Addendum to

RAILPLAN SOUTH DAKOTA 1980

Department of Transportation

Division of Railroads

June 1981

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FOREWORD

This Addendum to Railplan, South Dakota, 1980 completes a two-year rail planning cycle. The most pervasive rail service changes in the State's history have occurred during this time, and have been the subject of South Dakota's railplans and numerous other rail studies. The Milwaukee Road's abandonment of over 1,200 miles of South Dakota's track in March 1980 was the most important single rail transportation event of the last two years, and it precipitated 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 lines, and the State recognized that for service to be restored they would first have to be purchased by another party--probably the State itself. Efforts to purchase the lines began immediately, and this Addendum describes final plans for the rehabilitation and operation of some of the lines, called the core system. It is planned that federal funds will have a major role in the rehabilitation process.

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 are available 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 the six line segments that compose the core system, and these analyses will enable the State to make applications for LRSA funds. The purpose of these projects is to rehabilitate the lines from Class I to Class II track conditions.

Unlike rail lines that have been studied previously by South Dakota, the lines studied in this Addendum combine to form an interdependent system. Only one of the lines, in fact, does not provide access for the system 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 core system lines have a combined benefit-cost ratio of 2.12, indicating that the projects studied can be justified on an economic basis. The lines provide essential transportation services to many rural grain elevators and industries, thereby further emphasizing the need for restoring efficient rail service on the core system.

The process of restoring efficient rail service consists of two primary phases. During the first phase, the Directed Service Program that was established by the Milwaukee Road Restructuring Act will be used to rehabilitate 4 of the 6 core system lines to Class I track standards. This work is necessary to allow safe

operations and will be completed by August 31, 1981. During the second phase, LRSA funds will be used to rehabilitate to Class II the two lines that are not eligible for Directed Service. This work will be done during the fall of 1981. In addition, pending a Congressional decision on the future of the LRSA Program, the State plans to use LRSA funds during 1982 to rehabilitate the Directed Service lines to Class II.

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 of the public at hearings on this Addendum are included as Appendix A. Further comments or questions should be addressed to:

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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 1980 had a dramatic and adverse effect on South Dakota. The State's economy is heavily dependent on agriculture, and the abandonment 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 being purchased from the Milwaukee Road will be placed in operation during the summer of 1981, with service provided by a private company to be chosen by the State. Lines that are purchased but 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 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 have been a complete substitute for rail service. Only the Aberdeen to Wolsey line has had service since March 1980, and this service has been provided by the Chicago and North Western Railroad.

During the last several years, the Milwaukee failed to perform normalized maintenance on the core system lines and allowed them to physically deteriorate. Thus, although most of the lines are equipped with at least 85-pound rail, tie conditions make them inoperable. A comprehensive program to rehabilitate the lines is currently in process and is explained in sections that follow. This Addendum is an important part of that 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, and the Milbank to Sisseton branch line. Efforts are currently underway by states and shippers to assist the Milwaukee in performing the rehabilitation necessary for the Milwaukee to retain the main line as an operating part of its system.

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, the primary rail planning concern of the State has been the core system and the effort to restore 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 if operations were 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.

The core system lines meet each of 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 purchase lines for operation is discussed in a later section.

EXHIBIT II-1

ESSENTIAL RAIL SYSTEM OF SOUTH DAKOTA
(CORE SYSTEM CONCEPT)

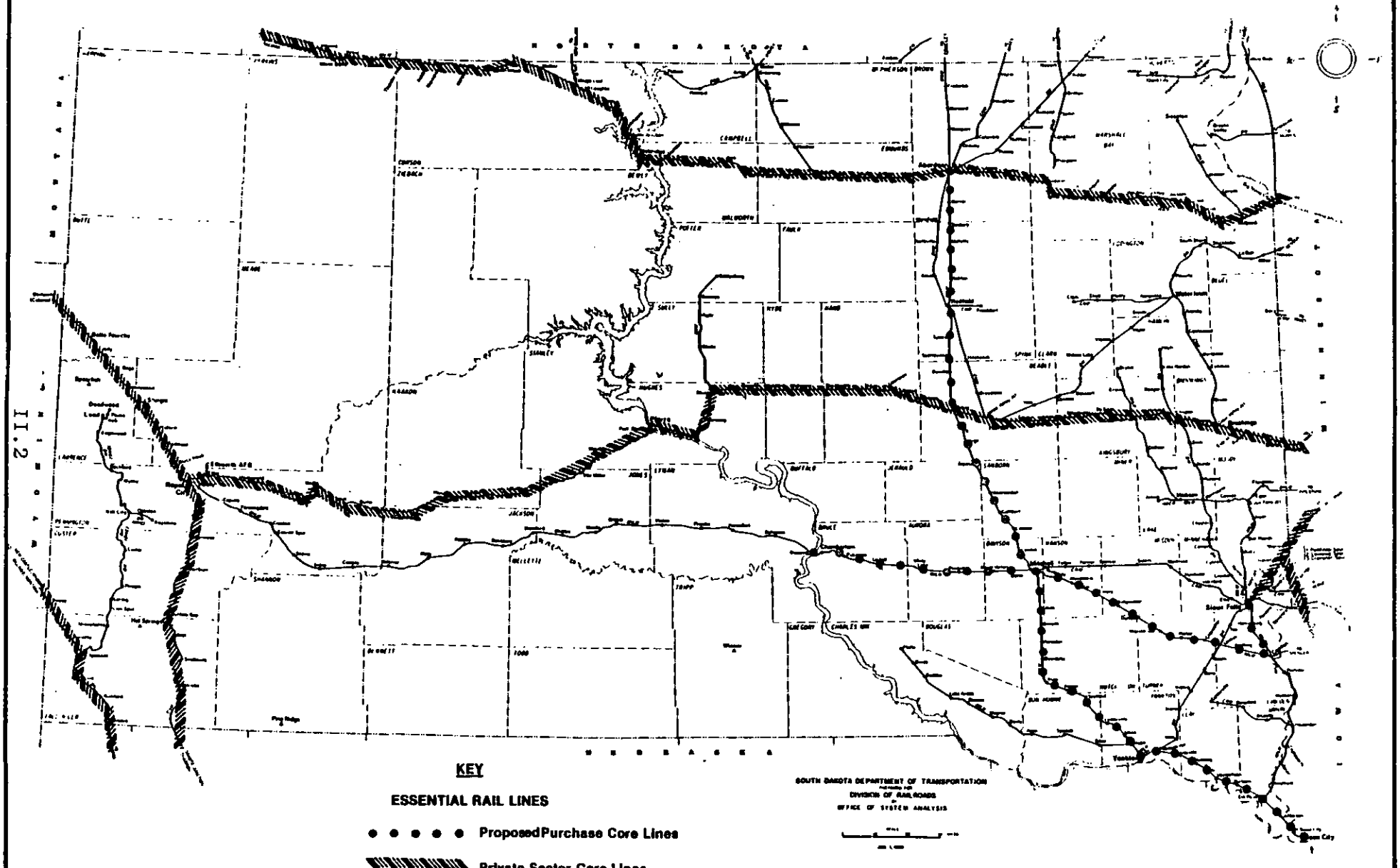
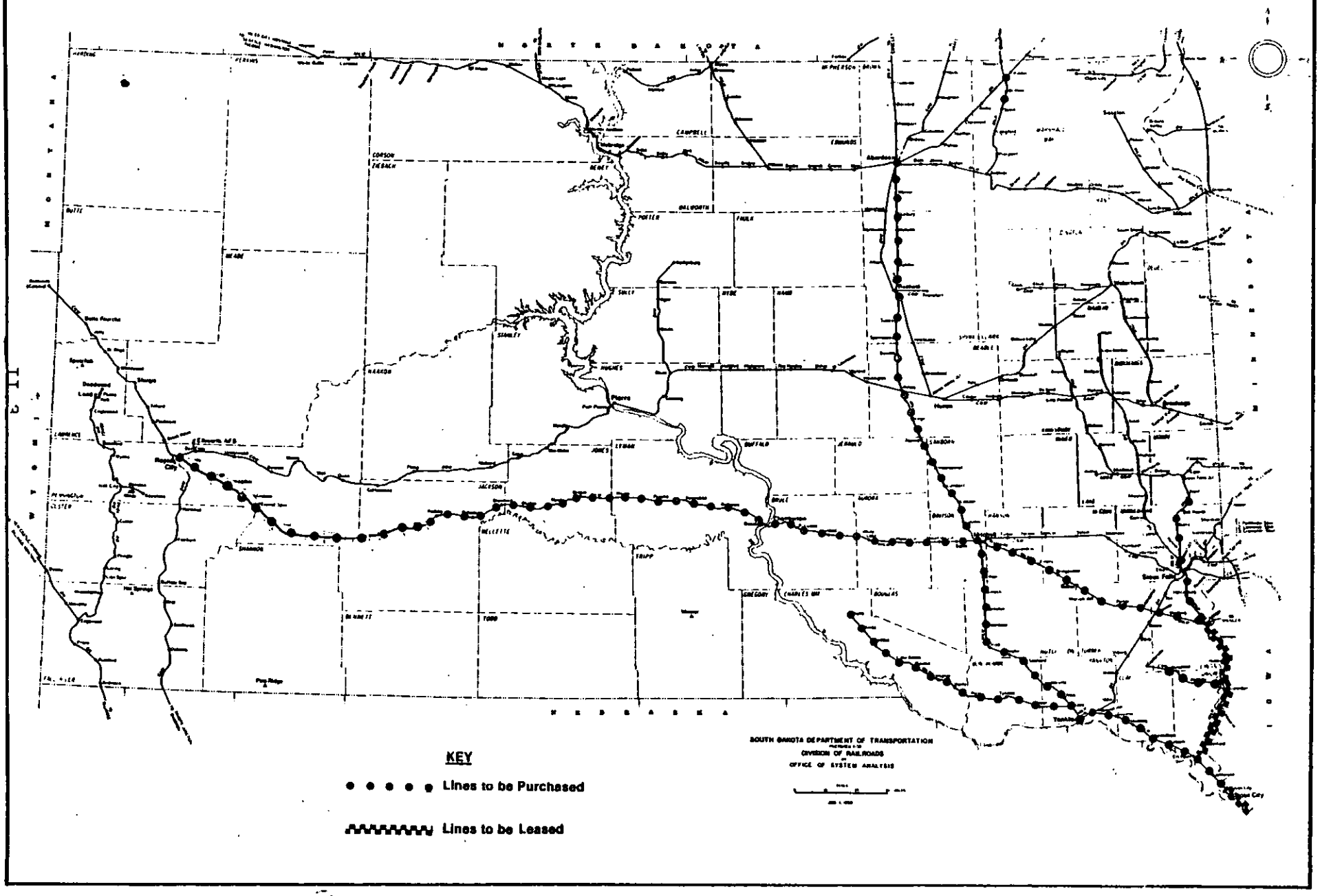


EXHIBIT II-2

SOUTH DAKOTA PURCHASE PLAN



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 neccessary 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 is part of the process of restoring the lines to a safe operating condition.

SELECTION OF PURCHASED LINES FOR OPERATION

The State selected six line segments for operation in 1981, all of which are intensive study lines in this Addendum. They are:

- Aberdeen - Wolsey;
- Wolsey - Mitchell;
- Mitchell - Chamberlain;
- Mitchell - Elk Point;
- Mitchell - Canton; and
- Sioux Falls - Sioux City.

The Canton to Elk Point (East Wye Switch) segment of the Sioux Falls to Sioux City line is not part of the South Dakota core system as the system was defined by the 1980 State Legislature. This segment was defined as a local option line, and operations were not planned to begin until after service was restored on the core system itself. Through an agreement with

the Sioux Valley Regional Rail Authority, however, this segment will be operated as part of the core system. This will be done because of its importance to these lines' ability to function as an efficient operating system and to serve major shippers located on the line.

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 cash 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 operating 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. Aberdeen and Sioux City, Iowa, provide the primary access to the national Class I rail system, although Sioux Falls also serves as a useful gateway. The gateways available and the connecting railroads are:

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 Illiois Central Gulf

Because of abandonments by the Chicago and North Western (C&NW) and the Burlington Northern (BN), most 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 movement of inbound bulk commodities such as rock for highway construction and cement from the State-owned plant.

Although other operating rail lines in the State can function effectively without the core system, the system will serve as an important source of interlined traffic, particularly for the Milwaukee Road and the BN. The Milwaukee, C&NW, and BN serve grain markets in the Minneapolis-St. Paul area, and the BN serves the West Coast and Gulf. The Illinois Central Gulf (ICG) also provides a vital link with the Gulf ports. By providing these connecting railroads with significant amounts of interlined traffic that would otherwise be unavailable, the State hopes to contribute to the viability of the lines and help ensure their long-term operation.

PRELIMINARY OPERATING PLAN

Two preliminary operating plans were developed for the core system, assuming that service would be provided by a short line. The Alternative Case plan was based on a 25 miles-per-hour operating speed limit, twice weekly service to all locations on the system, and traffic volumes based on a March 1981 shipper survey. The Base Case plan was based on a 10 miles-per-hour operating speed limit and the same physical assets used for the Alternative Case operating plan. Appendix C contains the detailed operating plans. This section outlines the running times, train schedules, crew schedules, locomotive schedules, and car requirements for both plans.

Trip Times by Line

Running time is the time it takes to operate over a rail line without stopping, while observing all slow orders. Switching time is added to running time to develop the total trip time. Switching time is the time it takes to set out and pick up cars.

The total trip times for each line segment for the two operating plans are as follows:

TOTAL DAILY TRIP TIMES
(Hours)

Line Segment	Alternative Case (25 MPH)	Base Case (10 MPH)
Mitchell - Aberdeen	10.0	18.0
Mitchell - Chamberlain	11.6*	12.0
Mitchell - Canton	11.9*	12.0
Mitchell - Elk Point (East Wye Switch)	10.0	23.0
Mitchell - Sioux City	--	--
Sioux Falls - Sioux City	9.0	17.0

Train Schedules

The plans vary in the amount of service provided to each line segment. The alternative case plan provides twice weekly service to all shippers. The Base Case plan provides twice weekly service to all lines except the Mitchell - Chamberlain and Mitchell - Elk Point (East Wye Switch) lines which would receive weekly service. The Alternative Case plan provides for a yard switch engine at Mitchell four days per week which breaks up inbound trains, makes up outbound trains, and provides switching service to local industries. The proposed Base Case plan provides for a yard switch engine at Mitchell twice weekly. The detailed train schedules for both plans are shown in Appendix C.

Crew Schedules

Both plans are based on four two-person crews and one three-person crew. The additional crew member is used in Mitchell yard as a relief person for crew members absent from work. A second relief person would be the trainmaster.

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* Round trip in one day.

The hours worked per week for each crew vary signicantly between the two plans. The 10 miles-per-hour operating speed limit of the Base Case plan adds significant time each week to the crew schedule. The hours worked per week for each crew are as follows:

CREW HOURS WORKED PER WEEK

Crew	Alternative Case (25 MPH)	Base Case (10 MPH)
Crew 1	48	52
Crew 2	44	60
Crew 3	44	47
Crew 4	48	57
Crew 5	40	58

The detailed crew schedules are shown in Appendix C.

Locomotive Schedules

Locomotive requirements will depend on the amount of gross tonnage handled, the terrain of the railroad, and the size and power of the locomotives used. For both plans it was assumed that 10 GP 9 (1,750 horsepower) locomotives would be used. The locomotives required for each line segment are as follows:

LOCOMOTIVE REQUIREMENTS

Line Segment	Locomotives Required
Mitchell - Aberdeen	4
Mitchell - Chamberlain/ Mitchell Yard	1
Mitchell - Canton	2
Mitchell - Elk Point (East Wye Switch)	2
Sioux Falls - Sioux City	3

The detailed locomotive schedules are shown in Appendix C.

Freight Car Requirements

Freight car requirements were based on the proposed train schedules for the core system, estimated train schedules on other railroads, unloading and switching time, and unproductive days. The total number of cars required for each proposed plan are as follows:

FREIGHT CAR REQUIREMENTS

	Alternative Case (25 MPH)	Base Case (10 MPH)
100-Ton Cars	568	516
70-Ton Cars	102	73

The variance is the result of the average car turn time, assuming a relatively uniform flow of traffic, versus the car requirements based on peak month demand. It should be possible to obtain cars from other carriers or car suppliers during peak periods. This will enable the operator to supply the above number of cars. The use of foreign cars will result in higher cost to the operator, based on the number of miles travelled and the number of days spent on the system.

The operating plans outlined above are only preliminary and are provided in this report to explain the methodology used for developing on-branch transportation costs for the benefit-cost studies in Section V.

PROGRAM FOR REHABILITATION AND SERVICE RESTORATION

South Dakota's goal is to rehabilitate the core system as soon as possible. None of the lines currently meet Class II standards, and only one (Aberdeen to Wolsey) even meets Class I standards. The State believes that rehabilitation to allow trains to operate at 25 miles per hour (Class II) is essential to achieve an efficient, cost effective rail system. It therefore has formulated a two-year rehabilitation plan. This plan, including expected funding sources, is summarized by Exhibit II-3.

The first element of the plan uses 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 is currently

EXHIBIT II-3

PLAN FOR REHABILITATING CORE SYSTEM LINES TO CLASS II

Line Segment	Existing Condition	Planned Condition After 1981 Phase	Planned Condition After 1982 Phase ***
Aberdeen -- Wolsey	Class I	Class II**	Class II maintained
Wolsey -- Mitchell	Sub-Class I	Class I*	Class II
Mitchell -- Chamberlain	Sub-Class I	Class I*	Class II
Mitchell -- Canton	Sub-Class I	Class I*	Class II
Mitchell - Elk Point	Sub-Class I	Class I*	Class II
Sioux Falls -- Sioux City	Sub-Class I	Class II**	Class II maintained

* Project Funded through Directed Service Program
** Project Funding Expected from Local Rail Service Assistance
*** Project Funding Unclear, Pending Disposition of Local Rail Service Assistance

completing its final review of the State's application before issuing a guarantee of certification and making available Program funds (expected at $2.6 million).

South Dakota's plan is to implement the Program in three discrete 30-day periods, beginning on the first days of June, July, and August. Each period will address a different portion of the core system, and will include 15 days of subsidized train service during the second half of each period. Operations will be conducted by a company selected by the State and will continue uninterrupted after each directed service period. Rehabilitation work will be performed on each line during the entire period to attain minimum Class I track safety standards. The lines to be included in each period are:

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

July 1 - July 30: Mitchell - Chamberlain and Mitchell - Scotland; and

August 1 - August 30: Scotland - Elk Point.

The Aberdeen to Wolsey line is ineligible for the Program because service is being provided by the C&NW, but State's core system will use the line beginning June 15 so that access to the directed service lines can be gained. The Sioux Falls to Elk Point line will be operated beginning on September 1, provided that an operating waiver can be obtained from the Federal Railroad Administration.

FINANCING SOUTH DAKOTA RAIL OPERATIONS

The 1981 State Legislature provided the necesary authority to secure an operator for the State-owned core rail system and also provided financing for projected short-term operating deficits.

The Division of Railroads estimates that an operator will need a declining amount of outside revenue over a five-year period to supplement linehaul freight charges. The funding mechanism selected resulted in a one cent per gallon gas tax increase for three years on all fuel burned in internal combustion engines. It is estimated that this tax will generate $5 million per year, of which $2.7 million is designated to support rail operations in the initial year. Various organizations disagreed with the use of gas tax collections for railroad purposes, and took the issue before the State Supreme Court. On May 8, 1981, the Court ruled that it is illegal to fund rail operations with tax revenues from fuels burned on the highway,

but did not prohibit the use of tax money from fuel used in vehicles for off-highway use, such as farm tractors. Tax collections from off-highway use are estimated to be $1.2 million, $1.5 million short of the first year's operating subsidy.

A special legislative session convened on May 18, 1981, to address the rail funding shortfall, and decided to allocate $1.8 million from State general funds to meet rail needs. Of this, $1.5 million is available for rail operations, and $318,000 is provided to the Division of Railroads for administration. Together with off-highway gasoline tax receipts (estimated at $1.2 million annually) a total of $2.7 million is earmarked for the operating subsidy. To maintain a balanced budget, $1.8 million of general funds previously used to support the State Highway Patrol will be funded instead by the special one cent per gallon gas tax on motor fuel. Until 1979, the State Highway Patrol was funded entirely out of the State Highway Fund and gas tax revenues. This procedure appears to meet the needs of the State for rail operating funds, and is consistent with the Court ruling.

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 in March 1980 of the Milwaukee Road, the State of South Dakota has realized 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, 1980 AND CONSISTENCY WITH RAIL SERVICE AND PLANNING POLICIES, OBJECTIVES, AND GOALS. [266.15(c)(1)]

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

- applications for 1981 Local Rail Service Assistance (LRSA) Program funds can be made;
- applications for 1982 LRSA Program funds can be made if the program is continued; and
- facts can be assembled on the economics and importance of the core system.

The final point is important because sources of potential funds (including shippers) will want to know as much as possible about the economic importance of the lines before making financial commitments. The LRSA Program requires that detailed benefit-cost studies be conducted on lines under consideration for assistance. Although the future of the program is unclear, the State decided to perform these studies so that applications can be made promptly if, indeed, funds are available.

In conformity with Title 49 of the Code of Federal Regulations, the State of South Dakota established rail service planning policies, objectives, and goals as part of the rail planning process and included them as part of the Railplan South Dakota 1980 document. These criteria, which are reprinted below, guide rail planning activities until they are revised by a subsequent railplan update or amendment.

RAIL SERVICE AND PLANNING POLICIES

- Rail users, railroad companies, local governments, and the State need to coordinate their efforts to solve transportation problems in South Dakota.
- The South Dakota DOT encourages the continuation of financially solvent, privately owned and operated rail services in the State. Therefore, the South Dakota DOT will not openly oppose all railroad abandonment applications, but first will consider the potential viability of the line, the social and economic impacts of line abandonment, the local interest in the

line, the potential for substitute service, and other factors which may be unique to the line or its service area.

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

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

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

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

RAIL SERVICE AND PLANNING OBJECTIVES

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

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

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

- maintain essential rail services and facilities in South Dakota which serve the public interest

but which cannot otherwise be profitably continued by private carriers; and

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

Established, workable goals are necessary for 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 non-profitable rail lines which are non-essential and whose services could be more economically provided by an alternative rail line or transportation mode;

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

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

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

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

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

PART B

INTENSIVE STUDY LINE ANALYSIS

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

This Addendum is aimed at performing benefit-cost analyses of core system lines for which service restoration is planned. They were not included as intensive study lines in the 1980 Railplan because of the uncertainty of the State's core system plans and the need to address other rail service issues that required immediate attention. Indeed, a criterion used to select study lines was specifically designed to exclude lines under consideration for purchase. As stated in the 1980 Railplan, the criteria was that the lines be:

> non-embargoed Milwaukee Road lines, because assistance for lines to be purchased by the South Dakota Railroad Authority will be sought at a later date.

Criteria used to select lines for intensive study in this Addendum included:

A. Lines to be purchased from the Milwaukee Road by South Dakota and rehabilitated under the Directed Service Program;

B. Lines to be purchased by South Dakota that are in need of rehabilitation assistance but that are ineligible for Directed Service Program funds;

C. Lines to be purchased by South Dakota that are classified as local option lines but that may be operated as part of the core system;

D. Abandoned lines with potentially significant shipper/community impacts of abandonment in South Dakota; and

E. Abandoned or light density lines that provide accessibility to the regional and national railroad network.

The above criteria's focus was on abandoned lines that, according to current plans, will be operated as part of the South Dakota core rail system. Because of several years of deferred maintenance and the State's desire to operate the lines at Class II speeds (up to 25 miles per hour), rehabilitation of the tracks will be required. With the help of the Directed Service Program, the condition existing at the time of rehabilitation on all the lines will be Class I (except the Sioux Falls to Sioux City line). Operation of the Sioux Falls to Sioux City line is considered essential to enhance the efficiency of the core system

and to meet shipper demand for service. For these reasons, the State plans to request an operating waiver to allow service until the track can be upgraded. 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, and all are without service except the Aberdeen to Wolsey line (over which the C&NW operates). The Directed Service Program will rehabilitate the lines shown in Exhibit IV-3 to Class I standards, and this Addendum documents the benefits and costs of rehabilitating the lines to Class II. Because the Aberdeen to Wolsey line is still in operation, it is assumed that this line currently meets Class I standards. The Sioux Falls to Sioux City line does not meet Class I standards, but because of its importance to efficient operation of the core system, an application to operate the line will be filed with the FRA. It is assumed that the operating waiver will be granted and that the core system operator will, at his own expense, perform the work necessary to maintain operations. The base case used in the analysis therefore is a Class I operation and the alternative is a rehabilitation project to attain Class II.

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

- improve the efficiency of operations and reduce operating costs on a carload basis;
- satisfy additional demand for rail transportation; and
- attract additional traffic that will move by motor carrier unless rail operating speeds exceed Class I levels.

These projects represent one-time rehabilitation assistance to the core system. After the projects are completed, the core system operator will be responsible for performing annual maintenance, therefore eliminating the need for further State or federal rehabilitation assistance. This process will also complete South Dakota's initial plan for addressing its rail transportation crisis. The crisis is discussed in Part A of this Addendum.

EXHIBIT IV-1

INTENSIVE STUDY LINES

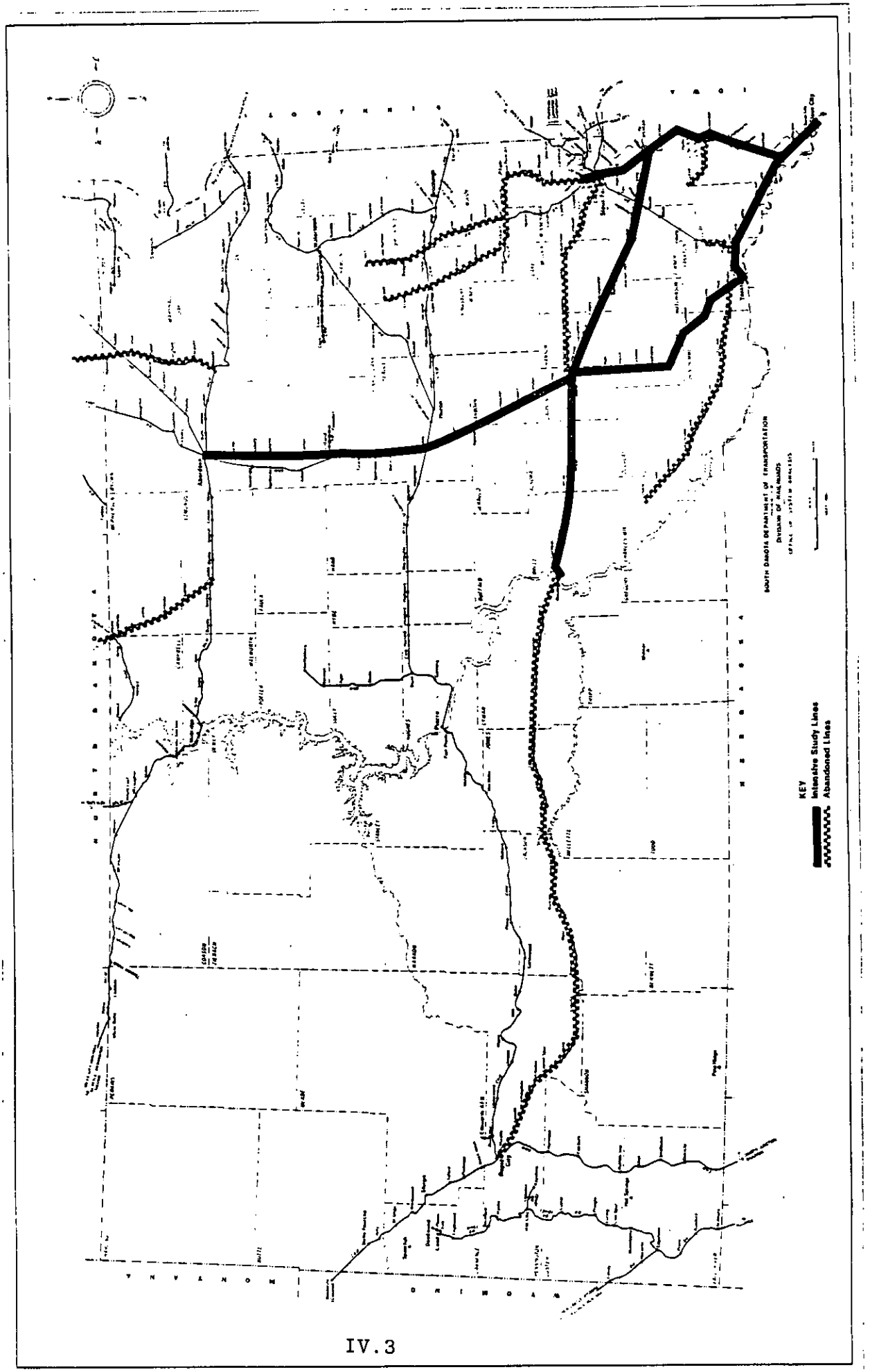


EXHIBIT IV-2

INTENSIVE STUDY LINES AND PROJECT ALTERNATIVES

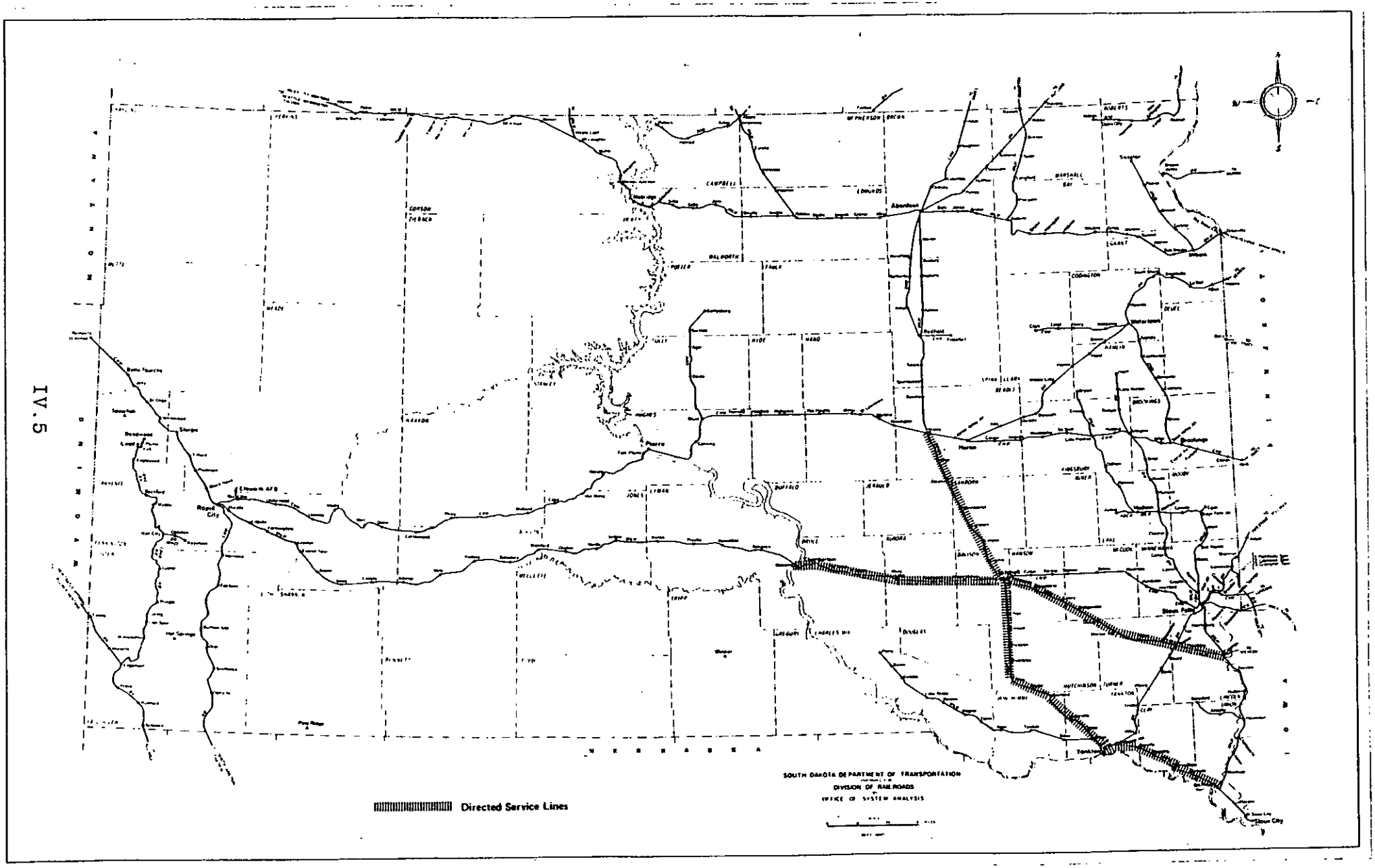
Study Number	INTENSIVE STUDY LINE	Selection Criteria **
1.	Aberdeen-Wolsey *Continue Rail Service at Class I -Continue Rail Service and Rehabilitate to Class II	(B), (D), (E)
2.	Wolsey-Mitchell *Continue Rail Service at Class I -Continue Rail Service and Rehabilitate to Class II	(A), (D), (E)
3.	Mitchell-Chamberlain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

** See listing of criteria on page IV.1.

Note: Base cases (existing cases) are indicated by an asterisk (*) and project alternatives are indicated by a dash(-).

EXHIBIT IV-3

DIRECTED SERVICE LINES



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, the community, and the State of South Dakota. The purpose of these studies is to provide the benefit-cost analyses necessary to formulate a program for the rehabilitation of the core system lines to Class II. An addendum to the 1980 railplan rather than the 1981 railplan was chosen as the mechanism to generate study results more quickly.

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 Appendix D.

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. Appendix D 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 upon 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 upon 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.

Shipper Survey

Shipper information was developed by surveying, in person or by telephone, virtually all rail users on each intensive study line. Appendix B contains the shipper survey interview form

which was used for this purpose. 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 must 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 has 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 of 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.

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

- railroad annual reports (R-I reports) to the Interstate Commerce Commission (ICC);
- Statewide railroad statistics filed with the South Dakota Public Utilities Commission, and State 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 1980, T.K. Dyer, Inc. and the Division of Railroads, made detailed on-site inspections of the intensive study lines. Most inspections were made in the company of railroad officials and used combination rail/highway vehicles provided by the railroad.

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 to prepare cost estimates of rehabilitating the track to certain operating standards, and maintaining the track at a normalized level. These estimates reflect rehabilitation costs as of late 1980.

Actual rehabilitation estimates for the Aberdeen to Wolsey and Sioux Falls to Sioux City lines were available from the contractor who was selected to perform the rehabilitation work funded by the Directed Service Program.

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.

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 projects' viability, whereby a ratio in excess of 1.0 means that the project produces more benefits than costs in a ten 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 to 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 Efficiency Benefit ($), Alternative "n" versus Base Case

Q_o = Quantity Shipped, Base Case (Tons)

Q_n = Quantity Shipped, Alternative n (Tons)

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

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

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

C_n = Transportation Costs, Alternative n ($/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 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, and 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 composite volumes); and

C_n = rail transportation cost.

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 Appendix D. 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 Appendix D.

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 by 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.

Non-monetary 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 non-monetary 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 non-monetary 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 non-monetary 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 to the base case, and a summary of the benefit-cost ratio and non-monetary outcomes.

INTENSIVE STUDY LINE ANALYSIS

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

Study Line #1

MW17 ABERDEEN TO WOLSEY

BACKGROUND

The Aberdeen to Wolsey is the only core system line that has received service since the Milwaukee abandonment. The C&NW has operated the line since the abandonment of its James Valley Junction to Redfield line, and since the Mansfield to Aberdeen portion of its Redfield to Aberdeen line became inoperable. The C&NW has provided service to former Milwaukee customers since March 1980.

The line does not originate or terminate a large amount of traffic, but it is essential for 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 line is expected to carry all core system traffic destined for the West Coast, Minneapolis, and Duluth, and traffic terminating on the system from points in Canada and the Pacific Northwest. Without this line, all traffic would be forced to flow over the Sioux City and Sioux Falls gateways. A total of 7,686 cars and 683,400 tons are expected to be interchanged annually at Aberdeen and travel over this segment.

LINE CHARACTERISTICS - BASE CASE

Line Description

The Aberdeen to Wolsey line was a secondary main line for the Milwaukee Road, and connected with their east-west main line at Aberdeen. That line now extends only to Miles City, Montana, where traffic is interchanged with the BN. A detailed line description was prepared for Railplan, South Dakota, 1980, and is included as Exhibit V-1.

Operations and Services

The C&NW operates 3 round trips per week over this line, continuing through Aberdeen to reach its line that terminates in Oakes, North Dakota. In the shipper survey, 5 shipping station and 5 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.

SOUTH DAKOTA SEGMENT - MW17
WOLSEY TO ABERDEEN

LINE DESCRIPTION

LINE STATUS - Abandoned by Milwaukee, Operated by Chicago & North Western under trackage rights.
TYPE OF LINE - Secondary Main LINE LENGTH IN MILES - 74.0
MAXIMUM WEIGHT LIMIT - 263,000 lbs. MAXIMUM SPEED LIMIT - 40 mph (entire line under slow orders)
SERVICE FREQUENCY - 3 round trips per week
YARDS - Aberdeen
CONNECTING LINES - Chicago & North Western at Wolsey, and Aberdeen; Milwaukee main line at Aberdeen, former Milwaukee line at Wolsey, Burlington Northern at Aberdeen.
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 lbs. rail between Wolsey and Tulare, 85 lbs. rail between Tulare and near Redfield, and 90 lbs. rail for remainder of line.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 3°
BALLAST - Gravel placed in 1919 from Wolsey north about 5 miles, 4" gravel placed in 1945 north to near Bonilla, gravel placed in 1909 to near Redfield, 4" gravel placed in 1942 to Ashton, surfaced and Shiele Process Gravel 1970 north to Warner, and gravel placed in 1929 from here to Aberdeen.

BRIDGES AND TRESTLES - 6 pile trestles ranging in length from 1 to 15 spans and totaling 29 spans and also 4 other steel bridges.

STATION LOCATIONS

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
TRAFFIC DENSITY -	1.11 MGT	1.58 MGT
TRAFFIC DIRECTION -	59% Orig./41% Term.	97% Orig./3% Term.

COMMODITIES - Primarily grain.

OTHER INFORMATION

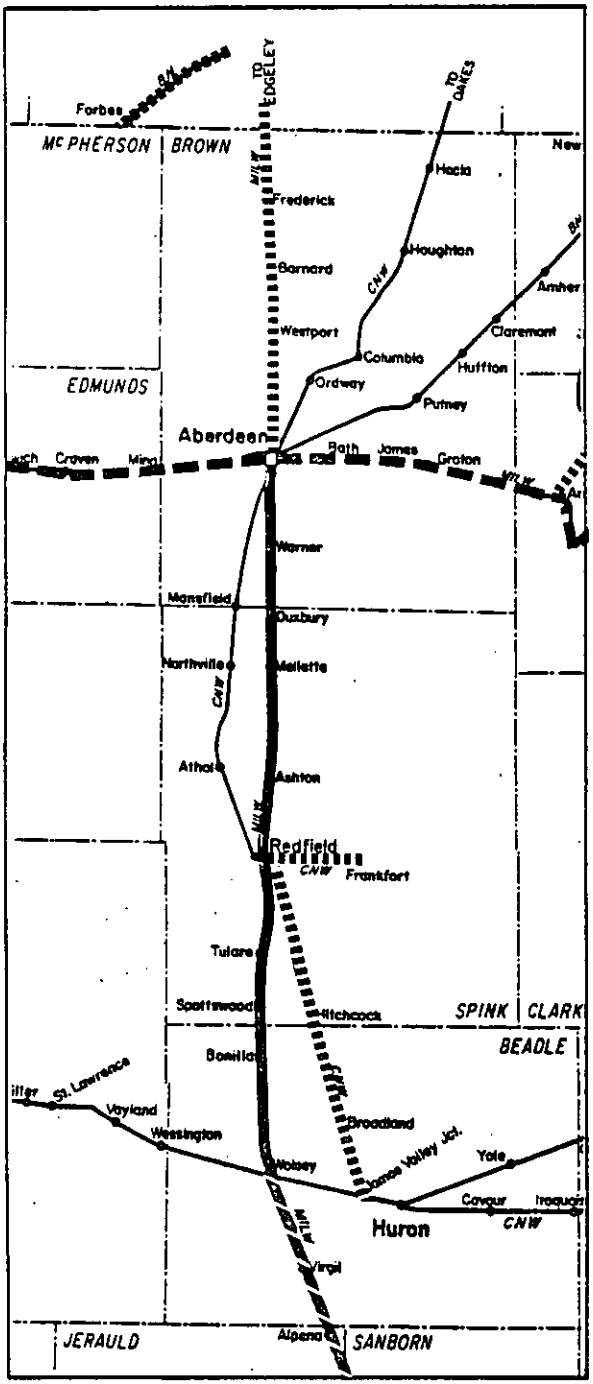
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The Chicago & North Western is currently servicing the line under a trackage rights agreement with the Milwaukee Road. The line will be acquired by the State during 1981, and operated as part of the South Dakota core system.

Study Line #1

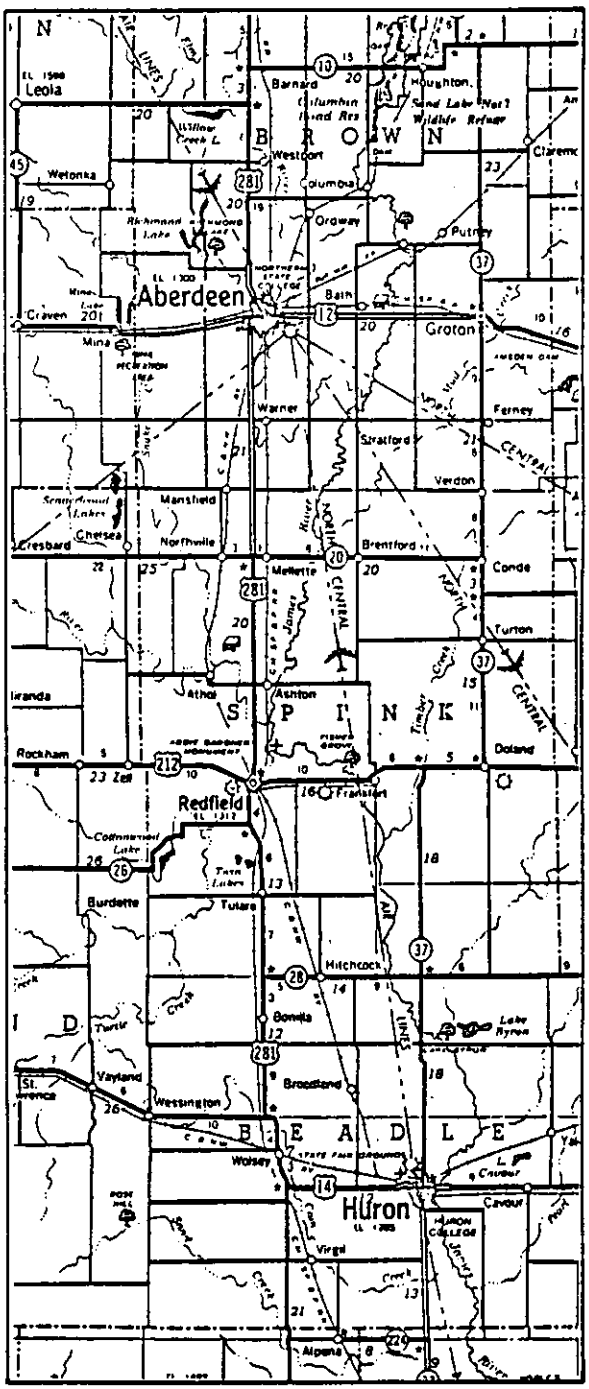
EXHIBIT V-1 (Continued)

SOUTH DAKOTA SEGMENT MW17
WOLSEY TO ABERDEEN

RAILROAD SEGMENT MAP

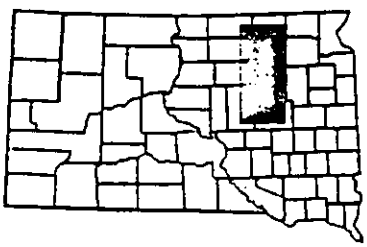


RAILROAD-HIGHWAY LOCATION MAP



KEY

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



Study Line #1

Rail Traffic Volume

1979 Traffic

Originating	Cars	Tons
Commodity		
Grain	424	25,426
Other	9	729
Total Originating	433	26,155
Terminating		
Commodity		
Chemicals	6	325
Primary Metal Products	58	2,187
Other	13	322
Total Terminating	77	2,834
Total for Line	510	28,990

Shipper Survey Results

Originating	Destination/Origin	Cars	Tons
Commodity			
Grain	Minneapolis	283	27,200
Grain	Duluth	19	1,900
Grain	West Coast	72	7,000
Grain	Miscellaneous	107	10,000
Total Originating		481	46,100
Terminating			
Commodity			
Fertilizer	Miscellaneous	21	2,100
Total Terminating		21	2,100
Total for Line		502	48,200

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 16,700 tons would have to be diverted to other modes if current Class I standards are not improved. This is primarily because a constrained supply of rolling stock and rail crews limits the capacity of this line.

Study Line #1

Track Conditions

The Aberdeen to Wolsey 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 on the jumbo covered hopper cars that the State plans to use on most of the core system.

STUDY PROJECT

This project will rehabilitate the Aberdeen to Wolsey line to Class II track standards. The majority of traffic moving over the line will be moved in through trains from Mitchell to Aberdeen and the ability to operate at higher speeds will allow important efficiencies to be attained. If this project is selected as the subject of a rail assistance application, construction could be completed during the 1981 construction season.

Rail Service Level

Service is currently provided by the C&NW three times a week. It is expected that the core system operator will serve all shippers on the line and will provide service at least twice a week if the project is completed and there is sufficient service demand. Through trains will be operated on a schedule to be determined by 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	- 46,100 tons
Terminating	- 2,100 tons
Total	- 48,200 tons

Study Line #1

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+35,018	$+35,018	$+35,018
Secondary Efficiency Benefits					
Income ($)	-	$-632	-	-822	-822
Highway Costs ($)	-	-	-	+4,785	+4,785
Taxes ($)	-	-	-	-1,229	-1,229
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)		$-632	$+35,018	$+37,752	$+37,752
Costs ($)	-	-	-	$+194,561	$+194,561
Jobs	-	-1	-	-1	-1
Energy (Gallons)	-	-	-	-9,457	-9,457
Air Pollution (lbs.)	-	-	-	-6,497	-6,497
Benefits Minus Costs					$-156,809
Benefit/Cost Ratio					+0.19

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

MW 16 WOLSEY TO MITCHELL

BACKGROUND

This segment of the core system serves is a vital link between the Mitchell and Aberdeen to Wolsey line. Mitchell, in addition to being a major population center, is also the junction of three other core system lines. If the Wolsey to Mitchell line is not operated, all traffic will be forced to flow over the Sioux Falls and Sioux City gateways, and the Aberdeen to Wolsey line will become an isolated branch line. The Wolsey to Mitchell line is scheduled for rehabilitation to Class I under the Directed Service Program, and operations are scheduled for restoration in mid-June 1981.

LINE CHARACTERISTICS - BASE CASE

Line Description

The Wolsey to Mitchell line was a secondary main line for the Milwaukee Road. The line crosses the C&NW's secondary main line at Wolsey, but the junction is not used as an interchange between the carriers. A detailed line description was prepared for Railplan South Dakota, 1980, and is reprinted as Exhibit V-2.

Operations and Service

The Wolsey to Mitchell line is currently abandoned, but service is scheduled to begin approximately June 15, 1981. At that time, service will be provided on an as-needed basis, although the line will also be used to permit through train service to Aberdeen. During the shipper survey, 3 shipping stations and 3 grain elevators were identified as potential rail users. Shippers expressed interest in having service restored and indicated a preference to use rail for the shipment of certain commodities usually sold at distant markets.

Track Conditions

Current track conditions do not meet Class I standards, but work planned to begin on June 1, 1981, will rehabilitate the line and permit safe operation at 10 mile-per-hour speeds. Because this work will be performed, a base case of Class I operations was used for the benefit-cost analysis.

Study Line #2

EXHIBIT V-2

SOUTH DAKOTA SEGMENT - MW16

MITCHELL TO WOLSEY

LINE DESCRIPTION

LINE STATUS - Abandoned, with service restoration planned.
TYPE OF LINE - Secondary Main LINE LENGTH IN MILES - 54.6
MAXIMUM WEIGHT LIMIT - 263,000 lbs. MAXIMUM SPEED LIMIT - 40 mph (entire line under slow orders)

SERVICE FREQUENCY - None
YARDS - Mitchell
CONNECTING LINES - Chicago & North Western at Wolsey.

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 lbs. from Mitchell to Letcher and 90 lbs. on remainder of segment.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 3°
BALLAST - Gravel dating from 1919 to 1929.

BRIDGES AND TRESTLES - 12 pile trestles ranging in length from 2 to 8 spans and totaling 55 spans, and also 3 other bridges of steel or concrete.

STATION LOCATIONS

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
TRAFFIC DENSITY -	1.11 MGT	1.34 MGT
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 products.

OTHER INFORMATION

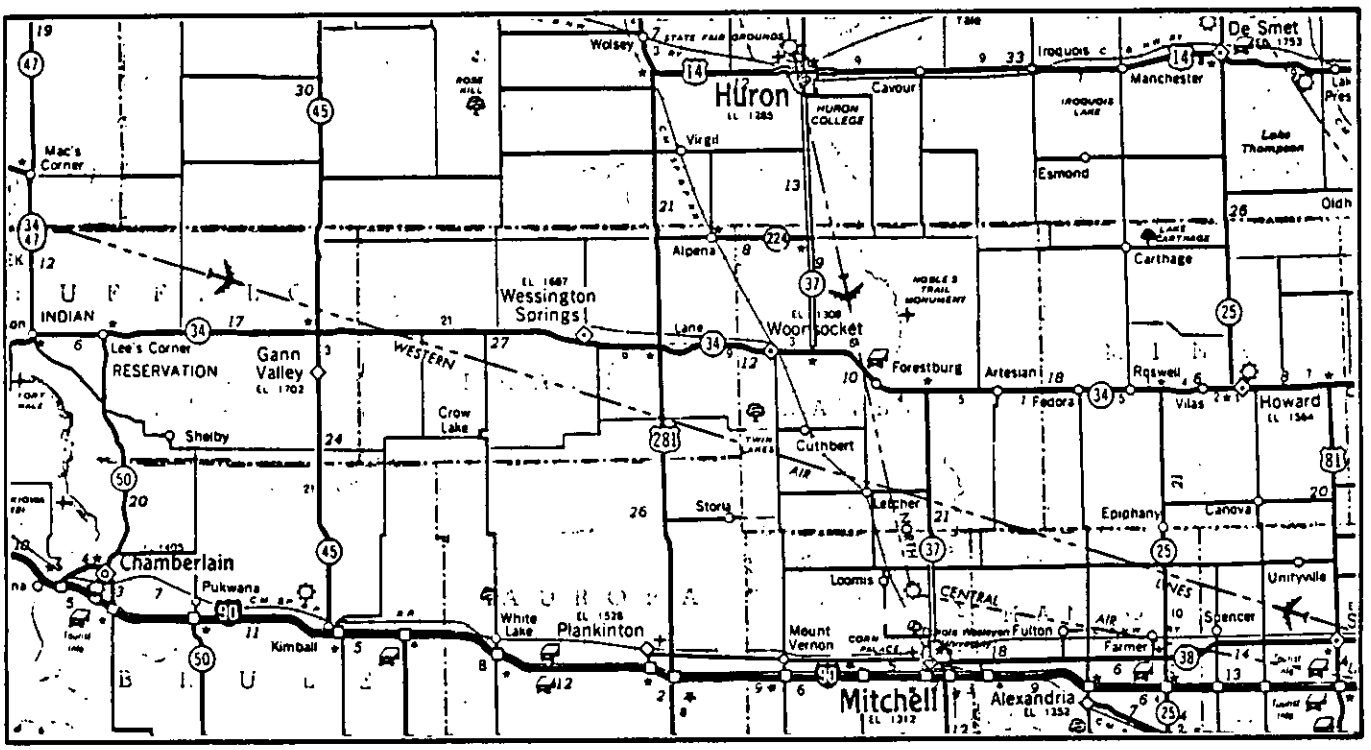
This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The line will be acquired by the State during 1981 and operated as part of the South Dakota core system.

EXHIBIT V-2 (Continued)

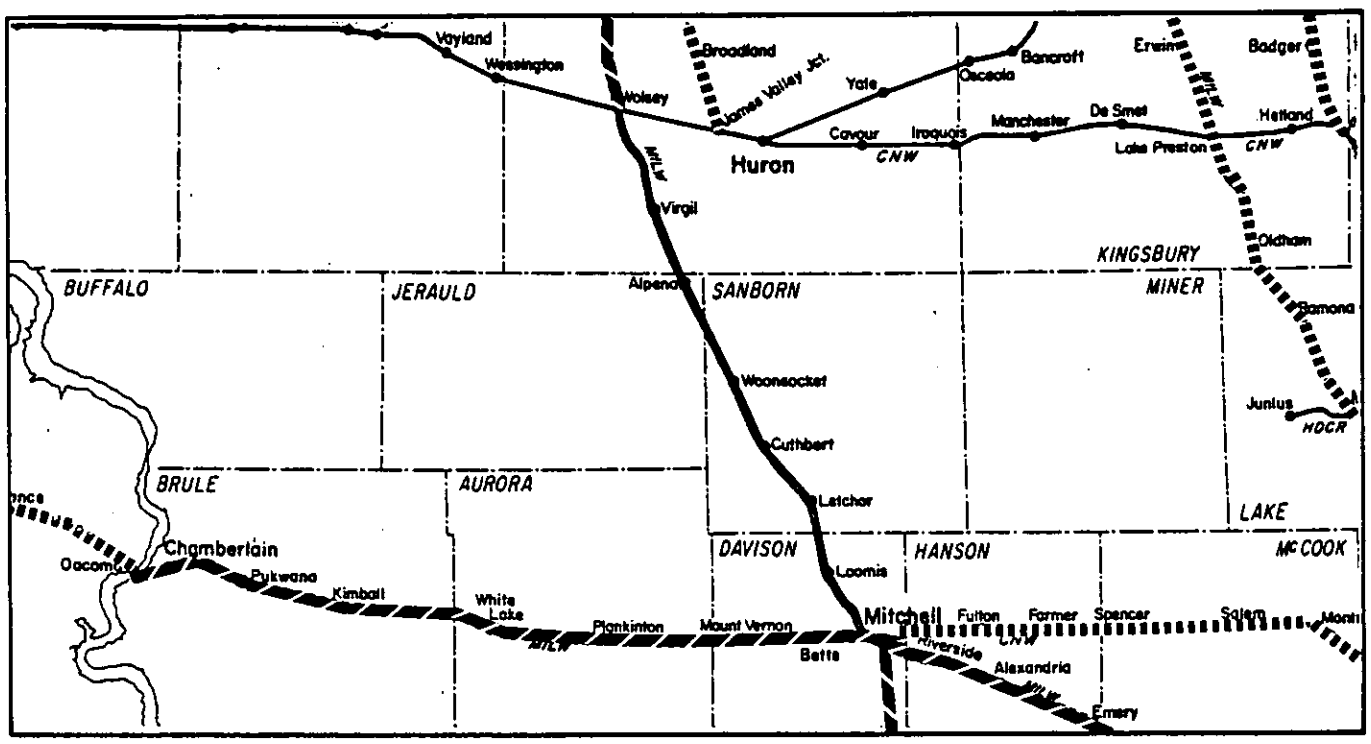
Study Line #2

SOUTH DAKOTA SEGMENT MW16
MITCHELL TO WOLSEY

RAILROAD-HIGHWAY LOCATION MAP



RAILROAD SEGMENT MAP



KEY

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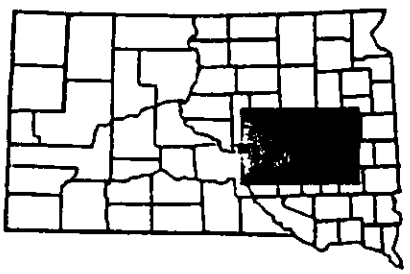
- Abandoned Line
- Potentially Subject to Abandonment Within 3 Years
- Pending Abandonment Approval
- All Other Lines



Study Line #2

Rail Traffic Volume

1979 Traffic

Originating Commodity	Cars	Tons
Grain	48	2,875
Total Originating	48	2,875
Terminations		
Commodity		
Miscellaneous	13	1,043
Total Terminating	13	1,043
Total for Line	61	3,918

Shipper Survey Results

Originating Commodity	Destination/Origin	Cars	Tons
Grain	Minneapolis	58	4,700
Grain	Duluth	4	200
Grain	West Coast	175	17,100
Grain	Miscellaneous	48	3,100
Total Originating		285	25,100
Terminating			
Commodity			
None		0	0
Total Terminating		0	0
Total for Line		258	25,100

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 8,100 tons would have to be directed to other modes unless Class II standards are achieved. This diversion will be necessary primarily because a constrained supply of rolling stock and rail crews limits the capacity of this line.

Study Line #2

STUDY PROJECT

Description

This project will rehabilitate the Wolsey to Mitchell line to Class II standards. The line provides essential access to the Aberdeen gateway and improves the efficiency with which the core system lines can operate. If funds are requested and approved for this line, construction will probably take place during 1982.

Rail Service Level

It is expected that the core system operator will provide service twice a week if the project is completed and there is sufficient shipping demand. Through trains will be operated on a schedule to be determined by 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 -	25,100 tons
Terminating -	0 tons
Total -	25,100 tons

Study Line #2

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+122,956	$+122,956	$+122,956
Secondary Efficiency Benefits					
Income ($)	-	$-631	-	-822	-822
Highway Costs ($)	-	-	-	+4,787	+4,787
Taxes ($)	-	-	-	-1,532	-1,532
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-631	$+122,956	$+125,389	$+125,389
Costs ($)	-	-	-	$+59,282	$+59,282
Jobs	-	-1	-	-1	-1
Energy (Gallons)	-	-	-	-11,781	-11,781
Air Pollution (lbs.)	-	-	-	-8,093	-8,093
Benefits Minus Costs					$+66,107
Benefit/Cost Ratio					+2.12

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Study Line #3

MW 21A MITCHELL TO CHAMBERLAIN

BACKGROUND

The Mitchell to Chamberlain line is the only dead-end branch line that is part of the core system, and is one of four lines that will be 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. It is hoped that shippers on the abandoned portion of the line west of Chamberlain will use the line to ship and receive grain, fertilizer, and other commodities instead of relying completely on trucks for their transportation. A detailed line description was prepared for Railplan, South Dakota, 1980, and is reprinted here as Exhibit V-3. Only the Mitchell to Chamberlain portion of the Mitchell to Murdo line was designated as an intensive study line.

Operations and Service

The Mitchell to Chamberlain line is currently abandoned, but service is scheduled to begin an approximately July 15, 1981. Service is expected to be provided at least once per week. During the shipper survey, 5 shipping stations and 6 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

Current track standards do not meet Class I standards, but work conducted under the Directed Service Program will restore 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. A base case of Class I operations was used for the purpose of the benefit-cost analysis.

Study Line #3

EXHIBIT V-3

SOUTH DAKOTA SEGMENT - MW21a

MITCHELL TO MURDO

LINE DESCRIPTION

LINE STATUS - Abandoned, with service restoration to Chamberlain planned.
TYPE OF LINE - Branch LINE LENGTH IN MILES - 142.3
MAXIMUM WEIGHT LIMIT - 220,000 lbs. MAXIMUM SPEED LIMIT - 25 mph (entire line under slow orders)

SERVICE FREQUENCY - None
YARDS - Mitchell and Chamberlain
CONNECTING LINES - Former Chicago & North Western at Mitchell, former Milwaukee at Mitchell and Murdo.
HIGHWAYS - I 90 parallels this line. Mitchell is served by SD 37, Plankinton by US 281, Kimball by SD 45, Chamberlain by SD 50, Reliance by SD 47, Vivian and Murdo by US 83 and Presho by US 183.

RAIL WEIGHT - 65 lbs. rail except for 20 miles of 75 lbs. and 11 miles of 85 lbs. from near Chamberlain to Kennebec.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 5°
BALLAST - Gravel laid in 1962 from White Lake to Chamberlain, gravel laid in 1971 from Reliance to Kennebec, about 21 miles of gravel placed in 1971 and 1972.

BRIDGES AND TRESTLES - 68 pile trestles ranging in length from 1 to 15 spans and totaling 434 spans and 4 steel bridges including that crossing the Missouri River.

STATION LOCATIONS

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Mitchell	0.0	Kimball	47.0	Kennebec	97.1
Betts	6.1	Pukwana	58.6	Presho	107.1
Mt. Vernon	11.8	Chamberlain	67.1	Vivian	119.0
Plankinton	23.1	Oacoma	71.0	Draper	131.9
White Lake	34.5	Reliance	83.8	Murdo	142.3

TRAFFIC CHARACTERISTICS

	1975	1979
TRAFFIC DENSITY -	0.52 MGT	0.55 MGT
TRAFFIC DIRECTION -	66% Orig./34% Term.	58% Orig./42% Term.

COMMODITIES - Forwarded grain; received stone, clay, and glass, petroleum products, and sand and gravel.

OTHER INFORMATION

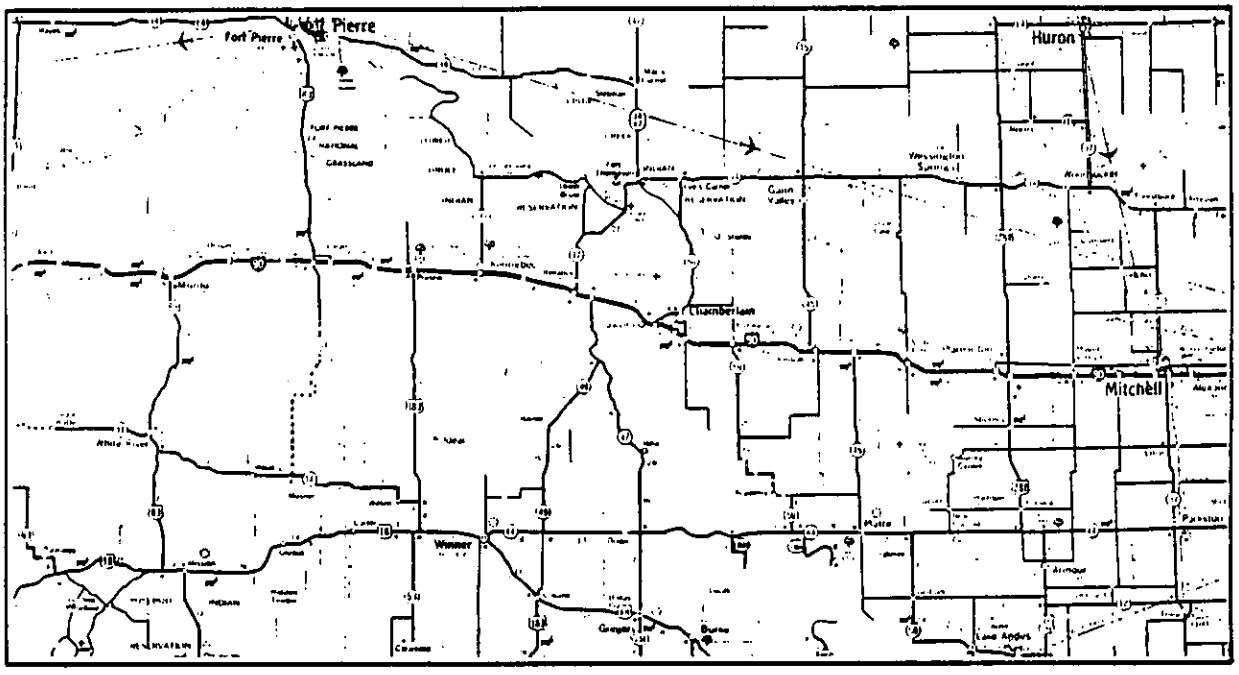
This line was embargoed by the Milwaukee Road in March 1980 and abandoned in June 1980. The line will be acquired by the State during 1981 and operated to Chamberlain as part of the South Dakota core system.

Study Line #3

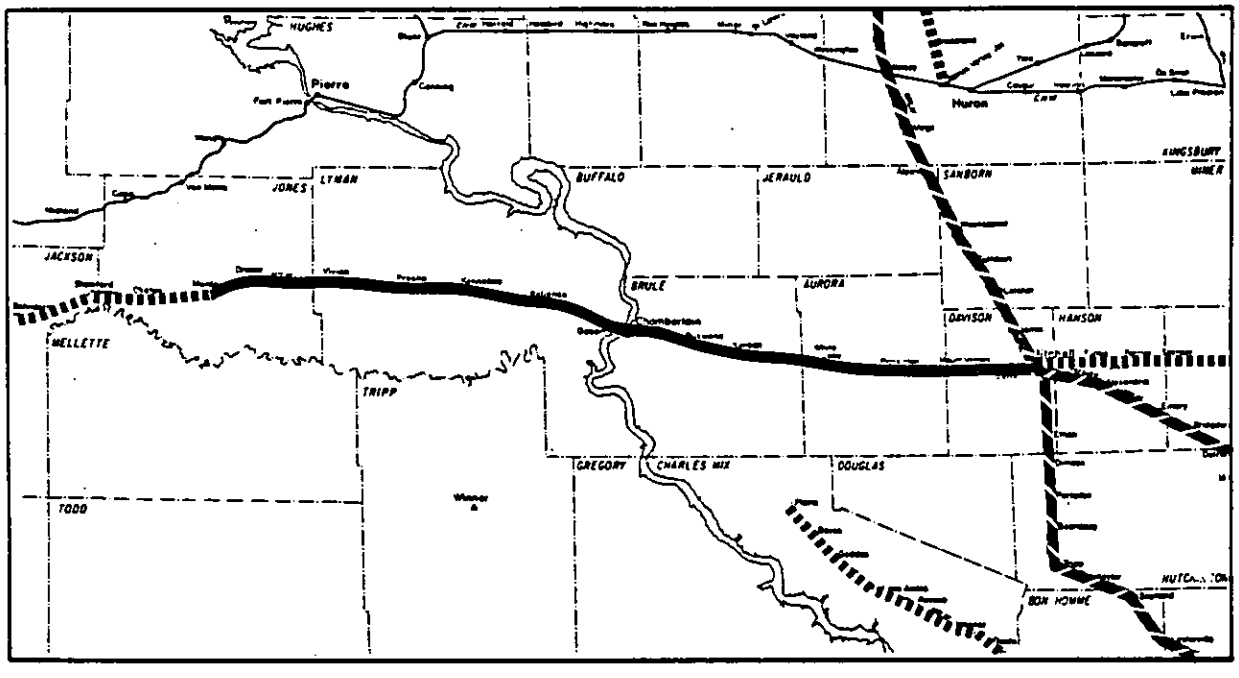
EXHIBIT V-3 (Continued)

SOUTH DAKOTA SEGMENT MW21a
MITCHELL TO MURDO

RAILROAD-HIGHWAY LOCATION MAP

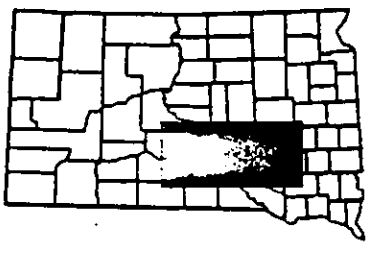


RAILROAD SEGMENT MAP



KEY

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



Study Line #3

Rail Traffic Volume

1979 Traffic

Originating Commodity	Cars	Tons
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 Commodity	Destination/Origin	Cars	Tons
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 project is implemented, 44,300 tons would have to be diverted to other modes unless Class II standards are achieved. This diversion will be necessary primarily because a constrained supply of rolling stock and rail crews limits the capacity of this line.

Study Line #3

STUDY PROJECT

Description

This project will rehabilitate the Mitchell to Chamberlain line to Class II standards, thereby reducing by 50 percent the time required to operate the line. The line extends into a productive agricultural area and has the potential of serving several abandoned grain elevators. A Section 803 rehabilitation project, if requested and approved, would probably be conducted during 1982.

Rail Service Level

It is expected that the core system operator will provide service twice a week if the project is completed and there is sufficient shipping demand. Until the project is performed, service will probably average 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	- 84,900 tons
Terminating	- 3,800 tons
Total	- 88,700 tons

Study Line #3

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+484,887	$+484,887	$+484,887
Secondary Efficiency Benefits					
Income ($)	-	$-3,785	-	-4,935	-4,935
Highway Costs ($)	-	-	-	+29,116	+29,116
Taxes ($)	-	-	-	-1,880	-1,880
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-3,785	$+484,887	$+507,188	$+507,188
Costs ($)	-	-	-	$+99,973	$+99,973
Jobs	-	-6	-	-6	-6
Energy (Gallons)	-	-	-	-14,458	-14,458
Air Pollution (lbs.)	-	-	-	-9,933	-9,933
Benefits Minus Costs					$+407,215
Benefit/Cost Ratio					+5.07

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Study Line #4

MW 24 MITCHELL TO ELK POINT (EAST WYE SWITCH)

BACKGROUND

The Mitchell to Elk Point line is the longest of the core system lines, and serves two of South Dakota's largest cities (Mitchell and Yankton) and a productive agricultural area. The line is scheduled for rehabilitation to Class I and operation during July and August 1981 under the Directed Service Program. The line provides Mitchell direct access to the Sioux City gateway.

LINE CHARACTERISTICS - BASE CASE

Line Description

The Mitchell to Elk Point 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 accessible service to abandoned shippers on the Napa to Platte line; and
- provides service to industries in Yankton that will be abandoned by the BN in August 1981.

A detailed line description was prepared for Railplan, South Dakota, 1980, and is reprinted here as Exhibit V-4.

Operations and Service

The study line is currently abandoned, but service at a Class I level will be restored after the rehabilitation project to be funded by Directed Service is completed. This service will be provided at least once a week. Identified during the shipper survey as potential rail users were 16 shipping stations, 17 grain elevators, and various industries and small businesses.

Study Line #4

EXHIBIT V-4

SOUTH DAKOTA SEGMENT - MW24

EAST WYE SWITCH TO MITCHELL

LINE DESCRIPTION

LINE STATUS - Abandoned, with service restoration planned.
TYPE OF LINE - Secondary Main LINE LENGTH IN MILES - 116.7
MAXIMUM WEIGHT LIMIT - 263,000 lbs. MAXIMUM SPEED LIMIT - 30 mph (12 miles under slow orders)

SERVICE FREQUENCY - None
YARDS - Yankton and Mitchell
CONNECTING LINES - Former Milwaukee Road at East Wye Switch, Napa and Mitchell; former Burlington Northern branch at Yankton; and former Chicago & North Western at Mitchell.

HIGHWAYS - Elk Point is on I 29; Vermillion, Meckling and Yankton on SD 50; Tripp, Parkston and Dimock on SD 37; Mitchell on I 90 and SD 37; all other stations except Napa and Beardsley are on hard surfaced local roads.
RAIL WEIGHT - 85 lbs. from East Wye Switch to Burbank and from Beardsley to Ethan; 90 lbs.from Burbank to Beardsley and 100 lbs. - 112 lbs. from Ethan to Mitchell.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 8° & 6° at Mitchell

BALLAST - Mostly gravel dating from 1918 to 1928.

BRIDGES AND TRESTLES - 25 pile trestles ranging in length from 1 to 11 spans and totaling 99 spans and 7 other bridges of steel or concrete.

STATION LOCATIONS

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
East Wye Switch	0.0	Yankton	41.7	Tripp	82.5
Elk Point	0.7	Napa	47.3	Beardsley	88.1
Burbank	9.3	Utica	50.9	Parkston	94.6
Vermillion	15.2	Lesterville	57.6	Dimock	100.0
Meckling	23.4	Scotland	68.9	Ethan	105.1
Gayville	29.6	Kaylor	75.5	Mitchell	116.7

TRAFFIC CHARACTERISTICS

	1975	1979
TRAFFIC DENSITY -		
East Wye Switch to Napa	0.94 MGT	0.56 MGT
Napa to Mitchell	0.80 MGT	0.41 MGT

TRAFFIC DIRECTION - 58% Orig./42% Term. 59% Orig./41% Term.
COMMODITIES - Forwarded grain and grain mill products; received food products, fertilizer, and iron and steel.

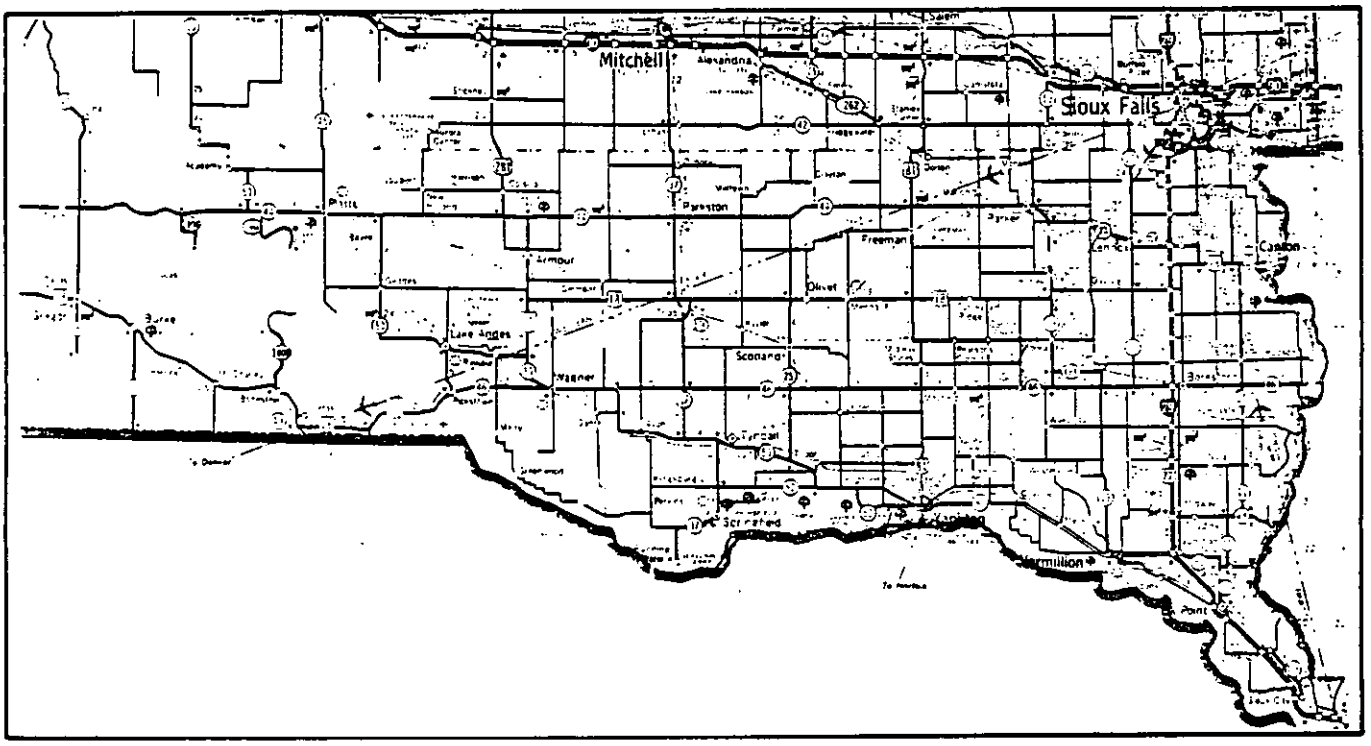
OTHER INFORMATION

This line was embargoed by the Milwaukee Road in March 1980 and abandoned in June 1980. The line will be acquired by the State during 1981 and operated as part of the South Dakota core system.

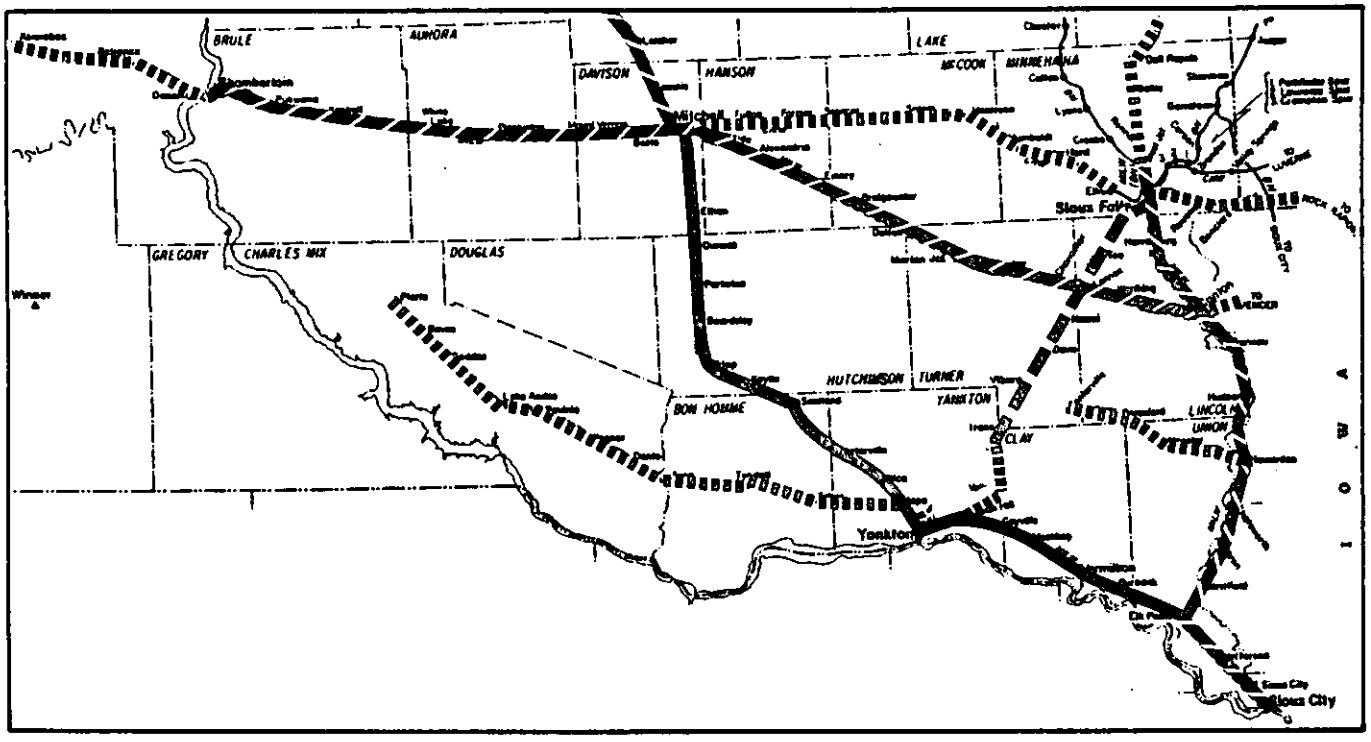
EXHIBIT V-4 (Continued)
SOUTH DAKOTA SEGMENT MW24
EAST WYE SWITCH TO MITCHELL

Study Line #4

RAILROAD-HIGHWAY LOCATION MAP

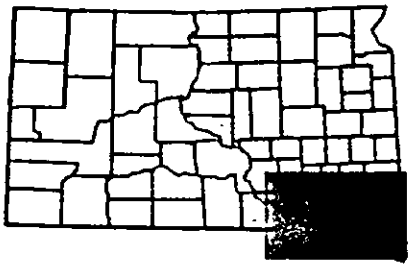


RAILROAD SEGMENT MAP



KEY

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



Study Line #4

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	136	9,600
Grain	West Coast	1,430	141,200
Grain	Miscellaneous	879	67,000
Grain	Miscellaneous	57	2,600
Total Originating		2,502	220,400
Terminating			
Commodity			
Fertilizer	Miscellaneous	240	24,000
Other	Miscellaneous	131	5,800
Total Terminating		371	29,800
Total for Line		2,873	250,200

NOTE: Although all rail service demand as measured by the shipper survey could be met if the study project is implemented, 127,400 tons would have to be diverted to other modes unless Class II standards are achieved. This diversion will be necessary primarily because a constrained supply of rolling stock and rail crews limits the capacity of this line.

Study Line #4

Track Conditions

Current plans will result in this line meeting Class I standards before service is restored to the entire line in August. For this reason, 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 this standard, and the core system operator will be responsible for performing normalized maintenance thereafter.

STUDY PROJECT

Description

This project will rehabilitate the Mitchell to Elk Point line to Class II standards and allow all existing rail shipping demand to be met. If this project were performed, a single crew could serve the entire line in one day, thereby eliminating the need for either a relief crew or the crew spending the night out of town. This would reduce operating costs. If selected by the State and approved by the FRA, the project would probably be performed during 1982.

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 probably average 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 - 220,400 tons

Terminating - 29,800 tons

Total - 250,200 tons

Study Line #4

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+873,528	$+873,528	$+873,528
Secondary Efficiency Benefits					
Income ($)	-	$-5,678	-	-7,402	-7,402
Highway Costs ($)	-	-	-	+36,614	+36,614
Taxes ($)	-	-	-	-1,267	-1,267
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-5,678	$+873,528	$+901,473	$+901,473
Costs ($)	-	-	-	$+164,600	$+164,600
Jobs	-	-9	-	-9	-9
Energy (Gallons)	-	-	-	-9,746	-9,746
Air Pollution (lbs.)	-	-	-	-6,696	-6,696
Benefits Minus Costs					$+736,873
Benefit/Cost Ratio					+5.48

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 #5

MW 15 MITCHELL TO CANTON

BACKGROUND

The Mitchell to Canton line is similar to Study Lines 2, 3, and 4 in that it is currently abandoned, and will be rehabilitated to Class I and operated under the Directed Service Program. The line connects with the Sioux Falls to Sioux City line at Canton, thereby joining two major population centers. Because the C&NW has abandoned its Mitchell to Ellis line, the core system will be the only rail link between these cities.

LINE CHARACTERISTICS - BASE CASE

Line Description

Located in the Southeast corner of South Dakota, this line provides the only rail service to a productive agricultural area. This market area is expected to grow in the near future with the BN's expected abandonment of the Sioux Falls to Irene line. The Mitchell to Canton line also provides important access for the State to stone quarries located in the Sioux Falls area. A detailed line description was prepared for Railplan, South Dakota, 1980, and is reprinted here as Exhibit V-5.

Operations and Service

Service is not currently provided over this line; however, service at least once a week is planned under Directed Service. The preliminary operating plan that was developed for this Addendum provides for service twice a week at Class I speeds. Higher crew and rail car costs are incurred than at Class II, but all demand can be served. Identified in the shipper survey as potential rail users were 9 shipping stations, 16 grain elevators and several other businesses.

Study Line #5

EXHIBIT V-5

SOUTH DAKOTA SEGMENT - MW15

CANTON TO MITCHELL

LINE DESCRIPTION

LINE STATUS - Abandoned, with service restoration planned.
TYPE OF LINE - Branch LINE LENGTH IN MILES - 79.2
MAXIMUM WEIGHT LIMIT - 263,000 lbs. MAXIMUM SPEED LIMIT - 35 mph (62 miles under slow orders)
SERVICE FREQUENCY - None
YARDS - Canton and Mitchell
CONNECTING LINES - Former Milwaukee Road line at Canton and Mitchell; former Chicago & North Western at Mitchell; and Burlington Northern at Lennox.

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

RAIL WEIGHT - 4 miles of 100 lbs. rail near Canton, about 9 miles of 75 lbs. rail from Lennox to near Worthing, 85 lbs. rail between Lennox and Parker, 90 lbs. rail between Parker and Mitchell.
MAXIMUM GRADE - 1% MAXIMUM CURVE - 2° 47'
BALLAST - Gravel dating from 1942 to 1971.

BRIDGES AND TRESTLES - 26 pile trestles ranging in length from 1 to 20 spans and totaling 155 spans and 6 other types of steel and concrete bridges.

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
TRAFFIC DENSITY -	0.62 MGT	0.78 MGT
TRAFFIC DIRECTION -	65% Orig./35% Term.	72% Orig./28% Term.

COMMODITIES - Primarily forwarded grain; also received grain mill products, fertilizer, and farm machinery.

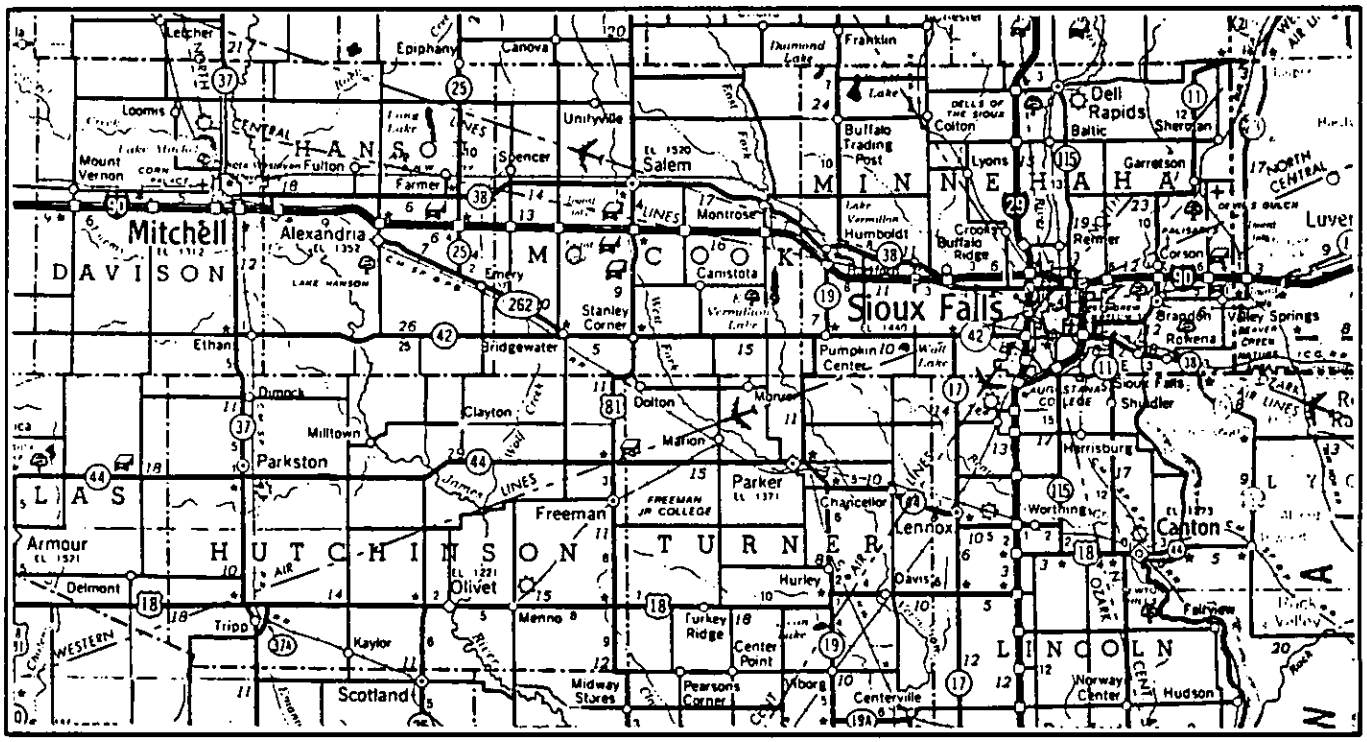
OTHER INFORMATION

This line was embargoed by the Milwaukee Road in March 1980 and approved for abandonment in June 1980. The line will be acquired by the State during 1981 and operated as part of the South Dakota core system.

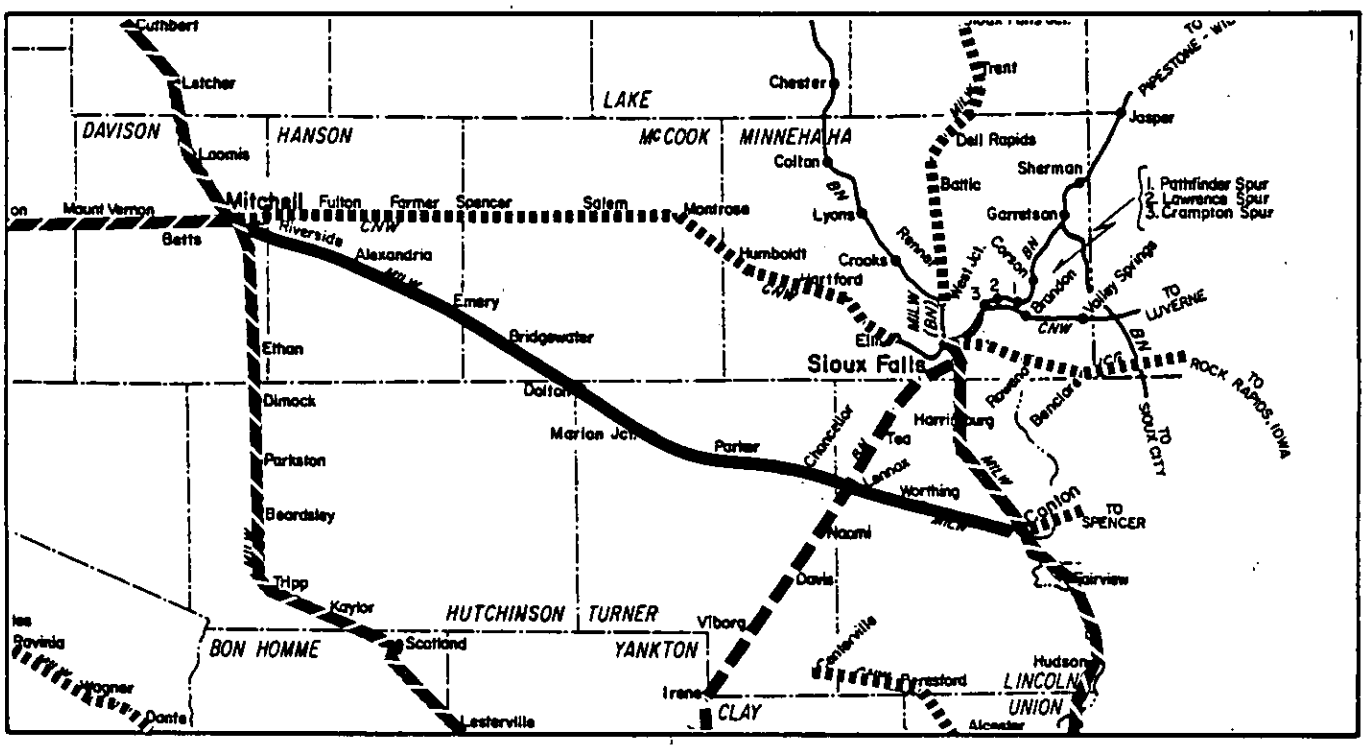
Study Line #5

SOUTH DAKOTA SEGMENT MW15
CANTON TO MITCHELL

RAILROAD-HIGHWAY LOCATION MAP

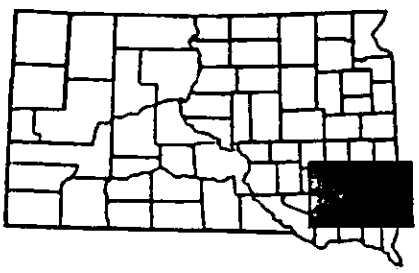


RAILROAD SEGMENT MAP



KEY

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



Study Line #5

Rail Traffic Volume

1979 Traffic

Originating Commodity	Cars	Tons
Grain	1,443	101,522
Food and Kindred Products	52	1,754
Waste and Scrap Materials	78	5,418
Other	16	442
Total Originating	1,589	109,136
Terminating		
Commodity		
Coal	134	10,512
Chemicals	142	12,812
Lumber and Wood Products	82	4,073
Food and Kindred Products	73	3,158
Petroleum and Coal Products	64	4,191
Other	106	3,508
Total Terminating	601	38,254
Total for Line	2,190	147,390

Shipper Survey Results

Originating Commodity	Destination/Origin	Cars	Tons
Grain	Minneapolis	190	15,400
Grain	Duluth	11	500
Grain	West Coast	2,023	198,100
Grain	Miscellaneous	1,141	85,100
Other	Miscellaneous	10	200
Total Originating		3,375	299,300
Terminating			
Commodity			
Fertilizer	Miscellaneous	527	50,700
Lumber	Miscellaneous	28	1,100
Other	Miscellaneous	190	13,800
Total Terminating		745	65,600
Total for Line		4,120	364,900

Study Line #5

Track Conditions

Current plans will result in the rehabilitation of this line to Class I standards before service is restored under Directed Service in June 1981. For this reason, a base case of Class I operations was used for the benefit-cost analysis. Tie renewal is the primary area of rehabilitation need, as the existing rail is capable of supporting jumbo covered hopper cars. The core system operator will be responsible for properly maintaining the track after service begins.

STUDY PROJECT

Description

This project will rehabilitate the Mitchell to Canton line to Class II standards. All existing rail shipping demand on this line can be met without the project. However, the ability to operate at higher speeds would lower operating costs and allow physical and labor resources to be redistributed to other core system lines. If selected and funded, a project would probably occur during the 1982 construction season.

Rail Service Level

Depending on the level and constancy of rail demand, it is expected that service will be provided twice 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	- 299,300 tons
Terminating	- 65,600 tons
Total	- 364,900 tons

Study Line #5

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+332,185	$+332,185	$+332,185
Secondary Efficiency Benefits					
Income ($)	-	-	-	-	-
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	-	-
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	$+332,185	$+332,185	$+332,185
Costs ($)	-	-	-	$+119,430	$+119,430
Jobs	-	-	-	-	-
Energy (Gallons)	-	-	-	-	-
Air Pollution (lbs.)	-	-	-	-	-
Benefits Minus Costs					$+212,755
Benefit/Cost Ratio					+2.78

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Study Line #6

MW 22 SIOUX FALLS AND SIOUX CITY, IOWA

BACKGROUND

The Sioux Falls (West Junction) to Sioux City line contains the only local option segment that is planned for immediate operation as part of the core system, and the only local option segment studied in this Addendum. Because almost 50 percent of the line is located in Iowa, it has been leased instead of purchased from the Milwaukee and was ineligible for the Directed Service Program. In addition to providing a direct link between two major cities, the line provides essential access to connecting Class I railroads at Sioux City. Without the line and its Sioux City connection, all traffic would be forced to move over the Aberdeen gateway.

LINE CHARACTERISTICS - BASE CASE

Line Description

This line is an important link in the South Dakota rail system and provides service to several major shippers. By linking the Mitchell to Canton and Mitchell to Elk Point lines, traffic is able to move efficiently between their eastern ends without first being routed through Mitchell. The study line extends 1.77 miles north of Sioux Falls to West Junction, where the BN line to Wentworth and Madison and the former Milwaukee line to Sioux Falls Junction separate. The BN will continue to have trackage rights over this segment. A detailed line description was prepared for Railplan, South Dakota, 1980, and is reprinted here as Exhibit V-6.

Operations and Service

The study line is currently abandoned, and the State plans to request an operating waiver from the FRA so service may be restored in September 1981. It is expected that the core system operator will want to continue to serve the line because of its importance to efficient core system operation, and because of a significant amount of traffic originating on the line. The preliminary operating plan developed for this Addendum provides for service twice a week and the ability to meet all expected rail service demand. A significant amount of stone traffic is

Study Line #6

EXHIBIT V-6

SOUTH DAKOTA SEGMENT - MW22

SIOUX CITY, IA TO SIOUX FALLS, SD

LINE DESCRIPTION

LINE STATUS - Abandoned, with service restoration planned.
TYPE OF LINE - Branch LINE LENGTH IN MILES - 89.7 Total, 48.6 in SD
MAXIMUM WEIGHT LIMIT - 263,000 lbs. MAXIMUM SPEED LIMIT - 30 mph (68 miles of operating under slow orders)
SERVICE FREQUENCY - None
YARDS - Sioux City, West Yard, Canton, South Yard, and Sioux Falls
CONNECTING LINES - Former Milwaukee Road line at East Wye Switch, Canton, and Sioux Falls; Chicago & North Western connects at Sioux Falls; Burlington Northern at Sioux Falls.
HIGHWAYS - I 29 serves West Yard, Jefferson and East Wye Switch; Hudson, Fairview and Harrisburg and served by local hard surfaced roads; Canton is served by US 18 and Sioux Falls is served by I 29, I 90, US 77, SD 42, and SD 38.
RAIL WEIGHT - 90 lbs. rail from Sioux City to Westfield and Hudson to Sioux Falls, 85 lbs. from Westfield to Hudson.
MAXIMUM GRADE - 1.5% MAXIMUM CURVE - 10^{o}X 32^{1}
BALLAST - Gravel placed in the 1930s from Sioux City to Canton and placed in 1942 from Canton to Sioux Falls.
BRIDGES AND TRESTLES - 41 pile trestles ranging in length from 1 to 15 spans and totaling 177 spans and 9 other bridges of pile trestle and steel combination ranging from 2 spans to 46 spans.

STATION LOCATIONS

STATIONS	MILES	STATIONS	MILES	STATIONS	MILES
Sioux City, IA	0.0	East Wye Switch, SD	19.8	Hudson, SD	53.8
Shore Acres, IA	3.9	Westfield, IA	25.9	Fairview,SD	60.5
Military Rd., IA	5.1	Akron, IA	31.4	Canton, SD	68.9
West Yard, SD	5.6	Chatsworth, IA	38.1	Harrisburg, SD	80.3
Jefferson, SD	12.1	Hawarden, IA	44.2	South Yard, SD	88.5
				Sioux Falls, SD	89.7

TRAFFIC CHARACTERISTICS

	1975	1979
TRAFFIC DENSITY -		
Sioux City to East Wye Switch	2.24 MGT	0.88 MGT
East Wye Switch to Canton	1.16 MGT	1.52 MGT
Canton To Sioux Falls	0.75 MGT	0.70 MGT
TRAFFIC DIRECTION -	70% Orig./30% Term.	57% Orig./43% Term.

COMMODITIES - Forwarded grain, food products, stone, sand, and gravel. and scrap iron or steel; received grain, grain mill products, and stone, sand and gravel.

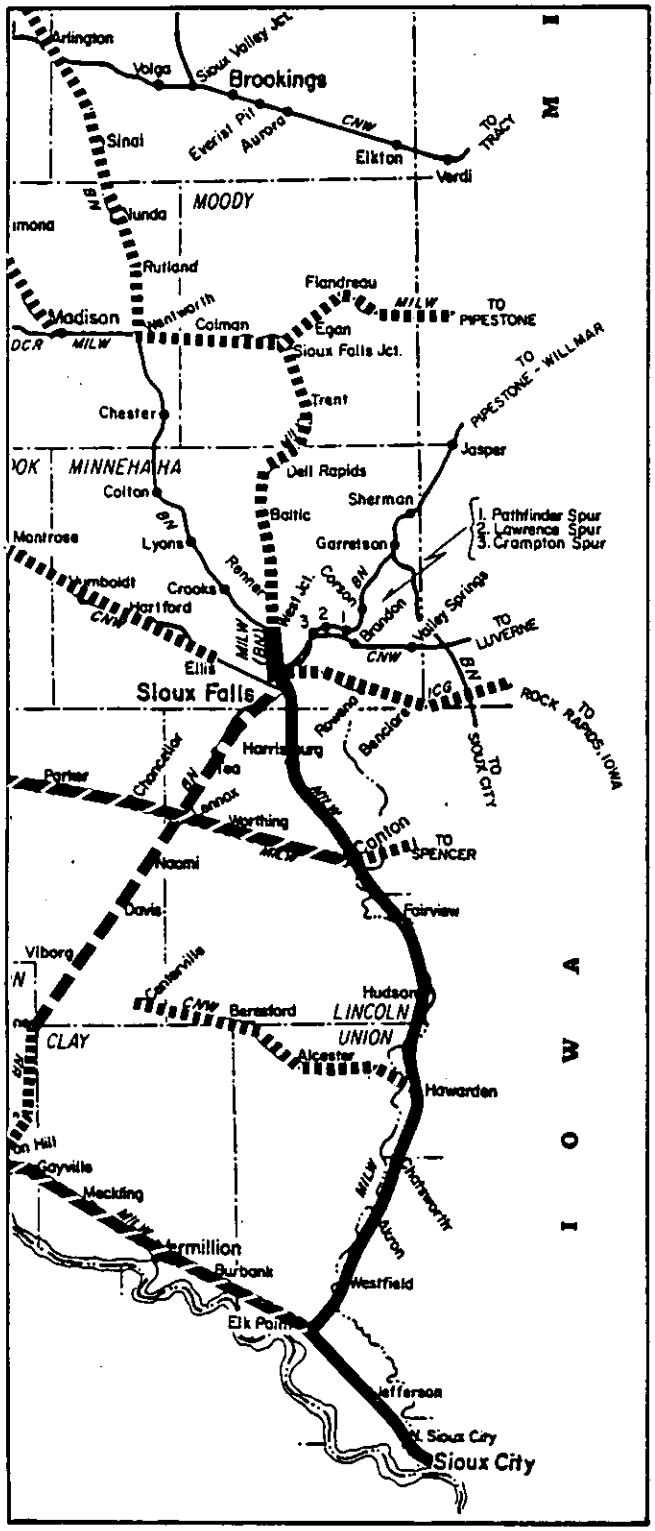
OTHER INFORMATION -

This line was embargoed by the Milwaukee Road in March 1980 and abandoned in June 1980. The South Dakota portion of the line will be acquired, and the Iowa portion will be either acquired or leased during 1981. Plans are to operate the entire line as part of the South Dakota core system.

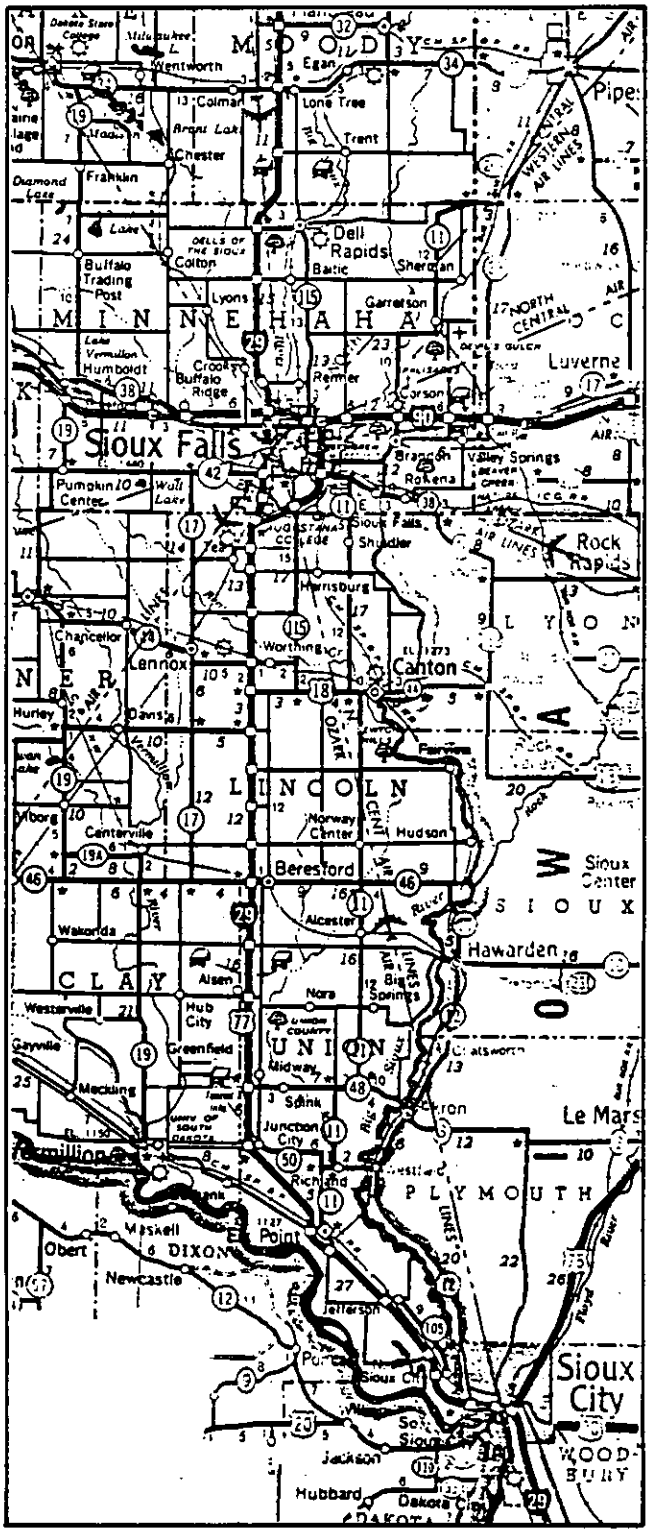
Study Line #6

SOUTH DAKOTA SEGMENT MW22
SIOUX CITY, IA TO SIOUX FALLS

RAILROAD SEGMENT MAP

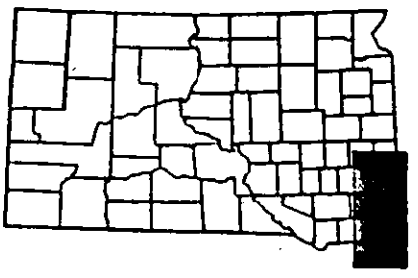


RAILROAD-HIGHWAY LOCATION MAP



KEY

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



expected to be delivered by L.G. Everist, Inc., to the operator at Sioux Falls. All this traffic will be in shipperowned cars. Because industries in Sioux Falls and Sioux City are continuing to receive rail service, and because this traffic does not generally move over South Dakota lines, these stations were not included in the benefit-cost analysis. The shipper survey identified as potential rail users 9 shipping stations, 12 grain elevators, and several other businesses.

Track Conditions

The Sioux Falls to Sioux City line does not currently meet Class I standards, and permission to operate will be required before service can be restored. For the benefit-cost analysis, it is assumed that the waiver will be granted and that sufficient maintenance will be performed to allow operations to continue.

Study Line #6

Rail Traffic Volume

1979 Traffic

Originating Commodity	Cars	Tons
Grain	212	14,653
Stone	2,943	237,569
Other	3	69
Total Originating	3,158	252,291
Terminating		
Commodity		
Chemicals	181	17,052
Food and Kindred Products	118	7,759
Other	9	411
Total Terminating	308	25,222
Total for Line	3,466	277,513

Shipper Survey Results

Originating Commodity	Destination/Origin	Cars	Tons
Grain	Minneapolis	180	18,000
Grain	West Coast	1,185	116,100
Grain	Miscellaneous	635	59,900
Stone	Miscellaneous	3,500	245,000
Total Originating		5,500	439,000
Terminating			
Commodity			
Fertilizer	Miscellaneous	167	16,700
Lumber	Miscellaneous	2	100
Other	Miscellaneous	1	100
Total Terminating		170	16,900
Total for Line		5,670	455,900

Study Line #6

STUDY PROJECT

Description

This project will rehabilitate the line to Class II standards and renew 1.77 miles of light rail between Sioux Falls and West Junction. The rail portion of the project is needed to provide a heavy-rail link with the BN's line from West Junction to Madison. (This line will be re-railed during the summer of 1981, so that unit trains of covered hopper cars can be moved. Without this rail renewal, access to the line with heavy cars would be impossible because of the 220,000-pound weight limit.) The remainder of the project is primarily directed at tie replacement.

Rail Service Level

It is expected that service on the line will be provided twice weekly.

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	- 439,000 tons
Terminating	- 16,900 tons
Total	- 455,900 tons

Study Line #6

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+172,221	$+172,221	$+172,221
Secondary Efficiency Benefits					
Income ($)	-	-	-	-	-
Highway Costs ($)	-	-	-	-	-
Taxes ($)	-	-	-	+7,596	+7,596
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	-	-	$+179,817	$+179,817
Costs ($)	-	-	-	$+346,949	$+346,949
Jobs	-	-	-	-	-
Energy (Gallons)	-	-	-	+58,434	+58,434
Air Pollution (lbs.)	-	-	-	+40,144	+40,144
Benefits Minus Costs					$-167,132
Benefit/Cost Ratio					+0.52

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.

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 comprise 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 Aberdeen to Mitchell portion of the system is not rehabilitated to Class II, capacity constraints imposed by a limited number of train crews and locomotives will require that traffic be diverted to another rail gateway, or perhaps even to motor carriers. This demand could be met with a Class II operation. Thus, the benefit-cost ratios of the Aberdeen to Wolsey and Wolsey to Mitchell lines, for example, 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 of the entire core system. The analysis indicates that the core system makes a positive contribution to the South Dakota economy and that the rehabilitation of all the lines to Class II can be supported on both an economic and service basis.

Summary of Study Lines Combined as Single Rail System

Annual Benefits and Costs

TYPE OF IMPACT	RAILROAD	TRUCK	COMMUNITY SHIPPER	STATE	TOTAL
Primary Efficiency Benefits ($)	-	-	$+2,020,795	$+2,020,795	$2,020,795
Secondary Efficiency Benefits					
Income ($)	-	$-10,726	-	-13,981	-13,981
Highway Costs ($)	-	-	-	+75,302	+75,302
Taxes ($)	-	-	-	+1,688	+1,688
Net Salvage Value ($)	-	-	-	-	-
Other:	-	-	-	-	-
Total Benefits ($)	-	$-10,726	$+2,020,795	$+2,083,804	$+2,083,804
Costs ($)	-	-	-	$+984,795	$+984,795
Jobs	-	-17	-	-17	-17
Energy (Gallons)	-	-	-	+12,992	+12,992
Air Pollution (lbs.)	-	-	-	+8,925	+8,925
Benefits Minus Costs					$+1,099,009
Benefit/Cost Ratio					+2.12

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.

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

The State of South Dakota received the benefit-cost analysis results and other factors that reflected the economic and service importance of the 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 Class II track conditions, 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.

The core system lines 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 by profitable 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.

EXHIBIT VI-1

RECOMMENDED RAIL ASSISTANCE PROGRAM

PRIORITY RANKING	RAIL SEGMENT	PROJECT DESCRIPTION	PROJECT COST
1	Aberdeen to Wolsey	Rehabilitation to Class II	$1,122,925
2	Sioux Falls (West Junction) to Sioux City (East Yard)	Rehabilitation to Class II	2,288,713
3	Wolsey to Mitchell	Rehabilitation to Class II	342,150
4	Mitchell to Elk Point (East Wye Switch)	Rehabilitation to Class II	950,000
5	Mitchell to Canton	Rehabilitation to Class II	689,300
6	Mitchell to Chamberlain	Rehabilitation to Class II	577,000

- 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;

- 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 socio-economic hardships.

The State believes that it is important to at least partially rehabilitate each core system line during 1981. The lines selected as priorities 1 and 2 are the only core system lines that are ineligible for the Directed Services Program and therefore the State plans to use Local Rail Service Assistance Program funds for their rehabilitation during the 1981 construction.

The Aberdeen to Wolsey line is being operated by the C&NW, but needs substantial rehabilitation because of deferred maintenance by the Milwaukee. Significant efficiencies could be realized if the line is rehabilitated, because of the length of the line and the through trains that will be operated from Mitchell to Aberdeen to interchange with the Milwaukee. Future operations of this line will be endangered unless this project is performed.

The Sioux Falls (West Junction) to Sioux City line is the highest traffic density segment of the core system and requires the greatest amount of rehabilitation. It also provides a direct link between the Sioux Falls and Sioux City gateways, and serves a significant amount of traffic originiating at stone quarries on the line. Included in this project is 1.77 miles of rail renewal between Sioux Falls and West Junction. The BN operates over this segment to reach its line that extends to Wentworth and Madison, and plans to rehabilitate this line with State assistance to allow the movement of unit trains of covered hoppers at at Class II speeds. Unless the Sioux Falls to West Junction segment is also rehabilitated, however, the track will be unable to support this type of operation and thereby negate the purpose of the project. Thus, the value of the Sioux Falls to Sioux City project goes beyond the beneift of serving only on-line traffic.

The remaining projects will be performed at a later date if the Local Rail Service Assistance Program is continued, or if funds can be transferred from previously approved projects that are not performed. Other lines will be selected for intensive study in the future, depending on the development of rail service issues and needs.

FUTURE RAIL PLANNING ISSUES

As the core system is rehabilitated to Class II, the emphasis of rail planning will return to the preservation of essential rail lines that are operated by Class I railroads. The most immediate of these planning needs concerns the Milwaukee's main line from Ortonville, Minnesota, to Miles City, Montana. The Milwaukee has filed on application with the Interstate Commerce Commission for permission to abandon the line, and efforts are underway by South Dakota, North Dakota, Montana, Minnesota and and Wisconsin to formulate a plan to maintain service. 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 amount of rehabiiitation, it is expected that more track will be abandoned in the near future. If abandonments include any essential lines, 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 A

PUBLIC PARTICIPATION COMMENTS
(To be provided by South Dakota)

APPENDIX B

SHIPPER SURVEY

APPENDIX B

SOUTH DAKOTA STATE RAIL PLANNING SURVEY
SHIPPER SURVEY

Person Conducting Survey: _____

PART A: GENERAL INFORMATION

1. Name and address of firm:

   _____

   _____

   _____

   _____

   Telephone: _____

2. Name and address of parent company (if different from above):

   _____

   _____

   _____

   _____

   Telephone: _____

3. Name of person reporting information, title:

   _____

NOTE: In all of the following questions, please record only local authority information - not information concerning parent company.

4. Do you plan to ship or receive traffic via the South Dakota rail system?

   _____

5. Principal type of business activity at firm (grain elevator, chemical plant, etc.):

   _____

6. How many people are currently employed at your firm: _____

   How many people do you estimate will be employed at your firm in 5 years:

   _____

PART B: USER ATTITUDES

1. Describe the type of rail service you need:

   Service frequency _____

   Cars Per Week _____

   Car Type _____

   Other _____

2. Can your facility load jumbo covered hoppers? _____

3. How many cars can you load at one time? _____

   Siding size (cars) _____

   Elevator capacity (cars) _____

4. How much time is required to load the above amount? _____

5. What type of siding does your facility use?

   Public _____ Private _____

PART C: IMPACTS OF RAIL SERVICE CHANGES

1. Since rail service to your firm has been discontinued, which action(s) did your firm take or is anticipating taking? (Check as many responses as apply):

   _____ Maintain present level of operations

   _____ Reduce operations by _____%

   _____ Close plant

   _____ Relocate plant to active rail line within South Dakota

   _____ Relocate plant to location outside South Dakota

   _____ Convert to truck transportation for entire haul

   _____ Truck to nearest rail line loading facility

   _____ Other (Specify) _____ _____

2. Is your firm willing to guarantee a minimum annual shipment level? _____

   What is the general range of this level? _____

3. Since rail service on the line to my facility will be restored,

   a. Employment at the facility over the next five years will increase/decrease by _____ jobs, or not change?

   b. Annual rail usage at the facility over the next five years will increase/decrease by _____ tons, or not change?

   c. Annual truck usage at the facility over the next five years will increase/decrease by _____ number of tons, or not change?

4. What is the destination of traffic that is shipped via truck?

   _____

PROJECTED TRAFFIC VOLUME

COMMODITY	DESTINATION	HISTORICAL (1979)		RAIL SERVICE LEVEL					
				MOST LIKELY		IMPROVED		NONE	
		CARS	TONS	CARS	BUSHELS / TONS	CARS	BUSHELS / TONS	TRUCKLOADS	BUSHELS / TONS

PROJECTED TRAFFIC VOLUME

COMMODITY	ORIGIN	HISTORICAL (1979)		RAIL SERVICE LEVEL					
				MOST LIKELY		IMPROVED		NONE	
		CARS	TONS	CARS	BUSHELS / TONS	CARS	BUSHELS / TONS	TRUCKLOADS	BUSHELS / TONS

PART E: ADDITIONAL COMMENTS

Thank you for assisting in the completion of this shipper survey. Your cooperation will help the Division to fully assess the importance of the rail line serving your facility, as it affects your firm and South Dakota as a whole. Do you have any additional comments, questions, or suggestions? If you have any further comments, please contact the Division of Railroads at:

Department of Transportation
Division of Railroads
Transportation Building
Pierre, South Dakota 57501
Telephone: 605-773-3710

APPENDIX C

PRELIMINARY CORE SYSTEM OPERATING PLANS

APPENDIX C

PRELIMINARY CORE SYSTEM OPERATING PLANS

The purpose of this Addendum is to provide an analysis of the benefits and costs associated with upgrading the rail lines included in the South Dakota core system to Class II (25 miles per hour) track conditions. The State of South Dakota anticipates receiving adequate funding from the Federal Railroad Administration through the Directed Service Program to upgrade most of the core system to the minimum Class I (10 miles per hour) track conditions needed to permit service to resume. South Dakota anticipates the use of Federal Local Rail Service Assistance Program funds to carry out the track rehabilitation to Class II. Therefore, the analysis contained in this report treats the core system upgraded to Class II as the Alternative Case, while the core system upgraded to Class I is treated as the Base Case.

In order to estimate the operating costs and revenues associated with the Base and Alternative Cases, two operating plans are developed. The lines to be operated for both plans are as follows:

- Mitchell to Aberdeen;
- Mitchell to Chamberlain;
- Mitchell to Canton;
- Mitchell to Elk Point (East Wye Switch); and
- Sioux Falls to Sioux City.

The common set of data used for each plan is discussed below.

TRAFFIC

The traffic volumes associated with each operating plan are based on a shipper survey conducted during March 1981. Responses to this survey provided tonnage estimates of originating and terminating traffic for each station on the core system, assuming an operating speed of up to 25 miles per hour. The traffic level for the Base Case operating plan was derived by keeping the number of locomotives and train crews fixed while reducing the permissible operating speed to 10 miles per hour. This reduced the number of carloads which could be served by the assumed number of locomotives and train crews.

Tonnage volumes were converted to carload volumes based on average tons per car for each major commodity. The origins and destinations of all traffic were examined and the traffic routed over either the Aberdeen or Sioux City gateways.

LOCOMOTIVES

The operator chosen to provide service to the core system will be required to supply the locomotives. The actual locomotives used will be chosen by the operator. For this analysis, a 1,750 horsepower GP 9 locomotive was assumed because of its general availability and low cost. If the operator uses an SD 7 or SD 9, it is possible that one to two fewer units would be required. However, few of these units are available and the acquisition cost is higher.

CREW SIZE

The ability of a short line railroad to become profitable largely depends on the amount of traffic available and the ability of the operator to keep costs as low as possible. The operation planned for South Dakota's core system is basically an over-the-road local switching operation. A small amount of yard switching is required to serve local industries and to break up and build trains. For this analysis, all but one train crew consists of two crew members. The one remaining crew has an extra crew member who can be used for switching or relief when other crew members are on vacation, sick, or miss duty for other reasons. The use of two-person crews in the gathering of grain is not new to the railroad industry, as the Chicago and North Western Railroad regularly operates certain local grain gathering trains with only two crew members.

This analysis also assumes that all jobs are interchangeable, by eliminating craft distinctions. In other words, a crew member could work as an engineman, conductor, or switchman. The need for this type of operation is critical in the winter months, when traffic levels decline and service is reduced. During the winter, railroad operations become very difficult due to the cold and snow. Interchanging crew members allows the operator to adjust the crew size to reflect changing service and operating requirements at no additional total cost.

TERRAIN

Each of the core system lines, except the Mitchell-Aberdeen line, has at least one long grade of up to one percent slope in each direction. To properly calculate horsepower requirements and thus locomotive consist size, each of these grades was identified and their relationships to major traffic areas examined. Due to their location, these grades should not be a major factor in horsepower assignment on most lines.

FREIGHT CARS

The operating plan assumes that 100-ton, 4,750 cubic foot jumbo covered hopper cars will be used for hauling grain on the core system, except on the Mitchell to Chamberlain line, where 70-ton covered hoppers or box cars will be used. Open top hopper cars used to haul stone from the Sioux Falls area will be 70-ton cars and are expected to be supplied by the shipper. To calculate gross tonnage, an average tare weight of 30 tons for all cars is used.

ALTERNATIVE CASE OPERATING PLAN

The Alternative Case operating plan is based upon the traffic data developed from the March, 1981 shipper survey, given a maximum operating speed of 25 miles per hour and the State's criteria that all shippers should be provided with a minimum of twice weekly service. The plan is designed to handle the maximum volume of traffic available in any one particular month. During off-peak months, crews would work fewer hours. If the amount of physical assets are reduced, the plan can easily be modified, but the total volume of traffic that can be handled would decrease. This section details the total trip times, train schedules, crew schedules, locomotive schedules, and freight car requirements of the proposed Alternative Case operating plan.

Trip Times By Line

Trip time is composed of running and switching time. Running time is the time it takes to move over a rail line without stopping, while observing all slow orders. Switching time is the time it takes to pick up and set out cars. Running and switching times are added to develop the total trip time to operate each core system line.

The maximum allowable operating speed for FRA safety standard Class II track is 25 miles per hour for freight trains. To maintain a safe speed that does not exceed 25 miles per hour, 22

miles per hour is used to calculate the running time for all trains. Although the trains, in most cases, could maintain 25 miles per hour, the 12 percent allowance is made to insure that trains would not exceed the Federal safety track standards. An additional 10 percent allowance is made to account for acceleration and deceleration, and to reflect the fact that on the most significant grades, speeds would drop below 25 miles per hour. Further, trains should avoid prolonged operation in the speed range of 16 to 21 miles per hour. This is to prevent excessive rocking and possible derailment and track damage by certain types of freight cars, including covered hoppers. When a train's speed cannot be maintained above 21 miles per hour, it should be reduced to 15 miles per hour or less.

The seasonality of shipments and the number of cars each shipper can handle are parameters which directly affect switching time. For this plan, it is assumed that shipments would average 5 car lots and that a total of 30 minutes per location would be required to pull loads and place empties.

The running times, switching times, and total trip times calculated for each line of the core system are shown in Exhibit C-1 for the Alternative Case operating plan.

Train Schedule

The train schedules designed for this plan reflect the amount of time it takes to serve each line segment and the State's criteria that a minimum of twice weekly service be provided to each line. The schedules are designed to prevent any crew from exceeding the federally mandated 12-hour crew day which would require a second crew. Train operations are scheduled for daylight hours except where connections with other trains require evening operations.

The proposed train schedule is shown in Exhibit C-2 for the Alternative Case operating plan. In this plan, three trains per week operate from Mitchell to Aberdeen. These trains handle all outbound tonnage to or via Aberdeen, which could exceed 8,500 tons or 78 cars per train during the peak month. The heavy volume and long train length would likely prevent these trains from making any pick-ups or set-outs. Therefore, all switching is done by the returning Aberdeen to Mitchell trains. These trains require a maximum of four locomotives for peak periods, and the one-way total trip time is approximately 10 hours.

The Mitchell to Chamberlain train makes a complete round trip from Mitchell to Chamberlain and back to Mitchell within one day. Empty or loaded cars arrive at Mitchell from either Aberdeen or Sioux City and are switched by the Day 2 or Day 5 Mitchell switch

EXHIBIT C-1

ALTERNATIVE CASE OPERATING PLAN

TOTAL TRIP TIMES PER DAY

BEGINNING STATION	ENDING STATION	LINE SEGMENT LENGTH (MILES)	RUNNING TIME @ (HOURS-ONE-WAY)	SWITCHING TIME (HOURS)	TOTAL DAILY TRIP TIME (HOURS)
Mitchell	Aberdeen	128.6	6.7	3.3	10.0
Mitchell	Chamberlain	66.6	3.3	5.0	11.6*
Mitchell	Canton	79.2	4.7	2.5	11.9*
Mitchell	Elk Point (East Wye Switch)	116.7	6.0	4.0	10.0
Sioux Falls	Marion Junction	55.8	4.8	3.2	8.0*
Sioux Falls	Sioux City	90.9	5.0	4.0	9.0

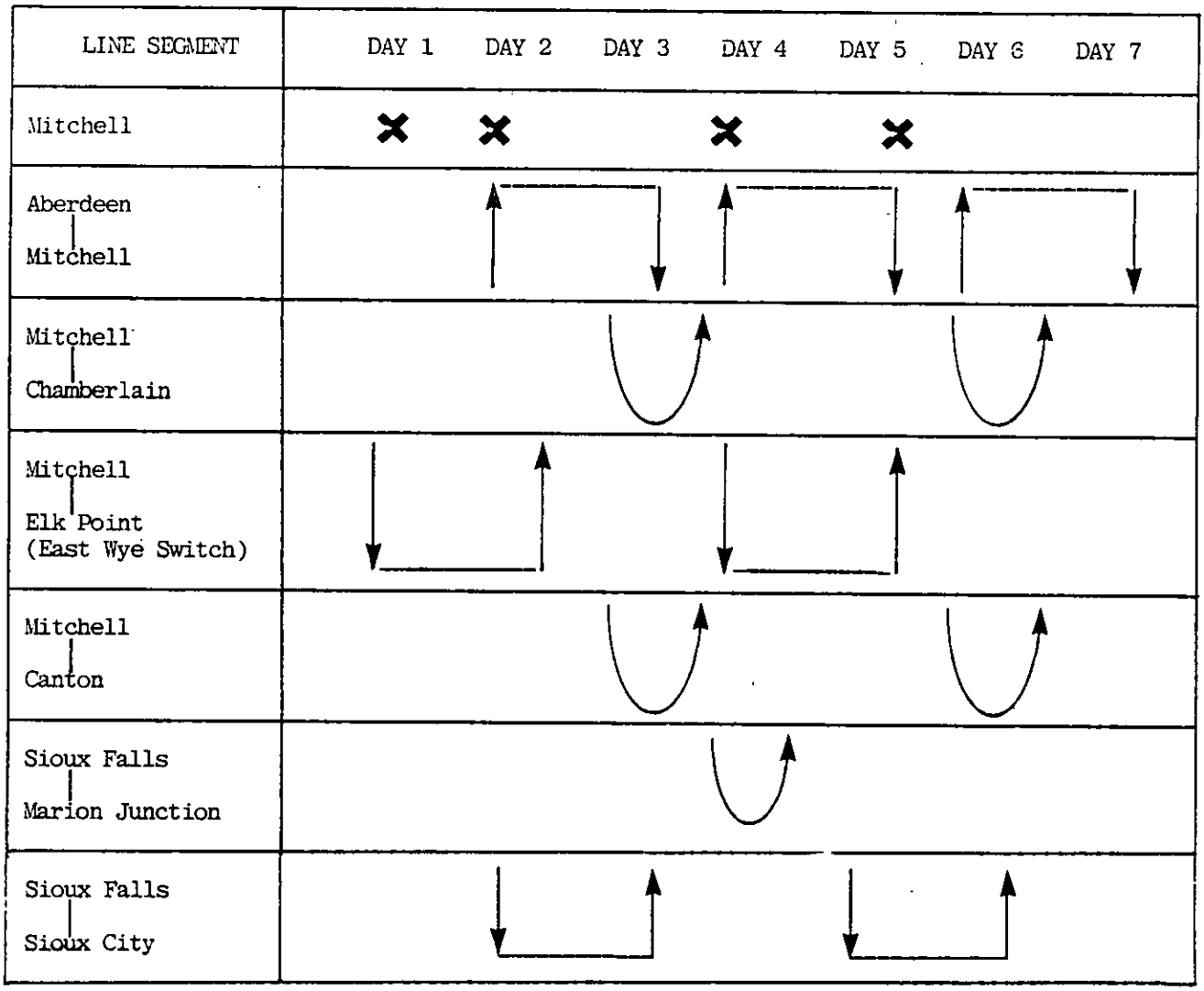
@ Includes 10% additional time for accelerating and decelerating and grades.

* Round-trip in one day.

EXHIBIT C-2

ALTERNATIVE CASE OPERATING PLAN

TRAIN SCHEDULE



Key

- ✕ - Mitchell Yard Switcher
- ↑ - One-way trip per day
- ∪ - Round-trip per day

engine into a Chamberlain train. The train places the inbound loads and empty cars on the first leg of its trip and pulls outbound loads and empty cars on the return leg. A weight restriction of 220,000 pounds per car prevents the loading of cars in excess of 70 tons. The train size could exceed 2,000 gross tons and 26 cars during the peak month. The train requires one locomotive and total round-trip time between Mitchell and Chamberlain is approximately 11.6 hours.

The train between Mitchell and Elk Point (East Wye Switch) operates south from Mitchell on Day 1 and Day 4 and north from Elk Point on Day 2 and Day 5. The southbound train places empties and pulls loads to or via Sioux City. In addition, the southbound train handles empties for the Sioux Falls to Sioux City line and loads which are terminating or interchanged at Sioux City. A siding at Elk Point is used for swapping cars with the Sioux Falls-Sioux City train. The northbound train pulls all cars from the Elk Point connection and local industries. Northbound cars which arrive in Mitchell on Day 2 can be in Aberdeen by Day 4. Northbound cars which arrive in Mitchell on Day 5 can be in Aberdeen by Day 6. This train requires two locomotives and the total trip time is approximately 10 hours each way.

The Mitchell to Canton train operates twice a week, Day 3 and Day 6, in round trip service between Mitchell and Canton. The train places loads and empties on the eastbound portion of the trip. The train picks up all loaded cars on the westbound portion of the trip. The train requires two locomotives and the total round-trip time is almost 12 hours.

The Sioux Falls to Sioux City train operates twice a week, on Day 2 and Day 5, from Sioux Falls to Sioux City; twice a week, on Day 3 and Day 6, from Sioux City to Sioux Falls; and once a week, on Day 4, from Sioux Falls to Marion Junction and back to Sioux Falls. The total trip time would be approximately 9 hours between Sioux Falls and Sioux City.

Locomotive Schedule

The need for motive power depends on the amount of gross tonnage handled, the terrain on the railroad, and the size and power of the locomotive units used. In the development of these plans, it was assumed that 1,750 horsepower GP 9 units would be used. If locomotives with greater horsepower are used, then fewer locomotives might be required.

The maximum power-to-gross-ton ratio used in this plan is one horsepower for each gross ton. The maximum power is required for the one percent grades, assuming the grades are not

"doubled" and the train has sufficient power to pull the grade at a speed which would not damage the locomotive (doubling involves taking the train up the hill in two parts). The minimum continuous speed for a GP 9 is approximately 10.5 miles per hour.[1] Therefore, to maintain a minimum speed greater than 10.5 miles per hour and prevent doubling of any grades, a one-to-one power-weight ratio is assumed. In areas where severe grades are not present, the power-weight ratio could be as low as approximately 0.75 to one. Based on the one-to-one power-weight ratio, the maximum number of gross tons which could be handled over each grade was estimated.

The locomotive requirements and schedule are shown in Exhibit C-3 for the Alternative Case operating plan. Four locomotives are required on the Mitchell to Aberdeen line six days per week. Two locomotives are required for the Mitchell to Elk Point line four days per week, and on the Mitchell to Canton line two days per week. One locomotive alternates between switching in Mitchell Yard four days per week and operating on the Mitchell to Chamberlain line two days per week. The heavy stone movement on the Sioux Falls-Sioux City line requires three locomotives five days per week. The operator would maintain the locomotive fleet on the days they are not operated. Spare locomotive units could be the Mitchell switch engine or one unit from the Mitchell to Aberdeen train. Use of this second unit as a spare would reduce the tonnage capacity of this train.

If larger locomotive units are available, they could be used on the Mitchell to Aberdeen line to lower the overall locomotive requirements. A light axle-loading locomotive, such as a SDL-9, would be desirable on the Mitchell-Chamberlain line.

Crew Schedule

The manpower requirements for the Alternative Case operating plan are based on the constraints previously outlined. The objective of the schedule is to work each crew between 40 hours and 60 hours per week and still be able to safely operate all trains with a minimum number of personnel. The resulting crew schedule is shown in Exhibit C-4.

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[1] Minimum continuous speed is defined as the speed at which a locomotive under full load continues to move with a maximum electrical generation, for a period which should not exceed 15 minutes.

EXHIBIT C-3

ALTERNATIVE CASE OPERATING PLAN

LOCOMOTIVE SCHEDULE*

LOCOMOTIVE UNIT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
1	—	M-A	A-M	M-A	A-M	M-A	A-M
2	—	M-A	A-M	M-A	A-M	M-A	A-M
3	—	M-A	A-M	M-A	A-M	M-A	A-M
4	—	M-A	A-M	M-A	A-M	M-A	A-M
5	M-EP	EP-M	M-CA-M	M-EP	EP-M	M-CA-M	—
6	M-EP	EP-M	M-CA-M	M-EP	EP-M	M-CA-M	—
7	MS	MS	M-CH-M	MS	MS	M-CH-M	—
8	—	SF-SC	SC-SF	SF-MJ-SF	SF-SC	SC-SF	—
9	—	SF-SC	SC-SF	SF-MJ-SF	SF-SC	SC-SF	—
10	—	SF-SC	SC-SF	SF-MJ-SF	SF-SC	SC-SF	—

Key

MS = Mitchell Yard Switcher
M-A = Mitchell to Aberdeen
A-M = Aberdeen to Mitchell
M-CH-M = Mitchell to Chamberlain to Mitchell
M-EP = Mitchell to Elk Point
EP-M = Elk Point to Mitchell
SC-SF = Sioux City to Sioux Falls
SF-SC = Sioux Falls to Sioux City
SF-MJ-SF = Sioux Falls to Marion Junction to Sioux Falls
M-CA-M = Mitchell to Canton to Mitchell

* Assumes GP 9 (1,750 horsepower) locomotive units.

EXHIBIT C-4

ALTERNATIVE CASE OPERATING PLAN

CREW SCHEDULE

CREW SIZE	CREW NUMBER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	CREW HOURS PER WEEK
2	Crew 1	MS	M-A	A-M	M-A	A-M	—	—	48
2	Crew 2	—	—	M-CH-M	M-EP	EP-M	M-CH-M	—	44
2	Crew 3	—	SF-SC	SC-SF	SF-MJ-SF	SF-SC	SC-SF	—	44
3	Crew 4	—	MS	M-CA-M	MS	MS	M-CA-M	—	48
2	Crew 5	M-EP	EP-M	—	—	—	M-A	A-M	40

Key

MS = Mitchell Yard Switcher
M-A = Mitchell to Aberdeen
A-M = Aberdeen to Mitchell
M-CH-M = Mitchell to Chamberlain to Mitchell
M-EP = Mitchell to Elk Point
EP-M = Elk Point to Mitchell
SC-SF = Sioux City to Sioux Falls
SF-SC = Sioux Falls to Sioux City
SF-MJ-SF = Sioux Falls to Marion Junction to Sioux Falls
M-CA-M = Mitchell to Canton to Mitchell

The crew schedule uses five separate crews: one three-person crew and four two-person crews. The extra crew member in the three-person crew is also used as a relief person during illnesses and vacations. The average crew works a total of 44.8 hours per week according to this schedule. Two crews, Crew 2 and Crew 5, work only four days a week. Crew 2 could be added as an additional Mitchell Yard switch engine on Sunday, if required. The lack of locomotives prohibits Crew 5 from working an additional day.

It is assumed that all crews will use Mitchell as a home terminal, except the Sioux Falls to Sioux City crew, Crew 3, which will operate out of Sioux Falls.

Freight Car Requirements

Based on the Alternative Case operating plan train schedule and estimated train schedules for other railroads, freight car cycles are developed for both interchange points (Aberdeen and Sioux City) and each line segment. Exhibits C-5 and C-6 show the round-trip time from each line segment to each major destination for traffic generated by the line segment via the Aberdeen and Sioux City gateways. Car times on the South Dakota core system are developed using the previously described train schedule. Car times beyond the system are based on estimated routes and schedules for each destination with an additional four days for switching and unloading at the destination.

Using the March, 1981 shipper survey and excluding the stone traffic that originates in Trent (which will move in shipper-owned cars), it is estimated that 8,642 loads per year will be handled in 100-ton cars and require a 516 car fleet. The 100-ton cars average 16.7 loads per year, or one load every 22 days. It is estimated that 92 70-ton cars will be required to handle the 1,485 outbound loads from the Mitchell to Chamberlain line. The 70-ton cars average 16.1 loads per year or one load every 23 days. These estimates assume a relatively uniform flow of traffic and year-round car utilization. On the basis of peak month car loadings, the 100-ton car requirement would be 829 cars and the 70-ton car requirement would be 149 cars.

These estimates do not assume any non-productive days, such as bad orders, stored cars, or mishandled cars. An average for non-productive days, experienced by a major Class I railroad, is 10 percent. Based on this adjustment, it is estimated that the maximum freight car requirements for the Alternative Case operating plan would be as shown in Exhibit C-7.

EXHIBIT C-5

ALTERNATIVE CASE OPERATING PLAN

FREIGHT CAR REQUIREMENTS

Aberdeen Gateway

LINE SEGMENT	DESTINATION	CARLOADS	CAR CYCLE DAYS			TRIPS PER YEAR	CARS REQUIRED
			ON SYSTEM	OFF SYSTEM	TOTAL		
Mitchell-Aberdeen	Minneapolis	341	4	11	15	24.3	14
	Duluth	23	4	14	18	22.3	1
	Seattle	247	4	15	19	19.2	13
Mitchell-Chamberlain	Minneapolis	389	9	11	20	18.3	21
	Seattle	991	9	15	24	15.2	65
Mitchell-Elk Point	Minneapolis	136	9	11	20	18.3	8
	Seattle	1,442	9	15	24	15.2	95
Mitchell-Canton	Minneapolis	190	9	11	20	18.3	11
	Duluth	11	9	14	23	15.9	1
	Seattle	2,023	9	15	24	15.2	133
	Canada	5	9	17	26	14.0	1
Sioux Falls-Sioux City	Minneapolis	180	11	11	22	16.6	11
	Seattle	1,185	11	15	26	14.0	85
Total 70-Ton Cars	—	1,380	—	—	—	—	86
Total 100-Ton Cars		5,783					373

EXHIBIT C-6

ALTERNATIVE CASE OPERATING PLAN

FREIGHT CAR REQUIREMENTS

Sioux City Gateway

LINE SEGMENT	DESTINATION	CARLOADS	CAR CYCLE DAYS			TRIPS PER YEAR	CARS REQUIRED
			ON SYSTEM	OFF SYSTEM	TOTAL		
Mitchell-Aberdeen	Omaha	97	11	6	17	21.5	5
	Sioux City	45	11	3	14	26.1	2
Mitchell-Chamberlain	Omaha	100	10	6	16	22.8	5
	Sioux City	5	10	3	13	28.1	1
Mitchell-Elk Point	Omaha	19	8	6	14	26.1	1
	Sioux City	132	8	3	11	33.2	4
	St. Joseph	316	8	8	16	22.8	14
	Chicago	41	8	10	18	20.3	2
	New Orleans	298	8	17	25	14.6	21
	Decatur	40	8	14	22	16.6	3
	Ohio	74	8	18	26	14.0	5
	St. Louis	16	8	16	24	15.2	1
Mitchell-Canton	Omaha	58	8	6	14	26.1	2
	Sioux City	400	8	3	11	33.2	12
	St. Joseph	257	8	8	16	22.8	11
	New Orleans	426	8	17	25	14.6	29
	Florida	5	8	18	26	14.0	1
Sioux Falls-Sioux City	Sioux City	201	5	3	8	45.6	4
	St. Joseph	5	5	8	13	28.1	1
	New Orleans	374	5	17	22	16.6	23
	Cedar Rapids	55	5	8	13	28.1	2
Total 70-Ton Cars	—	105	—	—	—	—	6
Total 100-Ton Cars		2,859	—	—	—	—	143

EXHIBIT C-7

ALTERNATIVE CASE OPERATING PLAN
FREIGHT CAR REQUIREMENTS

100-Ton Cars	568 to 912
70-Ton Cars	102 to 164

It may also be possible to borrow cars from other carriers or car suppliers during peak periods. This would reduce the number of cars which the core system operator would need to supply to satisfy local shipper needs.

BASE CASE OPERATING PLAN

This second operating plan is based on a maximum track speed of 10 miles per hour, using the same number of locomotives and crews that were used in the development of the Alternative Case operating plan. The lines operated do not change, but the lower operating speed limit causes the line segments over which the crews operate to change. The line segments used for this second plan are:

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

The traffic volumes for this plan are from the March 1981 shipper survey and the total number of gross tons that could be handled on the core system at 10 miles per hour.

This section details the total trip times, train schedules, crew schedules, locomotive schedules, and freight car requirements of the proposed Base Case operating plan.

Trip Times By Line

The maximum allowable operating speed for FRA safety standard Class I track is 10 miles per hour for freight trains. To maintain a safe speed that does not exceed 10 miles per hour, 9 miles per hour is used to calculate running time. Although trains, in most cases, could maintain 10 miles per hour, the 10 percent allowance is made to insure that trains do not exceed the Federal safety standards. An additional 5 percent allowance is made to account for acceleration and deceleration and to reflect the fact that on the more significant grades, speeds will drop below 10 miles per hour. Switching time is assumed to be 30 minutes for each location. The total trip times for this plan, including running and switching times, are shown in Exhibit C-8.

Federal law prohibits a train crew from operating in excess of 12 hours per day. Five of the seven line segments require a 12-hour operation. Because there are no relief crews, it is assumed that a crew would forego switching in an effort to avoid violating Federal law and still reach the destination terminal within the allotted time.

Train Schedule

The proposed train schedule for this operating plan is designed to provide the maximum amount of service to the largest volume lines. The slow running times, combined with a fixed number of crews, limits the amount of service that can be provided to the entire core system.

The proposed train schedule is shown in Exhibit C-9. As can be seen, service on the following line segments is reduced to once a week:

- Mitchell to Chamberlain;
- Mitchell to Yankton; and
- Yankton to Sioux City.

All other lines have twice a week service. A switch engine works in Mitchell two days per week.

The Mitchell to Aberdeen train requires three days to make a complete turn from Mitchell to Aberdeen and back to Mitchell. The train from Mitchell to Aberdeen handles all outbound core system tonnage to West Coast and Minnesota destinations. After leaving Mitchell, the train goes to Redfield and spends the night.

EXHIBIT C-8

BASE CASE OPERATING PLAN

TOTAL TRIP TIMES PER DAY

BEGINNING STATION	ENDING STATION	LINE SEGMENT LENGTH (MILES)	RUNNING TIME @ (HOURS-ONE-WAY)	SWITCHING TIME (HOURS)	TOTAL DAILY TRIP TIME (HOURS)
Mitchell	Aberdeen	128.6	15.0	3.0	18.0
Mitchell	Chamberlain	66.6	7.7	4.3	12.0
Mitchell	Canton	79.2	9.2	2.8	12.0
Mitchell	Yankton	74.9	8.7	3.3	12.0
Yankton	Sioux City	54.3	6.3	4.7	11.0
Sioux Falls	Canton	20.8	2.4	5.2	10.0*
Sioux City	Canton	62.4	7.3	4.7	12.0

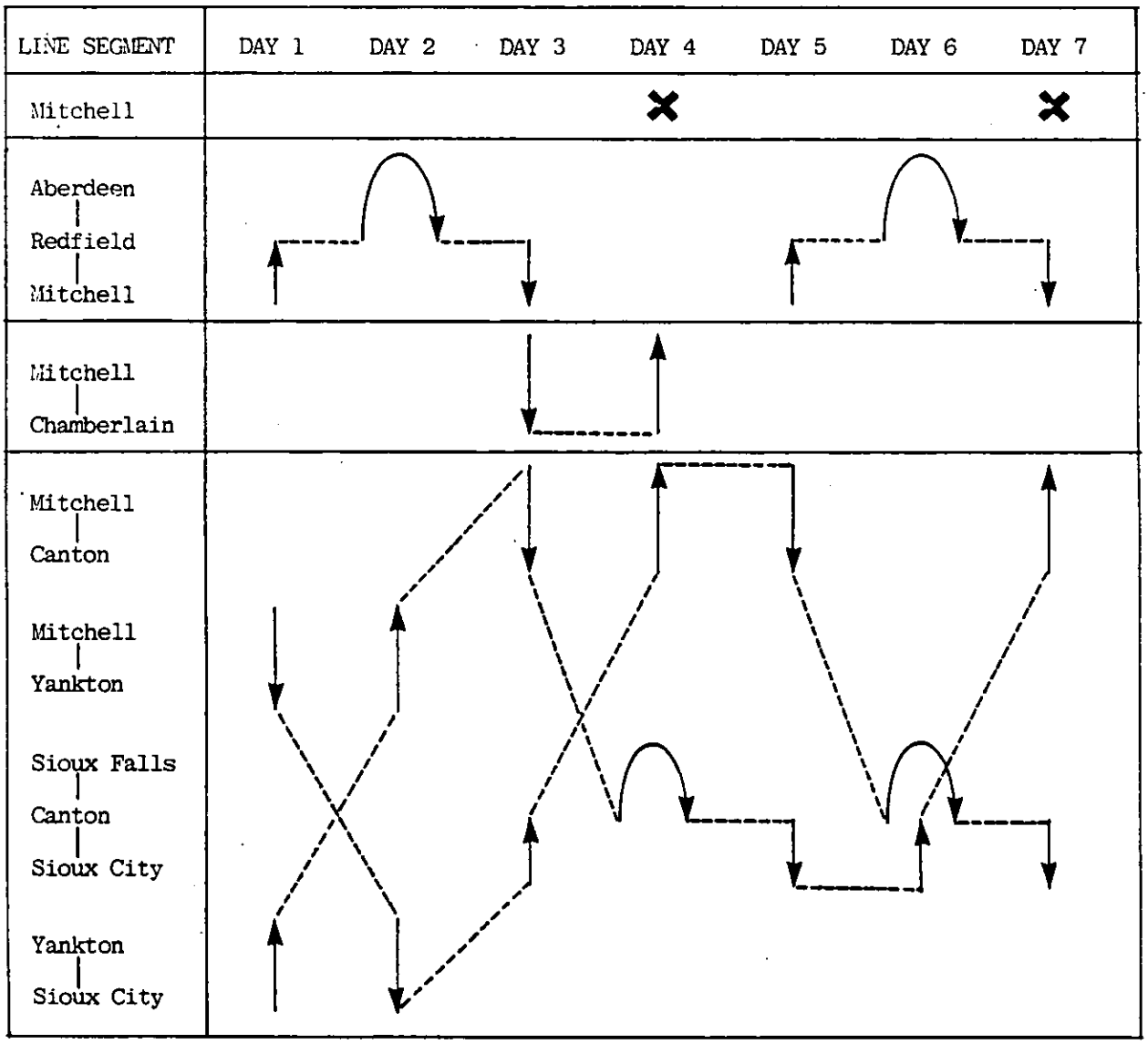
@ Includes 10% additional time for accelerating and decelerating and grades.

* Round-trip in one day.

EXHIBIT C-9

BASE CASE OPERATING PLAN

TRAIN SCHEDULE



Key

- ✖ - Mitchell Yard Switcher
- ↑ - One-way trip per day
- ↺ - Round-trip per day

The next day, the train proceeds to Aberdeen where it delivers the outbound cars and picks up inbound cars. On the trip from Aberdeen to Mitchell, the train provides any local service required. The train spends the night south of Redfield and proceeds to Mitchell on the third day.

The Mitchell to Chamberlain train operates to and from Chamberlain once a week. The train from Mitchell to Chamberlain places all empty and inbound loaded cars and then spends the night in Chamberlain. The next day, the train proceeds from Chamberlain to Mitchell, pulling the outbound loaded and empty cars.

The other trains operate on a cycle, serving the rest of the core system. The first train operates from Mitchell to Yankton and Yankton to Sioux City. The train spots empties and pulls loaded and empty cars that are destined for Sioux City. The train then proceeds from Sioux City to Canton and from Canton to Mitchell pulling all cars destined for Aberdeen and beyond. At Canton, the train leaves any empty stone hoppers and picks up any loaded stone hoppers that may be available for movement west to Mitchell. The train then operates from Mitchell to Canton. At Canton, the train meets the northbound Sioux City to Canton train and takes the empty stone cars to Sioux Falls and returns. The train then operates to Sioux City.

The other train operates from Sioux City to Yankton and Yankton to Mitchell, pulling cars that are destined for Aberdeen. The train then operates from Mitchell to Canton placing empties and returning empty stone hoppers. From Canton, the train operates to Sioux Falls and back to Canton, then proceeds to Sioux City, placing empties and pulling cars destined for Sioux City. The train then operates back to Canton and from Canton to Mitchell pulling cars destined for Aberdeen.

Locomotive Schedule

The type and number of locomotives used for this plan are the same as for the Alternative Case plan: 10 GP 9 (1,750 horsepower) locomotives. The locomotive requirements for each line segment are as follows:

- Mitchell-Aberdeen - 4 locomotives;
- Mitchell-Chamberlain
- Mitchell Yard Switching

} - 1 locomotive;

- Mitchell to Canton
- Mitchell to Yankton
- Yankton-Sioux City

\- 2 locomotives, and

- Sioux City- Canton
- Canton-Sioux Falls

\- 3 locomotives

The cycling of the locomotives, however, may not correspond to the above requirements. An additional locomotive could be used when it is not otherwise required due to locomotive cycle. Spare locomotives could be diverted from the Mitchell yard, or from the Mitchell to Aberdeen train. It should be recognized that additional work in Mitchell would be required if the Mitchell yard engine is diverted. Likewise, tonnage would be left in Mitchell if one unit is removed from the Mitchell to Aberdeen train.

The locomotive schedule is shown in Exhibit C-10. As can be seen, the locomotives have few idle days. Maintenance and repair work would have to be done at night or during idle days created by interchanging locomotives between trains.

Crew Schedule

The train crews average a 54.8 hour work week under this plan, compared to a 44.8 hour work week for the Alternative Case plan. The crew schedule is shown in Exhibit C-11.

As listed in the crew schedule, each crew gets two days off per week except Crew 3, which gets three days off. The home terminal for all crews is Mitchell. However, the crews spend a large amount of time away from their home terminal. For example, Crew 5 leaves Mitchell on Day 3 and does not return until Day 7.

The crew size does not change with this plan, with one 3-person crew and four 2-person crews. However, relief becomes more complicated. If a crew outlaws (works 12 hours before reaching the terminal), it becomes very difficult to finish the crew's work and bring the train into the terminal. The long running times prevent crews from making up time by spending more hours in one day than anticipated. For example, if Crew 5 outlaws on Day 5 before reaching Sioux City, on Day 6 the crew would have to finish the Sioux City run and then head back to Canton. However, Canton is a 12-hour run including local switching. Therefore, Crew 5 would have to either forego some local

EXHIBIT C-10

BASE CASE OPERATING PLAN

LOCOMOTIVE SCHEDULE*

LOCOMOTIVE UNIT	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
1	M-R	R-A-R	R-M	MS	M-R	R-A-R	R-M
2	M-R	R-A-R	R-M	---	M-R	R-A-R	R-M
3	M-R	R-A-R	R-M	---	M-R	R-A-R	R-M
4	M-R	R-A-R	R-M	---	M-R	R-A-R	R-M
5	M-Y	Y-SC	SC-CA	CA-M	M-CA	CA-SF-CA	CA-SC
6	M-Y	Y-SC	SC-CA	CA-M	M-CA	CA-SF-CA	CA-SC
7	SC-Y	Y-M	M-CA	CA-SF-CA	CA-SC	SC-CA	CA-SC
8	SC-Y	Y-M	M-CA	CA-SF-CA	CA-SC	SC-CA	CA-M
9	SC-Y	Y-M	M-CA	CA-SF-CA	CA-SC	SC-CA	CA-M
10	---	---	M-CH	CH-M	---	---	MS

Key

MS = Mitchell Yard Switcher
M-R = Mitchell to Redfield
R-M = Redfield to Mitchell
R-A-R = Redfield to Aberdeen to Redfield
M-Y = Mitchell to Yankton
Y-M = Yankton to Mitchell
Y-SC = Yankton to Sioux City
SC-Y = Sioux City to Yankton
SC-CA = Sioux City to Canton
CA-SC = Canton to Sioux City
M-CA = Mitchell to Canton
CA-M = Canton to Mitchell
M-CH = Mitchell to Chamberlain
CH-M = Chamberlain to Mitchell
CA-SF-CA = Canton to Sioux Falls to Canton

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* Assumes GP 9 (1,750 hoursepower) locomotive units.

EXHIBIT C-11

BASE CASE OPERATING PLAN

CREW SCHEDULE

CREW SIZE	CREW NUMBER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	CREW HOURS PER WEEK
2	Crew 1	M-R	R-A-R	R-M	MS	---	---	MS	52
2	Crew 2	---	---	M-CH	CH-M	M-R	R-A-R	R-M	60
2	Crew 3	M-Y	Y-SC	SC-CA	CA-M	---	---	---	47
3	Crew 4	SC-Y	Y-M	---	---	M-CA	CA-SF-CA	CA-SC	57
2	Crew 5	---	---	M-CA	CA-SF-CA	CA-SC	SC-CA	CA-M	58

Key

MS = Mitchell Yard Switcher
M-R = Mitchell to Redfield
R-M = Redfield to Mitchell
R-A-R = Redfield to Aberdeen to Redfield
M-Y = Mitchell to Yankton
Y-M = Yankton to Mitchell
Y-SC = Yankton to Sioux City
SC-Y = Sioux City to Yankton
SC-CA = Sioux City to Canton
CA-SC = Canton to Sioux City
M-CA = Mitchell to Canton
CA-M = Canton to Mitchell
M-CH = Mitchell to Chamberlain
CH-M = Chamberlain to Mitchell
CA-SF-CA = Canton to Sioux Falls to Canton

switching or outlaw before reaching Canton and setting the schedule back again. The only realistic alternative to this problem is to reduce the local switching and leave cars behind. It is possible to use the third person on the three-person crew and the trainmaster as relief, provided they can drive a motor vehicle wherever necessary to relieve a crew.

Freight Car Requirements

The car requirements for the Base Case plan change due to the increased transit time on the core system and the lower traffic levels which can be served. Based on the Base Case operating plan train schedule and estimated train schedules for other railroads, freight car cycles are developed for both interchange points, Aberdeen and Sioux City, and each line segment. Exhibits C-12 and C-13 show the round-trip time from each line segment to each major destination for traffic generated by the line segment via the Aberdeen and Sioux City gateways. Car times on the core system are developed using the previously described train schedule. Car times beyond the core system are based on estimated routes and schedules for each destination with an additional four days for switching and unloading at the destination. Using the revised March, 1981 shipper survey and excluding the stone traffic that originates in Trent (which will move in shipper-owner cars), it is estimated that 6,388 loads per years can be handled in 100-ton covered hopper cars and require a 469 car fleet. The 100-ton cars average 13.6 loads per year or one load every 27 days. It is estimated that 66 70-ton covered hopper cars will be required to handle the 724 outbound loads from the Mitchell to Chamberlain line. The 70-ton cars average 11.0 loads per year or one load every 33 days. These estimates assume a relatively uniform flow of traffic and year-round car utilization. On the basis of peak month car loadings, the 100-ton car requirement would be 717 cars, while the 70-ton car requirement would be 106 cars.

These estimates do not assume any non-productive days, such as bad orders, stored cars, or mishandled cars. Using the 10 percent adjustment previously described, it is estimated that the maximum freight car requirements for the Base Case operating plan would be as shown in Exhibit C-12, below.

EXHIBIT C-12

BASE CASE OPERATING PLAN
FREIGHT CAR REQUIREMENTS

100-Ton Cars	516 to 789
70-Ton Cars	73 to 117

EXHIBIT C-12

BASE CASE OPERATING PLAN
FREIGHT CAR REQUIREMENTS

Aberdeen Gateway

LINE SEGMENT	DESTINATION	CARLOADS	CAR CYCLE DAYS			TRIPS PER YEAR	CARS REQUIRED
			ON SYSTEM	OFF SYSTEM	TOTAL		
Mitchell-Aberdeen	Minneapolis	147	9	11	20	18.3	8
	Duluth	19	9	14	23	15.9	2
	Seattle	230	9	15	24	15.2	15
Mitchell-Chamberlain	Minneapolis	17	18	11	29	12.6	2
	Seattle	707	18	15	33	11.1	64
Mitchell-Yankton	Minneapolis	7	18	11	29	12.6	1
	Seattle	377	18	15	33	11.1	35
Yankton-Elk Point	Minneapolis	4	17	11	28	13.0	1
	Seattle	375	17	15	32	11.4	33
Mitchell-Canton	Minneapolis	201	13	11	24	15.2	14
	Duluth	11	13	14	27	13.5	1
	Seattle	1,642	13	15	28	13.0	127
	Canada	5	13	17	30	12.2	1
Sioux Falls-Sioux City	Minneapolis	180	13	11	24	15.2	12
	Seattle	1,071	13	15	28	13.0	83
Total 70-Ton Cars	—	724	—	—	—	—	66
Total 100-Ton Cars		4,269	—	—	—	—	333

EXHIBIT C-13

BASE CASE OPERATING PLAN

FREIGHT CAR REQUIREMENTS

Sioux City Gateway

LINE SEGMENT	DESTINATION	CARLOADS	CAR CYCLE DAYS			TRIPS PER YEAR	CARS REQUIRED
			ON SYSTEM	OFF SYSTEM	TOTAL		
Mitchell-Aberdeen	Omaha	88	13	6	19	19.2	5
Mitchell-Chamberlain	—	0	—	—	—	—	0
Mitchell-Yankton	New Orleans	30	15	17	32	11.4	3
Yankton-Elk Point	Chicago	59	13	10	23	15.9	4
	New Orleans	112	13	17	30	12.2	10
	Decatur	12	13	14	27	13.5	1
	Ohio	31	13	18	31	11.8	3
	St. Louis	6	13	16	29	12.6	1
Mitchell-Canton	Omaha	58	11	6	17	21.5	3
	Sioux City	400	11	3	14	26.1	15
	St. Joseph	257	11	8	19	19.2	14
	New Orleans	426	11	17	28	13.0	33
	Florida	5	11	18	29	12.6	1
Sioux Falls-Sioux City	Sioux City	201	6	3	9	40.6	5
	St. Joseph	5	6	8	14	26.1	1
	New Orleans	374	6	17	33	11.1	34
	Cedar Rapids	55	6	8	14	26.1	3
Total (100-Ton Cars)	—	2,119	—	—	—	—	136

It may be possible to borrow cars from other carriers or car suppliers during peak periods. This would reduce the number of cars which the core system operator would need to supply to satisfy local shipper needs.

Findings

The two operating plans developed in this appendix provide the basis for estimating the traffic volumes, freight revenues, and operating costs associated with serving the South Dakota core system at maximum operating speeds of 25 and 10 miles per hour. The primary impacts of not upgrading the core system lines to Class II (25 miles per hour) track conditions is summarized as follows:

- 30 percent decline in traffic served (carloads);
- 22 percent increase in crew hours worked per week;
- 25 percent increase in average car cycle times;
- 12 percent decrease in car fleet required; and
- reduced scheduling and operating flexibility.

The impacts on the transportation and market efficiency benefits as well as the local community impacts of these operating and rehabilitation alternatives are discussed in detail in the main body of the Addendum.

APPENDIX D

BENEFIT-COST ANALYSIS METHODOLOGY

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BENEFIT-COST ANALYSIS METHODOLOGY

This appendix describes in detail the benefit-cost analysis methodology used in assessing the economic effects of rehabilitating 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 non-monetary 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 D-1, and the steps are explained individually in the following pages.

Define Alternatives

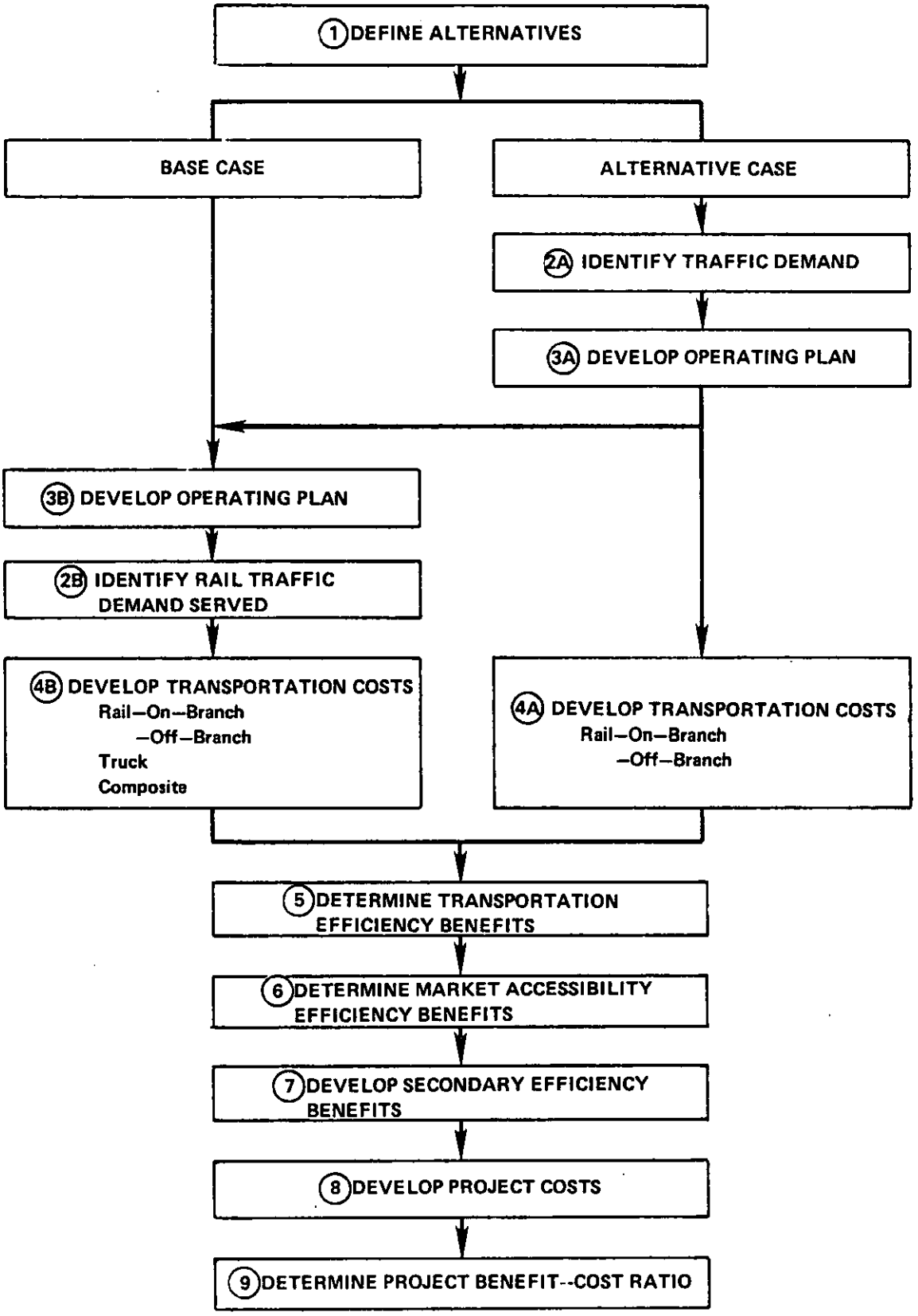
The first step in the project analysis was to identify the project alternatives being considered by South Dakota for rehabilitating the core system. At the time of this study, all the former Milwaukee lines except Aberdeen to Wolsey were below Class I track conditions. In the summer of 1981, through the Directed Service Program, the remainder of the core system, except for the Sioux Falls to Sioux City line, would be brought up to Class I conditions. This would permit operating speeds of up to 10 miles per hour. An operating waiver would be requested for the Sioux Falls to Sioux City line and it was expected that sufficient maintenance would be performed to allow operations to continue. This represented the Base Case Plan.

The Alternative Case Plan proposed by the Division of Railroads was to rehabilitate the core system to Class II track conditions, permitting operating 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 to the operator.

The existing status of the former Milwaukee lines in South Dakota was not considered the Base Case for this analysis because the proposed project consisted solely of rehabilitating the core system from Class I to Class II track conditions. It was assumed that even without the proposed Class II rehabilitation program,

EXHIBIT D-1

BENEFIT–COST ANALYSIS MODEL



rail service would be provided by an independent short line operator. The economic benefits of the proposed project therefore were limited to the cost savings associated with operating over the system at a higher operating speed, and the higher commodity rates made available to South Dakota shippers because of the accessibility of West Coast markets.

Develop Traffic Demand - Alternative Case

Once the alternative analysis cases were determined by the Division, 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. Projected traffic volumes were identified for all modes. Also 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 to 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 D-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.

Develop Operating Plans

To estimate the traffic volume associated with the Base Case, rail volume was limited to the amount that could be handled by the same number of crews and locomotives that would be required to operate the core system in the Alternative Case. This required that two operating plans be developed.

EXHIBIT D-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

The first operating plan was developed for the Alternative Case, assuming demand projections would be fully served, shippers would receive bi-weekly service, and the track would be operated at 25 miles per hour. The operating plan consisted of:

- a train schedule;
- a locomotive schedule;
- a crew schedule; and
- a freight car requirements list by gateway used.

Assuming that the Base Case operating plan would have available only the same number of locomotives and crews as in the Alternative Case served as a traffic constraint. This was because the slower operating speeds made it possible to continue bi-weekly service on only the Mitchell to Canton and Sioux Falls to Sioux City lines without additional locomotives or crews. The slower operating speed limit of 10 miles per hour thus resulted in fewer stations served per day per train.

This Base Case operating plan included reduced train and locomotive schedules. The crew schedule resulted in longer employee work weeks because the trains needed more time to complete their runs. As a result of the slower operating speed and the reduced train schedule, fewer carloads could be served on the core system. This reduced the car requirements in the Base Case, although the percentage reduction was moderated by the longer equipment cycle times on the core system.

For more information on the two operating plans, see Appendix C of this report.

Develop Traffic Demand - Base Case

The reduced volume of traffic which could be served on the core system with 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 Transportation Costs of Traffic Movements

An important element of the benefit-cost analysis methodology was the determination of the unit 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 costing models used to develop these costs are briefly described in this section.

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.

On-Branch Costs

On-branch costs consisted of the avoidable (variable) costs of moving traffic over the core system. These costs were developed using Peat Marwick's Rail Form A costing model, adjusted for the conditions associated with an independent short line operation.

Rail Form A is a formula procedure prescribed by the Interstate Commerce Commission for developing functional unit costs from accounting and operating data. The development of unit costs in Rail Form A is based on the assignment of functional costs incurred by a railroad in performing a given service over each functional unit of that service. The historical number of service units incurred in a specific movement is part of the basis for determining historical unit costs, which in turn become the basis for calculating unit costs for the future.

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

To estimate the costs of operating the core system by an independent short line operator, the Rail Form A inputs and outputs for an efficient grain-gathering railroad were adjusted to reflect the type of operation planned. These adjustments included the following:

- reduced crew size: 2-person crews;
- crew hour totals by case;
- reduced crew wage rates to reflect non-union crews;
- specific car days on the core system; and
- specific per-diem and mileage car costs.

The crew size and wage rate adjustments consisted of reducing by 60 percent the labor-related components of the Rail Form A outputs (half of the loaded and empty way train costs). The labor costs were further adjusted to reflect the different crew hours per line between the Alternative and Base Cases. The use of way train costs without any through train costs reflected the short line type of operation planned for the core system. A through train operation is planned between Mitchell and Aberdeen for West Coast traffic, and is reflected in the rail costs.

Car-day estimates for core system movements were based on the proposed operating plans for each case. Car per diem and mileage rates were based on average railroad equipment costs contained in the UMLER file, and it was assumed that cars were 2-3 years old. The rates for shipper-owned cars were used where appropriate.

The fully adjusted Rail Form A model produced long-term variable costs for the core system portion of the line haul. The original input expenses were indexed from a July 1977 cost base to a January 1981 cost base.[1] Adjusted Rail Form A costs were produced for each traffic movement group, defined by car type and lengh of haul for each line of the core system.

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[1] Based on "Indexes of Railroad Charge-Out Prices and Wage Rates," Association of American Railroads, Economics and Finance Department, Washington, D.C., January 1981, an estimated cost index of 1.40 was used to inflate July 1977 railroad costs to January 1981 cost levels.

Off-Branch Costs

Off-branch costs refer to the variable costs of moving traffic to or from points beyond the core system.

The off-branch costs were developed using Peat Marwick's unadjusted Rail Form A model, based on the inputs appropriate to the railroad involved in the particular interline movement.

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. This information was provided to the FRA in a confidential appendix.

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 averge of 2,000 hours driven per year. The truck costs were based on a January 1981 time frame. The variable costs were strictly a function of mileage with driver cost including a fixed component (minimum base salary). Pickup and delivery costs were a function of estimated delay time. Also included in the fixed costs were return on investment, insurance, licenses and permits, and overhead costs. The total fixed costs were estimated at $18,370 per year, or 18.37 cents per mile.

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. These total costs amounted to $71,970 per 100,000 miles or 71.97 cents per mile.

The total costs that were a function of mileage amounted to $90,340 for 100,000 miles or 90.34 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 $8.81 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. Truck-rail movements occurred only a limited number of times, and the composite transportation cost consisted of the cost per ton developed for the truck portion of the move, plus the off-branch cost per ton developed for the rail portion of the move.

When both rail and truck modes were used to move a given quantity of traffic between two points, a weighted average cost per ton of both modes was developed. All costs were applicable to January 1981.

Develop Project Benefits

The economic outcomes of the proposed rehabilitation of the core system to a Class II condition (the Alternative Case) are called project benefits, while the cost of performing the rehabilitation is called the project cost. 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.

non-monetary benefits

- . employment.
- . energy consumption.
- . air pollution emissions.

Exhibit D-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 efficiency benefits.

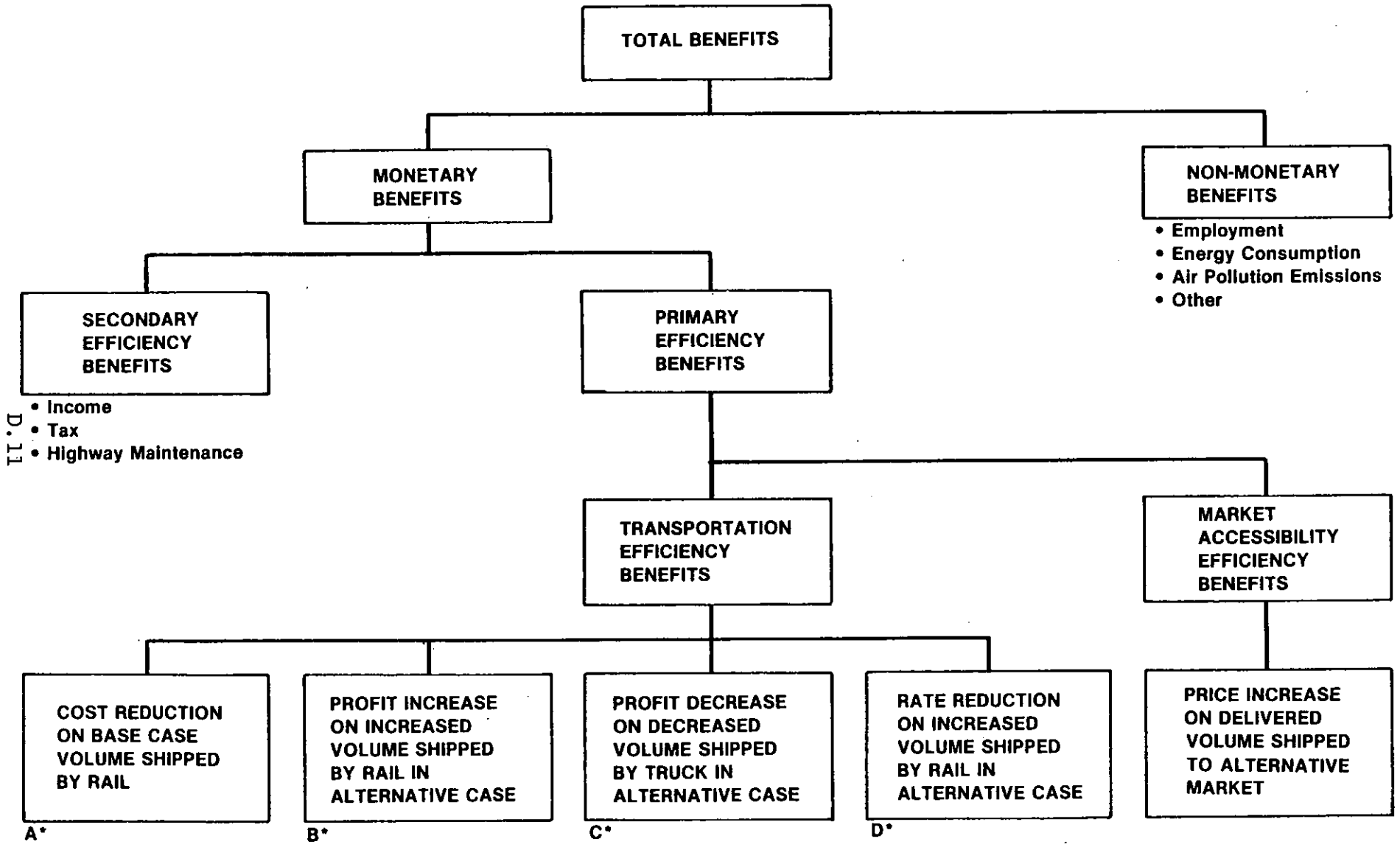
Transportation Efficiency

The transportation efficiency benefits of the Alternative Case consist of four components, as outlined in Exhibit D-3 and illustrated in Exhibit D-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;

EXHIBIT D-3

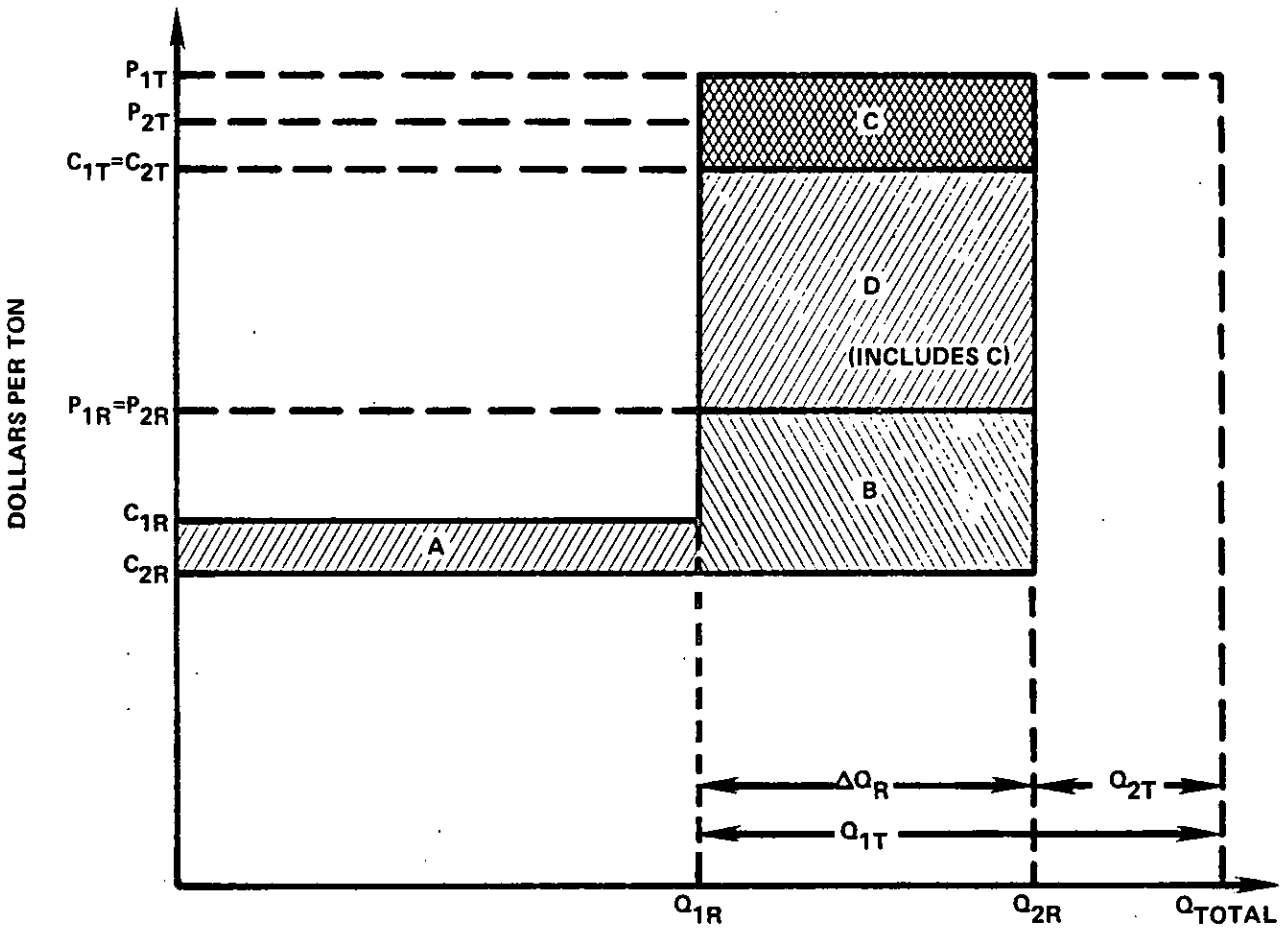
RAIL PROJECT BENEFITS



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

EXHIBIT D-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 $C_{1R} < C_{2R}$.

- 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 D-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 project line (for both rail and truck modes) remains constant, but the effect of the project is to increase the rail share of the total traffic. This reflects the fixed nature of the transportation demand found for core system lines.

- The level of rail rates was assumed to remain constant, while the 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) + O (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 was 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 outcomes 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 shippers, 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 outcomes 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 outcome 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:

$$(M_o-M_n)_H = (T)(V)(L)\ x\ [0.00167554]$$

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 Road Trip (Tons)
L = Length of Haul in South Dakota (One-Way Miles)

Highway cost impacts were considered only for the roadways located in South Dakota and were calculated on an annualized basis. Impacts 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.

Non-Monetary Benefits - Non-monetary benefits of a local rail assistance project consist of the non-dollar-valued outcomes that result over the term of the project. These include both quantifiable and non-quantifiable 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, and 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

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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; p. 5-16, 6-11.

for all traffic movements for all modes by line. Next, the totals were compared to 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.[1] Exhibit D-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 to 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.

Other

Other non-monetary 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 national rail system;

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

EXHIBIT D-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.

- 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 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 Class II condition. These one-time costs were provided by the following sources:

- Railroad Builders, Inc
  - Aberdeen-Wolsey Line
  - Sioux Falls-Sioux City Line
- Thomas K. Dyer, Inc.
  - Wolsey-Mitchell Line
  - Mitchell-Chamberlain Line
  - Mitchell-Elk Point Line
  - Mitchell-Canton Line

Railroad Builders, Inc. is currently the designated Directed Service operator for the core system and is performing the Directed Service Program rehabilitation to Class I of four core system lines.

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 annualized 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 criteria were as follows:

Criteria	General Decision Rule
Benefit-Cost Difference	Accept if $B_n - C_n > 0$ 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 non-monetary 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 such an analysis. 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 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. However, the enclosed results reflect the best estimates of the consequences of rehabilitating the core system to Class II conditions to permit maximum operating speeds of 25 miles per hour, assuming operations by an independent, short line operator.