CURRENT LOAD	INCREASE LOAD	NO ALTERNATE SERVICE	ALTERNATE SERVICE	NO ALTERNATE SERVICE	ALTERNATE SERVICE
ACQUISITION							N/A	N/A
SUBSIDY					N/A	N/A	N/A	N/A
REHABILITATION					N/A	N/A	N/A	N/A
SUBSTITUTE SERVICE	N/A	N/A	N/A	N/A	N/A		N/A	
NEW CONSTRUCTION					N/A	N/A	N/A	N/A
NO ACTION		N/A	N/A	N/A	N/A	N/A		N/A

EXHIBIT D-2

TRANSPORTATION DEMAND CURVE OF SHIPPER



truck according to each alternative. Shipment quantities are determined for each station on the line, by commodity and origin-destination pair. Both inbound and outbound shipments are included. Total quantities by station are calibrated to the actual 1979 traffic level reported by the operating railroad.

It is assumed that the total volume shipped under the base case or during the last full year of operation will continue to move under each alternative. The amount moving by truck versus rail distinguishes between the alternatives, with differing amounts moving by truck to the nearest railhead or all the way to the final destination. This depends on whether the facility closes or continues to operate. If the facility is an elevator and closes, it is assumed that the farmer will move his/her commodities to the nearest available elevator served by a railroad. If the elevator stays open despite the loss of rail service, the traffic is trucked to the final destination or to a major elevator with rail service, depending on the final destination and the results of the shipper survey. In certain cases where a line is rehabilitated and rail service consequently improved, increased shipments result.

Transportation Rates By Alternative - Transportation rates for both rail and truck modes are developed for each alternative by commodity and origin-destination pair. These are determined on a per-ton basis.

Rail Rates - The costs of providing rail service were based on estimated on-branch costs, using system average cost, normalized maintenance-of-way costs, and net salvage values. Off-branch rail costs were developed from the individual railroad's Rail Form A costs, dependig on the particular origin or destination. Revenues were obtained by calculating the average revenue per ton and multiplying by the number of tons. Both revenues and costs are indexed to an October, 1980 level using the Index of Railroad Prices and Wage Rates published by the Association of American Railroads, and the Price Indexes for Total Railroad Freight published by the Bureau of Labor Statistics of the Department of Commerce.

Truck Rates - The primary commodity transported on the special study 803 Project rail lines is grain. In alternatives where this traffic would be diverted to motor carrier, the goods will primarily be hauled by owner-operators owning a single tractor-trailer. For intrastate traffic, the rates charged are regulated under the authority of the South Dakota Public Utilities Commission. The applicable tariff is the South Dakota Class B Motor Carriers Tariff No. 63, Naming Rates on Livestock and Other Commodities. The primary portion of the tariff used for this study is for grain shipments weighing 40,000 pounds or more.

With regards to interstate motor carrier movements of grain, this commodity is exempt from Interstate Commerce regulation. Therefore, rates charged are subject to market demand and fluctuate during the year. Since it is difficult to secure precise data on these rates because set rates are not published, this analysis uses the South Dakota rate tariff. This situation is only applicable to the truck-all-the-way alternative. In cases where the trip mileage is greater than that available from the tariff, the price and mileage is extended to cover these incidences using the rate differences between 500 and 600 miles. An example of this is a mileage of 700 miles. The rate for 500

and 600 miles. An example of this is a mileage of 700 miles. The rate for 500 miles is $1.66 and the rate for 600 miles is $1.95, with a difference of $0.29. Therefore we assume an applicable rate for 700 miles to be $2.24. Although these rates are not necessarily what each shipper may pay for motor carrier transportation services, they do appear to be reflective of actual rates currently charged to shippers in South Dakota.

Commodities other than grain are also involved in this study. The rates used in this portion of the study are from other applicable rates published by the South Dakota Public Utilities Commission. Rates for feed, fertilizer and seed use the livestock rates from Tariff No. 63. Bentonite clay rates are charged at 150 percent of the livestock rates, which is the rate used for building materials. The South Dakota Public Utilities Commission Official Lumber Tariff is used for lumber commodities, including pulpwood and other applicable items. The commodities which would be classified under heavy hauling, such as farm machinery, use rates from the South Dakota Public Utilities Commission Official Heavy Hauling Tariff.

The rates in these tariffs are in hundredweights, and have been changed into tonnage. For the truck-to-the-nearest-railhead and truck-all-the-way scenarios, the truck rates were taken directly from these tariffs. In scenarios where some of the movements were split between part being truck-all-the-way, and truck-to-the-nearest-railhead, a weighted average by tonnage is used of the total price charged, including the off-branch rail rates to determine an average rate charged to the shipper.

Transportation Costs By Alternative - Transportation costs for both rail, truck, and rail-truck combinations are developed on a per-ton basis by commodity and origin-destination pair.

Rail Costs - Rail service costs are determined for each line and alternative by calculating the on-branch costs of service and the off-branch costs of service.

On-Branch Rail Costs - On-branch costs are those avoidable (variable) costs which are incurred by a railroad operating over a particular branch line. Most of these costs were determined by applying the standards and formulae developed by the Rail Services Planning Office[1] (RSPO) and Rail Form A[2] variable cost percentages and cost of capital rates.

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[1] Standards for Determining Rail Service Continuation Subsidies in the Northeast - Midwest Region of the United States, Ex Parte No. 293, Sub-No.2, as amended through February 10, 1977; Rail Services Planning Office, Interstate Commerce Commission, Washington, D.C.

[2] Formula for Use in Determining Rail Freight Service Costs, Statement 1F1-73; for the Chicago and North Western Transportation Company and Subsidiaries, the Burlington Northern Inc., and the Chicago, Milwaukee, St. Paul and Pacific Railroad Company, Debtor; Interstate Commerce Commission, Washington, D.C., 1977.

RSPO standards sometimes required that the costs assigned to a branch line be the actual direct branch costs. Since these actual direct costs were not available, almost all branch line costs were determined by first taking the R-1[1] system cost and dividing by an appropriate system operating statistic, e.g., car miles, for each carrier operating the branch lines analyzed in detail by this study. This system unit cost was then multiplied by the actual branch line operating statistic to yield an estimate of branch line cost. PMM&Co. believes the system unit costs calculated are not significantly different from the actual branch unit cost. Therefore, the total branch cost should be a reliable estimate of actual branch cost.

A computer program is used to take the inputs of system unit costs, actual branch line operating statistics, and inflation factors[2] to arrive at 1980 branch line costs.

Exhibit D-3 displays the process used to generate the on-branch costs by line alternative. The individual costs elements included in this derivation are described below.

- Maintenance of Way and Structures - Normalized maintenance of way and structures (MOW) costs are based on estimates developed by T. K. Dyer, Inc. for each branch line analyzed in detail by this study. The normalized maintenance of way estimates are typically in the range of $7,000 to $7,400 per mile of line and are used for both Class I and Class II track rehabilitation alternatives.

- Locomotive Repair - Road locomotive repair costs are allocated to each branch line on the basis of locomotive gross ton miles on the branch as a percentage of the system total.

- Locomotive Ownership - The cost of capital and replacement cost for road locomotives is apportioned to each branch line according to the ratio of branch locomotive unit hours to system locomotive unit hours.

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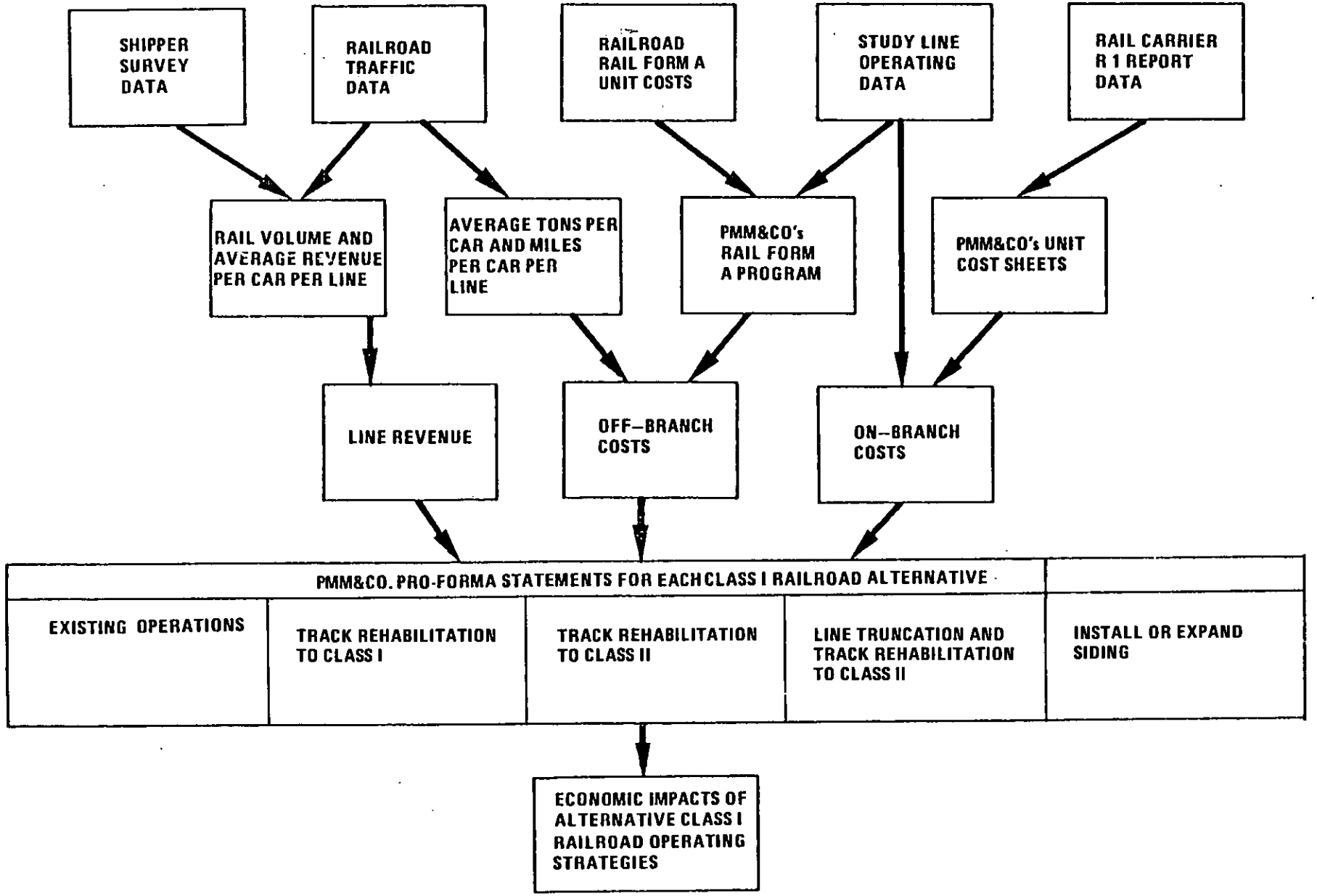
[1] Annual Report to the Interstate Commerce Commission for the year ended December 31, 1977; for the Chicago and North Western Transportation Company and Subsidiaries, the Burlington Northern Inc., and the Chicago Milwaukee, St. Paul and Pacific Railroad Company, Debtor. Interstate Commerce Commission, Washington, D.C. 1978.

[2] Based on "Indexes of Railroad Charge-Out Prices and Wage Rates", Association of American Railroads (AAR), Economics and Finance Department, Washington, D.C., June 1980. An estimated cost index of 1.21 is used to inflate 1979 railroad costs to 1980 cost levels.

EXHIBIT D-3

FLOW DIAGRAM FOR PMM&CO's COST-REVENUE ANALYSIS
OF SPECIAL-STUDY LINE OPERATING ALTERNATIVES



The cost of capital is determined by applying the 1977 Rail Form A (system) historical cost of capital rate to the system net investment in locomotives.

The use of replacement costs for 803 eligible projects has been approved by the ICC for determining railroad branch line costs. Total replacement cost is determined by applying the cost which would be incurred to rebuild one locomotive unit out of the locomotive fleet owned by each carrier. Annual replacement cost is computed by assuming a 10 year life, i.e., dividing total replacement cost by 10.

- Locomotive Servicing, Fuel, Labor, and Train Supplies and Expenses - Train fuel and the servicing of train locomotives are allocated to each branch line on the basis of system locomotive unit hours and system locomotive unit miles, respectively. Crew costs (salary and fringes) and train supply expenses are developed using system averages per train hour and actual branch line train hours.

- Taxes and Rents - Property taxes paid in South Dakota by railroads vary widely, depending on the level of maintenance efforts expended on a line. Since railroads can deduct portions of their maintenance costs from the property tax liability of each line operated in South Dakota, no consistency in railroad property taxes is evident between lines. Therefore this cost element is omitted from the analysis. Revenue taxes and rents are also not considered significant to the economic analysis of branch line avoidable costs.

- Miscellaneous Expenses - Miscellaneous expenses are allocated on the basis of system net tons of revenue freight.

- Car Day and Car Mile Costs - System freight train car costs are classified as functions of both time and mileage. Components of freight car cost include repair expense, cost of capital, car hire, and replacement cost.

The cost of capital is determined by applying the 1977 Rail Form A (system) historical cost of capital rate to the system net investment in freight cars.

Total replacement cost is arrived at by applying a weighted average cost for new equipment to the freight car fleet held by each carrier. Annual replacement cost is computed by a 15 year life, i.e, dividing total replacement cost by 15.

System car days and car miles are calculated according to RSPO standards. These system totals are divided into the relevant time and mileage system freight car costs to arrive at the unit freight car costs for each carrier. These system unit costs are multiplied by branch line car days and car miles to obtain branch line costs.

- Return On Investment - The return on rail properties is determined according to RSPO standards by applying the current yield to maturity in Treasury bonds issued in August 1980 and maturing in August 1990 to the net liquidation value of rail properties, considering their highest and best use. Estimates of net liquidation value exclude land values, but do reflect the value of materials added to line upon rehabilitation. These estimates are based on information supplied by T.K. Dyer, Inc.

The unit operating statistics for each line and alternative are based on information supplied by each operating railroad. This includes the length of the line average round-trip travel time, service frequency, maximum operating speed, locomotive and crew consists, and traffic volume. All other operating statistics used in the line analysis are derived from these operating statistics.

Rail Costs - Off-branch costs refer to the variable costs of moving the traffic to or from the branch line under study from or to its ultimate origin or destination. The off-branch costs are developed using PMM&Co's Rail Form A program. The primary purpose of Rail Form A is to provide the foundation for, and inputs to, a standard, uniformly applied, costing procedure for purpose of protecting the public against unlawful charges as defined in Part I of the Interstate Commerce Act (Title 49, Chapter 1, of the U.S. Code).

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, i.e., 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, etc., 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 the combining of such, 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 a variable and fully allocated basis.

Long-term variable costs are based on average traffic density experienced during the year in which costs were developed. For 1980 costs, the 1977 expenses are indexed to reflect the effects of inflation. Costing information for each line is developed for a mixture of car types most frequently using the line. For most of the lines under study, this includes some combinations of open top hoppers, covered hoppers, and box cars.

The Rail Form A program is run for each line using the actual Form A data for the railroad operating the line. The output of the Rail Form A program lists the cost per ton and hundredweight for the off-branch movement at various lengths of haul and load weights. These variable costs involve 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 the purposes of this study, the cost per ton is applied to the number of tons moved over each line by alternative and added to the average on-branch cost to determine the total rail variable costs per ton. This is based on the average length of haul by origin-destination pair and traffic volume per rail line as provided by the railroad supplied data.

The products of the economic analysis of Class I operating alternatives are inserted in a pro-forma income statement which arranges revenues, on-branch costs, and off-branch costs, and produces an indication of the amount of contribution to profit and overhead which i projected for each line. Both unit revenues and costs were incorporated in the Pro-Forma Income Statement and applied to the specific operating statistics for each line and alternative. The Pro-Forma Income Statement is illustrated in Exhibit D-4.

EXHIBIT D-4

PRO–FORMA INCOME STATEMENT
CLASS I RAILROAD OPERATIONS

REVENUE

1979 carloads x revenue per car x inflation factor.

EXPENSES

On Branch

- Maintenance of Way and Structures - Branch cost for annual normalized maintenance of way per mile x branch miles of line.
- Locomotive Repair - System locomotive repair cost per locomotive gross ton mile x annual branch gross ton miles x inflation factor.
- Locomotive Ownership - System road locomotive capital and replacement cost per locomotive unit hour x annual branch locomotive unit hours x inflation factor.
- Locomotive Servicing - System train locomotive servicing cost per locomotive unit mile x annual branch locomotive unit miles x inflation factor
- Fuel - System cost per locomotive unit hour x annual branch locomotive unit hours x inflation factor.
- Train Supplies and Expenses - System cost per train hour x annual branch train hours x inflation factor.
- Train Labor - System cost per train hour x annual branch train hours x inflation factor.
- Taxes and Rents - Not applicable.
- Miscellaneous Expenses - System cost per net ton of revenue freight x annual branch net tons of revenue freight x inflation factor.
- Car Day Cost - System cost per car day x annual branch car days x inflation factor.
- Car Mile Cost - System cost per car mile x annual branch car miles x inflation factor.
- Return on Investment - Net liquidation value of branch rail property x annual yield on ten year Treasury bond.

Subtotal

Off Branch

Rail Form A system cost per net ton of revenue freight (prorated by miles of line) x annual branch net tons of revenue freight x inflation factor.

TOTAL COST

Total on-branch expenses + total off-branch expenses.

PROFIT (LOSS)

Revenue - Total Cost.

Truck Costs - To develop costs of moving freight which would be diverted to truck if a rail line were abandoned, a truck cost model is utilized. The traffic which would be diverted to truck is truckload freight, and primarily carried by individual owner-operators. These costs relate primarily to linehaul costs but additional factors are included to allow for the cost of pickup and delivery.

Both the fixed and variable elements of the annual cost of a single driver operated truck are considered. The vehicle used in the model is a five-axle tractor-semi-trailer suitable for carrying grain. It is assumed that approximately 100,000 miles would be driven per year. This is based on an average truck speed of 50 m.p.h. and an average of 2,000 hours driven per year. The costs developed correspond in time period with the rail costs. The variable costs are strictly a function of mileage with driver cost including a fixed component (minimum base salary). Pick-up and delivery costs are a function of the number of trips. The cost of traveling twenty-five miles is added to each round trip to account for the expense of moving the vehicle to the point of freight origination from the drivers domicile. Also included in fixed costs are return on investment, insurance, licenses and/or permits, and overhead costs. These costs account for $16,600 per year or a fixed cost per mile of 16.6¢.

Variable costs include cost of capital or equipment, depreciation of the vehicle, current fuel costs, tires and maintenance. These variable costs are directly related to mileage and were developed using cost estimates from the U.S.D.A., the Association of American Railroads, the American Trucking Association, the Interstate Commerce Commission and current literature and discussions with manufacturers. Also included in variable costs are driver costs as a function of miles driven, drivers' benefits and social security. Miscellaneous costs were also estimated, such as out-of-town layover. These costs amount to an approximate total of $68,400 or 68.40¢ per mile.

The total costs, which are a function of mileage, amount to approximately $85,000 for 100,000 miles driven or 85¢ per mile. The costs which are a function of the number of trips amount to $29.08 per trip. If more than one trip can be made in one day from the same point of origin and destination, these costs decrease to $15.00 per trip (based on tons per railcar load and miles) and include the hour layover for pickup and delivery and the apportioned expense of traveling to and from the driver's domicile. See Exhibit D-5 for truck cost breakdown with further explanation of each cost item following.

In utilizing these costs, a 100 percent empty backhaul for trips under 200 miles was assumed. Based on the Interstate Commerce Commissions, "Energy/Loaded Truck Miles on Interstate Highways During 1976" study, the ratio of empty backhaul varied. Using percents for exempt carriers in appropriate geographical regions, the empty backhaul for 201 to 1,000 miles was approximated to be 53 percent and over 1000 miles to be 42 percent. Tons per truck approximate 20, but fluctuate depending on tonnage and number of rail shipments.

EXHIBIT D-5

TRUCK COST BREAKDOWN

TRUCK COSTS - assuming annual mileage of 100,000 miles

Fixed Costs	
Insurance	$ 6,000.00
Licenses and Permits	1,400.00
Management and Overhead	3,305.00
Return on Investment	5,907.00
Total Fixed Cost	$16,612.00
Variable Costs	
Cost of Capital	2,029.00
Depreciation	6,148.00
Fuel	24,000.00
Tires	3,700.00
Maintenance	8,800.00
Driver Cost	22,744.00
Miscellaneous	1,000.00
Total Variable Cost	$68,421.00
Total Fixed and Variable Cost	$85,033.00
Fixed Cost per Mile	.166
Variable Cost per Mile	.684
Fixed and Variable Costs per Mile	.850

Per Trip Costs

Lost Driver Time - Pickup and Delivery $7.83 per hour

Travel mileage to and from freight origination point 25 miles x .85 =	$21.25
Total Per Trip Cost	$29.08

Truck Costs--Fixed - Truck Cost Breakdown, Exhibit D-5, item descriptions and footnotes on fixed costs are as follows:

- Insurance - Insurance on all items approximate $6,000. This figure includes liability, collision and cargo insurance on the tractor and trailer. Insurance rates on the tractors and trailers for a specific owner-operator may be higher or lower depending on the safety and cargo loss claims record of the owner. The figure is derived using the USDA, Office of Transportation's April 1980 "Owner-Operator Truck Cost Guide" and allowing for a lower capital equipment cost and lower cargo loss.

- Licenses and Permits - The total cost for licenses and permits is estimated to be $1,400. This cost includes state license fees and trip permits. This cost varies as to annual mileage driven and the states in which the driver operates. An average cost is estimated using fees charged in South Dakota, the USDA's "Owner-Operator's Truck Cost Guide," and White Motor Trucks "Cost per Mile Handbook."

- Management and Overhead - The cost for management and overhead includes various items not readily associated with road trips. The office rental allowance is for a portion of the owner-operator's home that is used for an office. It includes part of the utilities used for that purpose. Telephone is for the standard monthly charge but does not include long distance calls. Travel is for business-related trips that don't involve the owner-operator's vehicle.[1]

- Return on Investment - The return on investment is determined by computing the opportunity cost of the net investment in the tractor and trailer (purchase price less available investment tax credit). An alternative investment of comparable risk appears to be triple A rated utility bonds. The yield on risk bonds averages 11.00% annually as of June 30, 1980.[2]

Truck Cost--Variable - Truck Cost Breakdown, Exhibit D-5, item descriptions and footnotes on variable costs are as follows:

- Cost of Capital - The cost of capital is based on the cost of a new tractor and trailer suitable for grain movements.

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[1]USDA's Office of Transportation, "Owner-Operator Truck Cost Guide", April 1980.

[2]Business Week, July 14, 1980, pg. 83.

The cost of this equipment is determined from surveys of manufacturers selling the appropriate equipment. The capital cost is the effective annual interest charge incurred on the loan obtained to finance the tractor/trailer. The effective annual interest was calculated by dividing the total amount of interest paid over the life of the loan for the tractor and the trailer by their respective useful lives. The total amount of interest paid was determined by applying an annual 10% "add-on" interest rate to the loan over a three year period. The add-on method, interest rate, and maturity term were arrived at by reference to an article on truck financing.[1]

- Depreciation - Depreciation is computed separately for the trailer and tractor because of different useful lives. A tractor and trailer are assumed to have a maximum life of 650,000 and 850,000 miles, respectively[2]. The basis for depreciation is the purchase price less 20 percent for salvage and less the available investment tax credit. It is assumed the salvage value would be reinvested as the downpayment for the next tractor/trailer.

- Fuel - Fuel is costed at $1.14 per gallon[3]. Since no backhaul is assumed, fuel efficiency is computed by averaging 4.4 miles/gallon for a loaded truck and 5.1 miles/gallon for an unloaded one[4]. This yields an average cost of 24¢ per mile.

- Tires - The cost of maintaining and replacing a set of 18 truck tires is determined to be $0.037 per mile for an owner-operator.[5]

- Maintenance - Maintenance expense for the tractor/trailer of an owner-operator varies with the age of the equipment. This cost is determined to average $0.088 per mile.[6]

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[1]"Truck Financing" Owner Operator, Volume 10, Number 2, March/April 1980, Radnor, Pa.

[2]USDA's Office of Transportation, "Owner-Operator Truck Cost Guide", April, 1980.

[3]Federal Register, Vol. 45, No. 128, July 1, 1980, Appendix - Fuel Surcharge.

[4]Rose, Energy Intercity, - Op. Cit.; p.6-11.

[5]Fruit and Vegetable Truck Cost Report, June 30, 1980, USDA, Volume 2, No. 6.

[6]Ibid.

- Driver Cost - Driver cost consists of salary, fringes, payroll, taxes and subsistence costs. A base salary of $13,000 is set based on available cost reports and average earnings of people engaged in the transportation industry in South Dakota.[1] A charge of 16¢ per mile driven in excess of 81,250 miles (the equivalent of the base salary) is used.[2] Payroll taxes include the self employment tax, while fringes include health and worker's compensation insurance.

- Miscellaneous - Miscellaneous costs per mile can vary by both the length of the haul and its destination. It was assumed however, that 1¢ per mile would adequately reflect any such costs.[3]

Truck Costs--Per Trip - Truck Cost Breakdown Exhibit D-5, item descriptions and footnotes on per trip costs are as follows:

- Pickup and Delivery - The costs associated with pickup and delivery (P&D) were quantified as the opportunity cost of the time spent in a queue to pickup or deliver shipments. This opportunity cost was defined to be only driver cost, since the time would otherwise be spent in line haul and there are no other significant costs, e.g., equipment. It was assumed that the P&D time associated with each trip would be one hour. Therefore, driver cost was computed on an hourly basis and multiplied by the number of round trips to determine P&D cost.

- Travel Mileage - The additional travel mileage to and from the freight origination point was estimated to be 25 miles at a cost of $.85 per mile.

Secondary Efficiency Benefits

The primary efficiency benefits measure the change in consumers' and producers' surplus associated with changing the level of rail service to shippers along a branch line. The measured surpluses relate to the transportation services provided to shippers located on intensive study lines. Secondary efficiency benefits measure other economic impacts which result from the proposed

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[1] "MVMA Motor Vehicle Facts 2 Figures '79", Motor Vehicle Manufacturers Association of the United States, Inc.

[2] "Current Cost of Operating Refrigerated Trucks for Hauling Fresh Fruits and Vegetables by Multi-Truck Lines." USDA, Economics, Statistics, and Cooperatives Service, National Economics Division, December 1979.

[3] "Cost per Mile Handbook", White Motor Trucks, 1980.

changes in rail services. This study considered the following types of secondary efficiency benefits:

- changes to local (community) income due to job losses or gains;
- changes to highway, capital or maintenance costs due to potential traffic diversion to trucks;
- changes in taxes resulting from the closing of shipper facilities and the diversion of traffic to trucks, whose fuel is taxed by the state;
- net salvage value of the intensive study line which is realized under the abandonment or truncation alternatives; and
- other economic impacts resulting from unique conditions associated with an intensive study line.

These changes can result in either positive or negative benefits depending on the volume of the base case and line alternatives. The secondary efficiency benefits are described more fully below.

Income Impacts

Rail service changes can result in the loss of shipper jobs due to plant closings, the loss of railroad jobs due to line abandonment, or the loss of truck driver jobs due to truck traffic being diverted to the railroad. Job gains can also result from the establishment or improvement of rail service, potentially affecting both railroad and shipper employees. Increased truck driver jobs can result from the loss of rail service and the diversion of rail traffic to trucks.

In this study, the income effect on local communities of job losses is measured as the on-time loss of salary for a period equal to the average period of unemployment for South Dakota (11.5 weeks) [1], less the average amount of unemployment compensation per week ($99 per week for all employees except railroad employees, whose higher average salary justifies the use of the maximum unemployment compensation rate of $119 per week). The income effect on the State from job losses is measured as the one time loss of salary for the average period of unemployment, without adjustment for unemployment compensation. At the state level, unemployment compensation is an economic transfer and so is not included in the income loss calculation.

[1]South Dakota Department of Labor, July 1980.

The diversion of traffic to rail from truck in the case of line service restoration or line rehabilitation is assumed to result in negligible income loss to the trucking sector due to the relative mobility of truck drivers. The annual income impact of job gains is measured by the average salary of the affected groups ($12,000 - elevator employees, $16,000 - truck drivers, and $25,000 - railroad employees) times the average percentage of unemployment in the counties served by the line.[1]

The equations used to calculate the income impacts of rail service changes are listed below:

Income Impact of Job Losses:

$$Bil - J\ Tuc\ (Ruc - R)$$

where

Bil = Secondary Employee Income Loss, One-Time
J = Lost Jobs
Tuc = Average Term of Unemployment (weeks)
R = Average Wage Rate ($/week)
Ruc = Average Unemployment Compensation Rate ($/week);
Ruc = 0 under the state allocation of benefits

Income Impacts of Job Gains

$$Big = Jg\ R\ U \times 52$$

where

Big = Secondary Employee Income Gain, Annual
Jg = Gained Jobs
R = Average Wage Rate ($/week)
U = Average Local Unemployment Rate (%)

Highway Costs

The diversion of traffic from the railroads to the motor carriers produces increased deterioration of the highways over which the traffic moves. This results in either higher highway capital costs, where the existing highway is currently inadequate to carry the expected traffic diversion and must be upgraded; or added maintenance costs, where the existing highway is adequate to carry the expected traffic diversion but the traffic increase causes some additional highway deterioration. The methodology used to obtain a rough estimate of these costs was developed with the assistance of the South Dakota Department of Transportation.

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[1]Based on South Dakota Department of Labor Unemployment Statistics, April 1980.

Increased capital costs are computed using the highway rehabilitation costs which would be incurred if the highway is rebuilt before substantial damage to the existing road takes place using average strength and 18-KIP axle weight equivalencies. In practice, the additional number of trucks on the highway generated by this abandonment would shorten the life of the pavement, with the next overlay of a suitable design to carry the increased traffic based on the new volumes. Since the increase in daily traffic is minimal in comparison to the current traffic volume, the study focuses only on the increased cost involved with additional overlay thickness necessary to meet design standards. Current road deficiencies and other structural changes such as bridge and shoulder repair are not included.

The following process was used to compute the upgrading costs to accomodate the diverted truck traffic for each of the intensive study lines:

1. Diverted truck traffic based upon an estimate of average cargo weight of 20 tons and 100% empty backhauls.

2. Adjust for seasonal patterns of traffic movements,[1] to obtain a maximum truck volume estimate per day.

3. Convert the diverted truck traffic to 18-KIP axle weight equivalents on flexible pavements using 5-axle vehicles weighing 14.5 tons empty and 34.5 tons loaded.[2] For loaded vehicles, the 18-KIP axle weight equivalency is 5.3, and for empty vehicles .7.

4. Determine the average strength figure for each highway under consideration for truck traffic diversion. Relate this figure to the dynaflect measure, which relates to a 18-KIP equivalent axle weight load.[1]

5. For the calculated number of 18-KIP equivalencies added to the existing volume of traffic for each affected highway, determine the required dynaflect measurement using the graph mentioned in step 4. (This does not take into account current design deficiencies.)

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[1]South Dakota Highway Traffic Report: 1979, State of South Dakota Department of Transportation.

[2]Truck Weight Study: 1979, South Dakota D.O.T., Pierre, S.D.

[3]Derived from Traffic vs. Maximum Recommended Dynaflect Deflections graph supplied by South Dakota's Department of Transportation - Research and Special Assignments.

6. Using the Average Strength Overlay Design Curve, determine the required pavement thickness for the resulting dynaflect measurement and compare to current pavement thickness.

Where the required pavement thickness exceeds the current pavement thickness, an overlay would have to be added. For a 24 foot wide road retaining the original design width, the additional overlay for the 138 mile segment would cost in 1981 approximately $2,682,000 (at $1.25 per sq. yd. of asphalt). Road surfaces in South Dakota are planned to last 18 years, so the yearly added cost would approximate $149,000.[1]

Applying these methodologies to each of the intensive study lines fails to result in the need to add additional pavement to roadways in South Dakota. The additional traffic created by abandonment to the various highways, dependent on freight destination, is a low percentage in comparison to the current traffic volume. This is due to the low volume of traffic which is typically diverted from these rail lines and the presence of nearby interstate highways to several of the affected rail lines.

The estimated added maintenance cost incurred before upgrading the affected highways has been calculated using an equation developed by the South Dakota Transportation Systems Planning Division. This equation was formulated in 1978 dollars. This cost has been inflated to 1981 dollars using an inflation factor of 36.5 percent. The equation follows:

# of additional trucks/yr. in each direction	x	# of tons per round trip	- 365	x [0.59060041]	x	# of miles in South Dakota affected	=	total added maintenance cost by highway segment per year in South Dakota.

Highway cost impacts are considered only for the roadways located in South Dakota and are calculated on an annualized basis. Impacts beyond the state border result from the estimated truck diversions, however this is not quantified as part of South Dakota's RAILPLAN. Traffic diverted to an interstate is assumed to result in negligible cost impacts due to the high design standards to which such roads are constructed.

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[1] Based on an analysis of the Added Cost of Maintenance and Construction if the Coal to Supply the Big Stone Power Plant were Hauled from Gascoyne, North Dakota over U.S. 12. prepared by S.D.D.O.T., Div. of Policy Development and Evaluation, Office of Transportation Planning, 1979, Appendix C.

EXHIBIT D-5

TRUCK FREIGHT ENERGY INTENSITIES 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 D-6

RAIL FREIGHT ENERGY INTENSITY BY COMMODITY CLASSES, 1976

Commodity	1976 Ton-miles[b] (10^6)	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]	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	2683	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: Rose. Energy Intensity - Ibid.; p. 5-16

Taxes

Changes in rail service also result in changes to the tax base of the state. The tax impacts of rail service abandonment or truncation are quantified by the property taxes paid by shippers who indicated they would close operations if they lost rail service. Railroad property taxes are not considered by this study since they are not consistently applied, due to the fact that the property tax liability of a railroad operating a line in South Dakota can be adjusted to reflect track maintenance and rehabilitation efforts conducted by the operating railroad.

The only other tax impact of rail service changes results from the diversion of traffic to the truck mode, which, unlike the railroads, pays a state tax of 12 cents per gallon of fuel consumed. Therefore the annual effect of traffic diversion to trucks is a tax revenue increase of 12 cents per gallon of fuel required to move the affected traffic in South Dakota.

Net Salvage Value

When a line is abandoned, a net benefit to the railroad is the net salvage value of the railroad materials (rail, ties, etc.) which can be salvaged from the line. The current net salvage value for each intensive study line is provided by T. K. Dyer, Inc., based on their inspection of the lines. The estimates exclude the value of the land contained in the track right-of-way.

Other

Other monetary secondary efficiency benefits considered by this study included the following:

- deferred highway construction costs - the costs associated with a highway project, such as a bridge overpass, whose construction could be avoided if a rail line is abandoned or terminated.

- producers' and consumers' surpluses resulting from new traffic growth. These effects cannot be quantified as part of this study. However, their qualitative impacts are noted.

Non-Monetary Benefits

Besides the primary and secondary efficiency benefits or disbenefits of rail service changes, non-monetary impacts also result. These include both quantifiable and non-quantifiable impacts and may in certain instances represent the primary justification for implementing a rail assistance project. The non-monetary impacts addressed by this study are discussed below.

Jobs

The number of jobs either lost or gained due to a proposed rail service change are listed in the descriptions of project benefits and costs. The affected job categories include railroad, truck, and shipper employees. This impact category relates directly to the monetary income impacts already discussed.

Environmental Impacts

The environmental impacts resulting from rail service loss consist of energy usage and the air and noise pollution impacts associated with alternative transportation modes. For this analysis, the noise pollution impacts are assumed to be negligible since the commodities will be transported, for the most part, through rural low-density populated communities. Two types of transportation modes are logical alternatives should rail service be reduced. The first alternative involves long distance hauling solely by truck to replace the long distance rail hauling. The second alternative involves truck hauling to the nearest railhead and thence transport by rail. Thus, the energy and air pollution impacts are estimated for the truck and the truck/rail alternatives. The impacts of these alternatives are compared to the impacts of the existing all-rail condition to assess the incremental impacts. The estimation methodology employed is similar to that endorsed by the ICC[1] and is described briefly below for each impact.

Energy Impacts

The energy impacts are evaluated in terms of the diesel fuel consumption per year for the truck and truck/rail alternatives. The fuel consumption of trucks and rail depends on several factors: shipment weight, volume, and length of haul; idling time and speed; physical condition and characteristics of road, track and terrain; age and condition of truck and locomotive; and various other factors.[2]

The concept of energy intensity of transportation modes has generated numerous intermodal fuel consumption comparison studies. Widely divergent estimates of modal variations in energy intensities have been made. For

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[1]ICC, Rail Service Planning Office. Guide for Evaluating the Community Impact of Rail Service Discontinuance. Washington, D.C., January 1975; pp. 26-34.

[2]L. A. Poth and J. Sward. Railroad Impact Study: Doland-Watertown, South Dakota-Chicago & North Western Transportation Company Railroad Line. University of South Dakota, Business Research Bureau, Pierre, South Dakota, October 1975; p. 36.

example, truck energy intensity estimates vary between 1,000 - 3,500 Btu/route-ton-miles, while those for rail vary between 300 - 1,450 Btu/route-ton-miles.[1] It is generally agreed however, that a ratio of 4/1 seems to be a reasonable estimate of the fuel efficiency of rail over trucks.[2]

The most widely used, and perhaps the best data for energy intensity by commodity class for truck and rail have been prepared by Rose.[3] The energy intensities (Btu/ton-miles) by commodity class are shown in Exhibit D-5 for truck and Exhibit D-6 for rail. It should be noted that these data have also been utilized in other studies involving the impact analysis of rail line discontinuance.[4],[5]

For each line and alternative, the quantity of diesel fuel is estimated, based on the net volume, haul length within South Dakota only, and modal composition of each traffic movement. Once an energy consumption estimate is made in Btus, it is converted to gallons of diesel fuel using the conversion factor of 138,700 Btu/gallon of diesel fuel. The energy consumption estimates are then summed for all traffic movements for each line alternative for all modes. The totals are then compared to the base case to arrive at an estimate of the incremental energy consumption by line alternative. Energy consumption impacts are considered only for the movements in South Dakota, although further impacts beyond the State borders will occur.

Air Pollution

The air pollution impacts are evaluated in terms of pounds of pollutants per year for the truck and truck/rail alternatives. The three major pollutants emitted by trucks and rail locomotives are carbon monoxide (CO), hydrocarbons (HC), and oxides of nitrogen (as NO_2). Supplemental emissions

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[1]A. B. Rose. "The Role of Air Freight in View of Energy Intensity and Related Parameters - An Intermodal Comparison." A paper presented to the 1978 SAE International Air Transportation Meeting. Boston, Massachusetts, May 1978.

[2]Poth. Railroad Impact Study: Doland-Watertown, Op. Cit., p. 36.

[3]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. 5-16, 6-11.

[4]Minnesota DOT. Potential Impacts and Alternatives to the Proposed Abandonment of the Milwaukee Road Mainline: From Chanhassen to Ortonville, Minnesota. Minneapolis, Minnesota, July 1979; pp. 19-22.

[5]Minnesota DOT. 1979 State Rail Plan. Minneapolis, Minnesota, December 1979; pp. E-11 - E-13.

include oxides of sulfur (as SO_2), particulates, aldehydes, and organic acids. For this analysis, the last two pollutants were assumed to be negligible. The air pollutants emitted by truck and rail depend on several factors: type of fuel and fuel consumption rate; vehicle type, age, condition, and weight; vehicle operating speed; ambient air temperature; altitude; and various other factors.[1]

Air pollution and emission analysis is highly technical and complex. As with energy intensity measures, pollutant emission rates vary widely and have been developed per quantity of fuel consumed or per mile travelled. In general, however, it appears that the total truck-to-rail pollutant ratio is about 4:1 under average conditions.[2]

The emission factors used for the analysis herein were developed by the EPA.[3] Exhibit D-7 presents these emission factors (lbs. of pollutants/ 100 gallons of diesel) for heavy-duty truck and locomotive diesel engines.

The calculation of air pollution impacts involves multiplying the estimated rail and truck fuel consumption by the appropriate air pollution factors. Summing the results for each movement by alternative and comparing to the base case produces an estimate of the incremental air pollution emissions of each rail service alternative. The emissions by type of air pollution are summed for each line and alternative for ease of presentation. Only the impacts which occur in South Dakota are quantified by this study, although further impacts beyond the state borders will occur.

Other

Other non-monetary impacts of rail service changes addressed by this study include the following:

- the competitive nature of transportation services to the State;
- the connectivity of the South Dakota rail system to that of the midwest and national rail system;
- the economic development potential of the State; and

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[1]U.S. EPA. MOBILE1: Mobile Source Emission Model. Washington, D.C. August 1978; pp. 3-5.

[2]Poth. Railroad Impact: Doland. op. cit.; p. 46.

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

EXHIBIT D-7

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 Completion of Air Pollution Emishon Factors. Washington, D.C., March 1975; pp.3.1, 3.2.

- the 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. The effect of each line alternative on these issues is noted as part of the discussion of project impacts.

Project Costs

Project costs include the actual program outlays associated with implementing the proposed rail project alternative. This can include the following items:

- acquisition costs;
- subsidy costs;
- rehabilitation costs;
- alternative mode costs; and
- new construction costs.

For the purposes of this study, the only costs considered are the following, due to the nature of project alternatives being proposed:

- rehabilitation costs to attain Class I or Class II traffic conditions;[1]
- relocation costs to move a grain elevator from a line losing or without rail service to an operating line;[2]
- construction costs for installing or expanding a rail siding, or for installing a transfer track.[1]

Distributional Considerations

The distributional analysis determines by how much different groups gain or lose as a result of the project. The distributional considerations may have critical implications for policy decisions. It is very likely that a project which has a net positive result will have significant negative effects on some groups. In certain instances, the effect on individual groups will cause a re-evaluation of available alternatives.

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[1] Based on estimates provided by T.K. Dyer, Inc.

[2] Based on estimates provided by Banner, and Associates.

To account for the distributional impacts of proposed project alternatives, the benefits are allocated to affected groups, including the

- railroads;
- truck drivers;
- community, including shippers; and
- state.

The sum of the maximum benefits (whether positive or negative) equal the total efficiency benefits for each project. Project costs are not allocated to the affected parties listed above.

Benefit-Cost Evaluation Criteria

The benefits and costs for each line alternative define the incremental changes relative to a consistent base case, which reflects the current status of each line. The impacts are listed in terms of annualized benefits and costs by using a 10-year time frame (except where noted) and a 10 percent discount rate. This permits consistent application of all monetary impacts to the evaluation criteria.

The project alternatives are evaluated by comparing the difference between the annualized benefits and costs for each alternative, and the ratio of annualized benefits and costs. The decision rules associated with each evaluation criteria are as follows:

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 benefits
C = Annualized value of costs
n = Number of benefits and costs

These decision rules are modified to reflect consideration for the non-monetary impacts associated with each line.

CONCLUSIONS

The benefit-cost impact and evaluation methodology described in this appendix attempts to address the intent of the Local Rail Service Assistance Act which first called for the benefit-cost assessment of local rail assistance projects. The methodology employed for this RAILPLAN amendment 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 such an analysis. The quality of supporting information is the most critical variable in determining the type of benefit-cost methodology which can be used. The Study Team was greatly aided by the quality of data maintained by the Division of Railroads and provided by the railroads and shippers associated with each of the intensive study lines.

The benefit-cost methodology is intended to be both meaningful and workable, and yet conform to the requirements of the Federal Railroad Administration. Significant judgement 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 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. However, the enclosed results reflect the best estimates of the consequences of rail service alternatives considered in this study, thereby providing a useful basis for selecting rail assistance projects for implementation.