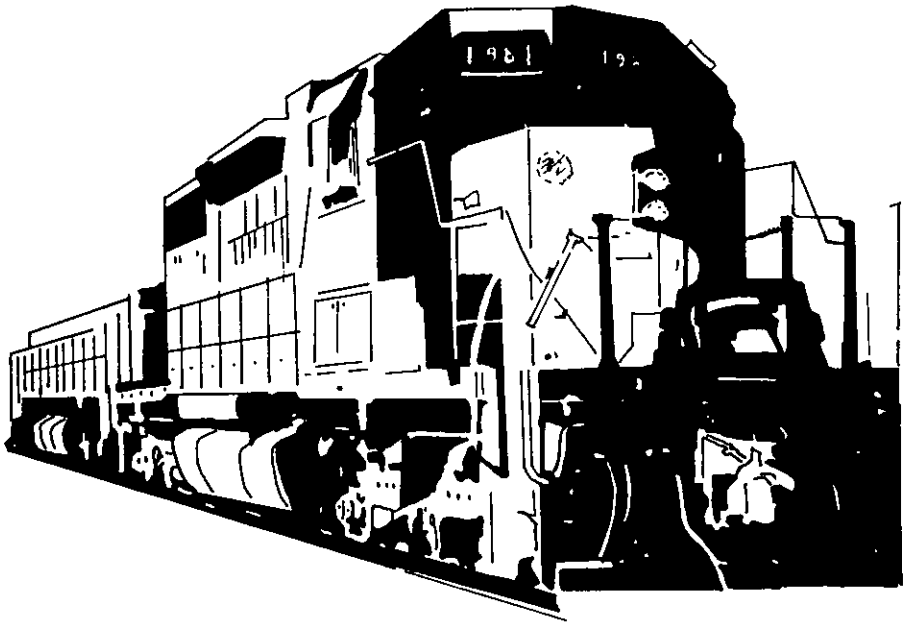
ADDENDUM TO RAILPLAN SOUTH DAKOTA -1981-



CORE SYSTEM BENEFIT / COST STUDIES

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

OCTOBER 1981

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FOREWORD

The most pervasive rail service changes in South Dakota's history have occurred during the last two years and have been the subject of the State's rail plans and other rail studies. The Milwaukee Road's abandonment of nearly 1,000 miles of South Dakota's track in March 1980 was an important rail transportation event and required action by the State to preserve rail service where it is believed to be essential. Many of the lines that were abandoned by the Milwaukee are essential and the State recognized that it would have to purchase the lines before attempting to arrange for the restoration of service. Efforts to purchase the lines began immediately and have now been concluded. This Addendum describes plans for the rehabilitation and operation of some of these purchased lines (the core system).

The Local Rail Service Assistance (LRSA) Program makes matching funds available to states for rail projects. These projects are selected by the states themselves, and matching federal funds may be requested after an analysis of the project's economic and service benefits and costs has been completed and approved by the Federal Railroad Administration (FRA). This Addendum contains the benefit-cost analyses of projects for three of the line segments that compose the core system. These analyses will enable the State to submit applications for LRSA funds.

This document updates benefit-cost studies of the core system that are contained in the report entitled Addendum to Railplan, South Dakota, 1980. The earlier studies were based on the likelihood that a short-line carrier would be selected to operate the system and that the track would be rehabilitated to minimum Class II (25 mile per hour) standards. These presumptions proved to be incorrect in that the Burlington Northern, a major national rail carrier, was selected as the operator, and a decision was made to initially rehabilitate, to standards permitting the operation of unit trains at Class II speeds, those core system lines that provide access to the national rail system.

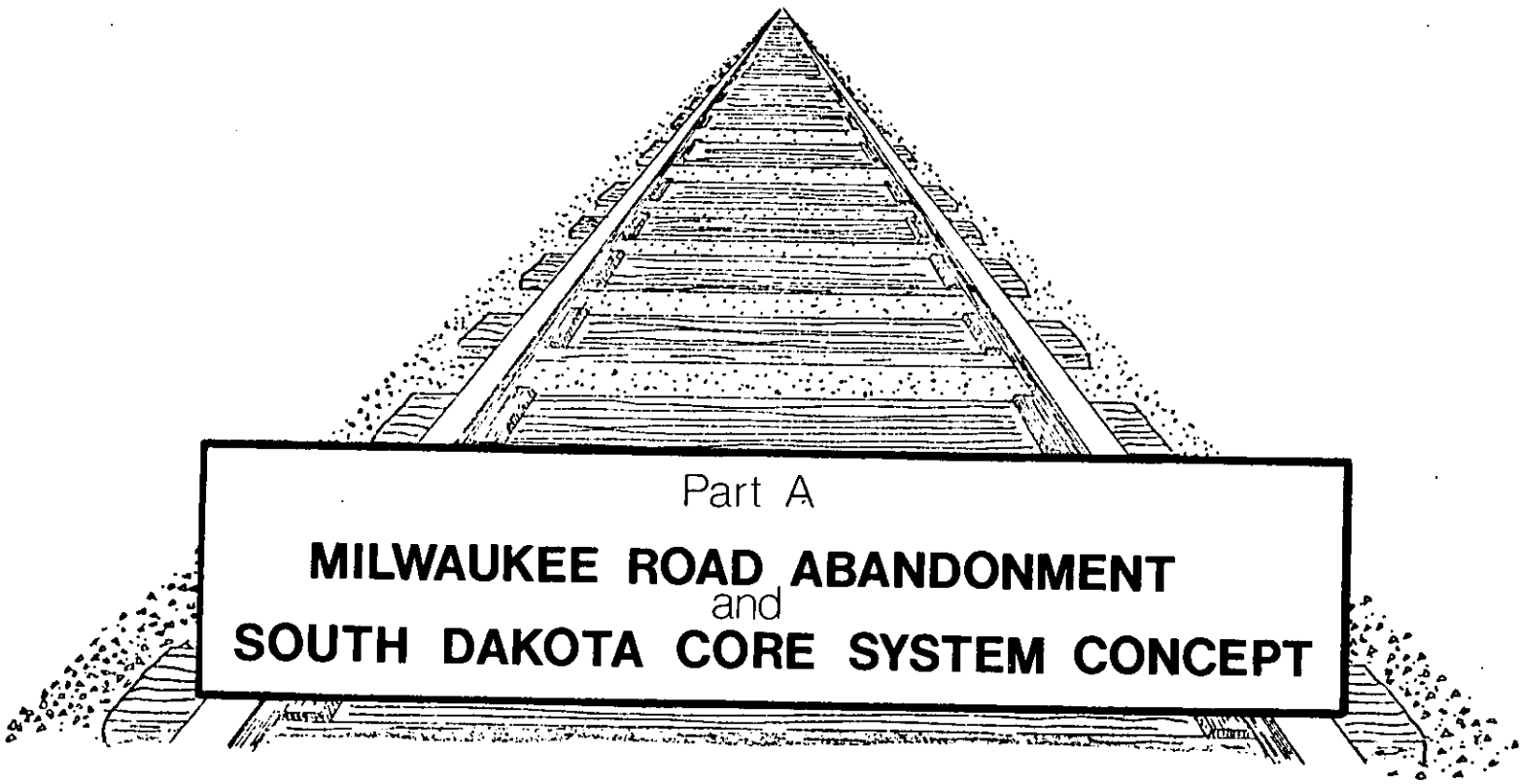
The core system lines combine to form an interdependent system, since only one of the lines does not provide direct access to connecting railroads. Because the lines are interdependent, the benefits and costs of each study project accrue to all the lines in the system and not just to the line for which the project is intended. The projects studied have a combined benefit-cost ratio of 1.28, indicating a substantial economic need. The projects also will enable increased service to be provided to a core system line that will not be initially rehabilitated to Class II, unit train standards. When these benefits are considered, the projects yield a benefit-cost ratio of 1.61. The lines provide essential transportation services to many rural grain elevators and industries, thereby further emphasizing the need to restore efficient rail operations on the core system.

The process of restoring rail service has consisted of two primary phases. During the first phase, the Directed Service Program that was established by the Milwaukee Road Restructuring Act was used to rehabilitate the non-operating core system lines to Class I track standards. This work was necessary to allow safe operations and was completed on August 29, 1981. During the second phase, the State plans to rehabilitate 85 percent of the core system mileage to 25-mile per hour, unit train standards. Both LRSA and State funds will be used.

Part A of this report provides background data concerning the Milwaukee's abandonment, the history of the core system concept, the process of restoring service to the core system lines, and the role of this Addendum in South Dakota's rail planning process. Part B contains a discussion of how projects were selected for study, the benefit-cost analyses, and the recommended assistance program.

Public participation is an integral part of South Dakota's rail planning process, and is necessary to establish and maintain a useful dialogue between the State, its citizens, and rail users. The communication of needs and concerns to State rail planners enables those planners to function more effectively. Comments or questions on this document should be addressed to:

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



Part A

MILWAUKEE ROAD ABANDONMENT
and
SOUTH DAKOTA CORE SYSTEM CONCEPT

I. HISTORY OF MILWAUKEE ROAD ABANDONMENT IN SOUTH DAKOTA

The bankruptcy of the Milwaukee Road in 1977 had a dramatic and adverse effect on South Dakota. The State's economy is heavily dependent on agriculture, and the Milwaukee's abandonment in 1980 of nearly 1,000 miles of grain gathering rail lines deprived many shippers access to major markets, such as the Gulf and West Coast ports. The resulting need to sell grain at less distant and less profitable locations has reduced revenues for grain elevators, and therefore lowered grain prices for farmers.

In response to this situation, South Dakota passed legislation authorizing the purchase of over 1,200 miles of abandoned track. Of this, 429 miles were designated as part of the State's essential rail system, and efforts began in 1980 for the purchase and restoration of these lines--called the South Dakota core system. The track purchased from the Milwaukee Road was placed in operation during the summer of 1981, with service provided by the Burlington Northern Railroad (BN). Lines that were purchased, but are not operated, have been designated as local option lines and will be rail banked until either service is restored or the lines are salvaged.

All of the purchased lines that are part of the core system to be operated are former Milwaukee lines. Their primary function is to gather grain from country elevators and provide access to markets that are not economically accessible by other transportation modes. Because the Milwaukee ceased operation of these lines, shippers have been forced to utilize a variety of shipping alternatives, none of which has been a complete substitute for rail service. Between March 1980, when Milwaukee service ended, and June 1981, when the Directed Service Program began, the only rail service on the core system was provided by the Chicago and North Western Railroad. This service was confined to the Aberdeen to Wolsey line.

During the last several years of their operation by the Milwaukee, the lines were allowed to physically deteriorate. Thus, although most of the lines are equipped with at least 85-pound rail, tie conditions made them virtually inoperable. A comprehensive program to rehabilitate the lines began and is explained in this report. This Addendum addresses an important part of that continuing program.

The only lines in South Dakota that are currently operated by the Milwaukee are the former main line that now extends between Jonathan, Minnesota, and Miles City, Montana, the Milbank to Sisseton branch line, and 10 miles of the McLaughlin, South Dakota, to New England, North Dakota, branch line. On September 15, 1981, the Interstate Commerce Commssion approved the Milwaukee's application to abandon all its remaining South Dakota track, and service is expected to cease during the spring of 1982. Attempts are currently being made by South Dakota to purchase and rehabilitate the portion of the line between Ortonville, Minnesota, and Terry, Montana. If these efforts succeed, the BN has agreed to provide service as lessee/operator.

II. SOUTH DAKOTA CORE SYSTEM - CONCEPT AND HISTORY

South Dakota selected several abandoned Milwaukee lines in 1980 for acquisition and service restoration. Since that time, a primary rail planning concern of the State has been this core system and the goal of restoring operations during 1981. The following section discusses the core system concept and its history to date.

IDENTIFICATION OF ESSENTIAL LINES

South Dakota identified a series of rail lines in its 1980 Railplan that were believed to be essential to the State and its economy (Exhibit II-1). These lines were divided into two categories: lines currently operated by the private sector, and lines abandoned by the Milwaukee that would have to be purchased by the State so operations could to be restored. These lines were called the South Dakota core system.

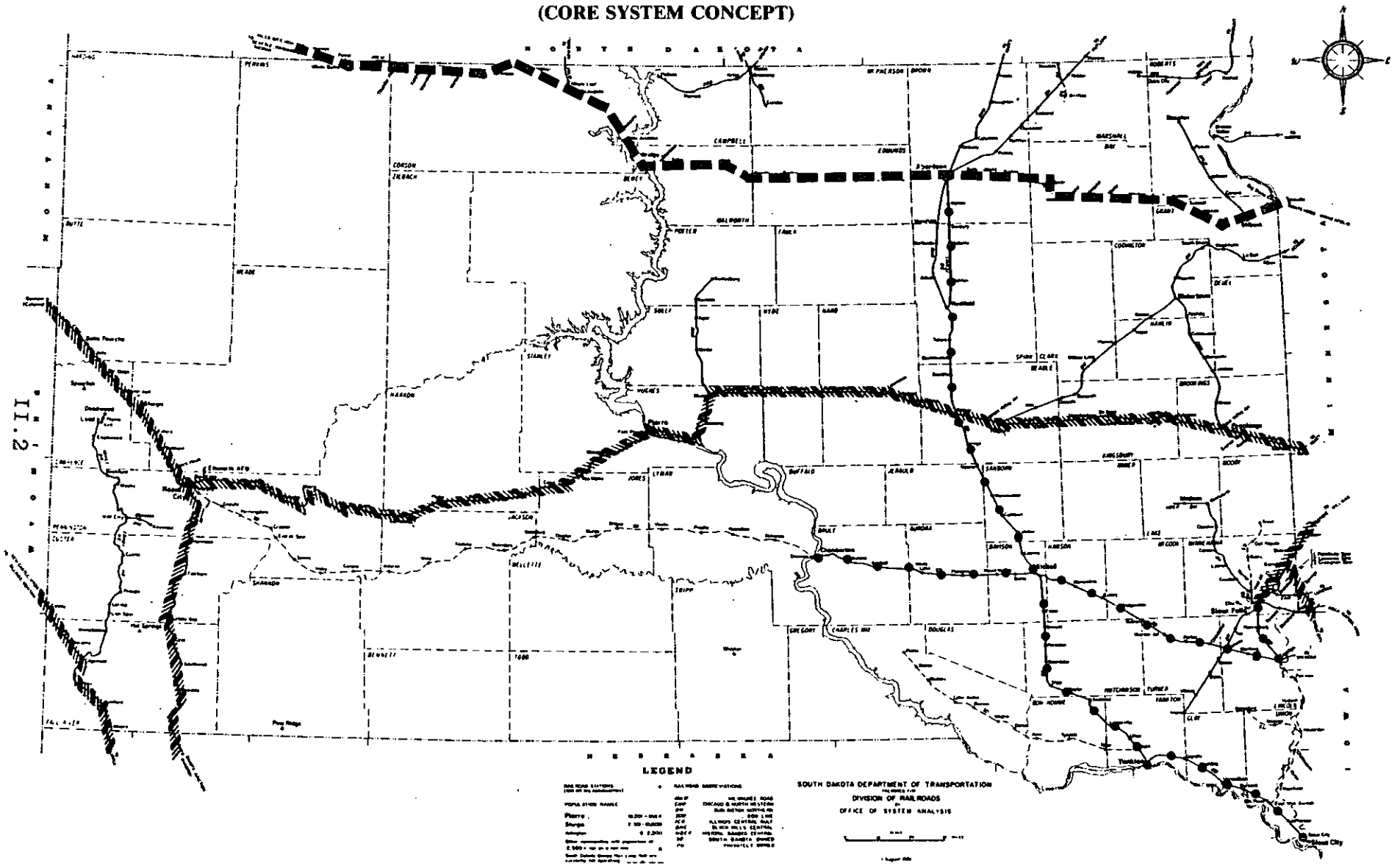
Rail lines are defined as essential by several characteristics. These include having:

- significant current and projected traffic volumes;
- access to major grain producing areas of the State;
- access to the national rail transportation network;
- access to natural resource areas, particularly coal deposits; and
- expected adverse effects of service loss, including shipper cost of alternative transportation, cost of highway maintenance as a result of increased truck traffic, and rail line rehabilitation cost.

Each of the core system lines meets all the above criteria with the exception of providing access to natural resource areas. The State recognized that rail service needs change over time, and therefore purchased more lines than were included in the core system itself. The purchase plan is shown in Exhibit II-2. The selection of purchased lines for operation is discussed in a later section.

EXHIBIT II-1

ESSENTIAL RAIL SYSTEM OF SOUTH DAKOTA
(CORE SYSTEM CONCEPT)



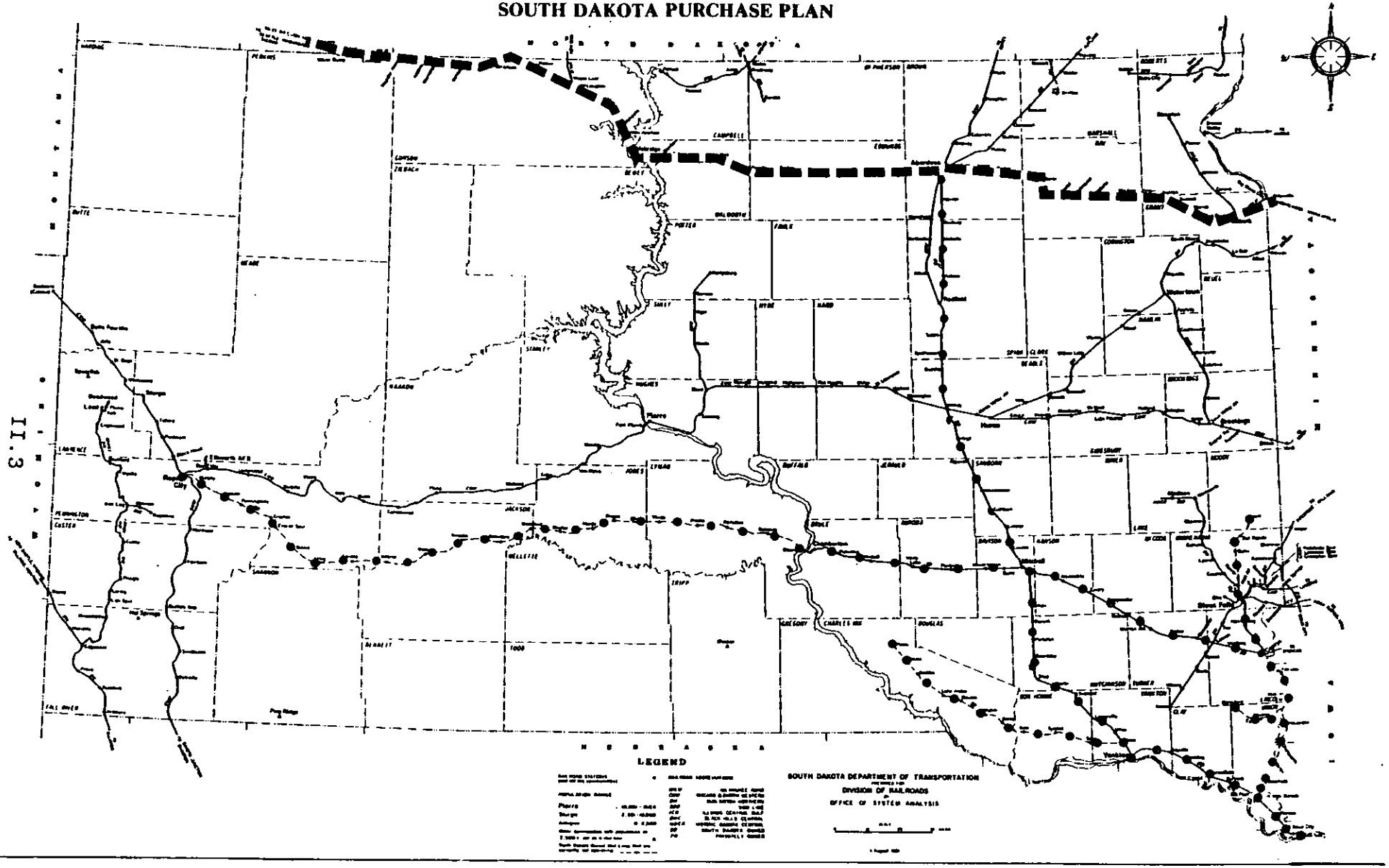
KEY

ESSENTIAL RAIL LINES

- Essential Lines Purchased by South Dakota (Core System)
- Private Sector Essential Lines
- Private Sector Essential Lines Approved for Abandonment

EXHIBIT II-2

SOUTH DAKOTA PURCHASE PLAN



KEY

Purchased Lines

Proposed Future Purchase

LEGISLATION TO ENABLE PURCHASE AND OPERATION OF ABANDONED LINES

Legislation was passed during 1980 that permitted the State to purchase up to 1,254 miles of railroad track in South Dakota. A $0.01 sales tax increment was applied to raise funds for that purpose. The tax was established with the provision that it would be automatically rescinded after $25 million was raised, or after July 1, 1981, whichever occurred first. The necessary funds have been raised and the tax has been repealed. The South Dakota Railroad Authority was also established in 1980 and assigned duties to plan, establish, acquire, develop, construct, purchase, enlarge, maintain, equip, and protect railroad facilities deemed necessary to the State. The State Railroad Board was also established to oversee the State Division of Railroads, which provides the necessary staff support for addressing all railroad issues.

Before operations could begin, the legislature was required to specifically authorize a plan for operations. This plan was considered during the 1981 session, and approval to operate the core system was granted. This Addendum is a result of the operating approval and the State's selection of the BN as core system operator, and is part of the process of restoring the lines to a safe, practical operating condition.

SELECTION OF PURCHASED LINES FOR OPERATION

The State selected four line segments for rehabilitation and operation as part of the core system. All are intensive study lines in this Addendum. They are:

- Mitchell - Canton - Sioux Falls;
- Mitchell - Sioux City;
- Mitchell - Aberdeen; and
- Mitchell - Chamberlain.

Together, these lines were chosen for operation because of their important historical function of transporting grain from elevators to distant markets. The Milwaukee's shortage of operating capital resulted in deteriorating service, track, and equipment. This, in turn, reduced rail service demand, and thus further depleted available cash. The resulting bankruptcy deprived many of South Dakota's most productive agricultural areas of rail service, and necessitated the involvement of the State to restore operations. Although other purchased lines may be added to the operat-

ing system in the future, these core lines are considered to represent the minimum amount of rail service necessary to meet transportation needs at this time. Without these lines, it is believed that a hardship in terms of lower grain prices will continue to be imposed on farmers and the South Dakota economy.

ROLE OF THE CORE SYSTEM IN THE SOUTH DAKOTA RAIL SYSTEM

The South Dakota core system is an integral part of the State's rail system. The line segments join together to form the only link betwen the major cities of Aberdeen, Mitchell, Yankton, and Sioux Falls. The rail gateways available to the core system and the connecting railroads are summarized below.

Gateway		Connecting Railroads
Aberdeen	-	Chicago and North Western Milwaukee Road Burlington Northern
Sioux Falls	-	Chicago and North Western Burlington Northern Illinois Central Gulf
Sioux City	-	Chicago and North Western Burlington Northern Illinois Central Gulf

Because of abandonments, much of the State's most productive agricultural area is without rail service. The core system will restore minimal, non-duplicative service to this area and provide a basis for potential future expansion of operations into other areas of the State. The system will also facilitate the intrastate movement of bulk commodities.

SELECTION OF OPERATOR AND FINANCING OF SERVICE

The 1981 Legislature provided the authority and statutes necessary to secure an operator for the core system. The selection process ended with the announcement on June 16, 1981, by Governor Janklow, that the State and the BN had reached an agreement in principle where the BN would be the core system operator. The State's agreement with the BN requires the rail company to provide common carrier service for a minimum of three years on State-owned, core system track.

The agreement with the BN represents a departure from the original plan which called for the State to provide decreasing yearly operating subsidies for seven years to a short-line operator. An operating subsidy was not requested by the BN; however, the BN required that the track be improved and upgraded to handle unit trains at 25 miles per hour. The State was studying the feasibility of rehabilitating the core to 25 miles per hour before the BN announcement and realized that upgrading the track was essential for unit train operations. The State, therefore, agreed to complete the necessary repairs within three years through funds that were to have been used for operating subsidies.

The BN began operating the core system in stages as rehabilitation of the lines to Class I (10 miles per hour) was completed. BN service started on July 6, 1981, on the first segment of track, and the entire core system became operational in November 1981.

PROGRAM FOR REHABILITATION AND SERVICE RESTORATION

South Dakota's goal is to rehabilitate the core system to Class II unit train standards as soon as possible. The State believes that this rehabilitation is essential to achieve an efficient, cost-effective rail system. It has therefore formulated a rehabilitation plan. This plan, including expected funding sources, is summarized by Exhibit II-3.

The first element of the plan has been completed through the Directed Service Program. This program, created by the Milwaukee Road Restructuring Act in 1980, is designed to assist purchasers of Milwaukee lines with service restoration. On May 6, 1981, the Interstate Commerce Commission approved South Dakota's plan for using Directed Service funds, and the Department of Transportation made available $2.3 million in Program funds.

South Dakota implemented the Program in three discrete 30-day periods. During each, a different portion of the core system was addressed, and freight service was included during part of each period. At the conclusion of each period, operations began by the BN and have continued uninterrupted. The lines included in each period were:

June 1 - June 30	Wolsey - Mitchell and Mitchell - Canton

EXHIBIT II-3

PLAN FOR REHABILITATING CORE SYSTEM LINES

LINE - Line Segment	EXISTING CONDITIONS	PLANNED CONDITION AFTER 1981 PHASE	PLANNED CONDITION AFTER 1982 PHASE
MITCHELL - CANTON AND SIOUX FALLS			
- Canton to Sioux Falls	Class I	Class II	Class II Maintained
- Mitchell to Canton	Class I*	Class I Maintained	Class II
MITCHELL- SIOUX CITY			
- Elk Point to Sioux City	Class I	Class II	Class II Maintained
- Yankton to Elk Point	Class I*	Class I Maintained	Class II
- Mitchell to Yankton	Class I*	Class I Maintained	Class II
MITCHELL - ABERDEEN			
- Wolsey to Aberdeen	Class I	Class I Maintained	**
- Mitchell to Wolsey	Class I*	Class I Maintained	**
MITCHELL - CHAMBERLAIN			
- Mitchell to Chamberlain	Class I*	Class I Maintained	**

*Line rehabilitated to Class I in 1981 through Directed Service Program.

** Line will be upgraded to Class II when funds are available.

July 1 - July 30	Mitchell - Chamberlain and Mitchell - Scotland
July 31 - August 29	Scotland - Elk Point

The Aberdeen to Wolsey segment was ineligible for the Program because service was being provided by the C&NW. Service by the BN will begin in November of 1981. The Sioux Falls to Canton and Elk Point to Sioux City lines will be rehabilitated to Class II according to the schedule described in Exhibit II-3. Neither line was included in the Directed Service Program.

BENEFIT TO SOUTH DAKOTA OF THE CORE SYSTEM

Restoring service to the lines that compose the core system will benefit South Dakota as follows:

- provide farmers and grain elevators with access to distant markets;
- provide an economical method for sending and receiving bulk commodities;
- relieve the State's highway system of the burden of transporting damaging amounts of bulk commodities; and
- provide the economical, reliable transportation service necessary to stimulate industrial growth.

Since cessation of service in March 1980 by the Milwaukee Road, the State of South Dakota has become increasingly aware of how important rail service is to its economy. During the late 1970s, the quality of rail service declined and traffic was diverted to other modes. This resulted in farmers being forced to sell their crops at markets with less attractive price structures. From 1977 to 1979, South Dakota prices for all grains except soybeans rose at a slower rate than the U.S. average (Exhibit II-4). It is believed that with reliable rail service, more profitable markets will be regularly accessible and thereby raise the price that can be offered by grain elevator operators to farmers and alleviate this hardship.

EXHIBIT II-4

COMPARISONS OF GRAIN PRICES FOR SOUTH DAKOTA and U.S. AVERAGE, 1977-1979

	1977		1978		1979	
	U.S. Average	South Dakota	U.S. Average	South Dakota	U.S. Average	South Dakota
Corn	$2.03	$1.85	$2.11	$1.80	$2.41	$1.90
Wheat	2.31	2.51	2.94	2.76	3.82	3.65
Oats	1.14	1.10	1.18	1.05	1.36	1.25
Soybeans	5.79	4.40	6.65	6.50	6.19	5.90

Source: U.S. Department of Agriculture

III. PURPOSE OF ADDENDUM TO RAILPLAN, SOUTH DAKOTA, 1981 AND CONSISTENCY WITH RAIL SERVICE AND PLANNING POLICIES, OBJECTIVES, AND GOALS [266.15(c)(1)]

The two primary purposes of this Addendum include preparing benefit-cost studies so that:

- applications for Local Rail Service Assistance (LRSA) Program funds can be made; and
- facts can be assembled on the economics and importance of the core system.

The LRSA Program requires that detailed benefit-cost studies be conducted on lines before Federal assistance can be approved. The second point is equally important because sources of potential funds (including shippers) want to know as much as possible about the economic importance of the lines before making financial commitments.

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

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 ongoing 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 the 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 nonprofitable rail lines which are nonessential and whose services could be more economically provided by an alternative rail line or transportation mode;

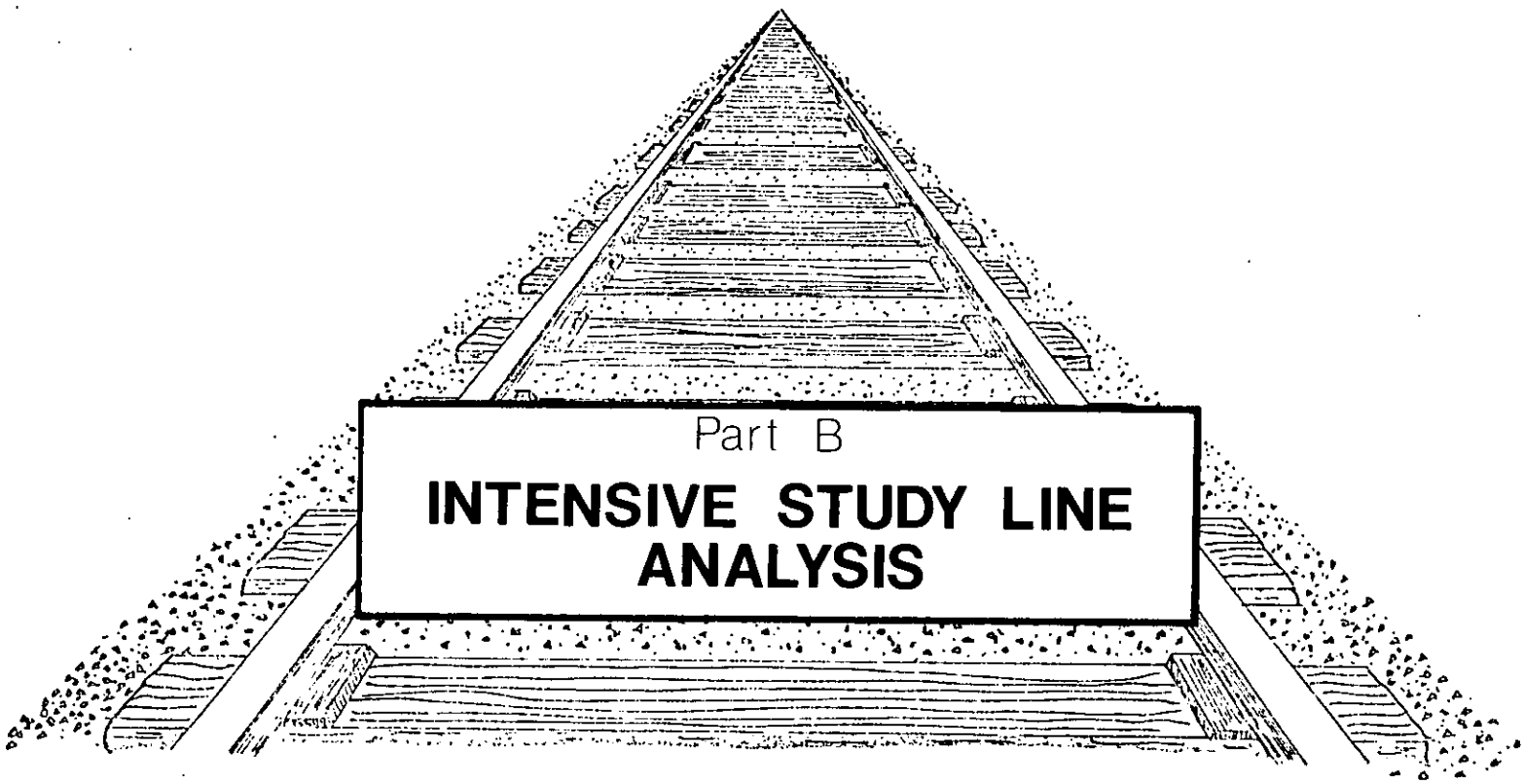
- develop competitive transportation options for those communities which lose rail service;

- promote increased use of rail service in those ways in which it is best suited;

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

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

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



Part B

INTENSIVE STUDY LINE ANALYSIS

IV. PROJECT SELECTION PROCESS [266.15(c)(4)]

The purpose of this Addendum is to provide benefit-cost analyses of intensive study lines. The lines that were selected for study make up the core system and reflect the priority placed upon rehabilitating the core system to Class II, unit train standards. Criteria used to select lines for study include:

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

B. Light density lines that provide accessibility to the regional and national railroad network.

C. Lines purchased by South Dakota for which track rehabilitation is being considered.

D. Lines that are or will be operated by the BN, under contract to South Dakota.

The above criteria focus on lines that are or will be operated by the BN as part of the South Dakota core system. Because of several years of deferred maintenance, and the State and BN desiring to operate the lines at Class II speeds (up to 25 miles per hour) with unit trains, rehabilitation of the track is required. With the help of the Directed Service Program, all the lines are currently in Class I condition. The rehabilitation projects for the segments that provide connections with the national rail system will further upgrade tie and ballast conditions. The intensive study lines are shown in Exhibit IV-1, and the project alternatives and selection criteria for each line are shown in Exhibit IV-2.

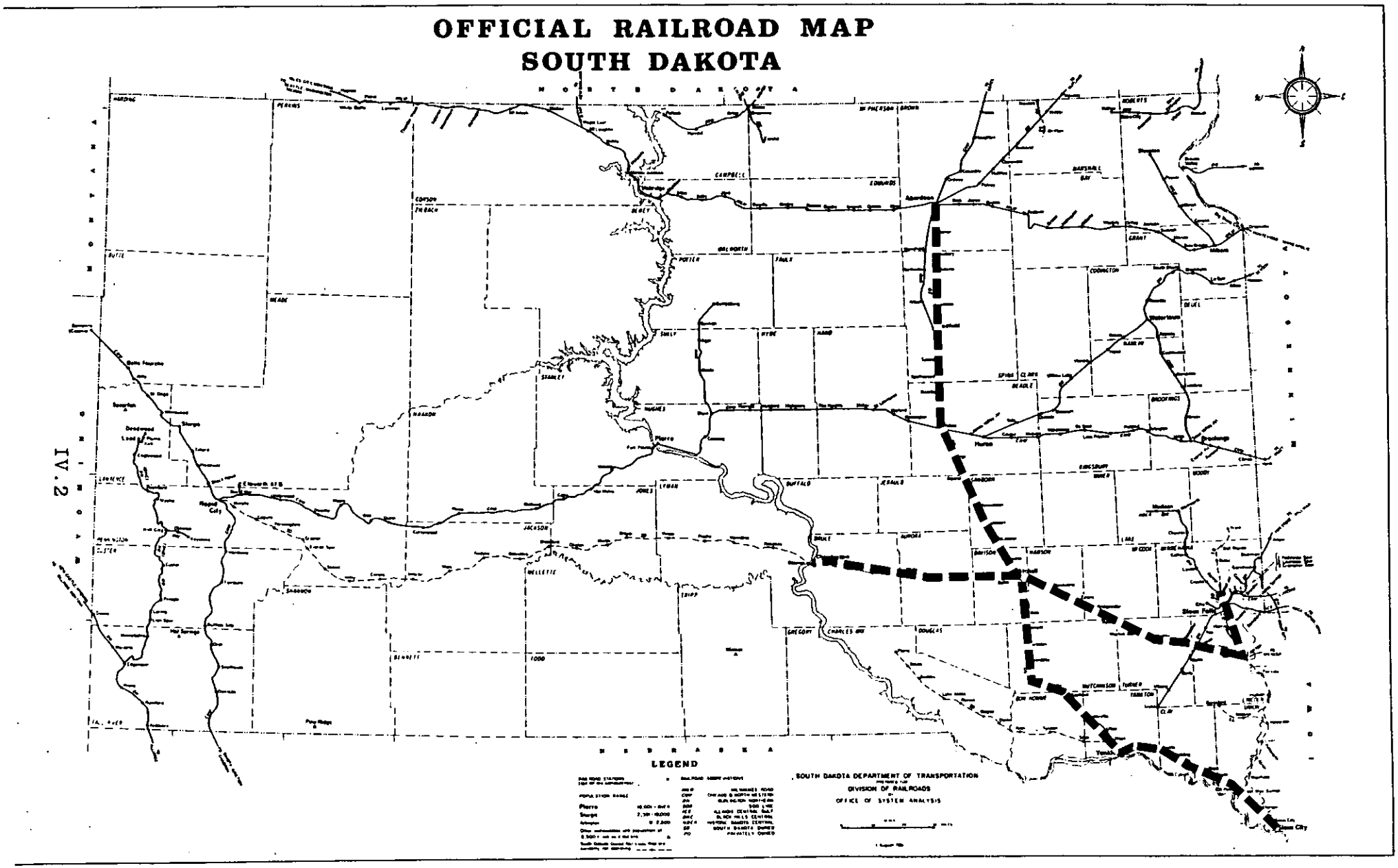
The intensive study lines that are the subject of this Addendum are light density lines that are or will be operated by the BN. The Directed Service Program financed the rehabilitation of the lines (shown in Exhibit IV-3) to Class I standards, and this Addendum describes the benefits and costs of rehabilitating the lines shown in Exhibit IV-4 to Class II, unit train standards.

These projects reflect South Dakota's belief that the efficient operation of these lines is essential to meeting the State's transportation needs, and that track standards permitting Class II speeds and unit train operations should be attained as soon as possible to:

- improve the efficiency of operations and reduce operating costs on a carload basis;

EXHIBIT IV-1

INTENSIVE STUDY LINES
(SOUTH DAKOTA CORE SYSTEM)



Intensive Study Lines

EXHIBIT IV-2

INTENSIVE STUDY LINES AND PROJECT ALTERNATIVES

Study Number	INTENSIVE STUDY LINE *	Selection Criteria*
1.	Mitchell-Canton-Sioux Falls	(A), (B), (C), (D)
	**Continue Rail Service at Class I	
	--Continue Rail Service and Rehabilitate to Class II	
2.	Mitchell-Sioux City	(A), (B), (C), (D)
	**Continue Rail Service at Class I	
	--Continue Rail Service and Rehabilitate to Class II	
3.	Aberdeen-Mitchell	(A), (B), (C), (D)
	**Continue Rail Service at Class I	
	--Continue Rail Service and Rehabilitate to Class II	
4.	Mitchell-Chamberlain ***	(A), (B), (D)
	**Continue Rail Service at Class I	

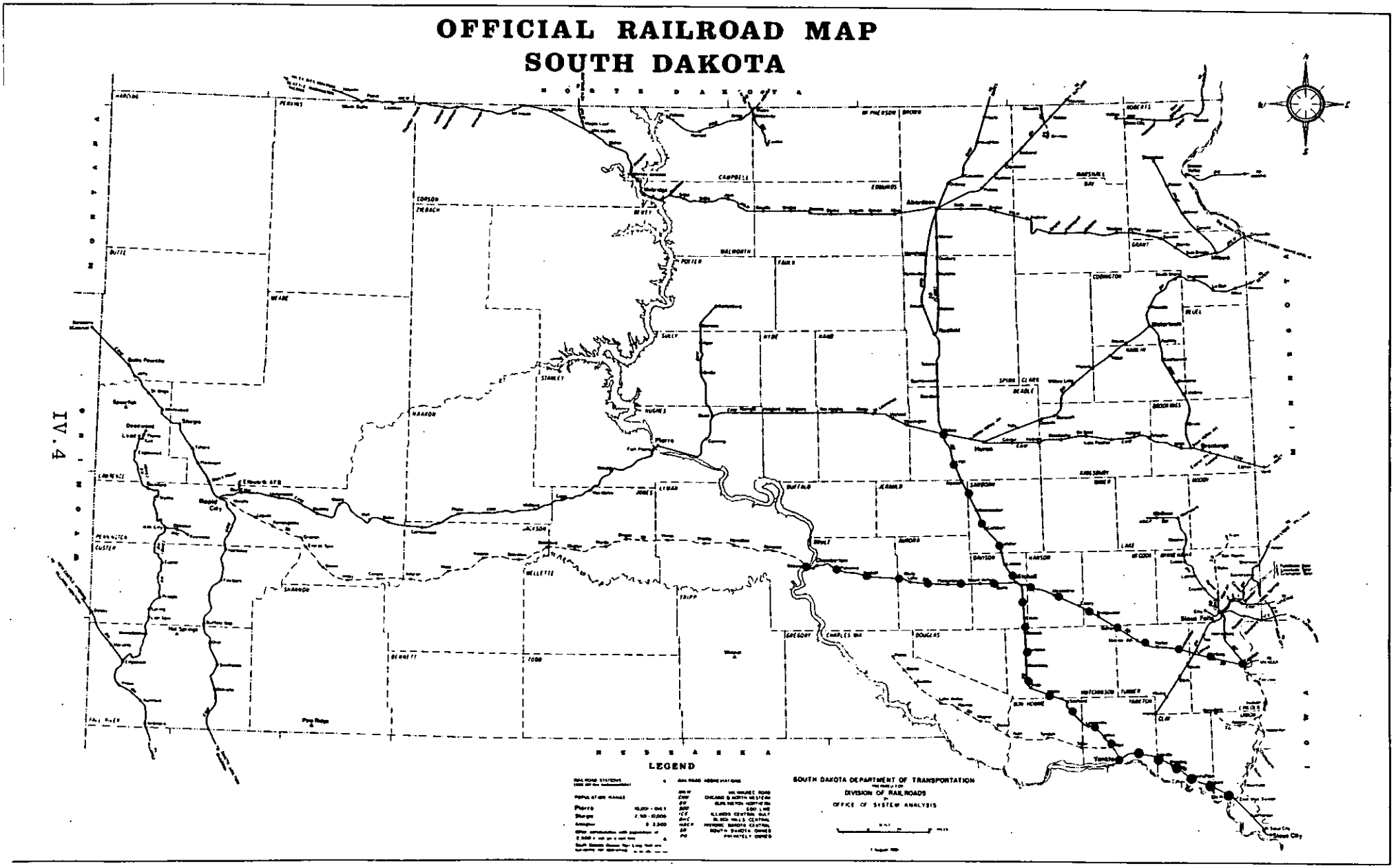
* See listing of criteria on page IV. 1

** Base cases (existing cases) are indicated by 2 asterisks (**) and project alternatives are indicated by 2 dashes (--)

*** Line is selected for intensive study to assess the benefits that accrue from rehabilitating other segments of the core system. No service improvement project that would use federal funds is currently planned for this line.

EXHIBIT IV-3

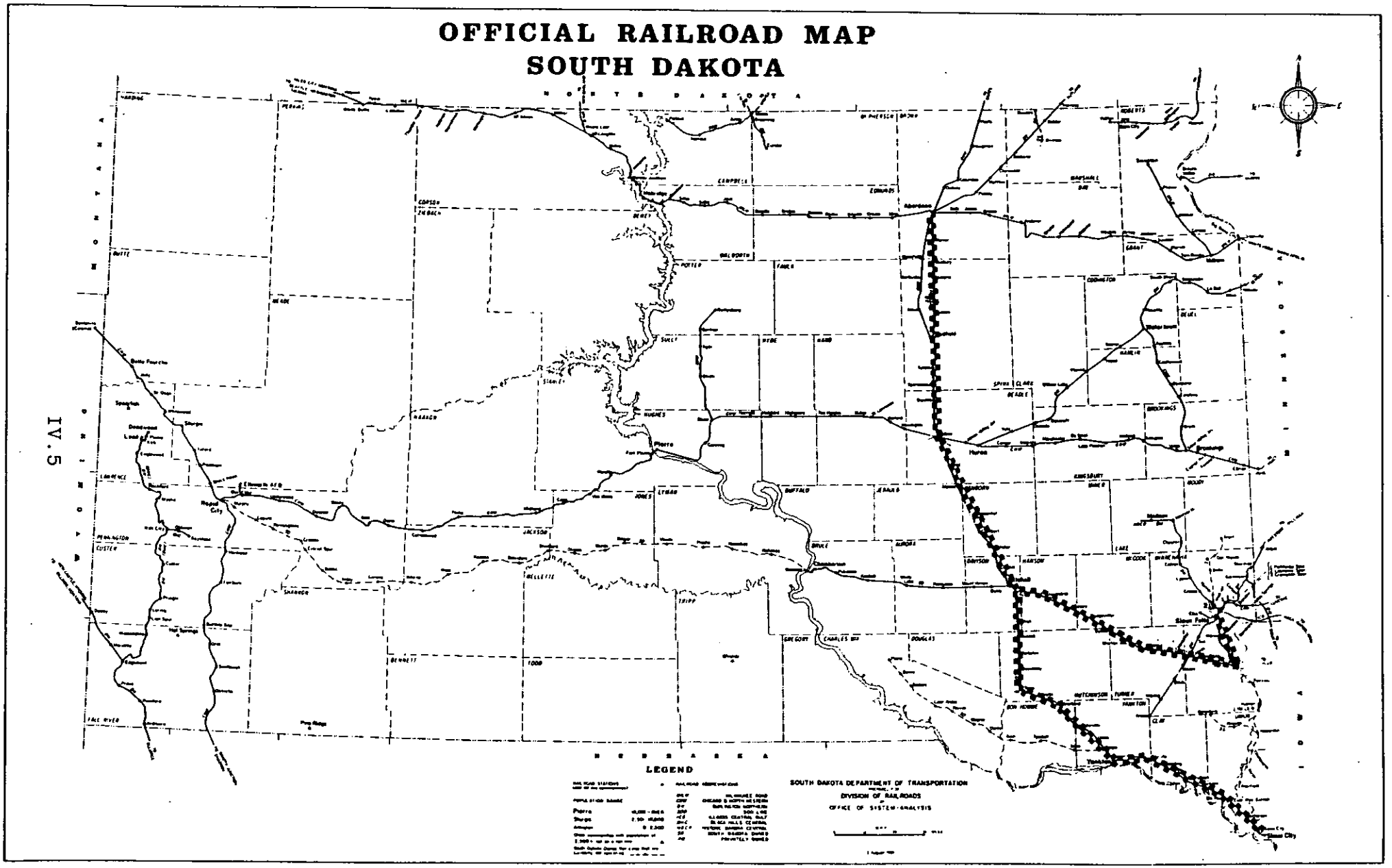
DIRECTED SERVICE LINES



• • • • Directed Service Lines

EXHIBIT IV-4

INTENSIVE STUDY LINES FOR WHICH REHABILITATION WITH FEDERAL FUNDS IS PLANNED



Lines for Which Rehabilitation with Federal Funds is Planned

- satisfy additional demand for rail transportation;
- attract additional traffic that will move by motor carrier unless rail operating speeds exceed Class I levels; and
- prevent undue damage to State-owned trackage that would result from operation of unit trains on trackage not adequately rehabilitated.

These projects represent the final State or federal rehabilitation assistance to the core system. After the projects are completed, the core system operator will be responsible for performing annual maintenance, thereby eliminating the need for further State or federal rehabilitation assistance.

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

Each intensive study line was analyzed on the basis of rail service demand, physical condition, importance to the operation of the core system, and importance to shippers, communities, and the State of South Dakota. The purpose of these studies is to provide the benefit-cost analyses necessary to implement a program for the rehabilitation of the core system lines to Class II, unit train standards.

A general description of information sources and analysis procedures used for the intensive study lines appears in this section. A more detailed documentation of these sources and procedures is included in the appendix.

The accompanying benefit-cost analyses for intensive study line alternatives were prepared on the basis of information and assumptions set forth in the text and exhibits of this Addendum. The appendix contains a detailed description of the methodologies used for the impact analysis as well as the benefit-cost evaluation. The study team relied upon information and assumptions from the sources indicated in the text and exhibits without verifying such data. Although the information and assumptions used constitute reasonable bases for preparation of the benefit-cost projections, the achievement of any financial projection may be affected by fluctuating conditions and is dependent on the occurrence of other future events which cannot be assured. Therefore, the actual results achieved may vary from the projections, and such variations could be material.

DATA COLLECTION

The analysis of intensive study lines was based on the existing data files maintained by the Division of Railroads and information collected during this study. Shipper data was collected for each intensive study line through a shipper survey. The condition of each intensive study line was independently evaluated based on an on-site track inspection by T.K. Dyer, Inc. and by the Burlington Northern Railroad Company.

Shipper Survey

Shipper information was developed by surveying, in person or by telephone, virtually all rail users on each intensive study line.

The type of information requested of each shipper included the following:

- intention to use State core system;
- rail user identification, employment, and principal business activity;
- rail loading capacity;
- rail service needs;
- volume and nature of potential rail usage and alternative transportation mode usage; and
- projected effects on employment, production, and rail and truck usage of restoring rail service.

The information provided by the shipper surveys should be viewed in most cases as upper estimates of the effects of rail service restoration on shippers' business operations. Even so, this information is considered to be the best data on which to base the analysis of intensive study lines. The major concern as to the validity and accuracy of shipper-supplied information involves future actions and responses to rail service. Thus, care should be exercised in interpreting the project analysis results.

Responses were formulated on the assumption that the operating carrier will offer competitive service and competitive rates. Most respondents emphasized the importance of these factors to the study team, saying that their future decision to use the system will be based solely on whether an economic advantage is offered. The time that passed without rail service has resulted in a better understanding by the shippers of the economic advantages offered by each transportation mode. Thus, rail service will be used primarily to gain access to long distance markets, and motor carriers will be used to provide service over shorter distances. As mentioned by many grain elevator operators, however, all shipping depends on the terminal price offered for the grain and the farmer's productivity and willingness to sell. The survey results therefore assume a normal crop, good markets, and competitive service and rates. If one or more of these factors do not exist in any given year, the basis for the study results will be affected. The survey represents a "best estimate" of rail demand assuming that the railroad can be competitive with other carriers in the area, including trucks.

As described in the appendix, all shipper responses were compared with 1979 rail shipping data and adjusted where appropriate. The historical and projected percentages of grain shipped by rail were also calculated and compared as a method of validating the adjusted survey data. The shipping volumes used in the benefit-cost analysis represent a projection that approximately 32 percent of a typical year's grain production that is marketed in the core system's market area will move by rail.

Additional information regarding each line and railroad was also available at the South Dakota Division of Railroads. This included:

- railroad annual reports (R-1 reports) to the Interstate Commerce Commission (ICC);
- annual reports for each railroad filed with the South Dakota Department of Revenue;
- commodity flow statistics for each railroad as compiled by the Division;
- line abandonment summaries compiled by the Division;
- line abandonment applications filed by the operating railroads with the ICC;
- detailed line segment data maintained by the Division; and
- past shipper survey data also maintained by the Division.

Track Inspections

During the summer of 1981, T.K. Dyer, Inc. and the Division of Railroads made detailed on-site inspections of the intensive study lines. Inspections were made in the company of railroad officials, and combination rail/highway vehicles were used.

During the inspections, detailed observations were made of the condition of the rails, ties, rail-joints and tie plates, ballast, and right-of-way. Bridge facilities and grade crossings were inspected for major defects. Weed, grass, and brush growth in the right-of-way was also noted.

Additional materials were obtained by the study team, including operating timetables, track charts, and the number and type of bridges, culverts, and grade crossings on the intensive study lines. The results of the on-site inspections enabled T.K. Dyer, Inc. to prepare cost estimates of rehabilitating the track to standards permitting unit train operations at Class II speeds. Inspections by the Burlington Northern Railroad Company were made during the late summer and early fall of 1981.

PROJECT ANALYSIS METHODOLOGY

The analysis of each intensive study line involved the determination of the quantitative and qualitative effects of the project alternatives on the rail users, State, and Nation. This section describes the types of effects considered and the method of calculating the results as part of a benefit-cost analysis for each line. The methodology is similar to that used in the addendum to the 1980 railplan which was approved by the Federal Railroad Administration. Modifications were made only to reflect the selection of the BN as the core system operator.

Benefit-Cost Analysis Methodology

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

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

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

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

where

$(B_n-B_o)_p$ = Primary (p) Efficiency Benefit ($), Alternative (n) versus Base Case (o)

Q_o = Quantity Shipped, Base Case (Tons)

Q_n = Quantity Shipped, Alternative (Tons)

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

P_n = Transportation Revenue, Alternative ($/Ton)

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

C_n = Transportation Costs, Alternative ($/Ton)

An important assumption in the study resulted in the shipping quantity being equal in both the base and alternative cases. Under this scenario, the equation reduces and becomes:

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

The assumption causing the change is based on the belief that the shipper survey quantifies rail shipping demand and that the traffic volumes represented by that demand will move by an alternative transportation mode if the rail option is unavailable. Because the Base Case is represented by rail service at a Class I level, and the alternative case is rehabilitation of the lines and operation at a Class II level, more of the demand for rail shipping can be met under the Alternative Case. South Dakota is designing its system to transport 100 percent of rail demand, therefore the difference between rail shipping under the Alternative Case (a Class II system) and rail shipping under the Base Case (a Class I system) is the volume that must be transported by truck. Thus:

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

C_n = rail transportation cost for the alternative.

The costs reflect the composite costs of the alternative being considered, based on estimated rail and truck costs. The rail costs are based on estimated on-branch costs, as discussed in the appendix. Off-branch rail costs are developed from the individual railroads' Rail Form A costs. Truck costs are estimated on a truck-mile and trip basis, using average owner-operator driver costs. The quantity information is based on the shipper survey responses, adjusted by using several decision rules and historical data. This adjustment process is also detailed in the appendix.

The effect of market accessibility was calculated and added to the primary efficiency benefits. This effect is measured by the price paid for grain at the primary destination, less the price paid at the secondary destination. The secondary destination is used by shippers only when rail is unavailable under the Base Case. The difference in price is multiplied by the quantity of traffic diverted to calculate the total monetary impact of not being able to utilize the preferred market. This factor helps to offset the large difference in transportation costs between the Base and Alternative Cases that results when formerly diverted traffic is routed to its preferred, distant location.

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

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

- jobs - the loss or creation of jobs because of rail service improvement, including rail user, railroad, and truck jobs;
- income - the income of additional jobs filled by previously unemployed persons, less the income of persons losing jobs because of rail service improvement, adjusted for the amount of unemployment compensation. This affects not only rail service employees but also railroad and truck employees.
- highway capital/maintenance costs - the increase or decrease in highway capital or maintenance costs that results from the diversion of traffic between rail and truck;
- taxes - change in tax revenues caused by truck diversion and rail service improvement; and

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

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

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

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

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

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

EVALUATION METHODOLOGY

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

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

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

INTENSIVE STUDY LINE ANALYSIS RESULTS

Study Line #1

[266.15(c)(6,7,8, and 9)]

MITCHELL TO CANTON AND SIOUX FALLS

BACKGROUND

The Mitchell to Canton and Sioux Falls intensive study line is composed of two South Dakota rail segments. The first is the Sioux Falls and Canton segment that was not rehabilitated through the Directed Service Program, and the second is the Canton to Mitchell segment that was restored to Class I conditions with Directed Service Program funds. The study line also includes 1.7 miles of track between East Junction and West Junction in Sioux Falls.

LINE CHARACTERISTICS - BASE CASE

Line Description

Located in the southeast corner of South Dakota, this line provides the only remaining rail service in a productive agricultural area. The study line also provides important access to other market areas of South Dakota for stone quarries located in the Sioux Falls area. The 1.7 mile segment that extends to West Junction, north of Sioux Falls, provides access to the BN's branch line to Wentworth and Madison. This line was rehabilitated in 1981 with LRSA Program funds and is capable of supporting a unit train, covered hopper car operation. The connecting segment was rehabilitated with State funds in 1981 so that the benefits of the LRSA project could be realized as soon as possible. A detailed description of each segment of the line was prepared for Railplan, South Dakota, 1981, and is reprinted here as Exhibit V-1.

Operations and Service

Service is currently provided over this line once a week, and performance of the study project will result in an increase in service to twice a week. Identified in the shipper survey as potential rail users were 12 shipping stations, 17 grain elevators, and several other businesses. Traffic from Mitchell was included only in this study line.

Study Line #1

EXHIBIT V-1

South Dakota Segment - SD 01 SIOUX FALLS TO CANTON

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 24th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 21.9 Miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Canton and Sioux Falls

CONNECTING LINES – Chicago & North Western and Burlington Northern at Sioux Falls and State-owned line at Canton.

HIGHWAYS – Canton is served by US 18, Harrisburg by a local hard surface road and Sioux Falls is served by I-29, I-90, US 77, SD 42 and SD 38.

RAIL WEIGHT – 90 lb.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Sioux Falls	0.0				
South Yard	1.20				
Harrisburg	9.40				
Canton	21.90				

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.75 MGT	0.70 MGT	n/a
TRAFFIC DIRECTION –	70% Orig./30% Term.	57% Orig./43% Term.	

COMMODITIES – Forwarded grain, food products, stone, sand, and gravel and scrap iron and steel. (1979)

Other Information

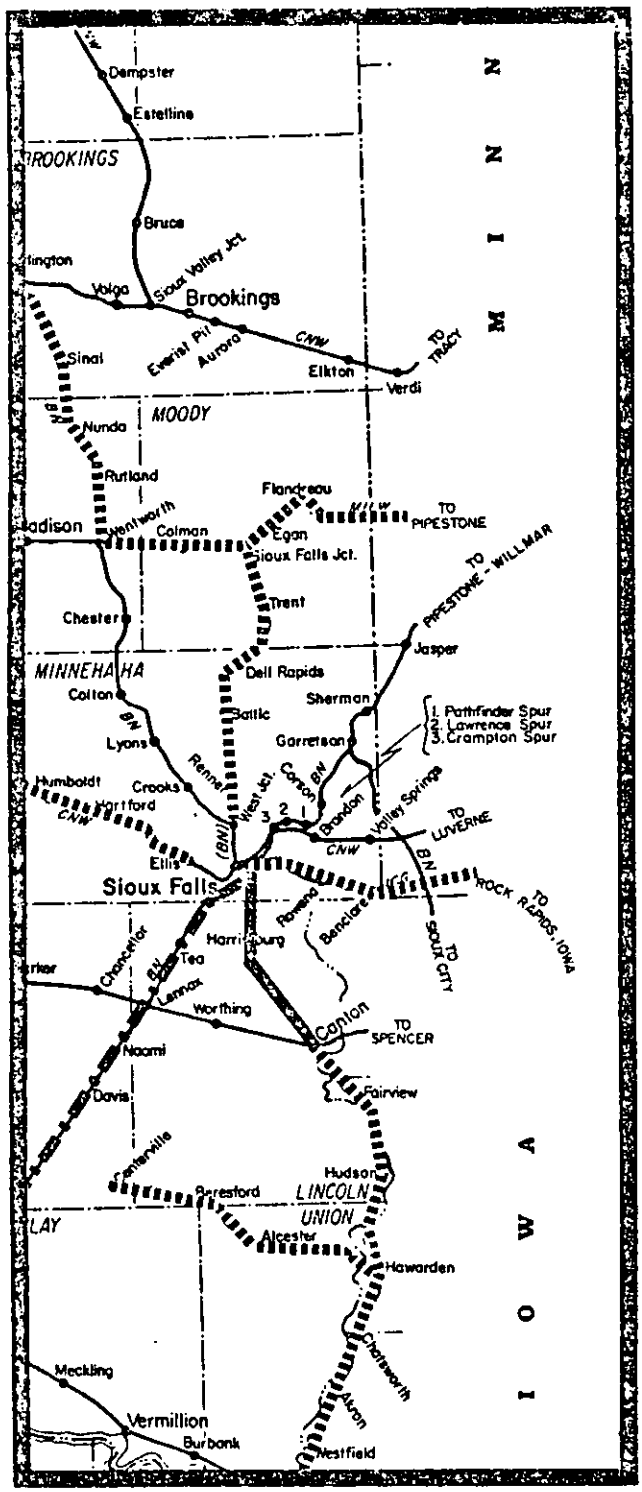
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line

The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

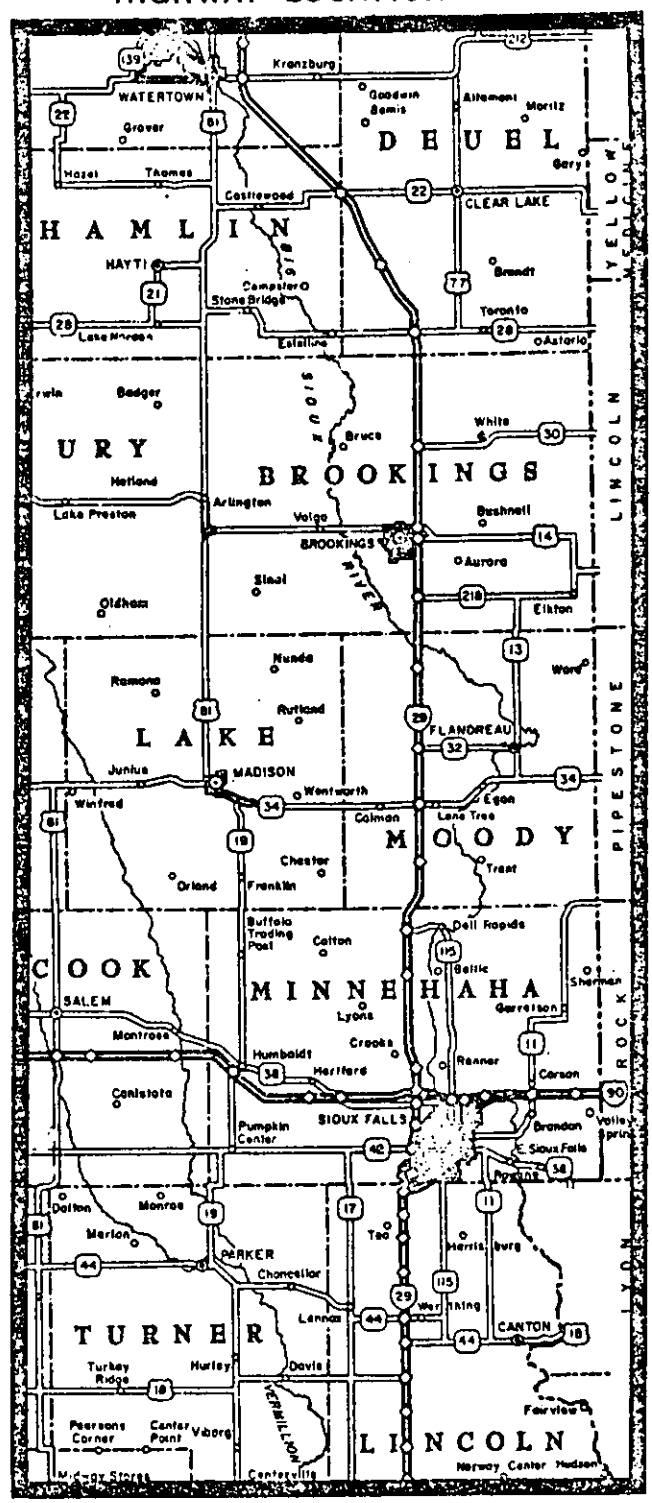
EXHIBIT V-1 (Continued)
SOUTH DAKOTA SEGMENT SD01
SIOUX FALLS TO CANTON

Study Line #1

RAILROAD SEGMENT MAP

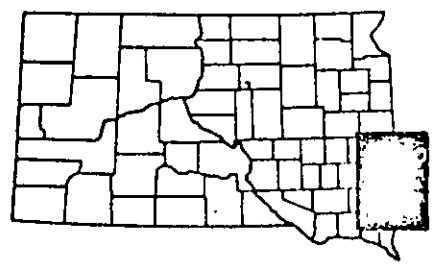


HIGHWAY LOCATION MAP



KEY

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



Study Line #1

EXHIBIT V-1 (Continued)

South Dakota Segment - SD 02 CANTON TO MITCHELL

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 24th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 79.2 miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Canton and Mitchell

CONNECTING LINES – State-owned line at Canton and Mitchell, and Burlington Northern at Lennox.

HIGHWAYS – Canton is served by US 18, Worthing, Lennox, Chancellor and Parker by SD 44; Bridgewater, Emery and Alexandria by SD 262; Mitchell by I-90 and SD 37; and Marion Jct. by a local road.

RAIL WEIGHT – 50 miles of 90 lb. rail and 29 miles of mixture from 75 lb. to 100 lb.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Canton	0.0	Marion Jct.	35.0	Mitchell	79.2
Worthing	9.0	Dolton	42.9		
Lennox	15.8	Bridgewater	49.9		
Chancellor	20.7	Emery	57.0		
Parker	28.5	Alexandria	65.9		

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.62 MGT	0.78 MGT	n/a
TRAFFIC DIRECTION –	65% Orig.	72% Orig.	

COMMODITIES – Primarily forwarded grain; also received grain mill products, fertilizer, and farm machinery (1979)

Other Information

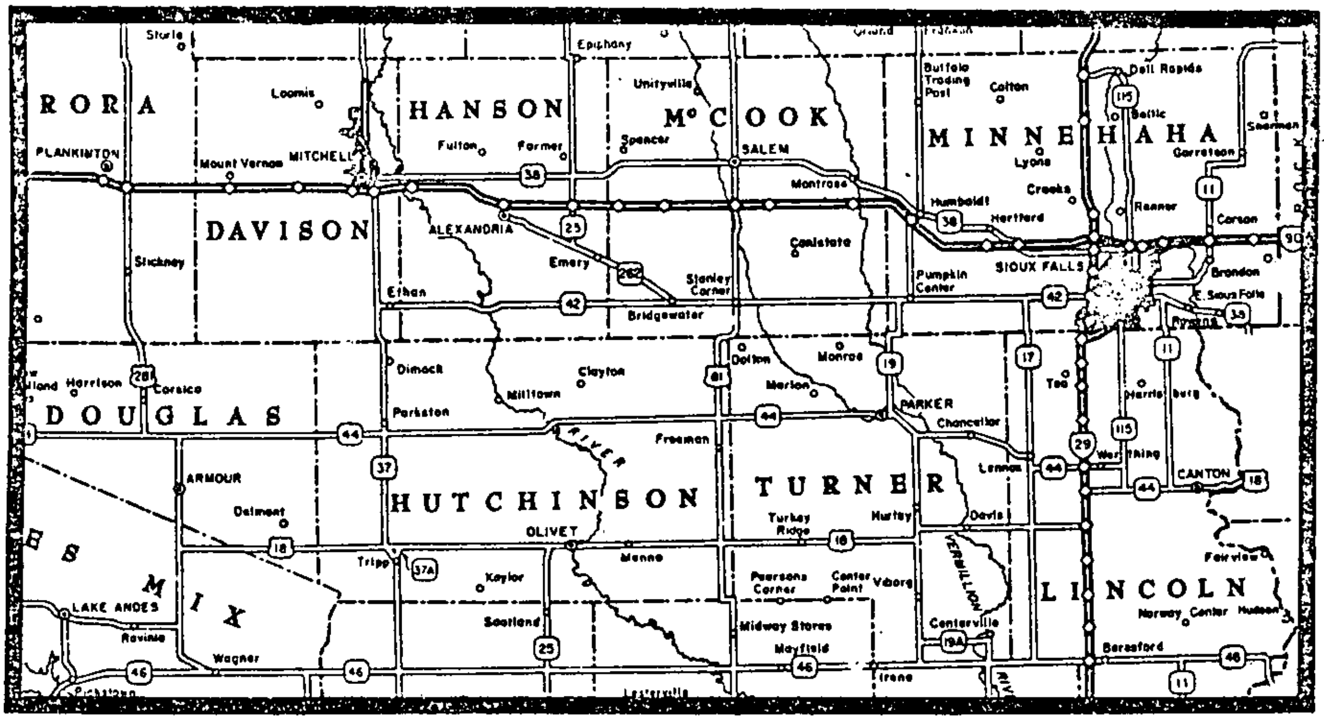
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

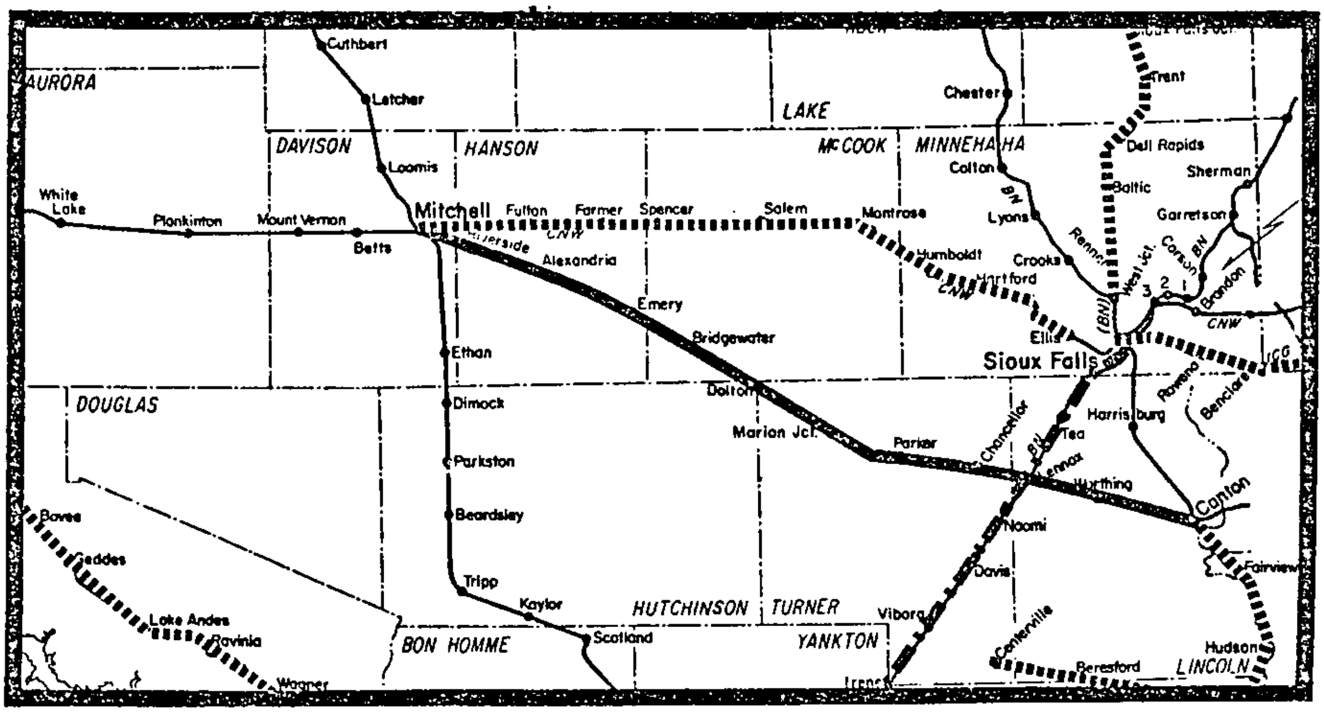
Study Line #1

EXHIBIT V-1 (Continued)
SOUTH DAKOTA SEGMENT SD02
CANTON TO MITCHELL

HIGHWAY LOCATION MAP

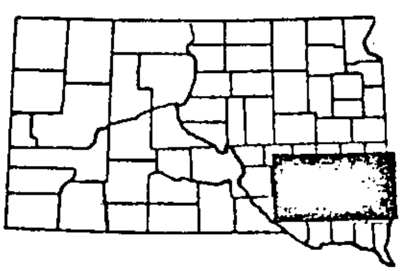


RAILROAD SEGMENT MAP



KEY

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



Study Line #1

MITCHELL TO CANTON AND SIOUX FALLS

Rail Traffic Volume

1979 Traffic		
Originating	Cars	Tons
Commodity		
Grain	1,858	133,368
Food and Kindred Products	52	1,754
Waste and Scrap Materials	78	5,418
Other	17	482
Total Originating	2,005	141,022
Terminating		
Commodity		
Coal	134	10,512
Chemicals	248	22,426
Lumber and Wood Products	86	4,290
Food and Kindred Products	73	3,158
Petroleum and Coal Products	64	4,191
Other	117	3,856
Total Terminating	722	48,433
Total for Line	2,727	189,455

Shipper Survey Results			
Originating	Destination/Origin	Cars	Tons
Commodity			
Grain	Minneapolis	190	15,400
Grain	Duluth	11	500
Grain	West Coast	2,067	202,500
Grain	Miscellaneous	1,171	87,800
Other	Miscellaneous	10	200
Total Originating		3,449	306,400
Commodity			
Fertilizer	Miscellaneous	412	41,200
Lumber	Miscellaneous	28	1,100
Other	Miscellaneous	190	13,800
Total Terminating		630	56,100
Total for Line		4,079	362,500

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 193,600 tons would be diverted to other modes unless Class II standards are achieved. This diversion will be necessary primarily because of the excess time, expense, and train size limitations incurred when operations at Class I speeds are required.

Study Line #1

MITCHELL TO CANTON AND SIOUX FALLS

Track Conditions

This line is currently operated at Class I speeds, and a base case of Class I operations was used for the benefit-cost analysis. Tie renewal and reballasting are the primary areas of rehabilitation need, as the existing rail is capable of supporting jumbo covered hopper cars.

STUDY PROJECT

Description

This project will rehabilitate the Mitchell to Canton and Sioux Falls line to Class II, unit train standards. The ability to operate at higher speeds will lower operating costs and prevent the continued diversion of 193,600 tons of rail traffic to alternative transportation modes. During 1981, the State funded partial rehabilitation of the Sioux Falls to Canton segment. Funds to complete the rehabilitation of the entire study line will be sought from the LRSA Program and will be combined with additional State monies. Completion of the project is planned for 1982.

Rail Service Level

Depending on the level and constancy of rail demand, it is expected that service will be provided twice a week. Unit trains will be moved in the most efficient manner available at the time of demand.

Rail Traffic Volume

If this project is performed, sufficient rail capacity will exist to serve 100 percent of demand as measured in the shipper survey. This demand is:

Originating	306,400 tons
Terminating	56,100 tons
Total	362,500 tons

Study Line #1

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+3,768,918	$+3,768,918	$+3,768,918
Secondary Efficiency Benefits					
Income ($)	-	$-72,820	-	-94,939	-94,939
Highway Costs ($)	-	-	-	+74,311	+74,311
Taxes ($)	-	-	-	-31,396	-31,396
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-72,820	$+3,768,918	$+3,716,894	$+3,716,894
Costs ($)	-	-	-	$+857,598	$+857,598
Jobs	-	-20	-	-20	-20
Energy (Gallons)	-	-	-	-241,504	-241,504
Air Pollution (lbs.)	-	-	-	-162,704	-162,704
Benefits Minus Costs					$+2,859,296
Benefit/Cost Ratio					+4.33

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 4,949,690
Project Benefit-Cost Ratio	4.33
Estimated Payback of Project	2.3 Years

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

Study Line #2

MITCHELL TO SIOUX CITY

BACKGROUND

The Mitchell to Sioux City line is the longest of the core system lines, and serves two of South Dakota's largest cities (Mitchell and Yankton) and an important agricultural area. The line is operated at Class I speeds and most of the line was rehabilitated during July and August 1981 under the Directed Service Program. The line provides Mitchell with the only direct access to the Sioux City gateway.

LINE CHARACTERISTICS - BASE CASE

Line Description

The Mitchell to Sioux City line is an essential part of the State's core system because it:

- provides direct access to the Sioux City gateway;
- links two major population centers in South Dakota;
- provides alternative service to shippers on the abandoned Napa to Platte line; and
- provides service to industries in Yankton that were affected by the BN's abandonment of the Irene-Yankton segment in August 1981.

A detailed line description of the two line segments that compose this study line was prepared for Railplan, South Dakota, 1981, and is reprinted here as Exhibit V-2.

Operations and Service

Service at Class I speeds was restored to this line after the rehabilitation project funded by the Directed Service Program was completed. Service is currently provided once a week. Identified during the shipper survey as potential rail users were 17 shipping stations, 19 grain elevators, and various industries and small businesses.

Study Line #2

EXHIBIT V-2

South Dakota Segment - SD 05 MITCHELL TO YANKTON

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 25th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 75.0 miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Yankton and Mitchell

CONNECTING LINES – State-owned lines at Mitchell and Yankton Non-operating State-owned line at Napa.

HIGHWAYS – Yankton is on SD 50 and US 81; Tripp, Parkston and Dimock on SD 37; Mitchell on I-90 and SD 37; all other stations except Beardsley to Napa are on hard surfaced roads.

RAIL WEIGHT – 90 lb. from Yankton to Beardsley, 85 lb. from Beardsley to Ethan and 100 lb. - 112 lb. from Ethan to Mitchell.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Mitchell	0.0	Kaylor	41.2		
Ethan	11.6	Scotland	47.8		
Dimock	16.7	Lesterville	59.1		
Parkston	22.1	Utica	65.8		
Beardsley	28.6	Napa	69.4		
Tripp	34.2	Yankton	75.0		

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.80 MGT	0.41 MGT	n/a
TRAFFIC DIRECTION –	60% Orig.	74% Orig.	–
COMMODITIES –	Forwarded grain and received fertilizer.		

Other Information

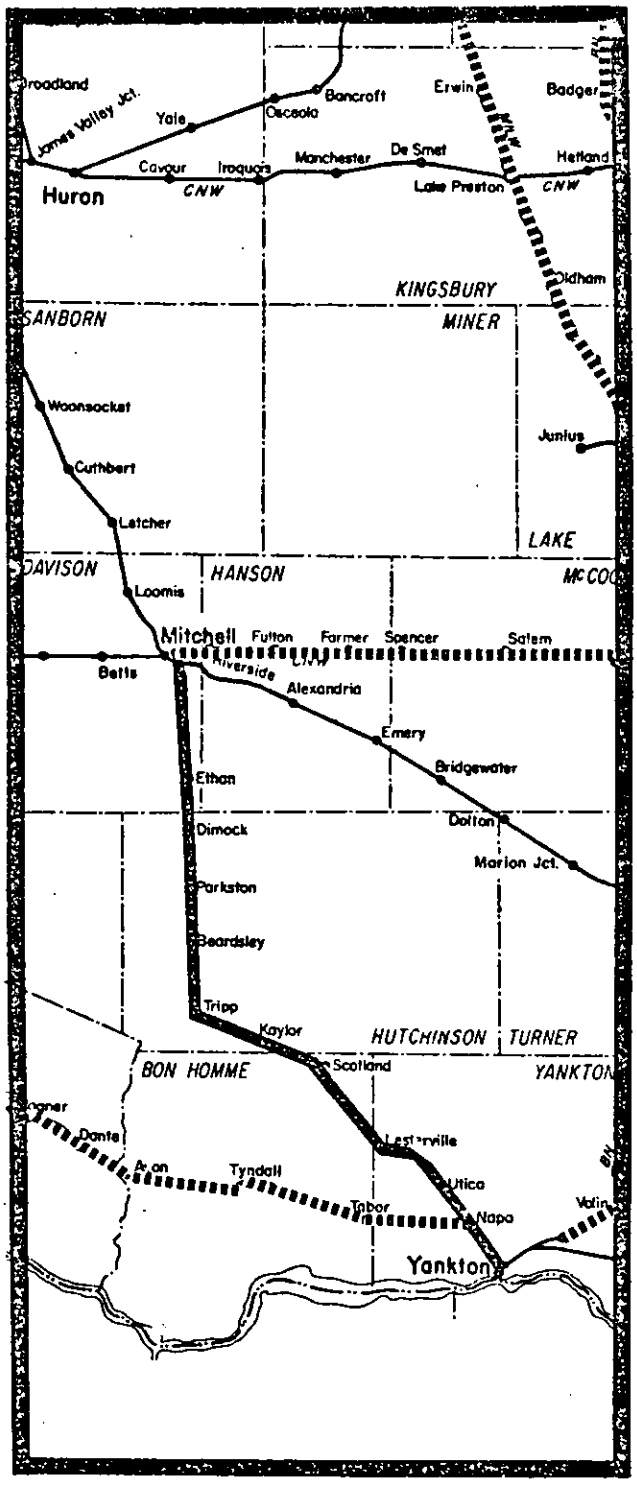
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

The State of South Dakota has identified this line segment as part of the State core system. Service continuation on this line is important because of the large economic impact of abandonment.

EXHIBIT V-2 (Continued)
SOUTH DAKOTA SEGMENT SD05
MITCHELL TO YANKTON

Study Line #2

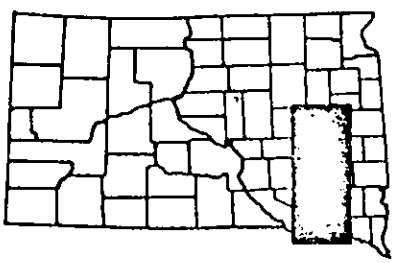
RAILROAD SEGMENT MAP



HIGHWAY LOCATION MAP

KEY

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



Study Line #2

EXHIBIT V-2 (Continued)

South Dakota Segment - SD 06 YANKTON TO SIOUX CITY, IOWA

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 25th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 61.5 miles Total, 55.2 miles in SD

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Sioux City and Yankton

CONNECTING LINES – Burlington Northern, Chicago & North Western and Illinois Central Gulf at Sioux City; State owned line at Yankton.

HIGHWAYS – Yankton is on SD50 and US 81, Vermillion and Meckling on SD 50 Elk Point, Jefferson, North Sioux City and Sioux City are on I-29.

RAIL WEIGHT – 90 lb. from Yankton to Burbank, 85 lb. from Burbank to East Wye Switch, and 90 lb. from East Wye Switch to Sioux City.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Yankton	0.0	East Wye Switch	41.7		
Gayville	12.1	Jefferson	49.4		
Meckling	18.3	North Sioux City	55.2		
Vermillion	26.5	Sioux City	61.5		
Burbank	32.4				
Elk Point	41.0				

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.94 MGT	0.56 MGT	n/a
TRAFFIC DIRECTION –	54% Orig.	50% Orig.	–
COMMODITIES –	Forwarded grain and received fertilizer		

Other Information

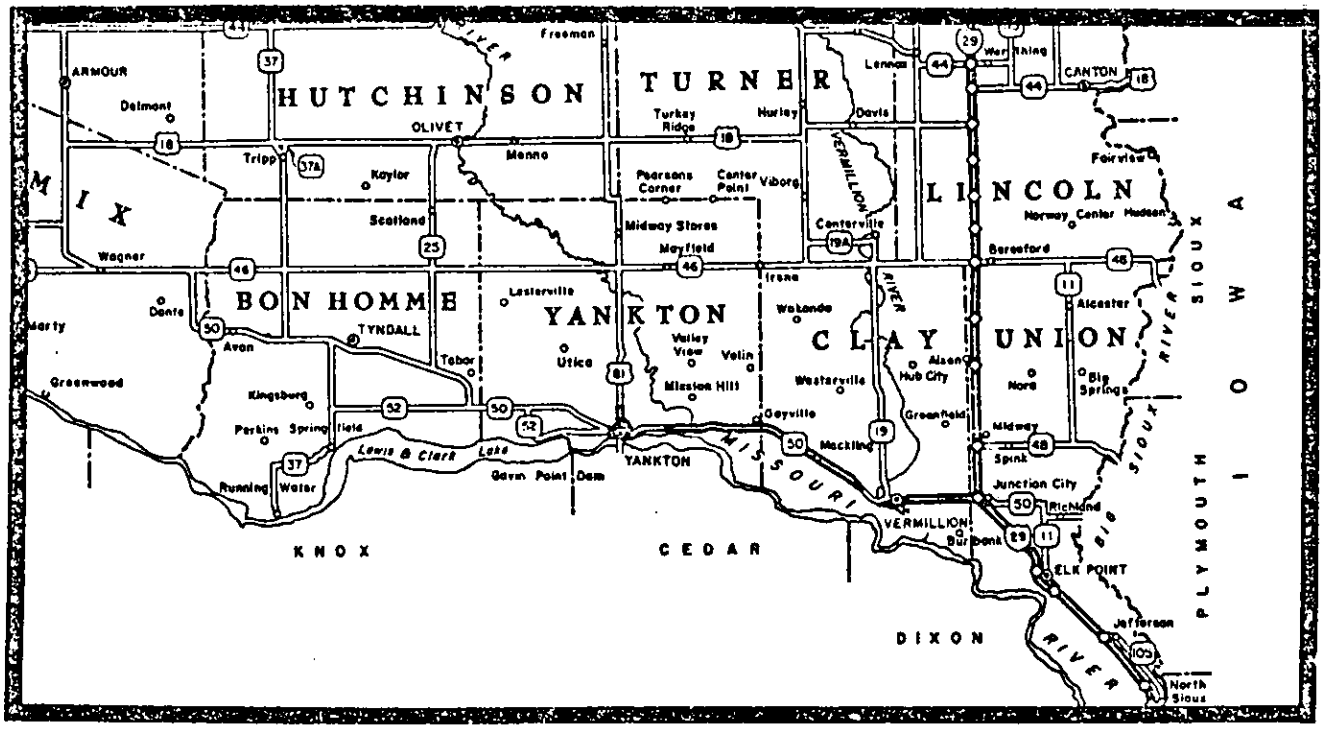
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

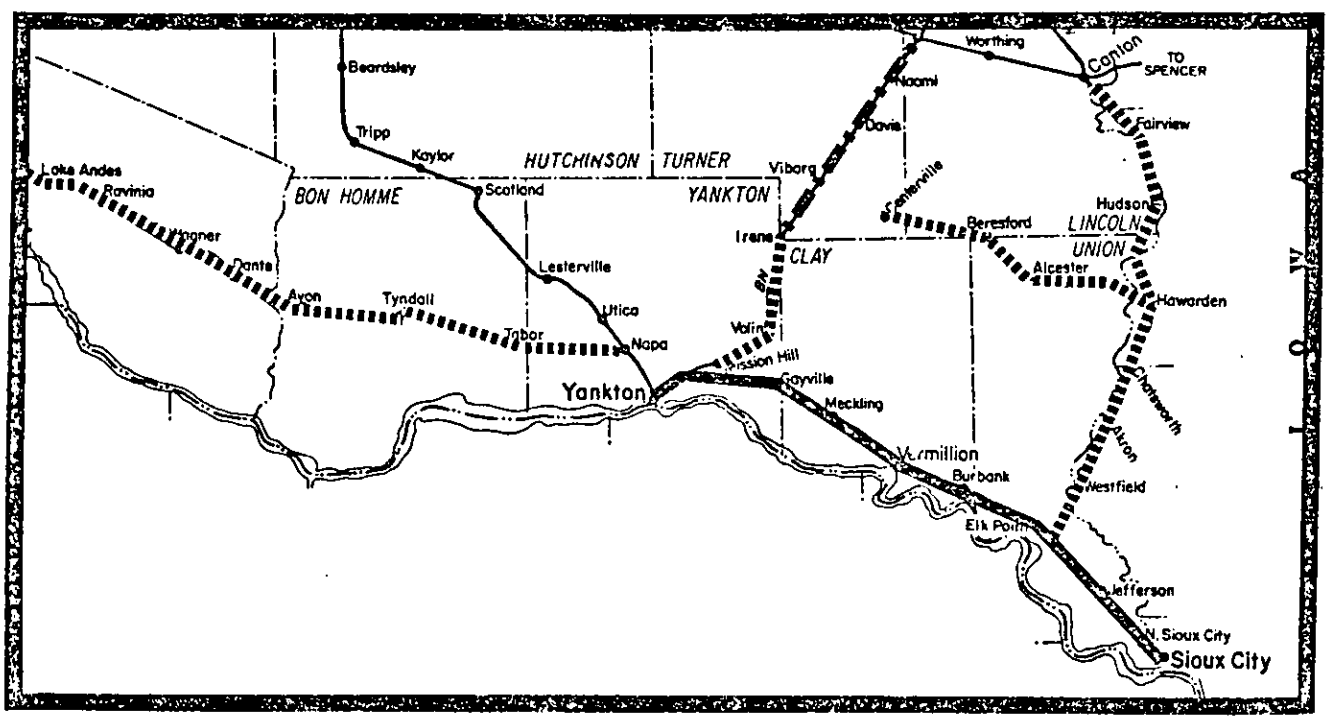
EXHIBIT V-2 (Continued)
SOUTH DAKOTA SEGMENT SD 06
YANKTON, SD TO SIOUX CITY, IA

Study Line #2

HIGHWAY LOCATION MAP

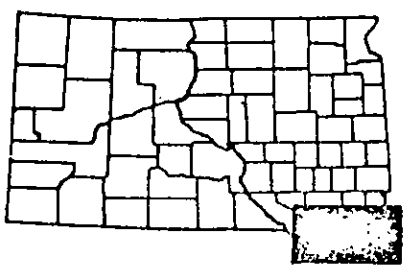


RAILROAD SEGMENT MAP



KEY

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



Study Line #2

MITCHELL TO SIOUX CITY

Rail Traffic Volume

1979 Traffic

Originating	Cars	Tons
Commodity		
Grain	908	60,570
Food and Kindred Products	27	1,545
Containers	25	506
Other	15	1,018
Total Originating	975	63,639
Terminating		
Commodity		
Machinery, Except Electrical	33	682
Chemicals	335	31,085
Primary Metal Products	73	4,255
Other	54	1,916
Total Terminating	495	37,938
Total for Line	1,470	101,577

Shipper Survey Results

Originating	Destination/Origin	Cars	Tons
Commodity			
Grain	Minneapolis	316	27,600
Grain	West Coast	1,469	145,000
Grain	Miscellaneous	931	72,000
Other	Miscellaneous	57	2,600
Total Originating		2,773	247,200
Terminating			
Commodity			
Fertilizer	Miscellaneous	240	24,000
Other	Miscellaneous	131	5,800
Total Terminating		371	29,800
Total for Line		3,144	277,000

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 162,550 tons would have to be diverted to other modes unless Class II standards are achieved. This diversion will be necessary primarily because of the time, expense and train size limitations incurred when operations at Class I speeds are required.

Study Line #2

MITCHELL TO SIOUX CITY

Track Conditions

This line currently meets Class I standards due to rehabilitation performed under the Directed Service Program. A base case of Class I operations was used for the purpose of the benefit-cost analysis. The existing rail weight is adequate to support jumbo covered hoppers, provided the track bed is properly maintained. The State's rehabilitation plan is focused at reaching standards that will allow operation of unit trains at Class II speeds. The core system operator will be responsible for performing normalized maintenance.

STUDY PROJECT

Description

This project will rehabilitate the Mitchell to Sioux City line to Class II standards, permit all existing rail shipping demand to be met and permit unit train operations. The State initiated the project in 1981 with partial rehabilitation of the Sioux City to Elk Point segment. In 1982, South Dakota plans to finance completion of this work and to combine its funds with LRSA Program funds to rehabilitate the Elk Point to Mitchell segment.

Rail Service Level

It is expected that the core system operator will provide service twice a week if the line is rehabilitated to Class II and there is sufficient shipping demand. Until the project is performed, service will be provided once a week.

Rail Traffic Volume

If this project is performed, sufficient rail capacity will exist to serve 100 percent of demand as measured in the shipper survey. This demand is:

Originating	247,200 tons
Terminating	29,800 tons
Total	277,000 tons

Study Line #2

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+1,313,876	$+1,313,876	$+1,313,876
Secondary Efficiency Benefits					
Income ($)	-	$-65,538	-	-85,445	-85,445
Highway Costs ($)	-	-	-	+44,316	+44,316
Taxes ($)	-	-	-	-18,232	-18,232
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-65,538	$+1,313,876	$+1,254,515	$+1,254,515
Costs ($)	-	-	-	$+1,657,479	$+1,657,479
Jobs	-	-18	-	-18	-18
Energy (Gallons)	-	-	-	-140,243	-140,243
Air Pollution (lbs.)	-	-	-	-94,781	-94,781
Benefits Minus Costs					$-402,964
Benefit/Cost Ratio					+0.76

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 9,566,260
Project Benefit-Cost Ratio	0.76
Estimated Payback of Project	13.2 Years

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

Study Line #3

MITCHELL TO ABERDEEN

BACKGROUND

The Mitchell to Aberdeen line is composed of two South Dakota rail segments. The BN began operating the Mitchell to Wolsey portion of the line in July 1981 and instituted service between Wolsey and Aberdeen in November 1981. Only the Mitchell to Wolsey segment was rehabilitated to Class I under the Directed Service Program. Service was provided on the Wolsey to Aberdeen segment by the Chicago and North Western (C&NW) Railroad during the period between the Milwaukee's abandonment and the BN's operation. The C&NW is continuing to operate over the segment under a trackage rights agreement.

Even though a large amount of traffic is not originated or terminated on the Mitchell to Aberdeen line, this line is essential to the core system as a connector to the Nation's freight rail system. At Aberdeen, connections can be made with the Milwaukee, BN, and C&NW railroads. The ICC recently approved the Milwaukee's application to abandon its Miles City line that connects with the core system at Aberdeen. If South Dakota's recent request for rehabilitation funds is approved, the State will purchase the line and lease it to the BN, which will provide freight service. This would result in a routing of all west coast traffic over the Aberdeen gateway instead of either the Sioux Falls or Sioux City gateways that are currently used. The benefits that would accrue from this routing do not depend on the performance of the rehabilitation projects considered in this Addendum, and thus are not considered in the analysis.

LINE CHARACTERISTICS - BASE CASE

Line Descriptions

The Mitchell to Aberdeen line was a secondary main line for the Milwaukee Road, and connected with its east-west main line at Aberdeen. This line now extends only to Miles City, Montana, where traffic is interchanged with the BN. A detailed description of the two segments that compose the intensive study line was prepared for Railplan, South Dakota, 1981, and is included as Exhibit V-3.

Operations and Services

The C&NW operates three round trips per week over this line, continuing through Aberdeen to reach its line that terminates in BN and Soo Line gateways at Oakes, North Dakota. In the shipper survey, five shipping stations and five grain elevators were identified as potential rail users. Shippers contacted during the survey emphasized the importance of rail service to their operation and mentioned that the absence of the rail option would prohibit access to certain distant markets, such as the west coast.

Study Line #3

EXHIBIT V-3

South Dakota Segment - SD 04 WOLSEY TO ABERDEEN

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 24th Subdivision

LINE STATUS – Service provided by C&NW

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 74.0 miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – 3 round trips per week

YARDS – None

CONNECTING LINES –Chicago & North Western at Wolsey, Redfield and Aberdeen; Milwaukee main line at Aberdeen, Burlington Northern at Aberdeen and State-owned line at Wolsey.

HIGHWAYS – US 281 parallels this line and, in addition, Wolsey is served by US 14, Redfield by US 212, Mellette by SD 20 and Aberdeen by US 12.

RAIL WEIGHT – 90 lb. rail between Wolsey and Tulare, 85 lb. rail between Tulare & near Redfield, and 90 lb. rail for remainder of line.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Wolsey	0.0	Ashton	41.4		
Bonilla	12.4	Mellette	52.4		
Tulare	23.1	Duxbury	58.3		
Redfield	33.2	Warner	64.1		
		Aberdeen	74.0		

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	1.11 MGT	1.58 MGT	
TRAFFIC DIRECTION –	59% Orig./41% Term	97% Orig./3% Term.	n/a

COMMODITIES – Primarily grain. (1980)

Other Information

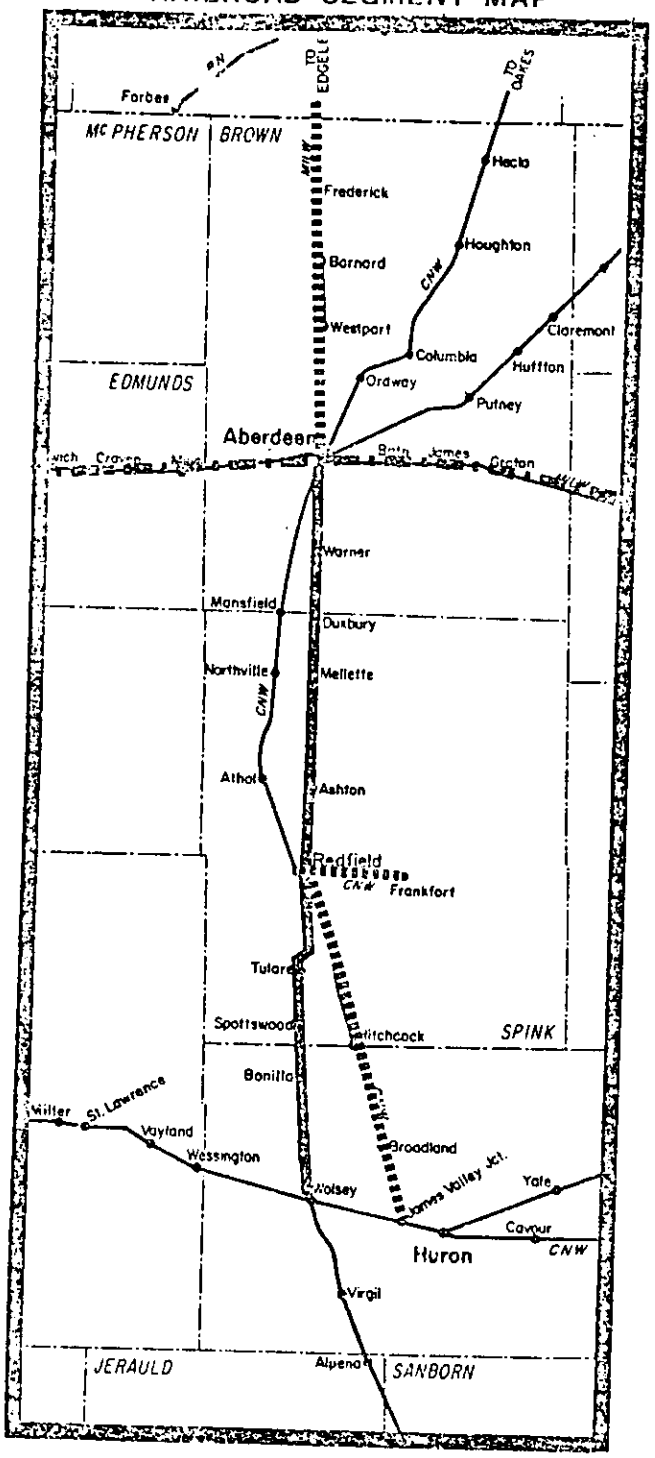
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

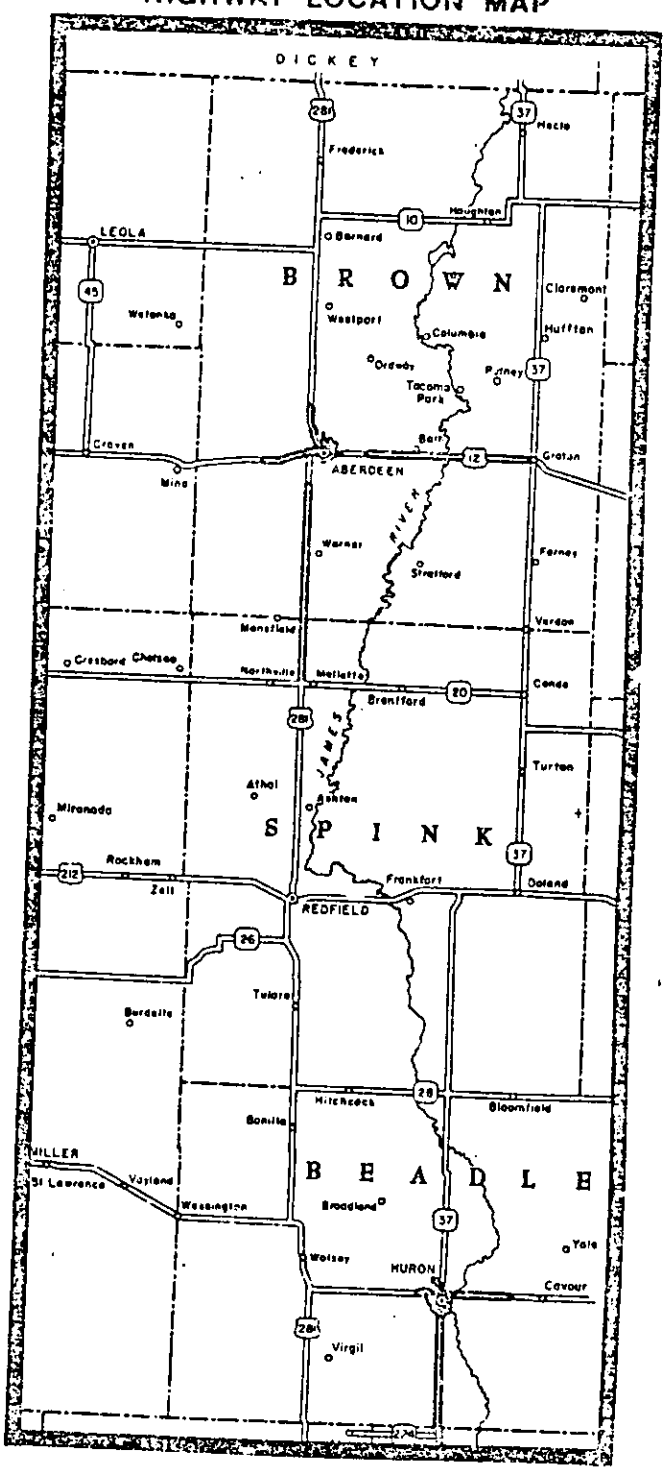
Study Line #3

EXHIBIT V-3 (Continued)
SOUTH DAKOTA SEGMENT SD04
WOLSEY TO ABERDEEN

RAILROAD SEGMENT MAP

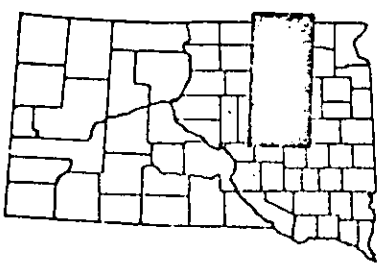


HIGHWAY LOCATION MAP



KEY

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



Study Line #3

EXHIBIT V-3 (Continued)

South Dakota Segment - SD 03 MITCHELL TO WOLSEY

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 24th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Secondary main

LINE LENGTH IN MILES – 54.6 miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 263,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Mitchell

CONNECTING LINES – Chicago & North Western at Wolsey, State-owned lines at Wolsey and Mitchell

HIGHWAYS – Mitchell is served by I-90 and SD 37, Woonsocket is served by SD 34, Wolsey is served by US 281 and US 14, the other stations are served by hard surfaced local roads.

RAIL WEIGHT 85 lb. from Mitchell to Letcher and 90 lb. on remainder of segment.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Mitchell	0.0	Woonsocket	28.2		
Loomis	7.5	Alpena	37.9		
Letcher	15.0	Virgil	46.1		
Cuthbert	21.8	Wolsey	54.6		

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	1.11 MGT	1.34 MGT	n/a
TRAFFIC DIRECTION –	59% Orig./41% Term	75% Orig./25% Term	

COMMODITIES – Forwarded food products, grain, farm machinery and scrap iron or steel; received coal, lumber products, and petroleum prod. (1979)

Other Information

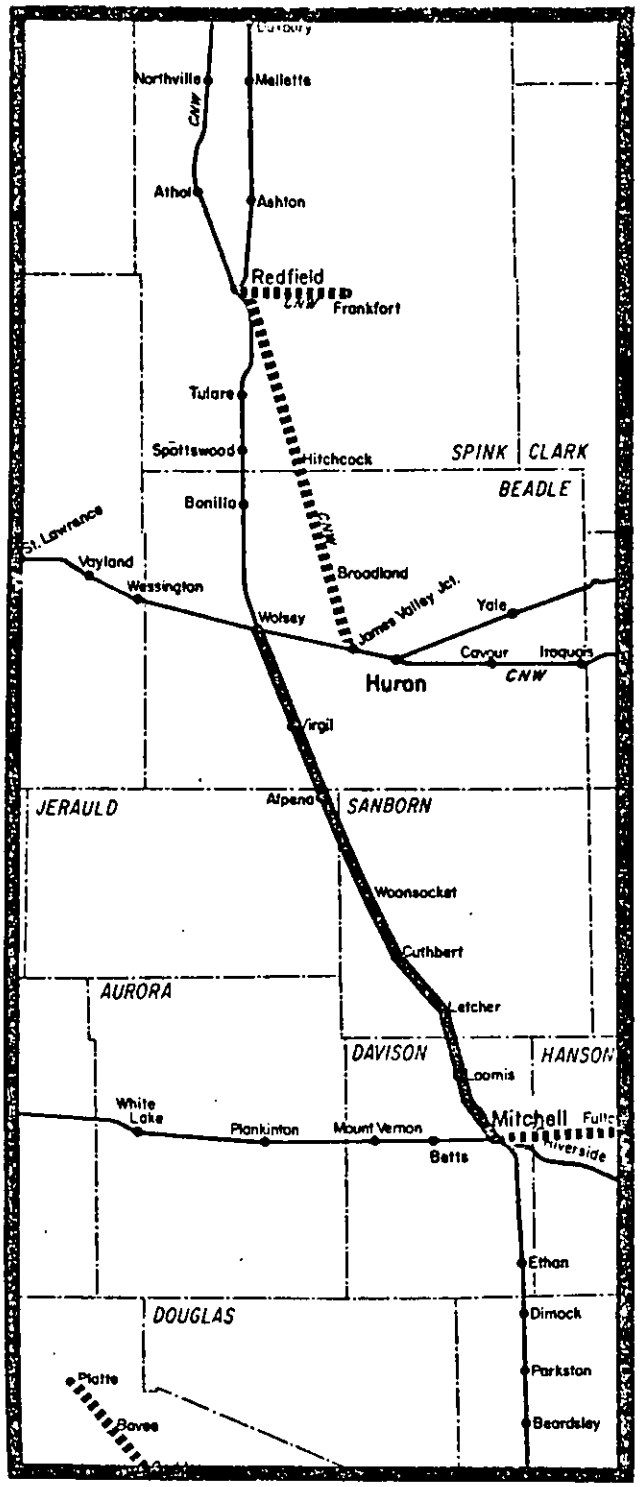
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

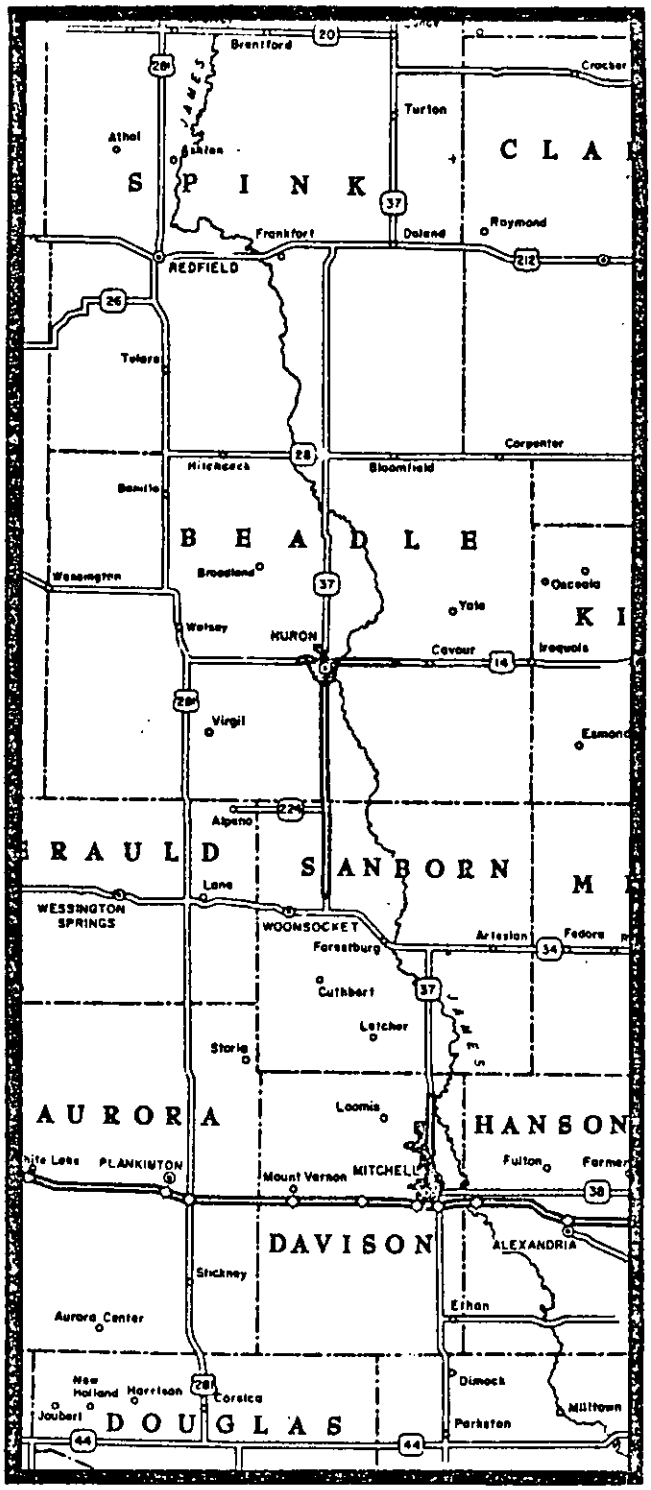
EXHIBIT V-3 (Continued)
SOUTH DAKOTA SEGMENT SD03
MITCHELL TO WOLSEY

Study Line #3

RAILROAD SEGMENT MAP

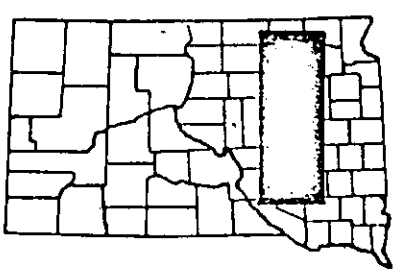


HIGHWAY LOCATION MAP



KEY

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



Study Line #3

MITCHELL TO ABERDEEN

Rail Traffic Volume

1979 Traffic

Originating	Cars	Tons
Commodity		
Grain	472	28,301
Other	9	729
Total Originating	481	29,030
Terminating		
Commodity		
Chemicals	6	325
Primary Metal Products	58	2,187
Other	26	1,365
Total Terminating	90	3,877
Total for Line	571	32,907

Shipper Survey Results

Originating	Destination/Origin	Cars	Tons
Commodity			
Grain	Minneapolis	341	31,900
Grain	Duluth	23	2,100
Grain	West Coast	247	24,100
Grain	Miscellaneous	155	13,100
Total Originating		766	71,200
Terminating			
Commodity			
Fertilizer	Miscellaneous	27	2,700
	Miscellaneous	27	2,700
Total Terminating			
Total for Line		793	73,900

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 47,500 tons would have to be diverted to other modes if current Class I standards are not improved. This diversion will be necessary because of the time, expense, and train size limitations incurred when operations at Class I speeds are required.

Study Line #3

MITCHELL TO ABERDEEN

Track Conditions

The Mitchell to Aberdeen line is currently operated at Class I speeds. Maintenance was deferred in recent years by the Milwaukee Road, and the continued lack of maintenance (primarily ties) could result in inadequate support for the rail. This, in turn, could result in rail and angle bar damage that would present operating and safety problems. The existing rail weight is adequate to permit movement of the jumbo covered hopper cars that the State's operator plans to use on most of the core system.

STUDY PROJECT

This project will rehabilitate the Mitchell to Aberdeen line to track standards that will permit operation of unit trains at Class II speeds. If the BN operates the Milwaukee's Class II Miles City line, the Mitchell to Aberdeen line will be vitally important as a connector for core system traffic destined for the west coast. The rehabilitation is needed to permit important operating efficiencies. Although sufficient LRSA Program funds will not be available in 1982 to permit completion of this project, it will be undertaken as soon as possible.

Rail Service Level

The C&NW operates over the Aberdeen to Wolsey segment three times a week and the BN serves the entire line once a week. It is expected that the BN will serve all shippers on the line at least twice a week if the project is completed and there is sufficient service demand.

Rail Traffic Volume

If this project is performed, sufficient rail capacity will exist to serve 100 percent of demand as measured in the shipper survey. This demand is:

Originating	71,200 tons
Terminating	2,700 tons
Total	73,900 tons

Study Line #3

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+427,729	$+427,729	$+427,729
Secondary Efficiency Benefits					
Income ($)	-	$-7,282	-	-9,494	-9,494
Highway Costs ($)	-	-	-	+33,030	+33,030
Taxes ($)	-	-	-	-12,460	-12,460
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-7,282	$+427,729	$+438,805	$+438,805
Costs ($)	-	-	-	$+1,398,078	$+1,398,089
Jobs	-	-2	-	-2	-2
Energy (Gallons)	-	-	-	-95,846	-95,846
Air Pollution (lbs.)	-	-	-	-64,610	-64,610
Benefits Minus Costs					$-959,284
Benefit/Cost Ratio					+0.31

STUDY LINE ANALYSIS SUMMARY	
Rehabilitation Project Cost	$ 8,069,170
Project Benefit-Cost Ratio	+0.31
Estimated Payback of Project	32.3 Years

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

Study Line #4

MITCHELL TO CHAMBERLAIN

BACKGROUND

The Mitchell to Chamberlain line is the only dead-end branch line that is part of the core system, and was one of four lines rehabilitated to Class I standards during the summer of 1981 under the Directed Service Program. The line is part of the Milwaukee's Mitchell to Rapid City branch line that was abandoned in March 1980. The entire line was included in South Dakota's rail line purchase package.

LINE CHARACTERISTICS - BASE CASE

Line Description

This line extends west from Mitchell to the Missouri River in a wheat growing area of the State. A detailed line description was prepared for Railplan, South Dakota, 1981, and is reprinted here as Exhibit V-4.

Operations and Service

Service was restored to the Mitchell to Chamberlain line in July, 1981 on a once per week basis. During the shipper survey, five shipping stations and six grain elevators on the line were identified as potential rail users. Widespread interest in the core system and service restoration was noted during the survey, and most shippers expressed an intention to use rail service as soon as it is made available.

Track Conditions

Work conducted under the Directed Service Program restored the track to a uniform Class I condition. Because of the weight of rail currently in place, the existing weight limit of 220,000 pounds will continue to prohibit the use of jumbo covered hoppers. To reflect current conditions, a base case of Class I operations was used in the benefit-cost analysis.

Study Line #4

EXHIBIT V-4

South Dakota Segment - SD Q7 MITCHELL TO CHAMBERLAIN

Line Description

OWNERSHIP – SOUTH DAKOTA

DIVISION / SUBDIVISION – Minnesota Division, 25th Subdivision

LINE STATUS – Service provided by BN

TYPE OF LINE – Branch

LINE LENGTH IN MILES – 67.1 miles

MAXIMUM SPEED LIMIT – 10 mph **MAXIMUM WEIGHT LIMIT** – 220,000 lbs.

SERVICE FREQUENCY – Weekly

YARDS – Mitchell and Chamberlain

CONNECTING LINES – State-owned line at Mitchell, and State-owned line at Chamberlain

HIGHWAYS – I-90 parallels this line. Mitchell is served by SD 37, Plankinton by US 281, Kimball by SD 45, Chamberlain by SD 50.

RAIL WEIGHT – 65 lb.

Station Locations

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Mitchell	0.0	Kimball	47.0		
Betts	6.1	Pukwana	58.6		
Mt. Vernon	11.8	Chamberlain	67.1		
Plankinton	23.1				
White Lake	34.5				

Traffic Characteristics

	1975	1979	1980
TRAFFIC DENSITY –	0.52 MGT	0.55 MGT	n/a

TRAFFIC DIRECTION – 66% Orig./34% Term. 58% Orig./42% Term.

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

Other Information

This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The State of South Dakota has purchased this line.

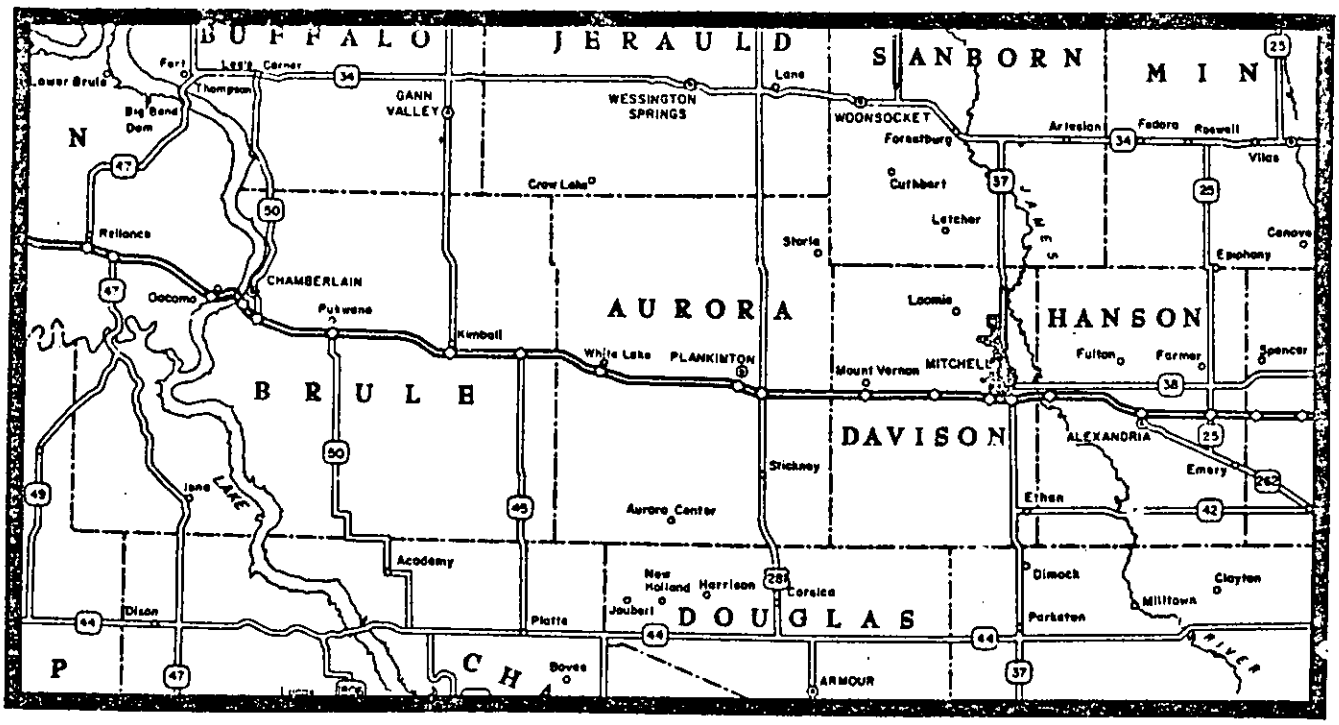
The State of South Dakota has identified this line segment as part of the State core system, which is important for service continuation due to the large economic impact of abandonment.

Study Line #4

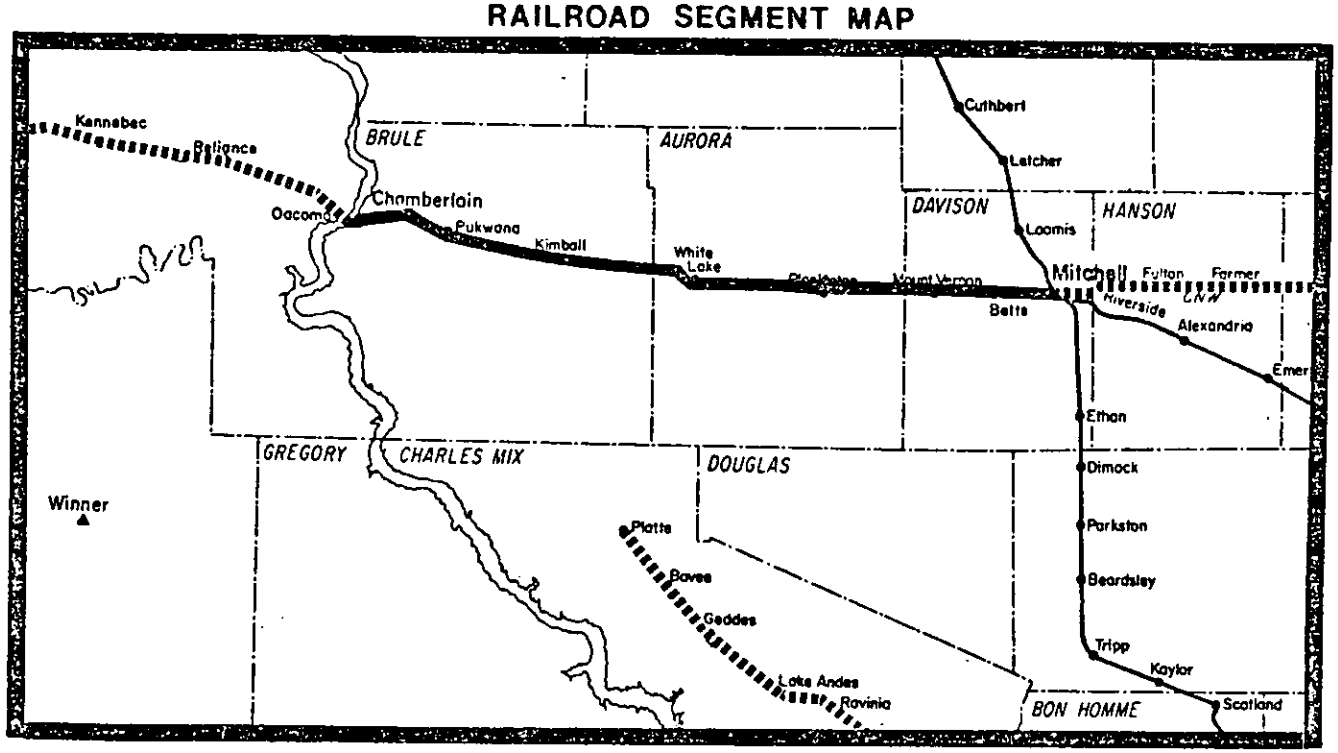
EXHIBIT V-4 (Continued)

SOUTH DAKOTA SEGMENT SD 07
MITCHELL TO CHAMBERLAIN

HIGHWAY LOCATION MAP

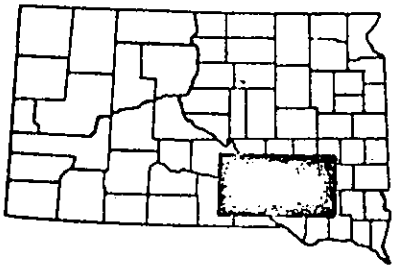


RAILROAD SEGMENT MAP



KEY

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



Study Line #4

MITCHELL TO CHAMBERLAIN

Rail Traffic Volume

1979 Traffic

Originating	Cars	Tons
Commodity		
Grain	386	20,444
Other	10	121
Total Originating	396	20,565
Terminating		
Commodity		
Chemicals	69	4,795
Petroleum Products	133	9,247
Other	78	3,081
Total Terminating	280	17,123
Total for Line	696	37,688

Shipper Survey Results

Originating	Destination/Origin	Cars	Tons
Commodity			
Grain	Minneapolis	389	23,100
Grain	West Coast	991	55,600
Grain	Other	105	6,200
Total Originating		1,485	84,900
Terminating			
Fertilizer	Miscellaneous	64	3,800
Total Terminating		64	3,800
Total for Line		1,549	88,700

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study projects on the remainder of the core are implemented, 28,900 tons would have to be diverted to other modes unless Class II standards on these lines are achieved on connecting line segments. This diversion will be necessary primarily because of the constrained service on the entire core that results from the 10 mile per hour operating speed restriction.

Study Line #4

MITCHELL TO CHAMBERLAIN

STUDY PROJECT

Description

No project that would use federal funds is planned at this time for the Mitchell to Chamberlain line. Rehabilitation will probably be performed with State funds at a later date. In the meantime, however, the line will benefit from the increased service levels resulting from the rehabilitation of the remaining core system lines. After the other projects are completed, the restriction on the number and size of trains originating in Sioux City will be eliminated and more cars can be allocated to the Chamberlain line for loading. The line was selected for intensive study because it is affected by other rail assistance projects, and because these effects need to be quantified to accurately assess all the benefits of the proposed projects. Additional detail on the study approach is contained in the Appendix.

Rail Service Level

It is expected that the BN will continue to provide service once a week if there is sufficient shipping demand.

Rail Traffic Volume

If the remainder of the core system is rehabilitated to Class II unit train standards, sufficient rail capacity on the Mitchell to Chamberlain line will exist to serve 100 percent of demand as measured in the shipper survey. This demand is:

Originating	84,900 tons
Terminating	3,800 tons
Total	88,700 tons

Study Line #4

Annual Benefits and Costs*

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+869,141	$+869,141	$+869,141
Secondary Efficiency Benefits					
Income ($)	-	-	-	-	-
Highway Costs ($)	-	-	-	+41,535	+41,535
Taxes ($)	-	-	-	-15,937	-15,937
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$+869,141	$+894,739	$+894,739
Costs ($)	-	-	-	-	-
Jobs	-	-	-	-	-
Energy (Gallons)	-	-	-	-122,592	-122,592
Air Pollution (lbs.)	-	-	-	-82,754	-82,754
Benefits Minus Costs					$+894,739
Benefit/Cost Ratio					-

STUDY LINE ANALYSIS SUMMARY		
Rehabilitation Project Cost	$ None	
Project Benefit-Cost Ratio	n/a	
Estimated Payback of Project	n/a	Years

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

*Although no project is currently planned for this line, other core system projects benefit the Mitchell to Chamberlain line. Thus, the table illustrates the impact of the other projects but not the impact of a project for the line itself.

Summary of Study Lines Combined as Single Rail System

Although the South Dakota core system has been analyzed on a segment-by-segment basis and the benefits and costs of performing rehabilitation projects on each segment have been studied separately, together these lines compose a single rail system. The system includes only one dead-end branch line, and thus by transporting overhead traffic all the remaining lines have a function beyond that of just serving on-line stations. All the study lines are interdependent, and if operations are improved on one segment, the benefits are shared with the others. In addition, if an individual line is unable to meet the demand for rail service, the resulting shortfall will adversely affect other lines as well.

As an example, if the Mitchell to Sioux City portion of the system is not rehabilitated, service constraints imposed by track conditions and operating speeds will require that traffic be diverted to another rail gateway, or perhaps even to motor carriers. Thus, individual benefit-cost ratios of individual study lines do not fully measure their actual importance to the core system. In fact, only by aggregating all the benefit-cost results can the true value of the system be shown.

The summary table on the next page illustrates the results of combining the annual benefits and costs of all the study lines. This represents a consolidated benefit-cost analysis for the core system. Although no project is defined for the Mitchell to Chamberlain line, the table also includes the benefits that accrue to it from rehabilitating other core system lines. The consolidated analysis indicates that the core system makes a positive contribution to the South Dakota economy and that rehabilitation of the core system can be supported on both an economic and service basis.

Summary - All Lines

Annual Benefits and Costs*

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+6,379,664	$+6,379,664	$+6,379,664
Secondary Efficiency Benefits					
Income ($)	-	$-145,640	-	-189,878	-189,878
Highway Costs ($)	-	-	-	+193,192	+193,192
Taxes ($)	-	-	-	-78,025	-78,025
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-145,640	$+6,379,664	$+6,304,953	$+6,304,953
Costs ($)	-	-	-	$+3,913,155	$+3,913,155
Jobs	-	-40	-	-40	-40
Energy (Gallons)	-	-	-	-600,185	-600,185
Air Pollution (lbs.)	-	-	-	-404,849	-404,849
Benefits Minus Costs					$+2,391,798
Benefit/Cost Ratio					+1.61

SUMMARY OF STUDY LINE ANALYSES	
Costs of Rehabilitation Projects	$ 22,585,120
Benefit-Cost Ratio of Projects	1.61
Estimated Payback of Projects	6.2 Years

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

*The table illustrates the consolidated benefits and costs associated with projects currently considered for the core system. Although no project is planned for the Mitchell to Chamberlain line, the benefits accruing to the line as a result of performing projects on the other lines are included in the consolidated analysis.

VI. RECOMMENDED RAIL ASSISTANCE PROGRAM [266.15(c)(9 and 12)]

The State of South Dakota reviewed the benefit-cost analysis results and other factors that reflected the economic and service importance of the intensive study lines. This review resulted in a decision as to whether assistance for specific lines and projects should be sought. The relative priority of the lines was also determined. A description of the selection and prioritization process appears below.

PROJECT DESCRIPTIONS AND PRIORITIZATION

South Dakota's current rail assistance program is intended to upgrade the core system to track conditions that will permit the operation of unit trains at Class II speeds, improve the efficiency with which the system can be operated, and permit all projected rail shipping demand to be served. The intensive study lines are assigned a priority ranking that reflects the urgency of the rehabilitation need, and the recommended rail assistance program is illustrated in Exhibit VI-1.

Core system lines that provide access to the national rail system are recommended for assistance because they fulfill several important rail service and planning policies, objectives, and goals. These are to:

- coordinate the efforts of rail users, railroad companies, local governments, and the State to solve transportation problems in South Dakota;
- maintain essential rail services and facilities in South Dakota which serve the public interest but which cannot otherwise be profitably continued by private carriers;
- coordinate the available resources of rail users, railroad carriers, and governments (local, State, and federal) for the purpose of maintaining essential transportation accessibility within South Dakota.
- 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;

EXHIBIT VI-1

RECOMMENDED RAIL ASSISTANCE PROGRAM TO REHABILITATE CORE SYSTEM TO CLASS II STANDARDS AND UNIT TRAIN OPERATIONS

Priority Ranking	Rail Segment	Project Cost
1	Mitchell to Canton and Sioux Falls	$4,949,690*
2	Mitchell to Sioux City	$9,566,260
3	Aberdeen to Mitchell	$8,069,170
4	Mitchell to Chamberlain	**

* Includes Rehabilitation of East Junction to West Junction segment in Sioux Falls.

** No project is currently defined for this line segment. However, to rehabilitate this line to Class II speeds an estimated $4,291,210 would be required. It is estimated that rail replacement to eliminate the current 222,000 pound weight restriction would add an additional $6,689,000 in project cost.

- develop competitive transportation options for those communities that lose rail service;

- promote increased use of rail service in those ways in which it is best suited; and

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

The State believed that it was important to at least partially rehabilitate as many core system lines as possible during 1981 so that service could be restored. The Directed Service Program was instrumental in meeting this goal, and enabled the State to select a core system operator (the BN) and restore rail service to the system. The Aberdeen to Wolsey segment, which was not rehabilitated, was being operated by the C&NW. The BN began operating this line in November of 1981.

With the first phase of rehabilitation completed, attention has now shifted to the second phase, restoration of the track to standards that will permit unit train operations. Funds from the Local Rail Service Assistance Program will initially be sought to rehabilitate the core system lines that provide access to the national rail system. Rehabilitation of the remaining line, Mitchell to Chamberlain, will be considered as needs justify expenditures.

The current rail assistance program, recommended for the core system, is significantly different from that contained in the Addendum to Railplan, South Dakota, 1980 in the areas of project cost and rail segment priority. The estimated project costs reflect unit train standards and improved estimates of rehabilitation need that result from intensive track inspection during the Directed Service Program. The primary track deficiencies exist in cross ties and track surface and the upgrading of both will be required before the goal of unit grain train operations at Class II speeds can be met. Unless this degree of rehabilitation is performed, the project benefits and rail traffic volume described in this Addendum will not be realized.

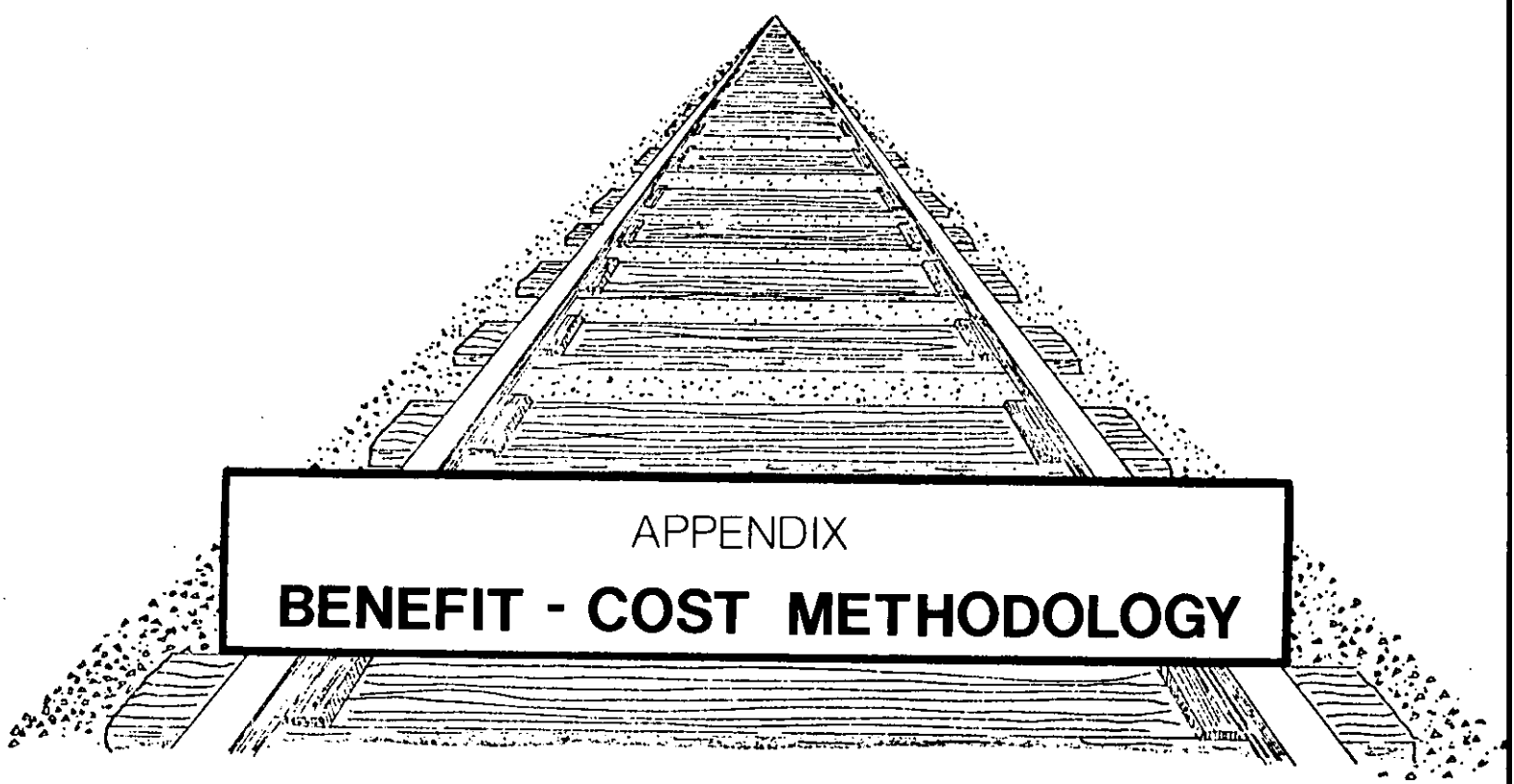
Selection of the BN as the core system operator had a significant effect on the State's plan for core system operations. The BN plans to operate the core system from

existing facilities at Sioux Falls and Sioux City instead of Mitchell, as originally planned by the State. This has made rehabilitation of the Mitchell to Aberdeen line less important in the short term than lines such as Mitchell to Canton and Sioux Falls. The Mitchell to Aberdeen line serves local traffic and provides access for the BN to other parts of the system. It is hoped that rehabilitation can be performed as soon as possible so that significant operating efficiencies can be gained and more traffic can be served. For these reasons, the Mitchell to Canton and Sioux Falls line was given first priority for rail assistance, and the Mitchell to Sioux City line, the other segment that provides access to the system, was assigned second priority. The Mitchell to Aberdeen line was assigned third priority because it serves less traffic and is not needed to access the system. This line will become significantly more important if the State is able to purchase the Milwaukee's line between Ortonville, Minnesota, and Terry, Montana, and lease it to the BN for operation. This would provide a shorter route for west coast core system traffic, and provide a single line access for South Dakota to this important market. It would also result in a large quantity of core system traffic being routed over the Mitchell to Aberdeen line instead of to the Sioux Falls and Sioux City routes. Thus, rehabilitation of this line is important for future operating efficiencies. The Mitchell to Chamberlain line was given fourth priority for rail assistance, a ranking that reflects its branch line status in the core system. Rehabilitation of lines with priorities 1, 2, and 3, is planned for 1982, if funding allows.

FUTURE RAIL PLANNING ISSUES

As the core system is rehabilitated to Class II, the emphasis of rail planning is returning to the preservation of essential rail lines that are operated by Class I railroads. The planning need that is most immediate concerns the Milwaukee's main line from Ortonville, Minnesota, to Miles City, Montana. The Milwaukee filed an application with the Interstate Commerce Commission (approved in September 1981) for permission to abandon this line. Efforts are underway by South Dakota to purchase the line and lease it to the BN for operation. An application for rehabilitation funds was filed with the Federal Railroad Administration by the State and the BN on September 21, 1981, and the State received legislative authority on September 24, 1981, to purchase the line. Negotiations with the Milwaukee regarding the purchase price are proceeding. The result of these efforts will affect future South Dakota plans for the core system, as well as influence rail planning priorities.

Because virtually all South Dakota's remaining private sector railroad lines are light density lines (less than 3 million gross tons per mile per year) and are in need of varying amounts of rehabiiitation, it is expected that more track will be abandoned in the near future. If abandonments include any essential lines, further State action may be necessary to help ensure the continuation of necessary transportation services. As in the past, a decision to commit financial resources will be made only after a thorough study of the economic and service issues associated with the line is completed.



APPENDIX

BENEFIT - COST METHODOLOGY

APPENDIX

BENEFIT-COST ANALYSIS METHODOLOGY

This appendix describes in detail the benefit-cost analysis methodology used in assessing the economic effects of rehabilitating portions of the South Dakota core rail system from a 10-mile-per-hour to a 25-mile-per-hour track condition. It discusses the economic basis for the methodology and the assumptions used in applying this methodology. It also describes the techniques used to develop and analyze the secondary economic and nonmonetary effects associated with rehabilitating the core system.

BENEFIT-COST ANALYSIS MODEL

A nine-step process was used to develop the benefit and cost effects of rehabilitating the core system. This process is shown in Exhibit A-1, and the steps are explained individually in the following pages.

Define Alternatives

The first step in the project analysis was to identify the project alternatives being considered by South Dakota for rehabilitating the core system. At the time of this study, the core system was operated by the Burlington Northern at speeds of up to 10 miles per hour. The Base Case for the benefit-cost analysis was limited train operations at Class I speeds with a continued prohibition of unit trains.

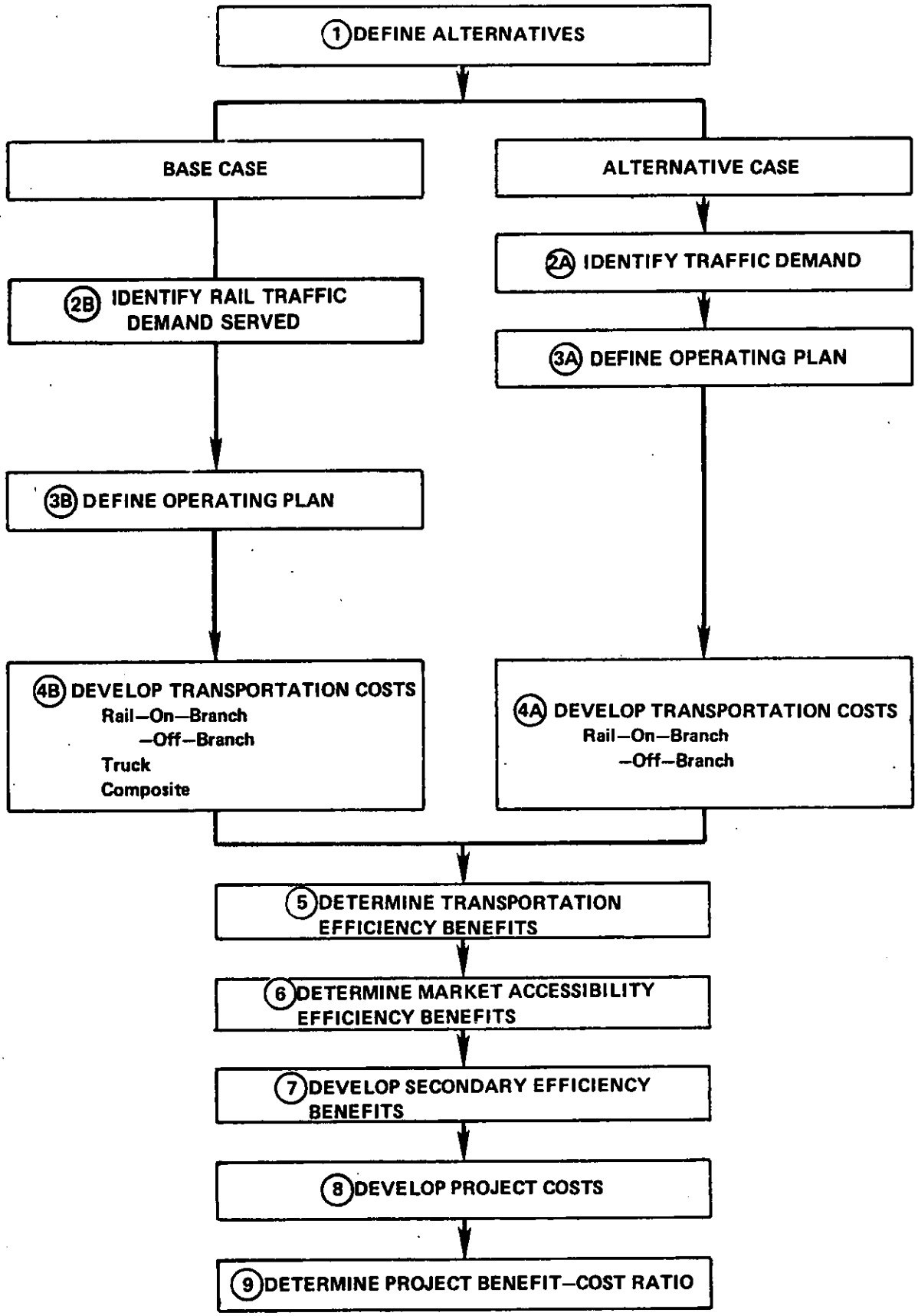
The Alternative Case proposed by the Division of Railroads was to rehabilitate the core system to permit operation of unit trains at speeds of up to 25 miles per hour. It was anticipated that this higher operating speed would permit a higher level of rail service for local shippers at reduced costs (on a per-ton basis) to the operator.

The economic benefits of the proposed project were limited to the cost savings associated with:

- operating over the system at a higher operating speed;
- realizing the efficiencies of unit trains; and
- benefiting from the higher commodity rates made available to South Dakota shippers because of the accessibility of west coast markets to a greater proportion of rail demand.

EXHIBIT A-1

BENEFIT-COST ANALYSIS MODEL



Develop Traffic Demand

Estimates of Rail traffic demand were developed for both analysis cases. Base Case represents that portion of shipper demand that can be moved under a restricted operations plan. Alternative Case demand represents all shipper demand for rail service.

Develop Traffic Demand - Base Case

The reduced volume of traffic which could be served with weekly rail service and a 10-mile-per-hour operation, provided the rail volume estimate for the Base Case. Based on the shipper survey responses, it was assumed that all traffic which could not be handled by rail on the core system would move by truck or some combination of truck and rail. The allocation of traffic to rail or truck modes was based on the commodity type and origin-destination pair for each station.

Develop Traffic Demand - Alternative Case

The study team conducted a survey of potential shippers on the core system through direct, personal interviews. During these interviews, investigations were made of the attitudes of shippers toward rail service, the type of rail service needed, the effects of rail service changes, and the projected volume and characteristics of traffic to be moved. Identified was the volume of traffic which the shipper would move by rail if at least bi-weekly service were provided. This traffic level provided the basis for the Alternative Case traffic demand projections.

Traffic demand information provided by the shipper survey included the commodity type, origin, and destination. As a check on the reasonableness of the survey responses, the traffic projections by station were compared with actual rail traffic loadings and unloadings during 1979, the last full year of Milwaukee Road rail operations over core system lines. In cases in which the traffic projections were significantly higher than the 1979 historical rail volumes, the projections were reduced by a set of adjustment rules. These rules, listed as Exhibit A-2, weighted the shipper traffic projections and the actual historic rail volumes, depending on the size of the difference between the two traffic volumes and the specific nature of the traffic involved. The more rail-intensive the traffic, the more weight was applied to the shipper projection.

Once the Alternative Case traffic demand projections were defined, they were aggregated by commodity type and origin-destination pair to permit costing of individual rail moves by traffic station.

EXHIBIT A-2

TRAFFIC PROJECTION ADJUSTMENTS

ADJUSTMENT RULES FOR ORIGINATING TRAFFIC

If $S \leq 1.33H$, Use S

If $S > 1.33H$ and Two or More Factors Apply, Use S

If $S > 1.33H$ and One Factor Applies, Use $\frac{1.33H}{3} + \frac{2S}{3}$

If $S > 1.33H$ and No Factors Apply, Use $\frac{1.33H}{2} + \frac{S}{2}$

ADJUSTMENT RULES FOR TERMINATING TRAFFIC

If $S \leq 1.33H$, Use S

If $S > 1.33H$, Use $\frac{1.33H}{3} + \frac{2S}{3}$

where:

S = Shipper Survey Projection
H = 1979 Historic Rail Traffic Level
-and-
Rail-Intensive Factors:

- shipper-supplied rail equipment
- length of haul over 300 miles
- high density, bulk commodity
- accessibility to abandoned grain elevators
- evidence of actual shipping records

Define Operating Plans

Two operating plans were developed to reflect both the Base Case service level and the service level sufficient to satisfy all rail shipping demand. It was assumed that service would not be increased until the rehabilitation is completed.

Base Case Operating Plan

The Base Case operating plan assumes that the BN will provide weekly service to the core system. Service is now provided on demand. For the purpose of this analysis it was assumed that there would be sufficient demand to require the trains to complete their entire scheduled round trips on a weekly basis. Each shipper receives a maximum of weekly service because of the constrained operating speeds, the time required to serve the lines, and the lack of passing sidings. The BN currently prohibits unit trains on the core system because it does not believe unit trains can be safely operated over Class I track. This prohibition also depresses rail shipping demand by making unavailable the economic advantages of shipping in large quantities.

The core system is currently served by two trains. The first train departs from Sioux Falls and serves stations between Sioux Falls and Aberdeen via Canton and Mitchell (a 7-day round trip). The second train departs from Sioux City and serves stations between Sioux City and Chamberlain via Mitchell (a 6-day round trip). As a result of the track conditions, each train is permitted to handle a maximum of 54 cars, of which only 27 can be loaded. The BN is committed to provide 100-ton covered hopper cars (L 153s) for grain loading on all the core system lines except Mitchell to Chamberlain. This line has a weight restriction imposed due to its 65-pound rail, and is therefore served by smaller hopper cars (L 151s). Locomotives used on the system are GP-7s and GP-9s.

Alternative Case Operating Plan

The operating plan developed for the Alternative Case assumed that rail shipping demand would be fully served, demand for unit train service could be met, and trains could be operated at up to 25 miles per hour. The Alternative Case operating plan differs from the Base Case plan in four important respects. Comparison shows the Alternative Case to have:

- increased operating speed (25 mph versus 10 mph);
- increased train size (80 cars versus 54 cars);
- increased loaded cars per train (80 cars versus 27 cars); and

. ability to move unit trains.

Under the Alternative Case, these factors would provide an enhanced level of rail service and an ability to satisfy total shipper demand.

The Sioux Falls and Sioux City gateways will still be used to access the system, with two round-trips a week originating at each location according to the following schedule:

Gateway	Train Number	Round Trip Days	Route Served
Sioux Falls	1	4	Sioux Falls - Canton - Mitchell - Aberdeen
	2	2	Sioux Falls- Canton - Mitchell
Sioux City	1	4	Sioux City - Mitchell - Chamberlain
	2	2	Sioux City - Mitchell

If the proposed rehabilitation is performed, unit trains of 54 cars will be permitted, and handled wherever possible through scheduled train operations. Because of higher operating speeds, the same number of crews is able to provide more service in the Alternative Case operating plan than the Base Case plan. This results in fuller utilization of equipment and personnel and reduced operating costs on a per-ton basis.

Develop Transportation Costs of Traffic Movements

An important element of the benefit-cost analysis methodology was the determination of the costs of transporting commodities according to the Base and Alternative Cases. For this analysis, both rail and truck costs were developed on a per-ton basis, depending on the transportation mode, the commodity type, and the origin-destination pair. The analytical models used to develop these costs are briefly described in this section. All costs developed in this study were applicable to the July 1981 time frame.

Rail Costs

The costs of rail service were determined for both on-branch and off-branch portions of the traffic movements, using Rail

Form A-based costs for the off-branch costs and engineered costs for the on-branch costs.

On-Branch Costs

The avoidable costs of moving traffic on the core system were estimated on the basis of each operating plan. Direct cost estimates were provided by the BN for most expense categories and were developed for both the Base and Alternative Case operations. Where direct estimates were unavailable, BN system average unit costs were used.

All costs for the core system were developed on either a per-train or per-system basis. Both operating plans included the number and type of service units (i.e. car-miles) associated with each train. The service units then were used to allocate these costs to individual movements and intensive study lines. Selection of a service unit for the allocation of a given expense category was made on the basis of the BN's internal costing methodology and experience.

The BN's internal costing system allocates costs to movements on the basis of the service units believed to affect cost accumulation in that category. Although the BN's system reflects the possibility that costs may vary as a function of several activities, a simplifying assumption was made for the core system. For estimation purposes, only the one or two primary units which account for the major part of the BN's cost accumulation in a given category were used as the allocation bases.

For instance, if the BN system applies Expense A as a function of ton-miles, car-miles, and cars originated, but ton-miles account for the majority of the allocation, ton-miles were used to develop core system unit costs. The direct Expense A cost estimate for the core system was divided by the expected annual number of core system ton-miles to generate a unit cost. This unit cost was applied to the service units for each movement. The total costs for each movement were then aggregated for each study line.

BN system average unit costs were applied on an activity level basis as well. For categories where direct estimates were unavailable, the system average unit costs were examined for their relevance to the core system. The composition of each unit cost also was reviewed to identify any allocation of fixed overhead which would be inappropriate to a calculation of only avoidable costs. The unit costs were adjusted as needed, and then applied where appropriate.

A review of the cost categories and the assumptions underlying the allocation procedures follows.

Maintenance of Way and Structures - A direct estimate of expenses for maintenance of way and structures was provided by the BN, and included wages and salaries, expenses, material, equipment, and equipment operating expense. The equipment ownership expense reflected the level of annuity required to permit the BN to earn its current costs of capital on the equipment's replacement value. The projected level of maintenance and expenses was consistent with current BN experience on similar lines in the same geographic region.

Fuel - The Estimates of fuel consumption and cost reflected each operating plan and BN studies of fuel usage under similar conditions. Fuel cost per gallon was based on current BN purchasing arrangements.

Station Clerical - The BN estimated staffing requirements for both cases and provided cost estimates based on current labor agreements. In the Alternative Case, the Maintenance of an office at Mitchell was assumed.

Servicing Train Locomotives - No direct cost estimate was calculated for this expense category. System average costs were believed to be reflective of each operation, and were therefore applied.

Train Supplies - System average unit costs were applied to the core system, as they were believed to be reasonable estimators for each operation.

Trainmen - Direct estimates of crew labor expenses, including health and welfare and all benefits, were developed. It was assumed that three-person crews, composed of an engineer, a conductor, and a brakeman would operate the trains. It was assumed, too, that no firemen would bid on the jobs. The assumptions were based on BN experience in the region. Crew requirements, overtime, and other expenses were estimated on the basis of each operating plan.

Injuries and Insurance - BN system average unit costs were used to estimate injuries and insurance expense, because no characteristic of the core system indicated that a different experience was probable.

Loss and Damage - Loss and damage statistics from the BN's experience were used to generate core system estimates. Since the traffic composition was known, loss and damage estimates (dollars per ton) were applied at a two-digit Standard Transportation Commodity Code (STCC) level. Traffic that originates or terminates on the core system was assigned 50 percent of the average BN system loss and damage expense for each

commodity. The remainder was allocated to the off-branch portion of the move on the BN. Local traffic to the core system was assigned the full BN system average loss-and-damage expense.

Other Transportation - BN system average unit costs were used to apply other transportation expenses that are not estimated individually.

Maintenance of Equipment - The BN provided unit costs by locomotive and car type for equipment maintenance. The unit costs for locomotive repairs reflected only direct materials, direct labor, and an allocation of materials issued without specific requisitions. Because only direct costs were incorporated in the analysis, this unit cost was applied. Freight car and caboose repair unit costs were reduced to exclude the allocation of fixed overhead which was included in the unit cost.

Equipment - Assumptions regarding car ownership an car types were made for each movement on the core system. Car days on the core system were estimated on the basis of each operating plan. Foreign car charges and private car compensation were based on current BN payments. BN system car, caboose, and locomotive ownership expenses were developed by equipment type. A level of annuity which would allow the BN to earn its current cost of capital on the equipment's replacement value was the basis of hourly expense. Spare equipment was factored into the expense, based on BN costing practices and operating experience.

General Office - Variable general office expenses were applied at BN system average rates which were believed to be reasonable estimators for each operation.

Result - The result of this procedure was an avoidable cost-per-ton estimate for each movement on the core system under each operating plan. An average cost per ton for each line and each plan is included in a confidential appendix for the Federal Railroad Administration and the State of South Dakota.

Off Branch Costs

Off-branch costs refer to the variable costs of moving traffic by rail to or from points beyond the core system. The off-branch costs were developed using Peat Marwick's Rail Form A costing model, based on the inputs appropriate to the railroad involved in the particular interline movement. Adjustments were made for BN movements to reflect where possible the BN's system average variable costs. Specific modifications were made to loss and damage, and freight car ownership expenses to reflect the assumptions made for the on-branch costs. These assumptions were described in the previous section.

For this study, the off-branch costs per ton for each core system interline rail movement were added to the on-branch costs. This was done to determine the total rail variable costs per ton, based on the commodity type and the length of haul by origin-destination pair. By applying the rail cost per ton factors to the traffic volume by station and aggregating the results by line segment, the cost of providing rail service to each line could be determined.

Motor Carrier Costs

The costs of motor carrier service were determined for those traffic movements that could not be served by rail in the Base Case. A truckload cost model was used to develop the cost per ton of moving diverted traffic by truck. Costs were developed based on the assumption that service would be provided by owner-operators. These costs related primarily to line-haul costs, but additional factors were 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 were considered. The equipment used for the model was a five-axle tractor semitrailer, suitable for carrying grain. it was assumed that approximately 100,000 miles would be driven per year. This was based on an average truck speed of 50 miles per hour and an average of 2,000 hours driven per year. The truck costs were based on a July 1981 time frame.

Variable costs included the cost of capital for equipment, the depreciation of the vehicle, fuel costs, tire costs, and maintenance costs. These variable costs were directly related to mileage, and were developed using cost estimates from the U.S. Department of Agriculture, the Association of American Railroads, the American Trucking Associations, the Interstate Commerce Commission, and current literature and discussions with manufacturers. Also included in the variable costs were driver wage expenses, benefits and social security. Miscellaneous expenses were also estimated, such as the cost of out-of-town layovers. The total variable costs amounted to $74,200 per 100,000 miles or 74.20 cents per mile. Pickup and delivery costs were a function of estimated delay time per trip.

Included in the fixed costs were return on investment, insurance, licenses and permits, and overhead costs. The total fixed costs were estimated at $19,300 for 100,000 miles, or 93.30 cents per mile. In the use of these costs, a 100 percent empty backhaul for trips under 200 miles was assumed. Based on the Interstate Commerce Commission's report, Empty/Loaded Truck Miles on Interstate Highways During 1976, the ratios of empty

backhaul miles were estimated by length of haul for exempt carriers in the appropriate geographical regions. The costs that were a function of pickup and delivery amounted to an average of $10.48 per trip. To calculate cost per ton, the commodity type, origin/destination pairs, and the optimum routing were analyzed. An average cargo weight of 22.5 tons was used unless state weight restrictions or the density of the commodity varied from the average, in which case the total cargo tonnage was decreased appropriately.

Composite Transportation Costs

Where both truck and rail modes were involved in a move to or from the core system (in the Base Case), a composite transportation cost per ton was developed. In such cases, a weighted average cost per ton of both modes was developed.

Develop Project Benefits

The economic effects of the proposed rehabilitation of the core system (the Alternative Case) are called project benefits, while the costs of performing the rehabilitation are called the project costs. The project benefits are outcomes that occur relative to the Base Case. Several types of project benefits are considered by the benefit-cost analysis methodology used by South Dakota. These include:

monetary benefits

- primary efficiency benefits:
  - transportation efficiency; and
  - market accessibility efficiency.
- secondary efficiency benefits:
  - community income;
  - tax; and
  - highway maintenance cost.

nonmonetary benefits

- employment.
- energy consumption.
- air pollution.

Exhibit A-3 illustrates the relationships among project benefits which are discussed in detail in the following pages.

Monetary Benefits

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

Primary Efficiency Benefits

The primary efficiency benefits of a local rail assistance project consist of the economic gains to the transportation provider and user of service affected by the project. These are defined in this methodology as transportation and market accessibility effiency benefits.

Transportation Effiency - The transportation efficiency benefits of the Alternative Case consist of four components, as outlined in Exhibit A-3 and illustrated in Exhibit A-4. These include:

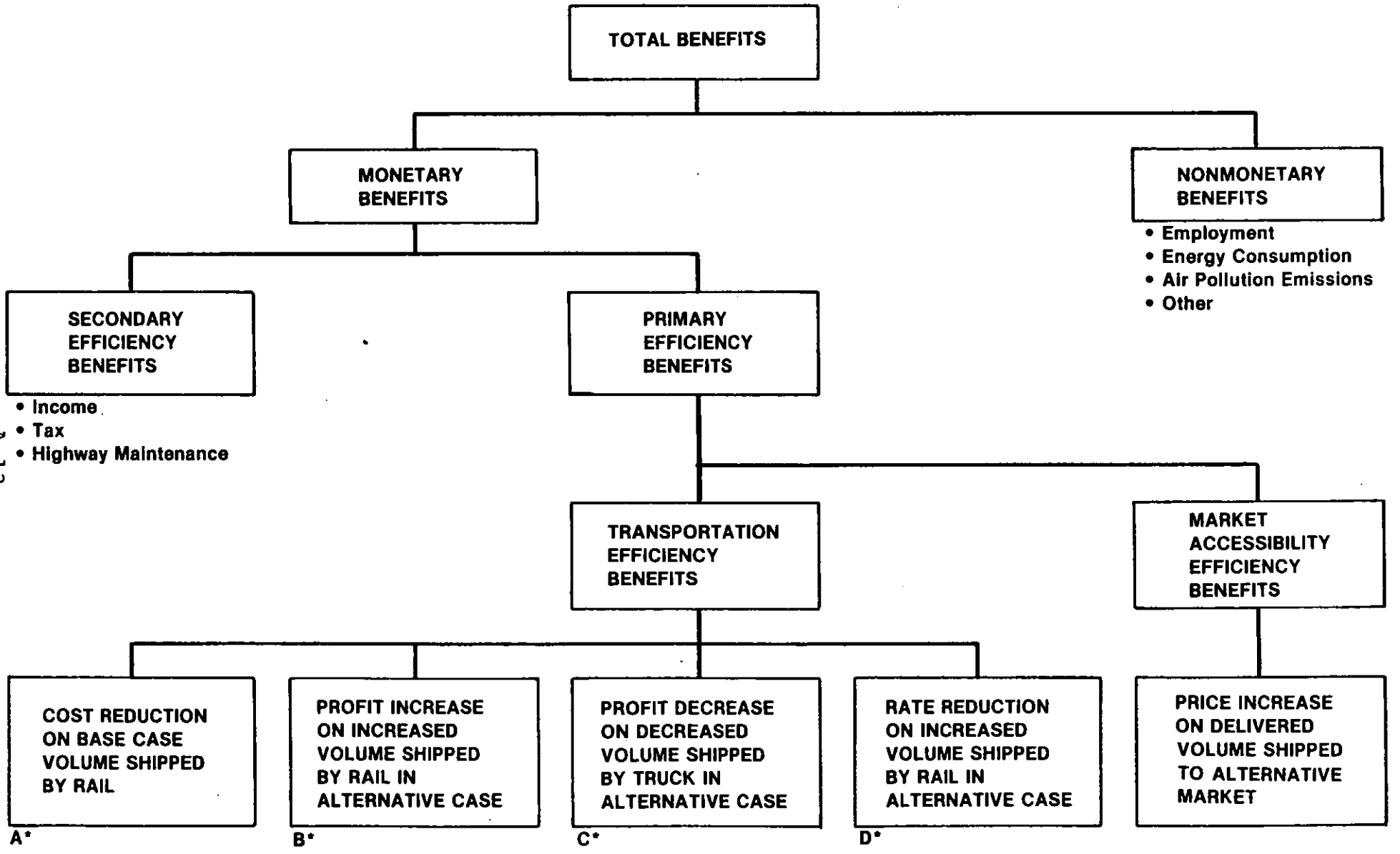
- cost reduction associated with providing rail service to the study line, using the original quantity moved by rail in the Base Case;
- profit earned by the rail carrier on traffic diverted from truck to rail;
- profit decrease by the truck carrier on traffic diverted from truck to rail; and
- transportation cost savings to shippers for traffic diverted from truck to rail.

These economic outcomes, as shown in Exhibit A-4, resulted from the assumptions concerning the nature of the Base and Alternative Cases. These assumptions specified that:

- because of the project, the costs of providing rail service are decreased to the rail carrier, while the costs of providing truck service are not affected;
- the total quantity shipped from each projectline (for both rail and truck odes) remains constant, but the effect of the project is to increase the rail share of the total traffic. This reflects the inelastic transportation demand found for core system lines; and

EXHIBIT A-3

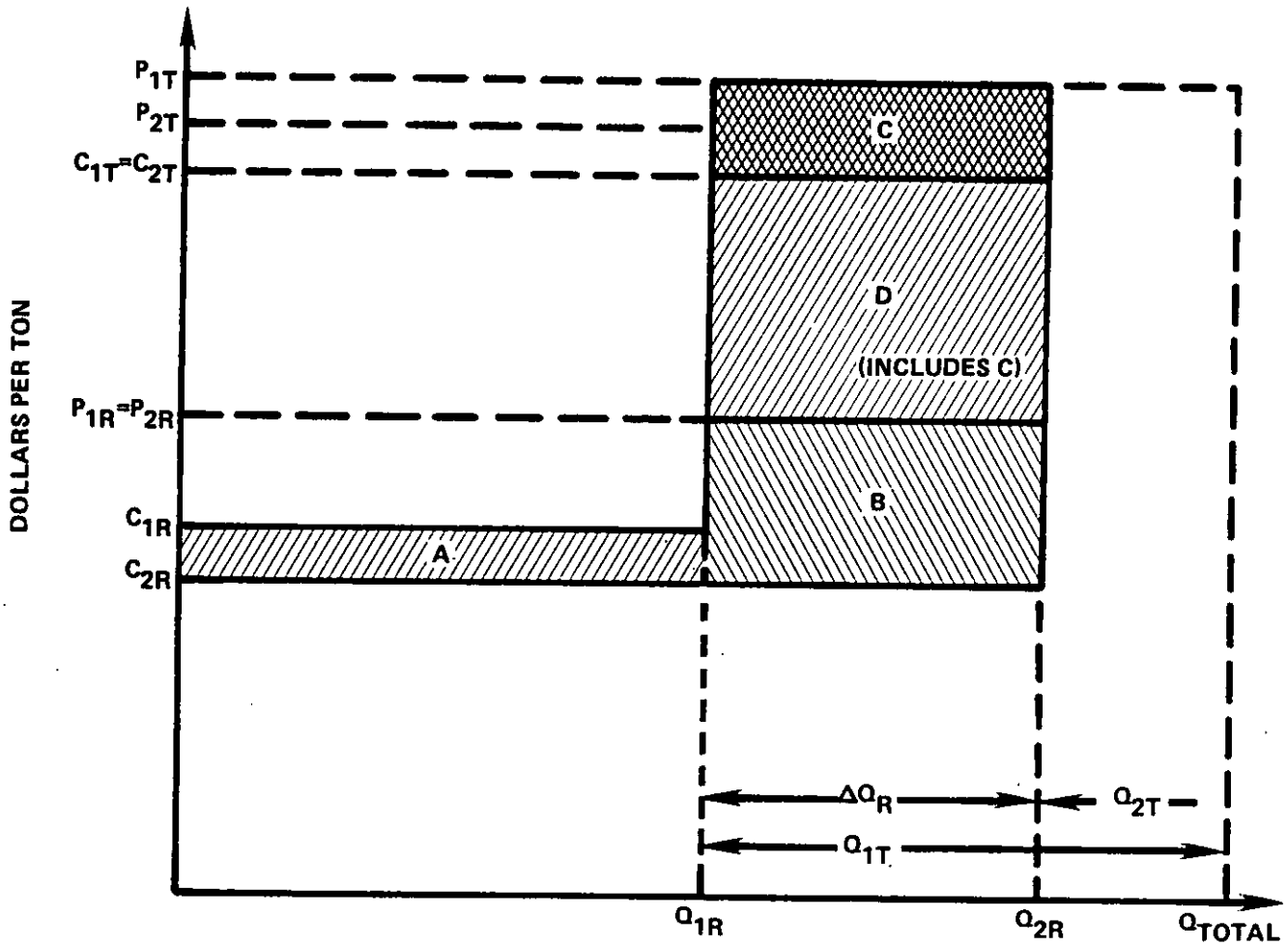
RAIL PROJECT BENEFITS



Note: *Areas A,B,C, and D are illustrated in Exhibit A-4

EXHIBIT A-4

TRANSPORTATION EFFICIENCY BENEFITS



WHERE:

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

$B = (P_R - C_{2R})\ (Q_{2R} - Q_{1R})$

$C = (P_{1T} - C_T)\ (Q_{2T} - Q_{1T})$

$D = (P_{1T} - P_R)\ (Q_{2R} - Q_{1R})$

$P_{1T} > P_{2T}$

$C_T = C_{1T} = C_{2T}$

$Q_{1T} > Q_{2T}$

$P_R = P_{1R} = P_{2R}$*

$C_{1R} > C_{2R}$*

$Q_{1R} < Q_{2R}$

$Q_{TOTAL} = Q_{1T} + Q_{1R} = Q_{2T} + Q_{2R}$

Q_{TOTAL} is a fixed volume

KEY

P_{1T} = Truck Rate Per Ton, Base Case

P_{2T} = Truck Rate Per Ton, Alternative Case

P_{1R} = Rail Rate Per Ton, Base Case

P_{2R} = Rail Rate Per Ton, Alternative Case

C_{1T} = Truck Cost Per Ton, Base Case

C_{2T} = Truck Cost Per Ton, Alternative Case

C_{1R} = Rail Cost Per Ton, Base Case

C_{2R} = Rail Cost Per Ton, Alternative Case

Q_{1T} = Truck Tonnage Quantity Shipped, Base Case

Q_{2T} = Truck Tonnage Quantity Shipped, Alternative Case

Q_{1R} = Rail Tonnage Quantity Shipped, Base Case

Q_{2R} = Rail Tonnage Quantity Shipped, Alternative Case

Q_{TOTAL} = Total Quantity Shipped

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

- rail rates are assumed to remain constant, while truck rates decline in response to the improvement in rail service. The effect of rates on the project benefits calculation is zero, because the overall quantity of traffic does not change in this analysis.

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

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

where

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

Q_o = Quantity Shipped, Base Case (Tons)

Q_n = Quantity Shipped, Alternative Case (Tons)

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

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

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

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

Because the total quantity shipped under the Base and Alternative Cases did not change, the above equation was reduced to the following:

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

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

= Area (A) + Areas (B+D-C) + 0 (See Exhibit D-4)

where

Q_T = Total Quantity Shipped (Tons), where $Q_T = Q_o = Q_n$
Q_{1R} = Quantity Shipped by Rail, Base Case (Tons)
Q_{2R} = Quantity Shipped by Rail, Alternative Case (Tons)
Q_{2T} = Quantity Shipped by Truck, Alternative Case (Tons)
C_{1R} = Transportation Cost by Rail, Base Case ($/Ton)
C_{2R} = Transportation Cost by Rail, Alternative Case ($/Ton)
C_{1T} = Transportation Cost by Truck, Base Case ($/Ton)
C_{2T} = Transportation Cost By Truck, Alternative Case ($/Ton)

The quantity shipped (Q_T) was based on the adjusted shipper surveys. The Base Case and Alternative Case transportation costs represented the unit costs developed from the on-branch and off-branch rail cost models and truck cost model previously described. Because the unit costs of serving the core system shippers by rail under the Alternative Case were typically below the unit costs associated with the Base Case, the resulting transportation efficiency benefits were positive for the Alternative Case.

Market Accessibility Efficiency - In certain cases, the effect of the Alternative Case was to permit local shippers to access west coast grain markets. The delivered grain prices of these markets exceeded those of closer Midwest grain markets, even after adjusting for the differences in transportation costs. This impact was called the market accessibility efficiency benefit and applied only to those shipments that would change destinations if rail service were made available. It was calculated by the following equation:

$$(B_n - B_o)_{MA} = (Q_n - Q_o)(GP_n - GP_o)$$

where

$(B_n - B_o)_{MA}$ = Market Accessibility Efficiency Benefit, Alternative Case versus Base Case ($)
Q_o = Quantity Shipped to Midwest Markets, Base Case (Tons)
Q_n = Quantity Shipped to West Coast Markets, Alternative Case (Tons)
GP_o = Midwest Delivered Grain Price ($/Ton)
GP_n = West Coast Delivered Grain Price ($/Ton)

The sum of transportation and market accessibility efficiency benefits made up the primary efficiency benefits of implementing the Alternative Case.

Secondary Efficiency Benefits

The primary efficiency benefits of the rail assistance project discussed above measure the direct economic effects of changes in quantity, cost, and rates of transportation services used by core system shippers. The secondary efficiency benefits measure the indirect economic effects of the proposed project on shipper, local communities, and the State. These include:

- changes to local (community) income caused by job losses or gains;

- changes in taxes resulting from the closing or opening of shipper facilities and the diversion of traffic to or from trucks, whose fuel is taxed by the State; and

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

Income Effects - The income effects of implementing the Alternative Case consisted of lost truck driver income because of diversion of truck traffic to rail. The number of shipper and railroad jobs is assumed to remain constant between the Base and Alternative Cases, based on the shipper survey and the system operating plans.

The truck driver income loss to the community was measured by the following equation:

$$B_{il} = J\ T_{uc}\ (R_{uc}-R)$$

where

B_{il} = Secondary Employee Income Loss (One-Time)
J = Lost Jobs
T_{uc} = Average Term of Unemployment (11 Weeks)
R_{uc} = Average Unemployment Compensation Rate ($100.54/Week)
R = Average Wage Rate ($431.54/Week)

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

$$B_{il} = -\ J\ T_{uc}\ R$$

because the amount of unemployment compensation would be contributed by the State.

Tax - The only tax effects calculated for the Alternative Case resulted from the diversion of traffic from the truck mode, which, unlike the railroads, would pay a state tax of 13 cents per gallon of fuel. The annual tax effect was therefore calculated as the per-gallon state fuel tax times the decrease in truck fuel consumption.

No shipper facilities were expected to open or close as a result of the Alternative Case, so no shipper taxes were affected.

Highway Maintenance Cost - The diversion of traffic in the Alternative Case from truck to rail mode produced a net reduction in the deterioration of the State's highways over which the traffic would have moved. Because of the relatively small volume of truck traffic affected, no significant highway capital costs were assumed to be avoided by the traffic diversion. However, reduced highway maintenance costs were assumed to result. This was quantified by using an equation developed by the South Dakota Transportation System's Planning Division, inflated to January 1981 dollars, and listed as follows:

$$(M_O-M_n)_H = (T)(V)(L) \times [0.00167554]$$

where

$(M_O-M_n)_H$ = Reduced Annual Highway Maintenance Cost ($)
T = Number of One-Way Truck Trips per Year Diverted to Rail
V = Average Gross Vehicle Weight per Round Trip (Tons)
L = Length of Haul in South Dakota (Round-Trip Miles)

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

Nonmonetary Benefits

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

Employment

The only effect on employment resulting from implementing the Alternative Case was the loss of several truck driver jobs. No shipper or railroad jobs were affected. The income effects of these jobs were quantified and are explained in the subsection on secondary efficiency benefits.

Energy Consumption

For each line, the quantity of diesel fuel consumed was estimated, based on the net traffic volume, haul length within South Dakota, an modal composition of each traffic movement. The energy intensity estimates for rail and for truck were based on data

prepared by Rose and varied by commodity.[1] Once the energy consumption estimates were made in Btus, they were converted to gallons of diesel fuel using the conversion factor of 138,700 Btus/gallon of diesel fuel. The energy consumption estimates were then summed for all traffic movements for all modes by line. Next, the totals were compared with the Base Case to arrive at an estimate of the incremental energy consumption by line. The effects of energy consumption were considered only for movements in South Dakota, although further effects beyond the state borders would occur.

Air Pollution Emissions

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

The three major pollutants emitted by trucks and rail locomotives are carbon monoxide, hydrocarbons, and oxides of nitrogen. Supplemental emissions include oxides of sulfur, particulates, aldehydes, and organic acids. For this analysis, the last two pollutants were assumed to be negligible.

The emission factors used for the analysis were developed by the EPA.[2] Exhibit A-5 presents these emission factors (pounds of pollutants/1,000 gallons of diesel fuel) for heavy-duty truck and locomotive diesel engines. The calculation of air pollution emissions involved multiplying the estimated rail and truck fuel consumption by the appropriate air pollution factors. Summing the results for each movement in the Alternative Case and comparing them with the Base Case produced an estimate of the incremental air pollution emissions for the Alternative Case. The emissions by type of air pollution were summed for each line for ease of presentation. Only the effects that would occur in South Dakota were quantified by this study, although further effects beyond the state borders would occur.

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

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

EXHIBIT A-5

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

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

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

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

Other

Other nonmonetary benefits of the Alternative Case addressed by this study included 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 the national rail system;
- the economic development potential of the State; and
- 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 the Alternative Case on these issues is noted in the text as part of the discussion of project benefits.

Determine Project Costs

Project costs associated with the Alternative Case were the costs to rehabilitate the core system from a Class I Base Case condition to a condition sufficient to support the movement of unit grain trains at Class II speeds. These one-time cost estimates were provided by T.K. Dyer, Inc., and the BN.

Evaluate Project Benefit-Cost Criteria

The economic benefits and costs for each line and case were evaluated in terms of annualized values, with one-time benefits and costs converted to anualized values using a 10-year time frame and 15 percent discount rate, assuming beginning-year benefits and costs.

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

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

This allocation determined how much each of the above groups would be affected by the proposed projects. The sum of the maximum

benefits (whether positive or negative) equalled the total efficiency benefits for each line. Project costs were not allocated to the affected parties listed above.

The Alternative Case was evaluated by comparing the difference between the annualized benefits and costs, and the ratio of the annualized benefits and costs for each line segment of the core system, and the core system as a whole. The decision rules associated with each evaluation criterion were 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 Monetary Project Benefits ($)

C = Annualized Value of Project Costs ($)

n = Number of Monetary Project Benefits and Costs

These decision rules are primarily guidelines because they do not include important nonmonetary effects associated with rehabilitating each line of the core system to Class II. These effects are taken into consideration by the State in the final project evaluation.

CONCLUSIONS

The benefit-cost analysis 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 Addendum incorporates many of the guidelines suggested by the Federal Railroad Administration for conducting benefit-cost analyses. It also reflects the nature of the data available to perform these analyses. The quality of supporting information is the most important variable in determining the type of benefit-cost methodology that can be used. The high quality of

data maintained by the Division of Railroads and provided by the BN and shippers associated with each of the core system lines was an important aid to the study team.

The benefit-cost methodology is intended to be both meaningful and workable, and yet conform to the requirements of the Federal Railroad Administration. Significant judgment is involved in applying the available data to the methodology. The statements and projections contained in this study result from the analysis methodologies, information, and assumptions set forth in this appendix. The achievement of any economic, financial, or usage forecast may be affected by fluctuating economic conditions and is dependent upon the occurrence of other future events which cannot be assured. The actual results achieved, therefore, may vary from the projections, and such variation could be material. The enclosed results, however, reflect the best estimates of the consequences of rehabilitating the core system to permit maximum operating speeds of 25 miles per hour and unit train service.