PRELIMINARY ANALYSIS OF CNW'S NEBRASKA RAIL LINE VOLUME I

by

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Preliminary Analysis of CNW's Nebraska Rail Line

Impacts of Abandonment

Feasibility of Continued Operation as an Independent Short Line Railroad

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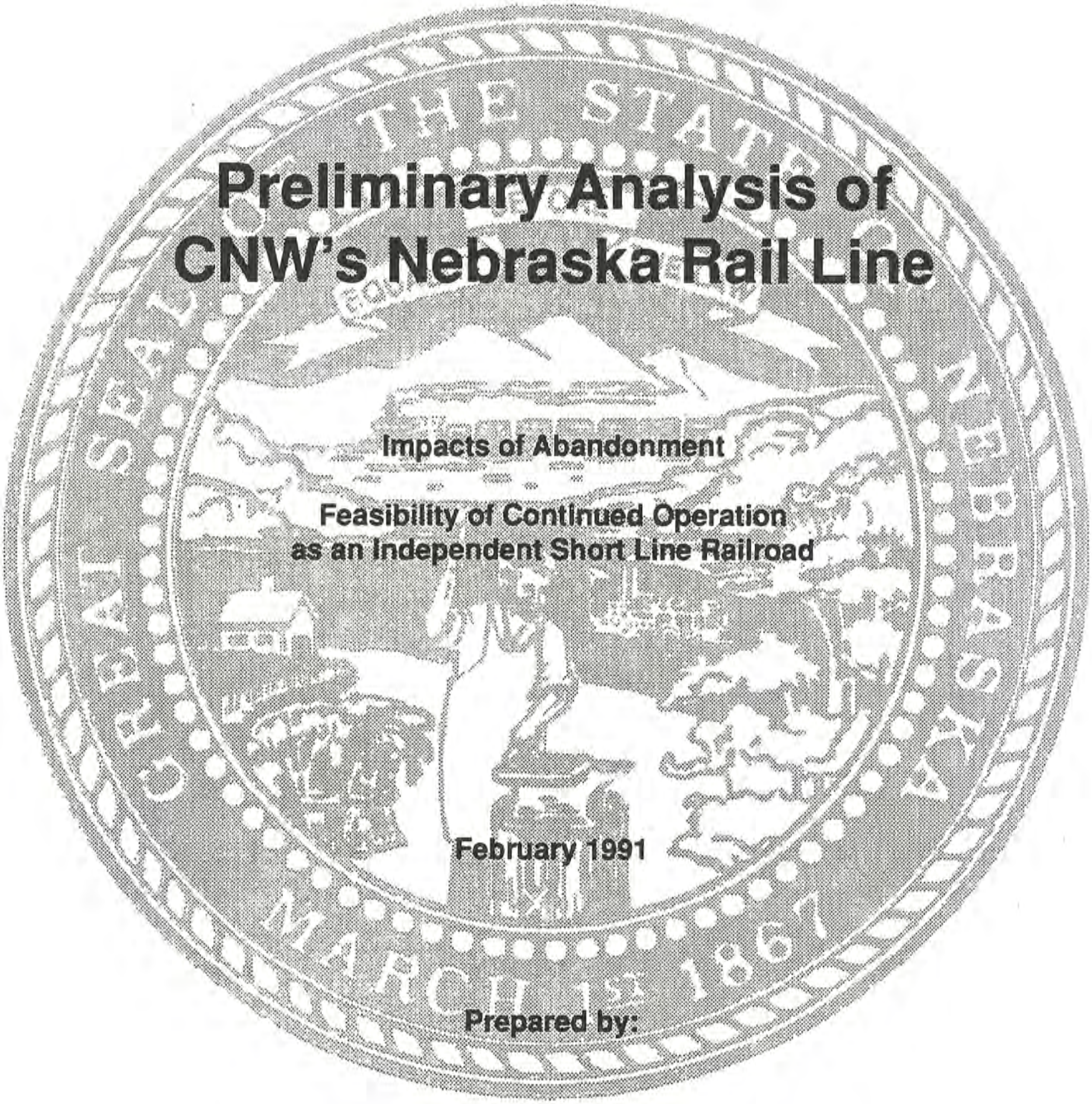

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PRELIMINARY ANALYSIS OF CNW'S NEBRASKA RAIL LINES

IMPACT OF ABANDONMENT

FEASIBILITY OF CONTINUED OPERATION AS AN INDEPENDENT SHORT LINE RAILROAD

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FORWARD

In September, 1989, Senator Howard Lamb, then chairman of the Nebraska Legislature's Transportation Committee, formed the "Nebraska Rail Needs Task Force." The purpose of the task force was to investigate the options available to the State to address the light density rail line needs identified in the 1989 Department of Roads', "Nebraska Rail Program Needs Study." Following this investigation, the task force was to formulate recommendations for review by the Legislature on a proper role for the State in addressing these needs. The task force did this and on December 28, 1989, presented the Transportation Committee with its report entitled, "PROPOSED ROLE FOR THE STATE OF NEBRASKA IN ADDRESSING LIGHT DENSITY RAIL LINE NEEDS."

In late 1990, Senator Lamb asked the Department of Roads to fund an impact study on the potential abandonment of the Chicago and North Western Transportation Company's rail line between Chadron and Norfolk. The purpose of the study was to identify the economic and highway impacts the state would experience if the line were abandoned. This study is the product of that request.

The contents of this study reflect the views of the authors who are responsible for the opinions, findings and conclusions presented herein.

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EXECUTIVE SUMMARY

This study analyzes the various issues and impacts surrounding the potential abandonment of the Chicago and North Western Transportation Company's (CNW) railroad line between Chadron and Norfolk, Nebraska. This 317.5 mile "Northern Line" serves the northern third of the state from Madison, to Dawes Counties and provides the only rail service throughout most of the region.

In late 1989, CNW placed the Northern Line up for sale. There were only two serious proposals brought to the CNW. However, neither proposal was considered sufficient by CNW to consummate a transaction. Unless a satisfactory arrangement can be made with the CNW, the line will be abandoned, probably by the end of this year.

Information from several sources was analyzed by Dr. Denver Tolliver of the Upper Great Plains Transportation Institute, North Dakota State University at Fargo. Dr. Tolliver has considerable experience in the area of transporation impact studies and focused on the impacts to the state's highways and economy. Transportation Operations, Inc. (TOI) of Plymouth, Michigan, analyzed the condition, rehabilitation costs and net salvage values of the line. The complete operations, including train service, engineering expense, equipment expense and all other normal categories of costs were carefully examined in TOI's short line cost/revenue model to determine the economic viability of the line.

The study concluded that the State of Nebraska will experience serious highway impacts if the Northern Line is abandoned. The abandonment will result in a dramatic increase in heavy trucks operating over highways in the area. This will create accelerated resurfacing costs, or Build Sooner Costs, amounting to $13.1 million over twenty five years. In addition, damage created by the heavy trucks will cost the state $95 million in additional pavement costs over twenty five years. Additional highway user costs are estimated at $2.1 million over the same period. These highway related costs over a 25 year period amount to $110.2 million.

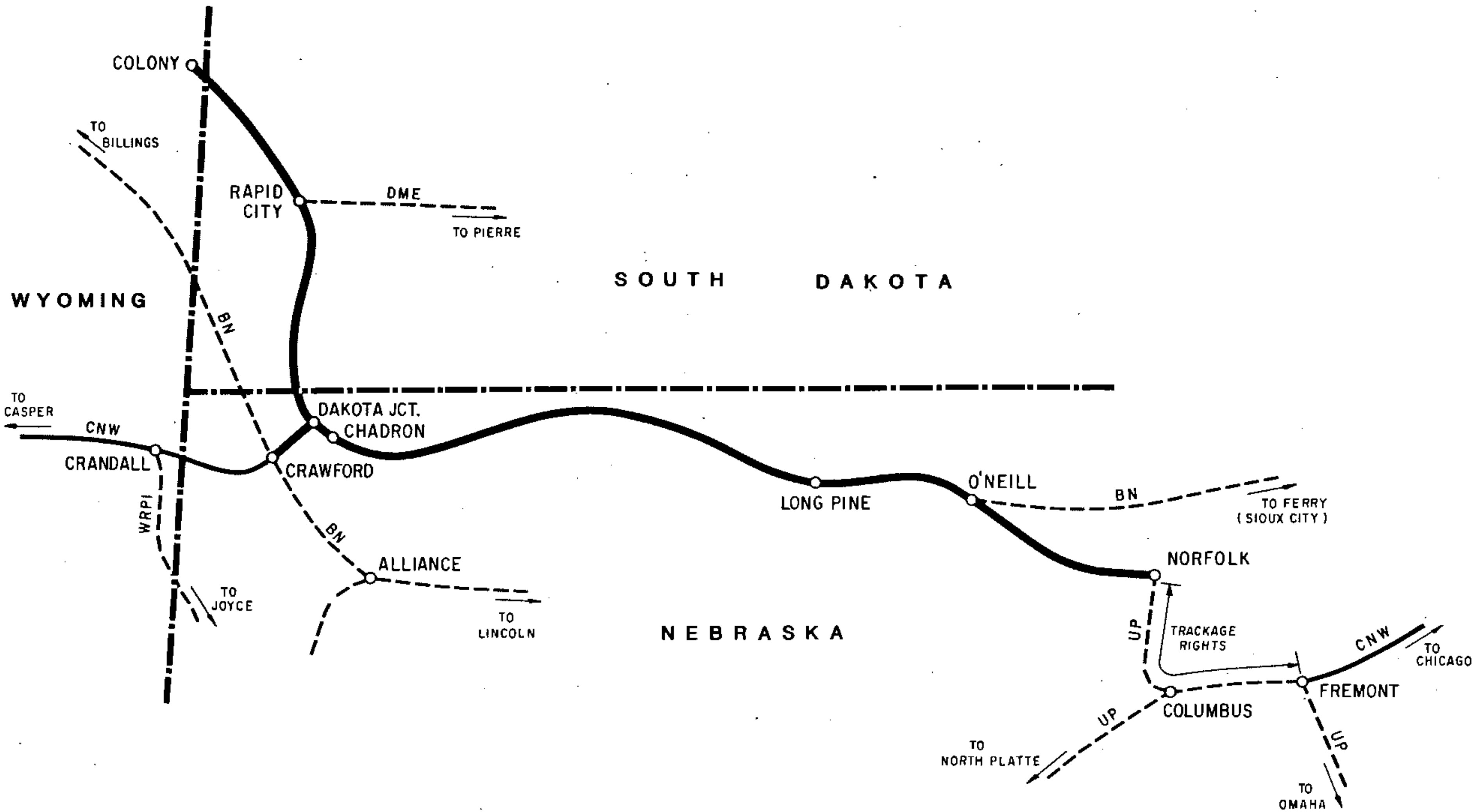
In addition, the impacts on the farmers, shippers and communities are high. Abandoning the Northern Line would increase shipping costs (reduce producers' incomes) by approximately $1.4 million annually. This results in primary economic impacts to the region of $35 million over a 25 year period.

When producers (mostly farmers) and shippers (primarily elevators) pay more for transportation, they have less to spend on other items. This in turn, has a ripple, or "multiplier" effect throughout the economy. The subsequent reduction in producers' expenditures would reduce regional incomes by an additional $1 million per year and reduce the revenues of businesses in the region by almost $2 million per year. These impacts consider the agricultural and general business sector. This does not include the offsetting impacts to the trucking sector.

The study found that a private sector investor purchasing, rehabilitating and operating the line is impractical. The only probable alternative to continued rail service would be a strong commitment from the users of the line to obtain control of the line and guarantee its long term viability through increased use. The TOI analysis showed that the line could survive and even prosper under such a scenario.

The State of Nebraska, on-line communities and shippers are the major beneficiaries if the line continues to operate. Because of the condition of the line, the price required by CNW and the inability to obtain commercial financing, the proposal suggests an alternative mechanism for the State of Nebraska to get the line in operation as a rehabilitated, independent short line. The line can be purchased for $7 million in the first year, and approximately $13.5 million is required for rehabilitation of the line, over a 5 year period. The users (shippers) would then lease/purchase the line from the state, and assume responsibilty for its' success over a 25 year period.

This proposal does not suggest that the State of Nebraska should get into the railroad business any more than it is currently in the trucking business. What it does suggest is an opportunity that will allow the state to save the line from abandonment and avoid substantial costs in highway maintenance and serious regional economic impacts. **The benefit to cost ratio to the state is conservatively estimated at 16.3 to 1. This indicates the project is in the public interest and should be given every consideration for implementation.**



CNW NORTHERN LINE

INTRODUCTION

Background

This study analyzes the various issues and impacts surrounding the potential abandonment of the Chicago and North Western Transportation Company's (CNW) railroad line between Chadron and Norfolk, Nebraska. This 317.5 mile "Northern Line" is part of a through route extending from Fremont to Central Wyoming. Between Fremont and Norfolk, the CNW uses trackage rights over the Union Pacific Railroad to connect to the CNW main line from Fremont east.

In late 1989, CNW placed the Northern Line up for sale. Response to the potential sale was light, with only two serious proposals brought to the CNW. However, neither of these proposals were considered sufficient by CNW to consummate a transaction. Unless a satisfactory arrangement can be made with the CNW by early summer, the line will be abandoned. The current issues are the impacts of abandonment of the line on the State of Nebraska's highways, on-line shippers and the economy of the region currently served by the line. Another key issue is the feasibility of the Northern Line being operated as an independent short line.

The Northern Line serves (from East to West) Madison, Antelope, Holt, Rock, Brown, Cherry, Sheridan and Dawes Counties in Nebraska. Primary commodities handled on the line are: grain and beans, fertilizer, propane gas, lumber products, farm machinery and various other miscellaneous commodities. In the event that the line is abandoned, alternative rail services would be available only at Norfolk and O'Neill. There would be some possibility that service would be available to the BN at Crawford, since the trackage from Chadron to Crawford is currently planned to be retained by CNW, but the feasibility of this gateway being competitive is uncertain. All traffic not conducive for movement to these points would require trucking to other grain terminals or processors off-line.

Traffic History

Prior to 1990, this line served as a "bridge line" for CNW, handling traffic between Eastern Wyoming and Western South Dakota and the remaining CNW system east of Fremont. This bridge traffic has since been diverted, and is now handled by the Dakota, Minnesota and Eastern (DM&E) via Pierre and Huron, South Dakota to CNW main lines at Mason City, Iowa and Winona, Minnesota. This traffic <u>may</u> be diverted away from the Northern Line forever. However, the final resolution of this traffic depends on the eventual disposition and ownership of CNW's so-called "Colony Line" between Chadron (Dakota Jct.) and Colony, Wyoming. Current service on the Northern Line is once per week with occasional extra trains as needed for unit grain trains.

Although the Northern Line provides the only east-west rail service throughout the Northern Nebraska/Southern South Dakota region, the line has a history of relatively low on-line traffic density, with an average of 2,111 cars originating and 1,144 cars terminating over the seventeen year period ending in 1990. However, traffic over the past three years has shown some increase over the long term average. Substantially more traffic could be handled easily on this line, but for several reasons, the majority of commodities carried in this region have historically moved by truck.

The Study

A survey of major proportion was sent to on-line shippers and potential customers on the line. The information from this survey was entered into a data base and analyzed by Dr. Denver Tolliver. Dr. Tolliver has considerable experience in the area of transportation impact studies at the Upper Great Plains Transportation Institute, North Dakota State University at Fargo. From this information, Dr. Tolliver has been able to quantify specific cost impacts to Nebraska highways and economic impacts to on-line communities and shippers in the event the Northern Line is abandoned.

A detailed engineering study was done by Transportation Operations, Inc. (TOI) of Plymouth, Michigan, analyzing the condition, rehabilitation costs and net salvage values of the line. In addition, details of the operations of the line were analyzed under various scenarios by TOI. TOI loaded the "track chart" information, (including track conditions and speeds, elevations and curvature) into a computer model known as a Train Performance Calculator (TPC) to make detailed simulations of trains operating on the line under various situations. The complete operations, including train service, engineering expense, equipment expense and all other normal categories of costs were carefully examined in TOI's short line cost/revenue model to determine the economic viability of the line and establish detailed cost estimates.

The information developed by Dr. Tolliver and TOI allowed a complete examination of the impact of a line abandonment and the long term viability of operating the Northern line as a separate short line railroad.

PART I-IMPACTS OF ABANDONMENT

Continued operation of the Northern Line by CNW would not likely ever result in an economically viable operation. Clearly, the CNW has an option to abandon the line or to sell it. **It is the opinion of TOI that with the diversion of bridge traffic from Wyoming and South Dakota to the DM&E, the remaining traffic on the Northern Line is currently insufficient to sustain continued operation of the line by CNW.** The line will certainly be abandoned if a successful transaction to sell the line is not consummated. There are, however, alternative options to abandonment, but time is of the essence.

In the event of an abandonment, serious consideration must be given to the consequences. Several significant elements include the negative impact on farmers and various agricultural businesses on the line because of increased transportation costs. Employees currently working directly or indirectly in the railroad operations would be dramatically affected by its demise, particularly if the option of continued employment with a regional or short line carrier is eliminated with abandonment. Communities along the line will suffer economic disadvantage as a consequence of reduced income to farmers, reduced employment and lost economic development potential. Finally, the State of Nebraska, and counties and municipalities adjacent to the line would experience significant impact in additional costs of maintaining streets, roads and highways in the region with the substantial increase in heavy truck traffic.

A major point should be noted regarding the scope of the impacts of rail line abandonments. Most abandonments occur in rural regions. In the short-run, highway funds are somewhat segregated and maintained by environment (urban vs. rural) and by functional class of highway. However, in the long-run, significant abandonments or traffic diversions may divert highway funds to rural regions or result in general user fees hikes. Thus, in the long run, all highway users tend to be affected by a rail line abandonment or traffic diversion regardless of location, even urban residents. In essence, the impacts of a rail line abandonment such as this are statewide in scope.

HIGHWAY IMPACTS

Highway Costs-Background

The abandonment of rail lines like the Northern Line can generate a significant new stream of heavy truck traffic. Unfortunately much of the rural highway system was not designed to handle large volumes of heavy trucks. It requires several trucks to provide the transportation capacity of a single rail car. One rail car of grain or dry fertilizer is roughly equivalent to 3.7 semi-trucks. Pavement costs can mount quickly where a significant volume of rail traffic diversions to truck are involved.

This particular project is also unique in impact potential because of the considerable mileage involved from this rail line to parallel rail lines. Abandonments in many states have occurred without major highway impacts because there were other rail lines closer to the line being abandoned. In addition to highway impacts, communities and counties along the line will experience many more heavy trucks on streets and roads within their jurisdiction that were designed for lighter vehicles and smaller volumes of traffic.

Rail abandonments can generate a wide range of highway costs. Some of them are quantifiable and others are not. Three types of highway costs are addressed in this study: Accelerated Resurfacing or Build Sooner Costs, Net Resource Costs and Highway User Costs. Costs were calculated based on two traffic levels. The first level is 4,174 car loads, representing the average traffic that was handled on the rail line over the last three years. The second level, 6,274 car loads represents 2,100 car loads of grain that are currently moving by truck, but which shippers could commit to return to rail movement with the operation of the line as an independent short line.

Project Period

All impacts are calculated over a twenty-five year period. This time frame was used because it is the length of time which is later proposed for State involvement. Many of the benefits associated with this project would actually accumulate on an ongoing basis. Consequently, the total impacts identified in this report are on the conservative side.

Build-Sooner Costs

Build-sooner costs are the result of accelerated resurfacing or replacement costs. In essence, an increase in heavy truck traffic can necessitate the resurfacing of a highway section earlier than would normally be the case. For example, under present traffic conditions, a highway section may need resurfacing in 2001. But with additional truck traffic, the section may have to be resurfaced in 1996.

In order to fully understand the concept of build-sooner costs, one must understand the difference between nominal dollars and present value. Nominal costs are expressed in today's dollars, without being deflated or adjusted to account for differences in prices or lost income potential over time. For example, a business or agency may anticipate receiving $100,000 per year for the next ten years from a particular project. The sum of the receipts in nominal dollars is one million dollars. However, the $100,000 scheduled to be received in year six of the project is really not equivalent to the $100,000 received in year one.

This difference in valuation is not really a function of inflation. Instead, it reflects the opportunity cost of the money. If a dollar is available for use today, it has many alternative uses. For one thing, it can be invested to earn income. On the other hand, a dollar scheduled to be received in year six cannot be invested today or used for alternative purposes. So, there is a lost earning potential or usage associated with money received in future years. In order to compare "apples-to-apples", economists deflate or discount all future dollars to present value.

In this study, accelerated replacement or build-sooner costs are computed by translating highway expenditures that occur in future years into present value. Specifically, build sooner costs are measured by simulating resurfacing and reconstruction costs over time for two scenarios: (1) "status quo" and (2) an "impact scenario". The status quo reflects the present rail traffic level and composition. Alternatively, the impact scenario reflects both the base-line traffic and the diverted traffic stream (diverted from highway to rail).

The two streams of expenditures are translated into present dollars. The difference between the two capital streams (if any) constitutes the build-sooner costs associated with an abandonment.

To summarize, the class of impacts known as build-sooner costs:

1. Represent the reductions in pavement life-cycles attributable to incremental (diverted) truck traffic;

2. Are concerned with the timing of future monetary outlays;

3. Are based on the time value of money; and

4. Are expressed as the difference in the present value of the discounted capital outlays between the status quo and the altered traffic streams.

The simulation of resurfacing events over time is a detailed process which requires a set of models. The theory of highway impact analysis and the models used to simulate resurfacing activities on the impacted highways are detailed in Addendum A. Only a few basic concepts will be touched on in this section of the report.

Highway Deterioration Models

Highways deteriorate primarily from the effects of time and traffic. Highways decay naturally over an extended period of time even if they are subjected to little or no traffic. However, in many instances, the principal cause of highway deterioration is truck traffic.

In this study, the effects of both factors (time and traffic) are simulated. A natural decay process is built into the analytical procedures. The decline of highway serviceability resulting from time (in the absence of traffic) is identified first and removed from the cost base. Thus, only the portion of highway costs directly attributed to traffic is considered in the impact analysis. This process is fully documented in Addendum A.

The damage that a mixed traffic stream causes to a highway is simulated through the use of a standard or reference axle. The effects of all axle types and weights are phrased in terms of the damage caused by an 18,000 pound single-axle. The sum of equivalent single axle loads (ESALs) is the basic measure of pavement damage used in this study. The ESAL, furthermore, is one of basic inputs to pavement design.

Highway deterioration analysis is essentially the flip-side of pavement design. The impact analysis uses highway deterioration models that were developed by the American Association of State Highway and Transportation Officials (AASHTO), the Federal Highway Administration (FHWA), and the United States Department of Transportation (DOT) Systems Center. They are consistent with the design standards employed by Nebraska highway engineers. The pavement damage model is essentially the same one that is used by the FHWA in their Highway Performance Monitoring System (HPMS). However, the basic damage functions are adjusted to account for the effects of tire-type and pressure on pavement deterioration. These adjustments are based on models and studies developed at the Texas Transportation Institute, and are fully explained in Addendum A.

Before discussing the resource or pavement costs associated with a line abandonment, it is important to reiterate a fundamental concept. Build-sooner costs reflect only the time value of money. This type of cost is comparable to an interest cost of capital. Build-sooner costs say little or nothing about the cost of the resource itself, the pavement. The pavement is not a free commodity. Not only does someone have to pay for the interest on build-sooner cost, but someone has to pay for the pavement itself. In the next section of the report, the cost of the pavement consumed by the diverted truck traffic is analyzed. In addition, the highway user fees generated by the traffic are computed.

Net Resource Costs

Each highway section has an expected life (in ESALs). Each truck trip consumes a portion of that life, and consequently a portion of the resources expended by society in the provision of highway services.

Highway finance in America has historically been premised on the concept of user fees. The fundamental principle underlying this approach to highway finance is that users should pay for the costs of the highway capacity and resources which they consume. If a class of highway users does not pay for the pavement costs which they cause, then taxpayers or other highway users must cover the difference. In this instance, if the truck traffic generated by diverting the traffic from rail to truck does not pay for the cost of the pavement that it consumes (either through vehicle registration fees or motor fuel taxes), then the cost must be borne by the public.

When a rail line is abandoned, three financial outcomes are possible. If the revenues generated from the diverted traffic (e.g. vehicle registration fees and motor fuel taxes) are equal to the additional highway costs, then other highway users and taxpayers are no worse-off than before, from a highway infrastructure perspective. Furthermore, if these revenues exceed the highway costs, then there has been a net gain to other highway users and to society in general. Consequently, any excess of new highway revenues (over and above the resource costs) are credited against the build-sooner costs. However, if the additional revenues do not cover the additional resource costs, then other highway users, and society in general, will have been made worse-off by the abandonment.

Following are several long-run consequences may result:

1. Highway funds may have to be diverted from an alternative use to cover the shortfall in replacement needs,

2. New highway revenues may have to be generated through new user fees or taxes,

3. The level of highway service may permanently decline.

As the life span of a highway section is shortened, it may have to be moved forward on the Nebraska Department of Roads' priority list. Thus, over a multi-year planning period, the Department of Roads (DOR) may have to divert highway funds from some alternative use in order to maintain the affected highway at the same level of serviceability.

In the short-run, existing highway funds may have already been obligated through multi-year capital programs and budgets, or the sum of all projected statewide needs may exceed the pool of existing revenues. In either event, new highway revenues may be needed.

In summary, the net resource cost of heavy truck traffic is the difference between the revenues generated and the cost of the pavement that is consumed. Together with the build-sooner or interest costs, the net resource costs comprise the infrastructure-related impacts of abandonment.

Highway User Costs

As heavy truck traffic increases on rural highways, the level of service provided by the highway may decline. Highway level of service encompasses two major elements which are relevant to this analysis: (1) pavement performance, and (2) capacity. Pavement performance refers to the capability of a highway section to provide a safe, comfortable, and economical ride at or close to the design speed. As pavement performance declines, highway user costs increase. Surface irregularities and roughness, such as rutting and cracking, typically grow in frequency and magnitude as maintenance and resurfacing activities diminish. As a result, the vibrations and oscillations of a vehicle's frame and parts increase. These forces tend to increase normal maintenance costs for the life of the vehicle. In addition, poor pavement performance reduces the life expectancy of vehicles and hastens their replacement.

Pavement roughness and irregularities can result in increased vertical and lateral motion of a vehicle along its path of movement. Vertical and lateral motions tend to increase both wind and rolling resistance, requiring more fuel to traverse a given distance at a particular speed.

Highway users may react to poor pavement performance in several ways. As the discomfort associated with rougher rides mounts, travelers may reduce their operating speeds. To the extent that speeds are significantly reduced below the legal limit, highway users will face higher opportunity costs, associated with lost time.

User costs may also rise due to capacity constraints. Each highway section has a throughput capacity in terms of vehicles per lane per hour. This is a function of the design speed. As the ratio of existing to maximum utilization increases, vehicle speeds decline. When they do, fuel costs and air pollution tend to increase. Furthermore, as in the case of poor pavement performance, travelers incur the costs associated with lost time.

To recap:

* The additional revenues generated by heavy truck traffic on low-volume roads may not cover the additional pavement costs.

* If a shortfall occurs, funds may have to be diverted from an alternative use, or new user fees and taxes will have to be implemented.

* The ability of the transportation agency to adjust user fees or develop new sources of highway funds is constrained by broader sociopolitical trends and values.

* As heavy truck traffic increases, the level of highway services may decline.

* A decline in highway serviceability may lead to increased user costs for repairs, replacement, fuel, and lost time.

Overview of the Highway Impact Assessment Procedures

The estimation of highway impacts is a multi-step process. For the sake of brevity, details of each step will not be discussed in this section, but are explained in Addendum A. Instead, a general overview of the process is presented.

As noted previously, highway costs are computed under the status quo and the impact scenario for a 25 year period. Although the costs will go on in perpetuity, the time frame for comparing them to project benefits is 25 years.

The primary steps involved in highway impact assessment are in the following chronological order:

1. The number of potentially-diverted rail cars of each type of commodity are estimated,

2. The most frequently-used truck-type or types are determined for each major commodity,

3. The number of equivalent trucks required to handle one diverted rail car is estimated for each major commodity and truck-type,

4. The gross and tare weights of each truck-type, and the tare and gross axle weights for each axle group are determined,

5. Truck routes and mileages to each major market are compiled,

6. The primary routes to each potential alternate rail transloading facility (rail-head) are identified,

7. The diverted traffic is routed over the highways,

8. The attributes of each highway section in each route are compiled [e.g. structural design rating, present condition, current traffic, etc.],

9. The existing truck traffic base is identified from Department of Roads' files,

10. Equivalent Single Axle Loadings (ESALs) on each section are estimated,

11. The incremental ESALs resulting from the <u>diverted</u> traffic stream are computed for each highway section,

12. Future resurfacing and/or reconstruction events are predicted for each section under the status quo and impact scenarios,

13. The cost of each resurfacing or reconstruction event is estimated for each section under both scenarios based on Nebraska DOR unit costs and the thickness of the overlay,

14. The future highway costs incurred under both scenarios are expressed in present dollars,

15. The difference between the status quo and the impact scenario is computed, which constitutes the build-sooner costs,

16. The life of each highway section is estimated in ESALs,

17. The proportion of highway deterioration attributable to time and environmental decay rather than to traffic is determined and deducted,

18. The proportion of remaining highway deterioration attributable to truck traffic (ESALs) is multiplied by the resurfacing or reconstruction cost for each section to estimate the costs of the resources consumed by this traffic,

19. The number of vehicle miles of travel (VMT) and truck capacity required to transport the diverted commodities are estimated,

20. The additional motor fuel taxes and vehicle registration fees generated by the diverted traffic are computed,

21. The difference between these revenues and the additional highway costs generated by the diverted traffic are calculated,

22. The difference is treated as either a credit against accelerated replacement costs if the additional revenues exceed the additional costs or a cost to other highway users and society if they do not,

23. The present value of highway user costs are computed for the status quo and the impact scenarios,

24. The difference between the two scenarios becomes a change in user costs.

It should be emphasized that the resource or pavement cost reflects only the portion that can logically be allocated to traffic. The portion of pavement deterioration that would occur anyway in the absence of traffic due to natural decay is not allocated to any class of traffic, but is assumed to be a cost that is borne by the taxpayers.

The sum of all three cost items (build sooner costs, net resource costs and highway user costs) represents the value of highway impacts. As will be discussed later, the present value of these costs will be compared to the present value of the outlays necessary to preserve rail service.

Before discussing the results of the highway analysis, the primary sources of data are highlighted, and the manner in which traffic forecasts and routes were developed is discussed.

Summary of Data Sources and Inputs

The purpose of this section of the report is to describe the principal data sources used in the highway impact analysis and to generally highlight the process by which the raw data were translated into usable variables or values.

Most of the data employed in the analysis were derived from eight sources:

1. Shipper surveys,
2. Nebraska Department of Roads (DOR) Pavement Management System (PMS) file,
3. Nebraska Highway Performance Monitoring System (HPMS) file,
4. Nebraska highway and railroad maps,
5. CNW company traffic data,
6. CNW and BN tariffs,
7. Nebraska railroad waybill sample and the
8. Nebraska DOR staff.

In addition, certain truck performance and operating factors were derived from previous surveys and analyses performed by the consultants.

Traffic Volumes

The shipper surveys were primarily designed to obtain information regarding present and historical volumes, modal split, truck types and operating characteristics, commodities handled, terminal markets and transshipment points. The elevator surveys, in addition, asked for information regarding grain-drawing areas and inbound shipment patterns.

A separate survey was designed for elevators (as opposed to other types of businesses). The majority of the traffic on the line consists of grains and oilseeds, so logically, the elevator survey was considered to be of primary importance. It was more detailed than the general business survey, and asked a broader range of questions.

The response rate to the elevator survey was fair (14 out of a probable population of 25). Not all of the surveys were completely filled-out, and some were unusable. However, most of the large-volume shippers responded and provided sufficient data to estimate traffic volumes and trends. When compared with 1990 carload data provided by the CNW, it appears that approximately two-thirds of the grain volume on the line was accounted for by the usable surveys that were returned.

The base-line traffic volumes and markets were developed from a combination of sources. Where the shipper surveys provided usable data that could be verified as reasonable, this information became the primary inputs to the traffic and highway routing procedures. All elevator survey data and much of the general business survey data were reviewed and cross-checked for reasonableness. For example, stated elevator volumes were cross-checked against storage and throughput capacities to determine if the values appeared reasonable.

All traffic forecasts for future years were compared to historical data in an effort to identify unusual relationships. Other cross-checks and evaluations were also employed. The few survey responses that appeared unreasonable in light of the reference data, or were sketchy or missing pertinent data were disregarded. In addition to traffic volumes, the alternate transshipping facilities listed by the shippers were closely scrutinized.

The current and projected traffic volumes were estimated from three major data sources: (1) survey data, (2) CNW traffic data, and (3) railroad waybill data. The CNW provided current and historical traffic data (by station) for the 1974--1990 period. Grain shippers were asked to provide the same data in their surveys. These two data sources were used jointly to derive originated traffic volumes.

Agricultural products comprised all or the vast majority of outbound shipments. In fact, all traffic originated on the line during 1990 consisted of grains and oilseeds. This made it relatively easy to compare the two data sources and develop relationships and factors which could be used in the study.

The 1990 outbound volumes reported in the survey (1,379 carloads) comprised 63 percent of the originated carloads reported by CNW (2,187). In addition to rail-originated traffic, the elevator surveys provided data on truck shipments. These truck data are very important because they allow the calculation of a modal split.

In 1990, approximately 4,900 truck loads were originated by elevators on the line which returned surveys. In tonnage, this is roughly the equivalent of 1,325 rail cars. Thus, the current modal split is approximately 49 percent (1,325 vs. 1,379). When this survey value is expanded to include all elevators, roughly 2,100 equivalent rail cars were originated along the line, but moved by truck in 1990 (1,325/.63). Much of this total represents traffic previously diverted from the railroad as a result of declining service levels and poor car supply. Under local rail operations, with substantial shipper input and participation, it is reasonable to expect that much of this truck traffic will be re-diverted to the railroad.

Because service was downgraded on the line in 1990, a three-year average (1988-1990) has been used to project rail traffic volumes. The use of a multi-year average also tends to smooth out year-to-year fluctuations in grain productions and sales due to droughts and market conditions. Consequently, it should provide for a more stable base-line traffic estimate.

From 1988 to 1990, an average of 2,808 carloads of traffic was originated on the line. All of these carloads consisted of grains and oilseeds (at least in 1990). A comparable three year average for terminated traffic is 1,366 cars. This average total of 4,174 car loads was used in lieu of 1990 values in projecting rail shipments to and from the line.

Traffic Distribution

In addition to projecting traffic volumes, the diverted flows must be routed over highways in order to perform an impact assessment. Although the report provided by the CNW identified originated traffic by station, it did not identify the destination or market. This is a very important factor in highway impact analysis. The markets will affect both the length of haul and the highways used.

The shippers were asked to provide detailed market and transshipping data in their surveys. In some cases, the data were specific and completely usable. In other cases, the answers were sketchy or incomplete. Thus, a third data source was used to provide information on markets for grains and oilseeds. This data source is the Nebraska railroad waybill sample. All major railroads must submit this annual waybill report to the Interstate Commerce Commission.

The Nebraska DOR authorized the use of its 1987 and 1988 waybill samples in this study. All of the traffic that originated or terminated on the line-segment was identified from the state file, and the origin and destination Standard Point Location Codes were decoded so that the actual stations could be determined. Almost all of the shipping points on the line were reflected in the waybill sample. These data were used to develop a history of recent rail markets and the distribution of traffic among markets. As you would expect, many of the markets listed by shippers also appeared on the waybill file.

The process of allocating the originated grain volumes among markets is as follows. Default distribution percentages were computed for each station from waybill data. If the shipper surveys contained usable (and reasonable) market data, this information was used to override the default distribution percentages computed from the waybill file. Thus, the distribution of outbound volumes among markets reflects survey data for many of the large shippers. In all cases, the distribution was based on actual data and percentages.

Once the originated volumes were allocated among markets, the distribution of the traffic between transshipping points and the terminal market were developed. After abandonment, shippers will have two options: (1) truck their grain directly to terminal market, or (2) truck the grain to a nearby rail transhipping point (referred to as a "rail-head"). Most studies of this type assume that the diverted traffic will be shipped to the closest rail-head. However, in this case, that is not a good assumption. Some of the markets are local -- that is, they are located within the state of Nebraska (e.g. Omaha and Fremont). Consequently, some of the diverted traffic may be trucked directly to a terminal market. In addition, the classical assumption that 100 percent of the diverted volume will go to the closest rail-head is circumspect in this instance. There are multiple railroads in the region, each having different markets and different degrees of market access. So, a given shipper may use more than one rail-head.

In the survey, each shipper on the line was asked to identify the two most desirable rail-heads in the event of abandonment. Each shipper was also asked to identify each major market, and for each market, to project the distribution of diverted rail traffic among the two rail-heads and the terminal market. Again, some of the survey returns were usable however, some were sketchy and incomplete. Therefore, an alternate method was devised to fill-in the blanks and verify the shippers' responses.

The general post-abandonment transshipment rule is: if the sum of the cost of trucking the commodity to the railhead, the cost of double-handling and/or transloading the grain, and the rail rate to terminal market is less than the trucking rate, then the commodity will be transshipped. Otherwise, it will be trucked directly to a market. The average cost of double-handling grain and grain trucking costs per mile were developed in a previous study by Taylor (1988) and Tolliver (1989). The rail rates for the CNW and the BN were derived from grain and oilseed tariffs. The UP tariffs were not available for the study, so the BN rates were used.

The above procedure was used primarily to augment shipper data and to complete the traffic distribution analysis. The transshipping rule was not used to override shipper responses unless they appeared to be unreasonable.

The reasonableness of this procedure can be judged empirically by evaluating the projected average length of haul after abandonment, which was roughly 112 miles in this case. This value fits well with prior expectations which were in the 75 mile to 125 mile range, so there is reason to believe that the process is working as intended.

The distribution of traffic in this study usually resulted in clear routes between origins and rail-heads and between origins and terminal markets. However, in some cases, alternate highway routes existed. In these instances, the shortest route that does not encompass minor collectors or local roads (except at the origin or destination) was selected. Again, it is reasonable to assume that truckers will take the shortest route except where highway service level and condition are relatively poor. In essence, truckers will minimize some generalized cost function which includes both time and vehicle operating costs.

Highway Data

Once the additional traffic over each route had been projected, the attributes of the impacted highways could be determined. The Nebraska Pavement Management System (PMS) file was used for this purpose. A cartridge containing the data file was obtained from the DOR. A program was written to read the data file and manipulate its elements. Using the pavement and base depths, the strength rating of each highway section contained in each post-abandonment route was computed. In addition, the present pavement condition and current truck traffic volume (ADT) were extracted from the PMS file. Then, using equivalent single axle load (ESAL) factors provided by the Nebraska DOR (by functional highway system), the current ESALs were computed for each impacted highway section.

The number of additional truck axle loads (by axle type) were estimated from gross and tare vehicle weights and factors developed by the consultants in 1989. The axle weights will vary by axle group (e.g. steering, driving, and trailing axles), truck-type, and commodity. Using commodity-specific truck weight factors, in conjunction with highway attribute data, the additional ESALS were predicted for each impacted highway section. These computations employed the standard AASHTO formulas for rigid and flexible pavements.

Use of the Data in Highway Impact Analysis

A procedure was written to accumulate the additional truck traffic (and ESALs) after abandonment, by highway section. The additional ESALS were the primary input to the highway damage functions.

As explained elsewhere, the highway damage functions were used to project the life of each section under the current traffic stream (referred to as the "status quo") and the altered traffic stream (referred to as the "impact case"). The difference in traffic levels and composition between the status quo and the impact scenario solely reflect the effects of the diverted rail traffic.

The highway deterioration models were used to forecast resurfacing events for a 25-year period (roughly two life cycles) under both the status quo and the impact scenario. The two streams of capital outlays were translated into present dollars using the prescribed Federal Railroad Administration discount rate. The difference between the two scenarios represents the accelerated replacement or "build-sooner" costs.

The highway models simultaneously compute the cost per ESAL per vehicle mile of travel (VMT) on each section. This represents the resource costs consumed by the additional traffic. A related procedure of the model predicts the additional highway revenues generated by the traffic. The additional revenues are then compared to the additional costs. If the result of the comparison is positive, the difference is used as a credit against the build-sooner costs. If, however, the difference is negative, it is considered to be a cost to the state.

The components of highway user costs were discussed earlier. Changes in highway user costs have been estimated using formulas presented in Balta and Markow (1985). Balta and Markow simulated user costs for a variety of traffic levels and pavement conditions using the U. S. DOT Systems Center's model EAROMAR. The process of estimating user costs and a full description of the model are presented in Addendum A.

Scenarios

Build-sooner and highway user costs have been computed under three different budgetary scenarios. The first scenario reflects an unconstrained highway budget. Under this scenario, the DOR will resurface a highway section when the Pavement Serviceability Rating (PSR)[1/] drops to 3.0. This is identified as the "1" Budgetary Scenario.

[1/]The PSR is a pavement serviceability rating which theoretically ranges from zero to five. A PSR of 5.0 denotes a newly-built or reconstructed highway. A PSR from 4.0 to 4.9 denotes a highway section in very good

The second budgetary scenario assumes that all highway sections will be resurfaced at or prior to a PSR of 2.0 (or 2.5 for interstates and freeways) -- known as the critical PSR. Beyond this level, pavements will have to be reconstructed at a higher cost per mile. Thus, although the life of a highway section has not completely expired at a PSR of 2.0, this level is usually interpreted as the practical life-time of a section. Below 2.0, the quality of the ride declines rapidly and routine maintenance costs accelerate. So, for purposes of analysis, the period of decline in PSR from 4.5 to 2.0 is interpreted as the maximum economic life of a section. This is identified as the "2" Budgetary Scenario.

The third scenario (reconstruction) typically represents a severe budgetary constraint and resulting failure to catch the pavement when resurfacing was still possible. The decline in PSR from 4.5 to 1.8 (or 2.0 for interstate highways) represents the maximum feasible life for most pavements. Although highways can still be traversed at or below this serviceability level, the quality and safety of the ride tend to decline very rapidly. Furthermore, user costs tend to rise quickly. This is identified as the "3" Budgetary Scenario.

The decay of pavements generally follows a declining power function. Thus, the decline in serviceability tends to accelerate towards the end of a cycle. The DOR's strategy, in essence, is aimed at arresting the decay of a pavement fairly early in its life-cycle. Economies can sometimes be gained by doing so.

The policy of the Nebraska DOR is to resurface each major highway section at a PSR of 3.0. So logically, this scenario has the highest probably of the three of being realized. However, it should be recognized that considerable uncertainty exists over a twenty-five year period. Many things can happen beyond the horizon of the five-year capital program. Thus, there is a likelihood that some sections may

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condition. A PSR in the 3.0 to 3.9 range is considered good. A PSR from 2.0 to 2.9 is considered fair, while a PSR from 1.0 to 1.9 is considered poor. A PSR below 1.0 denotes a very poor highway section. Historically, state DOT's have resurfaced or rebuilt major highways when the PSR reaches a level of 2.5. The trigger PSR has historically been 2.0 for other classes of highways.

fall into budgetary category two, and in extreme cases, under scenario three. However, to be conservative, costs were estimated based on the first budgetary scenario.

HIGHWAY COSTS-QUANTIFICATION

Build Sooner Costs

On the Northern Line, a traffic level of 4,174 car loads creates a Build Sooner Cost of about $13 million over 25 years. In addition, movement of the 2,100 car loads of grain from the highways to rail (making a total of 6,274 car loads), would result in a Build Sooner Cost avoidance of $3 million over the same period. This results in total Build Sooner Costs of about $16 million.

TABLE 1

BUILD-SOONER COSTS FOR TWENTY FIVE YEARS
(Millions of Dollars)
4,174 Carloads

Budgetary Scenario	Present Value of Status Quo Needs	Present Value of Impact Case Needs	Build Sooner Costs
1	$274.084	$287.093	$13.009
2	$379.653	$415.261	$35.608
3	$410.826	$463.984	$52.435

Table 2

BUILD-SOONER COSTS FOR TWENTY FIVE YEARS
(Millions of Dollars)
6,274 Carloads

Budgetary Scenario	Present Value of Status Quo Needs	Present Value of Impact Case Needs	Build Sooner Costs
1	$274.084	$290.036	$15.952
2	$379.653	$417.649	$37.996
3	$410.826	$470.227	$59.401

Net Resource Costs

Diversion of the 4,174 car loads to the highway system (15,444 semi trucks), results in additional pavement costs of $95 million over 25 years[2/]. Additional revenues generated from truck fuel taxes and registration fees (from the diversion of 4,174 car loads) have been deducted from this total to compute the net resource costs over the 25 year period. The estimated annual net resource costs are almost $3.5 million as shown in Table 3.

Table 3

ANNUAL NET RESOURCE COSTS FOR TWENTY FIVE YEARS
(4,174 Carload Diversion)

Annual Fuel Revenues	Annual Regist. Fees	Annual Pavement Cost	Annual Net Resource Cost
$184,723	$141,984	$3,812,248	$3,485,541

Movement of the 2,100 car loads of grain from the highways to rail (making a total of 6,274 car loads), would reduce the heavy truck traffic in the region and result in the reduction of programmed highway needs. This results in reduced pavement costs of $47.5 million over 25 years[3/].

In other words, over a twenty-five year period Nebraska taxpayers will have to spend an additional $95 million in pavement repair costs if the line is abandoned. As stated earlier, if service on the line is retained, an additional 2,100 rail car loads (7,700 semi-truck loads) of grain currently being trucked would likely be diverted from the highway system to the new short line railroad. This would result in taxpayer savings of an additional $47.5 million

[2/]These costs are in nominal or unadjusted dollars. Nominal dollars are used only for purposes of describing the magnitude of highway funds expended over the period. Nominal dollars are not used in the benefit cost analysis. The stream of expenditures is translated into present value or equivalent dollars later in this report.

[3/]These costs are in nominal dollars.

over the twenty-five year period. Therefore, total pavement cost savings to Nebraska taxpayers over the twenty-five year period is $142.5 million. This represents an annual savings of about $5.2 million (see Table 4).

Table 4

ANNUAL NET RESOURCE COSTS FOR TWENTY FIVE YEARS
(6,274 Carload Diversion)

Annual Fuel Revenues	Annual Regist. Fees	Annual Pavement Cost	Annual Net Resource Cost
$275,597	$212,976	$5,733,345	$5,244,772

Highway User Costs

Changes in highway user costs resulting from deterioration of pavement condition and increased truck trips are computed from the model developed at the United States Department of Transportation, (DOT) Transportation Systems Center. Highway user costs have been determined to amount to approximately $3.5 million over 25 years at the 4,174 car load level. An additional $.382 million in highway user costs will be avoided if the car loads are increased to 6,274 (moving the 2,100 car loads of grain from the highways to rail).

Tables 5 and 6 outline the Highway User Costs, both on a twenty five year basis and an annual basis:

Table 5

HIGHWAY USER COSTS FOR 25 YEAR PERIOD
(MILLIONS OF DOLLARS)
4,174 CARLOADS

Budgetary Scenario	Status Quo User Costs	Impact Case User Costs	Change In User Costs	Annual Increase In User Costs
1	$58.431	$61.944	$3.513	$ 0.14052
2	$62.020	$64.814	$2.794	$ 0.11176
3	$62.595	$65.219	$2.624	$ 0.10496

Table 6

HIGHWAY USER COSTS
25 YEAR PERIOD
6,274 CARLOADS

Budgetary Scenario	Base Case User Needs	Impact Case User Needs	Change In User Costs	Annual Equiv. Net User Costs
1	$58.431	$62.326	$ 3.895	$ 0.15580
2	$62.020	$65.226	$ 3.206	$ 0.12824
3	$62.595	$65.817	$ 3.222	$ 0.12888

On the whole these numbers are insignificant. However, the examination of the Northern Line impacts by this model conclude some costs in this area. Probably more important to the residents of Nebraska, tourists and other motorists using the highway network, is the significant increase in heavy truck traffic.

Comparison of Studies

The results of the Northern Line analysis have been compared to recent studies in other states. A study recently completed by the California Department of Transportation (1990) found that the incremental maintenance cost per "heavy" truck mile was $3.73, or approximately 11.3 cents per ton-mile[4/]. A Washington Department of Transportation study, Casavant and Lenzi (1989), quantified the incremental pavement costs resulting from rail-line abandonments. In the four case studies that were evaluated, the incremental costs ranged from two cents per ton-mile to nine cents per ton-mile, with a mean value of 7.5 cents per ton-mile.

In comparison, this study projects that the incremental pavement cost resulting from abandonment will be approximately three cents per ton-mile[5/]. However, this

[4/]This assumes an average loaded truck weight of 66,000 pounds, or 33 tons.

[5/]This figure reflects the present value of the build-sooner and pavement costs, divided by the total ton-miles accumulated during the 25 year period. If the costs are stated in nominal dollars, the unit cost becomes four cents per ton-mile.

study employs very conservative assumptions and techniques, and reflects an optimal maintenance policy by the Nebraska Department of Roads (DOR). The optimal maintenance policy has the effect of reducing the build-sooner costs. If the Nebraska DOR is unable to consistently implement such a maintenance policy, then the incremental highway costs could be significantly higher.

> **Note:** It is very important to distinguish the Washington DOT report from earlier studies throughout the country. Previous studies reflected a characteristic of the impacts of abandonment, or **potential** magnitude of impact, physical and financial, on nearby roads. The Washington DOT study outlined the consequences of four actual rail abandonments within the State of Washington over an eight year period. This allowed testing of the outlined procedure under significantly different situations to validate the findings of the study. The study provided the State of Washington with a **proactive** procedure regarding potential abandonments.

ECONOMIC IMPACTS

Primary Economic Impacts

The purpose of this section of the report is to highlight the procedures used to estimate the impacts of rail abandonment on shippers and producers. The section begins with a general discussion of the impacts and then turns to the topic of measurement.

After abandonment, shippers will have to use trucks to transport their commodities either to terminal market or to an alternate rail-head. In many cases, existing truck rates are higher than rail rates. Consequently, the cost of shipping commodities in the area may increase immediately after abandonment.

Although the immediate increase in the cost of shipping is important, it may represent only a small portion of the long-run impact. Truck rates are typically held within certain bounds by the presence of rail transportation, and vice versa. After abandonment, shippers situated on the line will be captive to trucks. In the absence of rail competition, truck rates may rise.

No one really knows what the long-term level of truck rates will be, or for that matter, what markets the shippers will be able to participate in. Previous studies have shown that when faced with rail competition, truck rates tend to fall somewhere between their variable and fixed costs[6/]. Truckers, reacting rationally, will seek to gain or hold market share, at least in the short-run, by pricing as close to variable costs (or out-of-pocket costs) as need be, in the expectation that rates might be raised in the future. In the absence of competition, it seems reasonable to assume that truck rates will rise to a level that **at least** cover their full cost of operations. Clearly, truck rates may increase above full costs in the absence of rail competition. So, the use of full truck costs to approximate long-run truck rates after abandonment is both a reasonable and conservative approach.

In the presence of intermodal competition, the rates of both modes of transport will tend to move towards their costs. For railroads, this may mean full cost, since carriers tend to normalize (annualize) their maintenance costs. Thus, the difference between truck full costs, after abandonment, and rail costs under a preservation scenario should approximate the long-run difference in shipping cost. If the difference is positive, shippers in the area will realize an increase in distribution costs.

In the final outcome, a global examination of the economics including the aforementioned impacts is required. In the absence of rail competition, truck rates may rise while service levels decline because there would be a sellers market for trucking grain. In order to evaluate the long term impacts of abandonment on shipping costs, a comparison between truck and short line railroad costs has been developed.

The traffic information provided by CNW allowed TOI to conclude that the weighted average distance for a car load of grain moving on the Northern Line from origin station to

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[6/]Truck fixed costs include items such as debt service, insurance, office overheads, etc. Variable costs reflect the fuel, tires, and other inputs (including an imputed wage) that change directly with traffic. These costs, in some cases, are referred to as out-of-pocket costs.

interchange was 165.7 miles. Based on that mileage statistic, we compared estimated short line rail operating costs[7], for that average car move with the equivalent cost of moving that same car load of grain by truck. Assuming 3.7 trucks per 100 net ton hopper car, the following table considers the comparison of those costs at various total annual car load levels.

> Important note: Truck costs outlined in Table 7 do not include any highway impact considerations. Fluctuations in fuel prices would also make the table comparisons differ accordingly. (The rail model used $1.05 per gallon as the simulated fuel price, while the truck prices have been indexed to 1990 levels).

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[7] Rail costs do not include the purchase of the line, but do include all expenses of maintenance, operation and equipment.

TABLE 7

COMPARISON OF TRUCK AND RAIL PER CAR COSTS AT VARIOUS TRAFFIC LEVELS

ANNUAL CAR LOAD LEVEL	ESTIMATED TRUCK COST PER EQUIV. CARLOAD/BUSHEL		ESTIMATED RAIL COST PER CARLOAD/BUSHEL	
4,000	$1,388	$.410	$1,225	$.360
5,000	$1,388	$.410	$1,048	$.308
6,000	$1,388	$.410	$ 939	$.276
7,000	$1,388	$.410	$ 858	$.253
8,000	$1,388	$.410	$ 797	$.234
9,000	$1,388	$.410	$ 747	$.219
10,000	$1,388	$.410	$ 706	$.208
11,000	$1,388	$.410	$ 672	$.197
12,000	$1,388	$.410	$ 642	$.189
13,000	$1,388	$.410	$ 616	$.181
14,000	$1,388	$.410	$ 593	$.174
15,000	$1,388	$.410	$ 571	$.168
16,000	$1,388	$.410	$ 552	$.162
17,000	$1,388	$.410	$ 534	$.157
18,000	$1,388	$.410	$ 518	$.152
19,000	$1,388	$.410	$ 503	$.148

Source: Truck costs-Report of Operating Costs of North Dakota Trucking Lines. Frank Dooley, Leslie Bertram and Wesley Wilson. Upper Great Plains Transportation Institute, Fargo North Dakota, Publication #67 August, 1988. These costs have been adjusted to reflect the state motor fuel taxes and vehicle registration fees of Nebraska. All other cost elements have been indexed to levels using the PPI. Those adjustments resulted in an average cost per mile of $1.12. Rail costs-Transportation Operations, Inc. Short Line Revenue/Cost Model, January, 1991. (See Tables 25ABCD)

Based on these cost comparisons, it is our opinion that even under the worst case scenario traffic levels, shippers on the Northern Line would experience greater shipping costs for the movement of commodities if the line is abandoned. At a level of 4,174 car loads, shipping costs are increased by $17.8 million over a 25 year period, or $710,000 annually. At a 6,274 car load level, shipping costs are increased by a total of $70.4 million over the same period, or $2.8 million per year.

In addition to increased shipping costs, elevators will also incur increased handling costs after abandonment. If elevators must transship grains and oilseeds to an alternate railhead, the commodities must be transferred to a rail car. This typically involves dumping, re-elevating, and temporarily storing the crops. Later, the crops must be loaded into a covered hopper car, completing the transloading cycle.

In a 1988 Washington Department of Transportation (DOT) study, Taylor and Casavant surveyed elevators that had lost rail service through abandonment[8/]. The study found that elevators, on average, incur an increased handling cost of five cents per bushel after abandonment. Tolliver (1989) updated double-handling costs for North Dakota elevators developed earlier by Zink and Casavant (1982). The unit costs ranged from five to six and one-half cents per bushel, depending on the annual volume and throughput capacity of the facility.

To be conservative, an incremental handling cost of five cents per bushel, (based on the Taylor and Casavant analysis), has been assumed. However, this unit cost reflects 1987 prices. Thus, it has been indexed to 1990 levels using the Producers Price Index. The resulting unit cost is 5.5 cents per bushel.

Not all of the volume on the line will be transshipped. Some will be shipped directly to terminal market, in which case a double-handling cost will not be incurred. Using the shipper surveys, it has been determined that approximately 80 per cent of the grains and oilseeds will probably be transshipped (as opposed to moving directly to terminal markets). This means that of the 2,808 car loads of grain originating on the line, 2,246 car loads are likely to be transshipped. The transshipping cost associated with each equivalent car is approximately $187[9/]. Thus, the potential increase in grain handling costs associated with the existing rail traffic on the line is approximately $420,000 per year.

[8/]Taylor, Richard and Ken Casavant. Working Papers: Washington Rail Development Commission Study, 1988.

[9/]Based on survey data, the average covered hopper car was determined to hold 94 tons. This translates into 3,400 bushels at an average density of 55 pounds per bushel. The cost per car is computed as $0.055 x 3,400, or $187.

In addition to the double-handling of grains, some inbound fertilizers and supplies will also have to be transloaded. The transloading costs for the non-grain commodities are unknown. If the average of 5.5 cents per bushel is assumed to be characteristic of other commodities, then a cost of approximately $2 per ton will be incurred on the remaining traffic. This is a conservative estimate, as transloading costs in other studies have ranged as high as $5 per ton. Therefore, double handling costs associated with non-grain commodities total $257,000 annually (1,366 car loads x 94 tons/car x $2/ton).

In summary, if the line is abandoned, total transportation related costs to shippers will increase by about $1.39 million annually ($710,000 shipping costs + $677,000 double handling). This amounts to $34.5 million over the 25 year project period. As stated earlier, the increased transportation costs associated with the 6,274 car load level amount to $2.8 million annually and $70.4 million over the 25 year project period.

Secondary Economic Impacts

If the Northern Line is abandoned, it is safe to assume that shipping costs will increase and these costs will have to be passed on to the producers in the form of lower prices. Even if the elevators were able to absorb the increase, much of it would still make its way back to the producer one way or another. This is particularly true of cooperatively-owned elevators in which the farmer is a part owner and/or patron. Under this type of organization and ownership, any increases in shipping costs that are not reflected in lower bid prices may be reflected in the level of patronage refunds. Either way, the producer is eventually impacted by the rail abandonment.

Studies have shown that bid prices at elevators quickly respond to changes in shipping costs, and that producers' incomes fall as shipping costs increase. When producers and shippers must pay more for transportation, they have less to spend on other items. This, in turn, has a ripple, or "multiplier" effect throughout the region. Because of the multiplier effects that exist within economic systems, reductions in income in the household sector and/or reductions in elevator margins will affect the entire area including purchases of fewer inputs, supplies, and consumer goods.

Similarly, a reduction in net farm income (as a result of lower elevator bid prices), means that producers and their households have less to spend in surrounding communities. Therefore, all transportation cost increases are assumed to be borne by producers' in the long-run.

The regional economic impacts of changes in producers' income were simulated by the Nebraska Department of Economic Development with an input-output (I-O) model. Input-output models can be used to estimate the total economic impact of a decrease in expenditures on a region.

Two regional economic effects are simulated through input-output analysis: (1) changes in regional income, and (2) changes in output and gross business volume (receipts). In order to simulate these effects, it was first necessary to estimate changes in local expenditures that would occur when there are changes in producers' incomes. These values were calculated by the Department of Economic Development from national data on household expenditure patterns. Table 8 shows the expected breakdown of expenditures for each $1 change in shippers' income. These values were used to calculate the changes in producers' expenditures that were used in the I-O model.

TABLE 8

EXPENDITURES PER DOLLAR OF CHANGE IN PRODUCERS' INCOME

Item	Expenditure per $1 of Additional Income
Retail Trade	$ 0.51
Services	0.18
Finance, Insurance and Real Estate	0.19
Other Expenditures*	0.12
Total	$ 1.00

*Includes changes in taxes and savings

The results of the input-output analysis are shown in Table 9. These results reflect the estimated direct, indirect and induced income and output effects of changes in producers' income. As stated in the previous section, abandoning the CNW Northern Line would increase shipping costs (reduce producers' incomes) by $1.39 million[10/]. This reduction in producers' incomes would result in a subsequent reduction in producers' expenditures. In turn, this would reduce regional business incomes by an additional $1 million per year and regional business revenues by almost $2 million per year.

Continuation and improvements in rail service (the 6,274 car load level) would generate annual transportation cost savings (income increases) of $2.8 million. The resulting increase in expenditures would generate an additional increase in regional income of $2.1 million per year. Regional business revenues would increase slightly more than $4 million per year.

Table 9

REGIONAL ECONOMIC IMPACTS
(000 omitted)

Regional Impact	Expenditure Reduction of $1.39 million No Rail Service	Expenditure Increase of $2.8 million 6274 Rail Cars
Change in regional business income		
Retail trade	$ -484	$ 981
Services	-178	362
Finance, Ins. & Real Est.	-282	571
Other sectors	-95	192
Total change in output	$-1,039	$ 2,106
Change in regional business revenues		
Retail trade	$ -941	$ 1,907
Services	-343	696
Finance, Ins. & Real Est.	-455	923
Other sectors	-244	496
Total change in output	$-1,984	$ 4,021

Changes in the regional economy are sometimes transfers from one group to another. If this is the case, they cannot be counted as benefits. Shifting from truck to rail, after an abandonment of the CNW Northern Line, would increase the revenues of the trucking sector and, assuming truck ownership is local to the region, would produce some additional increases in regional output and income.

These positive effects on output and income would, to some extent, be offset by the reduced revenues in the rail sector. In order to determine the net effect of such change, the negative impacts caused by reduced rail output should be compared to the positive impacts due to increased motor carrier output. The net impact of these changes is uncertain and depends on the location and production characteristics of the affected motor carriers and railroads. The results of shipper surveys did not provide sufficient information to permit such a comparison. It seems most likely, however, that the net changes that would occur would be overwhelmed by the effects of the reduction in producers' income discussed above.

In this study, it is also assumed that agricultural output remains constant after abandonment of the CNW Northern Line. This assumption is conservative and understates the impact of the abandonment on local output and incomes. It is estimated that transportation costs will increase a minimum of ten cents per bushel in the region if CNW abandons the Northern Line[11/]. Such increases will cause changes in the structure of the region's agricultural sector. These changes could include reductions in the number of farm operations, reductions in total agricultural output, and/or shifts to other agricultural products. Because of the numerous variables involved (ie. federal farm policy, future production in other areas, etc.), reliable estimates of these impacts cannot be made.

Economic Development Potential

A major potato processing concern is currently considering locating on the line near Bassett. The firm, which requested anonymity, stated that the absence of rail competition could significantly affect their operation in two ways. First, they would like to use the railroad for inbound soybean oil and some outbound shipments of finished product. Second, there was a concern expressed about the absence of rail competition to keep trucking rates in check.

[11/] At the 4,274 car load level trucking costs are about five cents per bushel higher than rail. As explained earlier, post-abandonment costs to the elevator will increase an additional five cents per bushel because of double handling. Hence, an additional five cents in increased transportation costs plus five cents for double handling results in a ten cent per bushel increase.

Although there is competition within the trucking industry, rates tend to converge at a higher level when rail competition is not present. The possibility of this industry locating on the line, as well as others in the future, will be greatly diminished if this line is abandoned.

Energy Consumption-Truck vs Rail

Energy consumption should also be a major consideration as we review the differences between the two modes of transportation. The Train Performance Calculator (TPC) simulated a loaded train operating westbound from Long Pine to Chadron (the steepest grades on the line and therefore the least fuel efficient portion) with three EMD GP-9 locomotives and 5,650 net tons of grain. The train consumed 1557 gallons of fuel over the 191.9 mile run. This averages 8.11 gallons per mile or 678 net ton-miles per gallon consumed. A truck handling 26.6 net tons of grain traveling the same distance (191.9 miles), averages approximately 5 miles per gallon, or 133 net ton-miles per gallon. **Therefore, the rail move is 5.1 times more fuel efficient than the truck.** This would theoretically result in an annual fuel savings of 418,013 gallons at the 4,174 car load level[12/] and 628,321 gallons at the 6,274 car load level[13/].

TRANSPORTATION OF HAZARDOUS MATERIALS

In the event of the abandonment of the Northern Line, the movement of hazardous materials for this market area will be diverted from rail to highway. Statistics, both national and state, consistently indicate that hazardous material incidents are more frequent via truck than via rail. Hazardous materials handled on the Northern Line include propane, anhydrous ammonia, heating oil, and diesel fuel.

12/ 4,174 cars x 100 tons=417,400 tons x 165.7 miles=69,163,180 ton-miles divided by 678 ton-miles per gallon=102,011 gallons by rail. 69,163,180 ton miles divided by 133 ton-miles per gallon=520,024 gallons by truck, for a difference of 418,013 gallons.

13/ 6,274 cars x 100 tons=627,400 tons x 165.7 miles=103,960,180 ton-miles divided by 678 ton-miles per gallon=153,334 gallons by rail. 103,960,180 ton miles divided by 133 ton-miles per gallon=781,655 gallons by truck, for a difference of 628,321 gallons.

Rail tank cars can carry over twice the amount of product than the largest truck trailer/container, thus increasing even more the potential of hazardous material incidents. The following is comprised from statistics provided from the Resource and Special Program Administration of the United States Department of Transportation.

TABLE 10

Hazardous Materials Incidents
1985 - 1989
Truck vs Rail
National Compared to Nebraska

Year	National Truck	National Rail	Nebraska Truck	Nebraska Rail
1985	4751	843	42	10
1986	4615	855	28	7
1987	4952	886	24	8
1988	4900	1018	23	5
1989	5990	1186	26	13
Total	**25208**	**4788**	**143**	**43**
National	**84%**	**16%**		
Nebraska			**77%**	**23%**

TABLE 11

Percent of Incidents by Type and Mode - National 1989

Type/Total Incidents		Truck	Rail
Human Error	- 4931	86%	9%
Package Failure	- 1972	64%	32%
Accident/Derailment	- 329	81%	18%
Other	- 249	78%	13%

(Air & Other mode figures/percentage not included.)

Additional data provided by the Nebraska Department of Roads shows that commercial trucks operating within the State of Nebraska for the year 1989 accounted for over 22.7 billion ton-miles (This is based on a total of 907.53 million vehicle miles times a conservative estimated average of 25 tons per truck). For the same period, based on annual operating reports provided to the Nebraska Public Service Commission by each operating railroad, railroads in Nebraska handled 81.4

billion ton miles. Based upon the 1989 truck vs. rail ton-miles and the U.S. DOT provided figures for truck and rail hazardous material incidents we can interpret the following:

TABLE 12

FREQUENCY OF HAZARDOUS MATERIALS INCIDENTS

	1989 Ton Miles	Incidents	Incidents per Billion Ton Miles
Truck	22,688,250,000	26	1.15
Rail	81,425,586,000	13	.16

Other statistical exhibits supporting and detailing highway vs rail hazardous material incidents over the past several years are included in the Addendum.

STATE'S OPTIONS

We believe there are two primary options available to the State of Nebraska under the current circumstances. Naturally the first option is to do nothing. The consequence of this option will most likely be a quick abandonment and salvaging of the line by CNW. The negative impacts previously discussed will then be set in motion.

The second option is a short line railroad option. Under this option, the State would provide a mechanism for the shippers and other interested beneficiaries to assume responsibility for the line. The following discussion is a proposed structure that we believe is a feasible option, but would require substantial commitment from the State, on-line communities and the shippers.

Although there are several ways that short line railroad operations are typically purchased and financed, this particular line has limited choices due to its history of low traffic density. While hundreds of short lines have been formed over the past decade from marginal lines, this line is a great deal longer in mileage than the average short line and has a low revenue car count per mile. In addition, commercial financing for a venture of this nature is tighter than before. Therefore, the practicality of arranging private financing for the purchase at the price required by CNW, and necessary rehabilitation of this line is extremely unlikely.

A purchase of the line by the private sector is not seen as a likely alternative. The economics of operating this line with the debt service required and the ownership by an independent private sector entity would justify a purchase price of about one third of the CNW's asking price. Even if the line could be obtained at a price that low, primary involvement of the shippers is a requirement to get the traffic levels increased to a point where costs and revenues might be reasonable enough to provide a viable operation.

Without a creative method of obtaining funds for the purchase and rehabilitation of this line, the line will no doubt be abandoned.

> Special Note: A primary concern of the authors of this report is to emphasize the importance of maintaining options for connections to a short line railroad operator. The initial scope of this study suggested reviewing options for the Northern Line segment between Norfolk and Chadron. In order to maintain options to all connecting carriers, it is assumed that any acquisition will include access through ownership or trackage rights to the BN at Crawford and the UP at Norfolk. Another consideration would be trackage rights over CNW to South Morrill to the UP. In addition, the disposition of the CNW Colony Line should be given **serious** consideration in the very near future.

A Short Line Option

The State of Nebraska, on-line communities and shippers are the major beneficiaries if the line continues to operate. All of these parties are in positions to positively influence the future long term viability of the line. This option proposal suggests their substantial involvement.

The decision on the fate of the line requires an economically viable business plan. The plan must include purchase and rehabilitation of the line to eliminate slow ordered track, efficient service to minimize equipment and train expense and substantial marketing to increase traffic on the line.

Additionally, the plan must address the very important issue of equipment supply.

Under this short line scenario, the state would facilitate a means for purchase of the line from CNW. The line would be purchased and rehabilitated over a five year period using funds advanced from the state. Then, an operating company comprised of shippers, operating partners and perhaps the on-line municipalities and other interested parties would lease/purchase the line from the State. The lease/purchase could begin at the completion of the rehabilitation with annual payments equalling not less than 1/20 of the amount invested by the State. The state would not be in the railroad business, but would provide a mechanism for the on-line shippers and communities to use the existing railroad infrastructure.

While the state contracts for rehabilitation of the line over a five year period, the new rail operators (shippers) would have five years to develop new traffic and maximize operational efficiencies. Shippers would be responsible to cover the full costs of the operation, to maintain service and gain full ownership at the completion of the 25-year lease/purchase agreement. Viability of the line would be an on-going responsibility of the shipper/operator partnership. The State would maintain an oversight and equity position throughout the life of the lease/purchase arrangement.

Acquisition and Rehabilitation Costs

The CNW has estimated the Net Liquidation Value (NLV) of the Northern Line at approximately $10 million. However, they have expressed a willingness to sell the line for 70% of the NLV, less the value of the State's interest in the 23.2 miles of continuous welded rail (CWR) upgrade between Stuart and Long Pine[14/]. Therefore, the State of Nebraska should be able to purchase the line from CNW for between $6 and $7 million, depending on equipment considerations. Rehabilitation of the line, costing an estimated $13.5 million ($12.4 million calculated over a five year period at

[14/] The State of Nebraska has a financial interest in the section of track between MP 182.7 near Stuart and MP 205.9 near Bassett that was involved in a federally supported Continuous Welded Rail (CWR) Program during the mid-1980s.

a 5% inflation rate), would be required, for a total investment of approximately $19.5 to $20.5 million.

This rehabilitation will remove all current slow orders (speed restrictions due to sub-standard track conditions) on the line and bring the entire railroad up to Class 3 standards, permitting a 40 mph maximum speed operation. Because of the extended length of the line, this operating level is necessary for the independent short line to be viable as a regional or short line carrier and to provide the lowest possible operating costs. It will also allow a short line operator to provide the necessary service levels and properly maintain the line and the equipment required to operate it.

BENEFIT-COST ANALYSIS

Using the present value of project costs, a set of benefit cost ratios have been computed. By definition, the benefit-cost ratio is the present value of project benefits divided by the present value of project costs. Calculations have been made using Federal Railroad Administration approved benefit-cost methodology. A project with a benefit-cost ratio greater than one is considered to generate public benefit.

Two financial indices are relied upon to judge the worthiness of a project: (1) the net present value (NPV) of the project, and (2) the benefit cost ratio. The NPV of the project is the sum of the benefits that will accrue over the 25 year period minus the project outlays. The benefit-cost ratio is the sum of the project benefits divided by the project costs. At a level of 4,174 car loads, this project will generate a NPV of approximately $86.5 million and a benefit-cost ratio of 10.8. At a level of 6,274 car loads, the NPV of the project is $139.4 million, and the benefit-cost ratio is 16.3.

These ratios indicate that the project has substantial benefits to the State of Nebraska and its implementation would be in the public interest.

Tables 13 through 16 on the following pages display a year-by-year breakdown of the project costs and benefits for the two car load levels.

TABLE 13

PROJECT COSTS FOR 4,174 CAR LOAD LEVEL
(000 OMITTED)

YEAR	ACQUISITION	REHABILITA	LEASE PAYMENTS	TOTAL	P.VAL OUTLAYS	P.VAL PAYMTS
1991	$7,000	$ 3,084	$ 0	$10,084	$10,084	$ 0
1992	0	2,894	0	2,894	2,769	0
1993	0	3,304	0	3,304	3,025	0
1994	0	2,465	0	2,465	2,160	0
1995	0	1,724	0	1,724	1,445	0
1996	0	0	(1,000)	0	0	(802)
1997	0	0	(1,000)	0	0	(768)
1998	0	0	(1,000)	0	0	(735)
1999	0	0	(1,000)	0	0	(703)
2000	0	0	(1,000)	0	0	(673)
2001	0	0	(1,000)	0	0	(644)
2002	0	0	(1,000)	0	0	(616)
2003	0	0	(1,000)	0	0	(590)
2004	0	0	(1,000)	0	0	(564)
2005	0	0	(1,000)	0	0	(540)
2006	0	0	(1,000)	0	0	(517)
2007	0	0	(1,000)	0	0	(494)
2008	0	0	(1,000)	0	0	(473)
2009	0	0	(1,000)	0	0	(453)
2010	0	0	(1,000)	0	0	(433)
2011	0	0	(1,000)	0	0	(415)
2012	0	0	(1,000)	0	0	(397)
2013	0	0	(1,000)	0	0	(380)
2014	0	0	(1,000)	0	0	(363)
2015	0	0	(1,000)	0	0	(348)
TOTAL	**$7,000**	**$13,471**	**($20,000)**	**$20,471**	**$19,485**	**($10,908)**

PRESENT VALUE TOTAL PROJECT COST	**$19,485**
PRESENT VALUE OF LEASE PAYMENTS	**-10,908**
(PRESENT VALUE-OUTLAYS LESS PRESENT VALUE PAYMENTS)	**$ 8,577**

TABLE 14

PROJECT BENEFITS FOR 4,174 CAR LOAD LEVEL
(000 OMITTED)

YEAR	NET RESOURCE COST AVOID.	HIGHWAY USER COST AVOIDANCE	TRNSPRTN SAVINGS	SALVAGE[15/] VALUE	TOTAL	PRES. VALUE
1991	$ 3,486	$ 124	$ 1,390	$ 0	$ 4,999	$ 4,999
1992	3,486	123	1,390	0	4,999	4,783
1993	3,486	135	1,390	0	5,010	4,588
1994	3,486	132	1,390	0	5,007	4,388
1995	3,486	147	1,390	0	5,022	4,211
1996	3,486	125	1,390	0	5,001	4,013
1997	3,486	162	1,390	0	5,038	3,868
1998	3,486	142	1,390	0	5,017	3,687
1999	3,486	127	1,390	0	5,003	3,518
2000	3,486	137	1,390	0	5,012	3,373
2001	3,486	140	1,390	0	5,016	3,230
2002	3,486	142	1,390	0	5,018	3,092
2003	3,486	138	1,390	0	5,014	2,957
2004	3,486	217	1,390	0	5,092	2,973
2005	3,486	199	1,390	0	5,074	2,740
2006	3,486	138	1,390	0	5,014	2,591
2007	3,486	124	1,390	0	5,000	2,472
2008	3,486	108	1,390	0	4,984	2,358
2009	3,486	117	1,390	0	4,993	2,261
2010	3,486	130	1,390	0	5,005	2,169
2011	3,486	135	1,390	0	5,010	2,077
2012	3,486	148	1,390	0	5,023	1,993
2013	3,486	191	1,390	0	5,066	1,924
2014	3,486	113	1,390	0	4,989	1,813
2015	3,486	120	1,390	12,500	17,496	6,083
TOTAL	**$87,139**	**$ 3,513**	**$34,750**	**$12,500**	**$137,902**	**$82,061**

TOTAL NET PRESENT VALUE BENEFITS	**$ 82,061**
PRESENT VALUE-BUILD SOONER COST AVOIDANCE[16/]	**+ 13,009**
PRESENT VALUE- TOTAL PROJECT BENEFITS	**$ 95,070**

15/ Salvage value is included under Federal Railroad Administration (FRA) approved benefit/cost methodology.

16/ The present value of project benefits include $13.009 million in build-sooner costs. Build-sooner costs cannot be annualized in any meaningful fashion, since they represent the difference between the present value of a resurfacing event under the status quo and the present value of the same resurfacing event under the impact case. In essence, build-sooner costs are the result of the same event occurring sooner instead of later. Therefore, they can only be stated in terms of present values. So, the approach followed in this table is to add the build-

TABLE 15

PROJECT COSTS FOR 6,274 CAR LOAD LEVEL
(000 OMITTED)

YEAR	ACQUISITION	REHABILITA	LEASE PAYMENTS	TOTAL	P.VAL. OUTLAYS	P.VAL. PAYMTS
1991	$7,000	$ 3,084	$ 0	$ 10,084	$10,084	$ 0
1992	0	2,894	0	2,894	2,769	0
1993	0	3,304	0	3,304	3,025	0
1994	0	2,465	0	2,465	2,160	0
1995	0	1,724	0	1,724	1,445	0
1996	0	0	(1,000)	0	0	(802)
1997	0	0	(1,000)	0	0	(768)
1998	0	0	(1,000)	0	0	(735)
1999	0	0	(1,000)	0	0	(703)
2000	0	0	(1,000)	0	0	(673)
2001	0	0	(1,000)	0	0	(644)
2002	0	0	(1,000)	0	0	(616)
2003	0	0	(1,000)	0	0	(590)
2004	0	0	(1,000)	0	0	(564)
2005	0	0	(1,000)	0	0	(540)
2006	0	0	(1,000)	0	0	(517)
2007	0	0	(1,000)	0	0	(494)
2008	0	0	(1,000)	0	0	(473)
2009	0	0	(1,000)	0	0	(453)
2010	0	0	(1,000)	0	0	(433)
2011	0	0	(1,000)	0	0	(415)
2012	0	0	(1,000)	0	0	(397)
2013	0	0	(1,000)	0	0	(380)
2014	0	0	(1,000)	0	0	(363)
2015	0	0	(1,000)	0	0	(348)
TOTAL	$7,000	$13,471	($20,000)	$ 20,471	$19,485	($10,908)

PRESENT VALUE TOTAL PROJECT COST	$19,485
PRESENT VALUE OF LEASE PAYMENTS	-10,908
(PRESENT VALUE-OUTLAYS LESS PRESENT VALUE PAYMENTS)	$ 8,577

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sooner costs to the sum of the net present value of all other project benefits at the last line of the table.

TABLE 16

PROJECT BENEFITS FOR 6,274 CAR LOAD LEVEL
(000 OMITTED)

YEAR	NET RESOURCE COST AVOID.	HIGHWAY USER COST AVOIDANCE	TRNSPRTN SAVINGS	SALVAGE[17/] VALUE	TOTAL	PRES. VALUE
1991	$ 5,245	$ 147	$ 2,817	$ 0	$ 8,208	$ 8,208
1992	5,245	148	2,817	0	8,209	7,856
1993	5,245	174	2,817	0	8,236	7,542
1994	5,245	164	2,817	0	8,226	7,208
1995	5,245	208	2,817	0	8,269	6,934
1996	5,245	164	2,817	0	8,226	6,601
1997	5,245	153	2,817	0	8,215	6,308
1998	5,245	154	2,817	0	8,216	6,037
1999	5,245	158	2,817	0	8,219	5,780
2000	5,245	183	2,817	0	8,244	5,548
2001	5,245	291	2,817	0	8,353	5,378
2002	5,245	166	2,817	0	8,228	5,070
2003	5,245	201	2,817	0	8,262	4,872
2004	5,245	161	2,817	0	8,223	4,640
2005	5,245	187	2,817	0	8,248	4,454
2006	5,245	245	2,817	0	8,307	4,292
2007	5,245	134	2,817	0	8,195	4,052
2008	5,245	137	2,817	0	8,199	3,879
2009	5,245	153	2,817	0	8,215	3,720
2010	5,245	178	2,817	0	8,240	3,570
2011	5,245	335	2,817	0	8,397	3,482
2012	5,245	146	2,817	0	8,210	3,257
2013	5,245	148	2,817	0	8,210	3,117
2014	5,245	149	2,817	0	8,211	2,983
2015	5,245	158	2,817	12,500	20,720	7,204
TOTAL	$131,119	$ 4,442	$70,425	$12,500	$218,486	$131,995

TOTAL NET PRESENT VALUE BENEFITS	$131,995
PRESENT VALUE-BUILD SOONER COST AVOIDANCE[18/]	+ 16,000
PRESENT VALUE- TOTAL PROJECT BENEFITS	$147,995

17/ Salvage value is included under Federal Railroad Administration (FRA) approved benefit/cost methodology.

18/ The present value of project benefits include $16 million in build-sooner costs. Build-sooner costs cannot be annualized in any meaningful fashion, since they represent the difference between the present value of a resurfacing event under the status quo and the present value of the same resurfacing event under the impact case. In essence, build-sooner costs are the result of the same event occurring sooner instead of later. Therefore, they can only be stated in terms of present values. So, the approach followed in this table is to add the build-sooner costs to the

PART II-MARKET POTENTIAL OF THE LINE

Market Area

The Northern Line serves (from East to West) Madison, Antelope, Holt, Rock, Brown, Cherry, Sheridan and Dawes Counties in Nebraska. The line operates very closely to Boyd and Keya Paha Counties in Nebraska and due to its close proximity, includes Gregory, Tripp, Todd, Bennett and Shannon counties in South Dakota as part of the Northern Line market area. Burlington Northern (BN) provides service to Antelope and Dawes Counties. Madison county is also served by Union Pacific.

Except for the Norfolk area, the entire Northern Line is rural. Chadron is the only on-line community larger than 5,000 in population. Four communities, Valentine, Ainsworth, Bassett and O'Neill exceed 1,000 in population. Businesses on the line are nearly all agriculturally oriented, including grain elevators, feed and fertilizer distributors, bulk petroleum plants, farm implement dealers and ready-mix concrete distributors. Primary commodities handled on the line are: grain and beans, fertilizer, propane gas, lumber products, farm machinery and various other commodities.

If the Northern Line is abandoned, alternative rail services would be available only at Norfolk to the CNW and UP, O'Neill to the BN's O'Neill-Sioux City line, and presumably at the west end at Chadron to the remnant of CNW's line with potential connections to the BN at Crawford and to the UP at South Morrill, and the Colony line connecting Chadron to the DM&E at Rapid City. Since the line has limited service options today at Chadron, it is not clear what rail service would be left at Chadron if the line east of Chadron is abandoned.

After abandonment the nearest east-west rail services will be the BN Grand Island-Alliance-Crawford-Gillette (Wyoming) line to the south and the Dakota, Minnesota and Eastern (DM&E) line operating from Rapid City through Pierre and Huron,

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sum of the net present value of all other project benefits at the last line of the table.

South Dakota to Mankato and Winona, Minnesota and Mason City, Iowa to the northeast.

Terminal elevators on the aforementioned BN line are located only at Alliance, (which is forty five miles south of Hay Springs) and Hemmingford, (which is forty one miles south of Chadron). In the event of a Northern Line abandonment, agricultural operations on the line would most likely require shipping grain and receiving inbound products via truck from/to a terminal on the Missouri River or one of these BN elevators or O'Neill on the BN's Sioux City line, or Ord on the Union Pacific's branch from Grand Island. (Ord is seventy-two miles south of Atkinson).

The primary east-west highway is U.S. 20 which parallels the railroad from Inman to Chadron. U.S. 275 parallels the line from Inman to Norfolk. North-south highways cross the line approximately every 40 miles. There are no navigable waterways in the area, the closest river ports being Sioux City and Omaha.

Traffic History

CNW provided summary information regarding on-line traffic originating and terminating on the Northern Line for the years 1974 through 1990. More detailed information was made available for 1989. Based on an analysis of 1989 car movements, the weighted average distance for a car load on the Northern Line was 165.73 miles comparable to a move from west of Wood Lake to Norfolk.

The following table displays a summary of traffic originated and terminated on the Northern Line since 1974. The line has a history of relatively low on-line traffic density, with an average of 2,111 cars originating and 1,144 cars terminating over the seventeen year period ending in 1990.

TABLE 17

Traffic Originating and Terminating on CNW line between but excluding Norfolk and Chadron

Year	Cars Originated	Cars Terminated	Total Cars
1974	2,388	2,032	4,420
1975	1,178	1,644	2,822
1976	1,043	2,232	3,275
1977	650	1,715	2,365
1978	1,266	1,547	2,813
1979	2,513	1,492	4,005
1980	3,844	986	4,830
1981	2,516	807	3,323
1982	1,837	620	2,457
1983	2,773	405	3,178
1984	3,251	399	3,650
1985	1,512	351	1,863
1986	1,261	360	1,621
1987	1,974	781	2,755
1988	2,947	1,043	3,990
1989	2,741	1,623	4,364
1990	2,187	1,420	3,607
Average	**2,111**	**1,144**	**3,255**

Source: Chicago and North Western Transportation Company

Potential Traffic

While the historical originated and terminated traffic on The Northern Line is relatively low, our research indicates that substantially greater carloads of traffic could actually be handled by an independent short line carrier taking over the line from CNW. Considerable work would be involved however, to convince shippers and consumers to return to rail transportation from the significant inroads that trucks have made in the Region.

Why is traffic on this line so low? Several shippers indicated their frustration in dealing with the CNW in getting equipment and competitive rates for rail moves. There appears to be a history of rather poor relations between CNW and the Northern Line shippers. Some shippers said they have completely stopped using rail for their shipments because of negative experiences with CNW. As a consequence of the problems experienced on the Northern Line, elevators along the line and the grain producers themselves truck grain away from the CNW directly to larger terminal elevators on the UP, BN, or to the Missouri River terminals. The cycle continues and traffic to CNW remains low.

Under the circumstances faced in the most recent years by CNW, we can understand the reasons why they decided to divert the bridge traffic, but we can certainly appreciate the position that the Northern Line shippers are left in. While the shipper frustration is certainly justified, and may have historically contributed to the low traffic levels of the line, the problems facing the line today are not necessarily all CNW's fault. Rather, many of the problems between CNW and the shippers are a product of economic realities which face Class 1 railroads.

Barge-truck moves through terminals at Sioux City and Omaha have increased the opportunities for trucks to make back-haul moves, such as inbound fertilizers or feeds, and outbound grain. These back-haul opportunities, and low-ball pricing by the independent truckers, combined with the CNW's reluctance and/or economic inability to provide more frequent service, equipment and competitive pricing for short hauls has contributed greatly to the erosion of short haul traffic from railroads.

Priorities for the allocation of equipment on a larger railroad system require limitations on the amount of assets that can be used for short haul traffic. A short line operator can work closely with shippers and receivers to use older, less expensive equipment in captive service that will not be interchanged off the line. Captive movements of grain between the east end of the Northern Line and consuming feed lots on the west end of the Northern Line can be attractive to shippers and profitable to an independent short line.

Because of the cost structure and labor constraints of the Class I railroads, service and revenue levels required to make this type of movement attractive to on-line shippers and receivers are not as likely for the larger carriers as they are for a short line. Higher standards of car type and the quality and maintenance requirements of equipment in interchange service, combined with far different priorities in resource allocation and contribution requirements precludes many opportunities of this nature for a larger carrier. This is what a short line can do best.

CNW's actions to increase density of traffic on their core lines, while rationalizing redundant or marginal segments are unfortunate requirements for Class I Railroad survival. Diversion of bridge traffic from Rapid City and beyond to the DM&E can be viewed objectively as a sound economic decision by CNW.

There are several important reasons why the diversion of the CNW bridge traffic to the DM&E was far more attractive to CNW than the alternative of rehabilitation of the Northern Line: (1) Strong federal and state support of DM&E's rehabilitation of their main line through Pierre and Huron, (2) lower operating costs, (3) higher density of traffic on that line and (4) the eventual traffic flows of the majority of this traffic to the remaining CNW system.

Once this bridge traffic was diverted, service levels were adjusted to reflect the remaining density of traffic on the Northern Line. The bridge traffic diversion helps secure the longer term viability of the DM&E as a partner of CNW. There is no reason why an independent short line operating the Northern Line couldn't compete with DM&E for this traffic, but it would be realistic to consider the eventual owner of the Dakota Jct. to Colony line as the winner in this contest for overhead business.

The philosophy of rationalization makes life very difficult for the on-line shippers, communities and employees. Rationalization can offer a solution to the problem of uneconomical Class I operations through the abandonment of selected lines or development of independent short lines. The latter option provides a lower cost method to feed the Class I's and provides the service and revenue flexibilities to regain (and retain) traffic back onto the rail. It is also extremely important to recognize the reasons why continued operation of the Northern Line by CNW is not practical. Traditionally, traffic originating on the line moves to interchange points, river ports or processors on CNW beyond Norfolk. CNW must do everything possible to insure the longest possible haul for themselves. Short haul traffic requiring the same equipment as long-haul business, but providing significantly less contribution to net income is not economically attractive to the larger rail carriers.

The high cost of equipment forces a rail carrier to establish priorities on the allocation of equipment to the traffic affording the company the greatest possible contribution to net income. Matching the pricing of back-haul trucks for traffic to the river or to processors is prohibitive for a larger railroad. A great deal of former rail business has been diverted to trucks and other modes as a consequence. This is why many lines have been sold to independent operators that can operate at different cost and revenue structures, while increasing markets by working with all connecting carriers.

In addition, there is little incentive for a larger railroad to allocate expensive equipment that will short haul their own line and subsequently interchange to another carrier for the long haul. CNW does not have direct access to the Gulf or to the Pacific ports. As a consequence, pricing, service and operations will actually dictate the extent of markets available to shippers and receivers on the line.

It is our opinion that CNW has had little or no incentive to provide equipment and price inducements to Northern Line shippers that would allow for extensive movement of traffic away from their own line. Examples include movements of grain to the BN at Crawford or O'Neill and/or the UP at South Morrill, Fremont or Norfolk. Any of these gateways would reduce CNW long haul movements and reduce potential revenues for CNW. Such a move would divert valuable equipment to off line ports that has been required for other higher revenue traffic or longer haul moves elsewhere on the CNW system. As an oversimplification, CNW is actually better off letting the business go to trucks than to short haul itself to other railroads. An independent short line does not have this problem.

A review of the total commodities produced and consumed in counties along the Northern Line indicates that substantial opportunities exist for increased rail traffic to an independent operator of the line. Based on earlier discussions with on-line shippers, there is substantial consumption of grain by major livestock feeding operations on the west end of the Northern Line, and substantial origination of grain on the east end of the Northern Line. With a regional or short line carrier the limitations and priorities for length of haul, service and equipment are quite different than a larger Class I carrier and could provide local service levels that the larger carriers often find unacceptable. It becomes necessary therefore, to examine any traffic that is moved in the region and to assume that any of this business could, in fact, be considered as potential business for a short line or regional railroad.

The following table indicates storage and loading capacities of the larger elevators on the Northern Line.

TABLE 18

CAPACITY AND TRACK CAPACITIES OF MAJOR NORTHERN LINE ELEVATORS

LOCATION	ELEVATOR	STORAGE CAPACITY (IN BUSHELS)	TRACK CAPACITY IN CAR LENGTHS
Hay Sprgs	Lewin Grain	3,500,000	55**
Hay Sprgs	Farmers COOP Grn	856,000	NA
Rushville	Nor'west Grn, Ltd	1,221,000	25
Clinton	Retzlaff Grain Co	440,000	4
Gordon	*Magowan Grain	2,058,520	30
Gordon	Retzlaff Grain	440,000	10
Gordon	*Ag. Pro. COOP	1,600,000	10
Merriman	COOP Non-Stock Gr	1,389,000	10
Crooksto	Crookston Grn & F	1,112,000	26
Valentine	Valentine Feed Sr	15,000	NA
Long Pine	Bassett Grain	2,463,000	80
Long Pine	Deaver-Stockham	966,000	54
Ainsworth	Farmers Ranchers	990,000	NA
Atkinson	*Segr Grain, Inc.	1,000,000	NA
Atkinson	Grasslands Grain	2,400,000	NA
Atkinson	Curry Grain Inc.	1,887,000	NA
Emmet	Emmett Fer & Grn.	698,000	NA
Clearwatr	*Clrwatr Elev Co	200,000	NA
Clearwatr	*Clrwatr Feed/Gn	80,000	12
Oakdale	White Grain Co.	1,294,000	NA
Tilden	Tilden Feed & Grn	914,000	NA
Medw Grv	Meadow Grove Grn	354,000	NA
Medw Grv	Warrick & Sons	275,000	NA
Battle Crk	Battle Ck F.COOP	3,311,000	NA
TOTAL		**29,463,520**	**NA**

Sources: "1990-1991 Nebraska Grain & Feed Directory."
* Shipper Survey Forms.
NA-Not Available

**The 55 car capacity shown for Lewin Grain, Inc. is actually five separate tracks with capacity of 8, 7, 5, 5 and 30 cars, respectively.

Considerable work is required by the shippers and the short line operator to encourage all of the elevators on the line to participate and increase rail loading capacity and shipping by rail.

To develop a reasonable assessment of the total volumes of traffic available in the Northern Line's service area, TOI reviewed information provided by the Nebraska and South Dakota Departments of Agriculture annual reports for 1989 regarding production and consumption by commodities in counties served by the Northern Line. For each of these commodities, we can assume that the total production for each county would be the greatest potential level of traffic available to move by any mode. This should give some idea to growth potential for any carrier operating within this market region.

TABLE 19(A)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Soybeans

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	2,178,280	681	2,519
Antelope	1,480,390	463	1,712
Knox	843,360	264	975
Holt	709,650	222	821
Boyd	164,450	51	190
Rock	49,400	15	57
Keya Paha	15,200	5	18
Brown	72,000	23	83
Cherry	46,020	14	53
Sheridan	0	0	0
Dawes	0	0	0
South Dakota			
Gregory	182,400	57	211
Tripp	35,200	11	41
Todd	17,500	5	20
Bennett	0	0	0
Shannon	0	0	0
Total	**5,793,850**	**1,811**	**6,699**

TABLE 19(B)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Corn

State / County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	4,748,750	4,338	16,050
Antelope	23,064,750	6,784	25,100
Knox	8,821,890	2,595	9,600
Holt	25,449,600	7,485	27,695
Boyd	1,694,700	498	1,844
Rock	4,191,240	1,233	4,561
Keya Paha	589,780	173	642
Brown	5,487,440	1,614	5,972
Cherry	1,777,570	523	1,934
Sheridan	2,848,320	838	3,100
Dawes	248,530	73	270
South Dakota			
Gregory	2,111,200	621	2,297
Tripp	1,231,400	362	1,340
Todd	410,400	121	447
Bennett	340,800	100	371
Shannon	16,200	5	18
Total	**93,032,570**	**27,363**	**101,241**

TABLE 19(C)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Wheat

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	14,820	5	17
Antelope	8,010	3	9
Knox	41,650	13	48
Holt	83,640	26	97
Boyd	44,030	14	51
Rock	9,900	3	11
Keya Paha	35,140	11	41
Brown	0	0	0
Cherry	17,600	6	20
Sheridan	1,719,900	537	1,989
Dawes	1,199,900	375	1,387
South Dakota			
Gregory	514,800	161	595
Tripp	2,057,850	643	2,379
Todd	193,200	60	223
Bennett	1,566,060	489	1,811
Shannon	682,500	213	789
Total	**8,189,000**	**2,559**	**9,469**

TABLE 19(D)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Oats

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	160,000	47	174
Antelope	172,800	51	188
Knox	825,000	243	898
Holt	261,300	77	284
Boyd	315,000	93	343
Rock	0	0	0
Keya Paha	16,800	5	18
Brown	8,700	3	9
Cherry	14,500	4	16
Sheridan	94,500	28	103
Dawes	51,300	15	56
South Dakota			
Gregory	1,291,500	380	1,405
Tripp	520,000	153	566
Todd	12,000	4	13
Bennett	21,600	6	24
Shannon	9,000	3	10
Total	**3,774,000**	**1,110**	**4,107**

TABLE 19(E)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Barley

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	3,000	1	3
Antelope	3,000	1	3
Knox	66,000	17	62
Holt	1,500	0	1
Boyd	24,000	6	22
Rock	0	0	0
Keya Paha	1,500	0	1
Brown	1,500	0	1
Cherry	1,500	0	1
Sheridan	78,400	20	73
Dawes	20,000	5	19
South Dakota			
Gregory	41,600	11	39
Tripp	54,400	14	51
Todd	6,400	2	6
Bennett	52,500	13	49
Shannon	21,600	5	20
Total	376,900	95	352

TABLE 19(F)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Sunflower Seeds

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	0	0	0
Antelope	0	0	0
Knox	0	0	0
Holt	0	0	0
Boyd	0	0	0
Rock	0	0	0
Keya Paha	0	0	0
Brown	0	0	0
Cherry	0	0	0
Sheridan	0	0	0
Dawes	0	0	0
South Dakota			
Gregory	130,321	34	127
Tripp	403,750	106	393
Todd	0	0	0
Bennett	0	0	0
Shannon	0	0	0
Total	**534,071**	**141**	**520**

TABLE 19(G)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Dry Edible Beans

State County	Equiv. Bushels Bu.Harvsted	Equiv. Est. Total Carloads	Equivalent Trucks
Nebraska			
Madison	0	0	0
Antelope	0	0	0
Knox	0	0	0
Holt	0	0	0
Boyd	0	0	0
Rock	0	0	0
Keya Paha	0	0	0
Brown	0	0	0
Cherry	0	0	0
Sheridan	324,800	102	376
Dawes	50,333	16	58
South Dakota			
Gregory	0	0	0
Tripp	0	0	0
Todd	0	0	0
Bennett	0	0	0
Shannon	0	0	0
Total	375,133	117	434

TABLE 19(H)

Summary of Harvest-Nebraska/South Dakota Counties Along CNW Northern Line-1989

Total Crops

State County	Estimated Total Bushels Harvested	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	17,104,850	5,071	18,763
Antelope	24,728,950	7,300	27,012
Knox	10,597,900	3,131	11,583
Holt	26,505,690	7,810	28,898
Boyd	2,242,180	662	2,451
Rock	4,250,540	1,251	4,630
Keya Paha	658,420	195	720
Brown	5,569,640	1,639	6,066
Cherry	1,857,190	547	2,025
Sheridan	5,065,920	1,524	5,640
Dawes	1,570,063	484	1,791
South Dakota			
Gregory	4,271,821	1,263	4,675
Tripp	4,302,600	1,289	4,770
Todd	639,500	192	709
Bennett	1,980,960	609	2,254
Shannon	729,300	226	837
Total	**112,075,525**	**33,195**	**122,822**

Other Products

In addition to the normal crops reviewed above, we also examined other commodities that are conducive to rail moves. Fertilizer products have traditionally moved by rail, but substantial erosion has occurred with movement of phosphates by barge from the gulf to river ports and movement then to distributors by truck. The railroads have not succeeded too well in working out back-haul arrangements with covered hoppers handling grain to the port facilities and fertilizer back to the distributors.

TABLE 20

Fertilizer Sold

State County	Estimated Total Tons Sold	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	34,043	358	1,362
Antelope	46,595	717	1,864
Knox	10,452	161	418
Holt	51,483	792	2,059
Boyd	2,501	38	100
Rock	0	0	0
Keya Paha	0	0	0
Brown	0	0	0
Cherry	0	0	0
Sheridan	0	0	0
Dawes	0	0	0
South Dakota			
Gregory	N/A	N/A	N/A
Tripp	N/A	N/A	N/A
Todd	N/A	N/A	N/A
Bennett	N/A	N/A	N/A
Shannon	N/A	N/A	N/A
Total	**145,074**	**2,067**	**5,803**

Although it may sound unusual, one large regional carrier in the west has found success in moving hay from their market area to the southwest. Therefore we included hay production for the Nebraska counties in the Northern Line market area. Similar statistics for South Dakota were not yet available. The west end of the Northern Line is a large consumer of hay and much of the hay produced would not be available to a carrier, but markets do exist. In addition, a surplus of good boxcars in the country (or at least the use of boxcars being returned empty), combined with a cooperative effort between the producers, consumers and carriers might afford some reasonable opportunities for a short line operator on the Northern Line.

TABLE 21

Hay Production

State County	Total tons of Production	Equivalent Carloads	Equiv. Trucks
Nebraska			
Madison	70,500	1,085	2,820
Antelope	84,920	1,306	3,397
Knox	154,880	2,383	6,195
Holt	230,160	3,541	9,206
Boyd	55,930	860	2,237
Rock	79,120	1,217	3,165
Keya Paha	65,520	1,008	2,621
Brown	59,400	914	2,376
Cherry	259,880	3,998	10,395
Sheridan	126,500	1,946	5,060
Dawes	63,600	978	2,544
South Dakota			
Gregory	N/A	N/A	N/A
Tripp	N/A	N/A	N/A
Todd	N/A	N/A	N/A
Bennett	N/A	N/A	N/A
Shannon	N/A	N/A	N/A
Total	**1,250,410**	**19,237**	**50,016**

As displayed in the above tables, there is a substantial quantity of products produced in the Northern Line's Market Area. In addition, other commodities, such as lumber, gravel and stone, road sand and salt, cement, propane, etc. are consumed in the market area, but not quantified. The eastern end of the railroad mainly produces corn and soybeans, while the west end is a strong producer of wheat. Traditionally, products from the east end are trucked to nearby processors and wheat from the west end is usually shipped to markets farther away, and generally by rail. Certainly a large portion of the traffic is probably not divertable to the line, but substantial opportunities are available to an independent short line, particularly if close relationships are established with the shippers in the market area.

Currently there is serious consideration being given to the construction of a potato processing plant on the Northern Line. The potential movement of rail traffic from this plant is expected to amount to approximately 500 cars annually.

Description of Past and Proposed Operations

Ironically, the development of very competitive unit train pricing and the construction of terminal elevators has detrimentally affected participation in many markets on the Northern Line. Grain rates are a major influence in establishing and maintaining markets for the line's shippers. Unit train rates require large volumes of grain loaded at single elevators. The elevators on the Northern Line have limited capacity to load unit trains, therefore CNW has not had incentive to provide unit train rates to the line on a widespread basis.

Grain rates under deregulation are established independently on each railroad and apply to shipments moving on that line only. When a shipper needs to use two or more major railroads to move from his elevator to a final destination, freight charges for that movement become a combination of each railroads' rates. For this reason, movements involving more than one large carrier are almost always significantly more expensive than an equivalent move operating over only one carrier. As noted previously, CNW has limited on-line market destinations, particularly for export grain, therefore nearly any move of export grain from the Northern Line is currently compelled to be handled by more than one carrier. The Northern Line elevators cannot currently compete very well against the terminal elevators located on UP and BN, since both of those carriers have access to Pacific and Gulf ports with a single line haul.

As stated earlier, few elevators on the Northern Line are capable of loading large unit trains at a single location, so unit train rates are more difficult to apply for this line by the CNW. Under the operation of the Northern Line as a shipper-oriented short line however, cars gathered throughout the entire line from all elevators can be delivered to the CNW, UP and BN interchange points as complete Unit trains. This affords elevators on line the same market opportunities as the larger terminal elevators. The approach that is necessary for survival is for the short line to establish itself as an extension of the Class I connections. In other words, the Northern Line must be approached as if it were one collective customer of the connecting line. The operation of the Northern Line as an unbiased collector of traffic for CNW, UP and BN creates a dramatically increased marketplace for shippers on the line.

Reinstatement of CNW Bridge Traffic

Certainly one of the most important elements of consideration now is the future disposition of the so-called Colony line, which is CNW's line operating from Dakota Jct. (near Chadron) to Colony, Wyoming. Substantial volumes of traffic from this line represents the greatest percentage of the diverted bridge traffic. The DM&E has an option to purchase this line until December 31, 1991. If this line would be sold with the Northern Line, the economic picture of the Northern Line would be enhanced. Because of the long term impact of the overhead traffic generated on this line, it should be of great interest to the State of Nebraska and other parties involved in future operation of the Northern Line.

Other Potential Revenues

An obvious opportunity for an independent short line operating the Northern Line is the geographical positioning of the line as a shorter route for trains currently operating on Burlington Northern. The BN has not been involved in this analysis and certainly may have reasons not to consider the Northern Line as an alternative route for some of its current traffic. Theoretically, however, the potential of a major rehabilitation of the Northern Line makes the line very attractive for reducing mileage in specific moves of BN traffic. BN is a leader in the rail industry in developing innovations to reduce fuel consumption. With volatile world fuel markets and the increased need for new fuel conservation practices, fuel consumption will continue as a target for cost reduction in the industry. The reduction of substantial miles for a unit train movement might be a strong incentive for BN to consider the merits of entering into cooperative agreements with an independent operator on the Northern Line.

The first area of obvious potential is grain traffic originating on BN's line between O'Neill and Sioux City. Currently, traffic originating on this line destined to a Pacific port such as Portland, Oregon must move through Sioux City, then to Willmar, Minnesota on to Fargo and over the BN's lines through Montana to the Pacific Northwest. The following table compares this mileage with the more direct route from O'Neill to Montana via Crawford and Gillette, Wyoming, using the CNW Northern Line vs. BN lines via Fargo.

TABLE 22

Mileage Differences O'Neill, NE to Portland, OR via Fargo vs. Crawford

Track Section	Miles	Track Section	Miles
O'Neill to Sioux City	129	O'Neill to Crawford	270
Sioux City to Willmar	225	Crawford to Billings	418
Willmar to Fargo	159	Billings to Portland	961
Fargo to Portland	1601		
Total	2114	Total	1649
Difference	**465 Miles saved**		

We did not have access to BN track profiles to do accurate Train Performance Calculator (TPC) simulations, but without the simulations, we can still make certain general assumptions regarding some of the potential savings involved for BN. A 75 car grain train totaling 9,975 trailing tons and three EMD SD-60 locomotives consume an average of about 9.25 gallons of fuel per mile operated westbound on the Northern Line. Assuming this is a reasonably close consumption rate on the BN lines in the area, 465 operating miles saved would equate to approximately 4,300 gallons of fuel. Assuming loaded private car miles at $.32 per mile would provide an additional $11,000 savings in private car cost. Savings in crew costs, locomotive maintenance, train supplies, incremental track maintenance, reduced transit time and other expenses would also greatly contribute to the benefits equation for BN.

In addition to the O'Neill line grain trains, another opportunity could be the rerouting of Unit coal trains and return empties over the Northern Line between Crawford and Sioux City via O'Neill instead of via Lincoln. The following comparison addresses potential mileage savings under this scenario.

TABLE 23

Mileage Differences Gillette, WY to Sioux City via O'Neill vs. Lincoln

Track Section	Miles	Track Section	Miles
Gillette to Crawford	174	Gillette to Crawford	174
Crawford to Lincoln	420	Crawford to O'Neill	270
Lincoln to Sioux City	130	O'Neill to Sioux City	129
Total	724	Total	573
Difference	**151 Miles saved**		

Under this scenario, BN coal trains operating from the Powder River Basin to Sioux City and points beyond would save 151 miles. Assuming fuel consumption at seven gallons per mile for three EMD SD-60 locomotives pulling a loaded 100 car eastbound coal train, BN would save approximately 1050 gallons of fuel by operating over the Northern Line. Private car miles at $.32 per car mile would save $4832. Additional savings under categories mentioned above and savings for the movement of empty trains returning to the Powder River Basin could also be realized. An additional consideration of this concept is the ability to divert some traffic away from BN's high density line between Crawford and Lincoln, perhaps avoiding some costs to BN in train delays on that line.

Assuming a reasonable balance of equipment and crews, BN could realize substantial savings in operating these unit trains over the Northern Line on overhead arrangements or trackage rights. Inclusion of this traffic over the Northern Line could benefit not only BN, but also reduce transportation costs for elevators on the BN O'Neill/Sioux City line, secure the viability of that line against any downturns in local traffic and offset substantial overhead and fixed costs of operating the Northern Line. Shippers on the Northern Line would benefit greatly by consequential reduced costs per car.

It is very important to realize that these potential overhead moves could be attractive to the involved parties only <u>after</u> the line is rehabilitated. Movement of tonnage as contemplated here would require a far greater investment in replacement rail, bridge reinforcement and other important track work. Additional employees would be required to maintain and operate the line under these circumstances. It must also be emphasized that BN has not been involved to this point in this analysis and may have concerns that are not known to this author that might influence a decision whether or not to actuate these arrangements. The consequence of resolving these challenges is an opportunity to increase the density of the Northern Line to help insure a strong, independent short line carrier for the long-term.

From an economic standpoint, trackage rights or overhead rights for BN to use the Northern Line for their traffic, would make a major positive impact in the cash flows of an independent carrier. Greater future expenses would be involved in capital expenses and maintenance of the line, particularly in bridge work and rail replacement. The possibility of a considerable number of trains operating over the line would require increasing siding capacity to accommodate the meeting of opposing trains. More sophisticated communication equipment would be required. Certainly it is important to recognize that the arrangements between the independent short line and the tenant railroad would certainly address these additional costs, perhaps in a combination of financial arrangements. The commitment however, of shippers to increase their use of the line, combined with close relationships with CNW, UP and BN to expand markets for on-line and connecting line shippers would greatly improve the prospects of the Northern Line's economic viability.

With the strong alliance between Union Pacific (UP) and CNW, and the strong influence that UP has on the movement of coal from CNW's Wyoming coal lines, it is highly unlikely that any of CNW's coal traffic from the Powder River Basin will ever be conducive to moves over the Northern Line. In fact, it is our understanding that the arrangements between UP and CNW preclude CNW from routing **any** of the coal trains over the Northern Line. However, future density on the Crandall to South Morrill line might influence this otherwise. Certainly operational savings could be argued for rerouting some of the coal moving to points north and east of Sioux City via the Northern Line and the BN line from O'Neill to Sioux City. However, with the resources of UP committed to capacity expansion for this coal, we would not currently encourage any consideration of this traffic.

In summary, TOI feels that there are extensive opportunities for an independent Short Line carrier to find long term success. However, to develop the overhead traffic described above would take several years and a very substantial effort by the operating carrier. In addition, it will require an extremely strong commitment from the shippers on line to work toward development of the additional traffic.

PART III-ENGINEERING ANALYSIS OF LINE

Engineering Study

During December of 1990, a detailed engineering study was done by TOI, analyzing the condition, rehabilitation costs and net salvage values of the line. Mr. R. J. Christensen, an engineering associate of Transportation Operations, Inc., Mr. B. F. "Pete" Collins and Mr. Dan Sabin, principals of Transportation Operations, Inc., made a hy-rail inspection trip of Chicago and North Western's trackage between Chadron and Norfolk, Nebraska.

The general condition of the line can best be described as fair. The line has had very little programmed maintenance over the past years. Maximum curvature is 3 degrees - 30 minutes. The worst grade heading westward is almost a continuous grade from M.P. 359.5 to M.P. 369.8 with a maximum of one (1%) percent. There is a 1.5 mile equation at Long Pine. Ballast in all but the welded rail section is a very thin layer of limestone, however underneath is all pit run gravel. The surface is fair in most areas, but we found a lot of the joints getting bad.

The ties have very few Class 2 or Class 3 violations, but it would appear that only used ties have been installed for the past twenty or so years. There are still some softwood ties in the track. In our capital estimate below we recommend that #1 New ties be installed, these ties should have a usable life of approximately forty years. Rail is in fair condition, but the 9035# and 10035# rail is starting to corrugate. The line is 100% tie plated and is very short on rail anchors. The track is running in quite a few locations.

There is very little brush on the right-of-way. It is estimated that about 90% of the line requires fencing only on one side (highways border the line on one side along most of the mainline).

All of our estimates and assumptions made for maintenance are based upon four trains per week from Norfolk to Long Pine and two trains per week from Long Pine to Chadron. It is recommended that the rehabilitation be done throughout a five year period, with one of five sections of the line rehabilitated each year, working a seven month annual maintenance schedule. It is assumed that the rehabilitation will be done by private contractor. Properly implemented, the five year program will cycle maintenance covering the poorest sections first. Following the first year rehabilitated, each section will require cycled capital programs in the same order as the rehabilitation program.

In addition to the rehabilitation in the first year, the line should be surfaced from M.P. 84.0 to M.P. 115.7 using approximately 300 ties and 40 carloads of ballast. This surfacing work should be handled by the Railroad's assigned work force. Surfacing will then allow for prescribed timetable speed from M.P. 84.0 to M.P. 205.9 after only the first year of rehabilitation.

Annual Capital Program

As noted above, at the end of the fifth year a capital program over and above the continuous regular annual maintenance program should be implemented. The capital program should cover approximately sixty four (64) miles of main line per year and include the following:

24,000	-Ties (6x8 #1 New)
30,000	-Rail Anchors
640	-Carloads of Ballast
1-2 Miles	-Rail

(Traffic volume would actually determine the above figures)

Engineering Department Staffing

Engineering Department staffing is recommended as follows:

1 Supervisor (track and bridges)
1 Track Inspector
1 Mobile HyRail Crane Operator
1 Boom Truck Operator
1 Tamper Operator
6 Three Section Crews with 1 Foreman & 1 Trackman
*3 Trackman for each Section Crew May - October
2 Bridge Crew with 1 Foreman and 1 Bridgeman
*1 Bridgeman from May - October
1 Signalman
14 Full time Engineering Employees
*4 Part time Employees from May - October

Total of 18 Engineering Employees Required

The Supervisor, Track Inspector, three Machine Operators and the one Signalman should be headquartered at O'Neill. The three section crews should be headquartered at O'Neill, Long Pine and Valentine. This will give each section crew approximately 106 miles of track to maintain.

The signal work could be contracted out, however it may cost more and not satisfy the Railroad's requirements. A determining factor in filling this position should take into account the Railroad's liability exposure if the automatic highway crossing signals are not properly maintained.

It is recommended that the track be inspected two times per week from Norfolk to Long Pine and one time per week from Long Pine to Chadron. Trucks, machines and tools required to maintain the Line are listed on a separate report in the Addendum. CNW should have a surplus of this type of equipment, therefore it is recommended that these items be included in the negotiations and purchase agreement.

Train speed restrictions over bridges No. 147, 234, 410 and 478 should be left at 10 M.P.H. even after the rehabilitation work is completed. If something major would happen to one of these bridges, the replacement cost could be exorbitant. It is recommended that at least one time each year all bridges be inspected by a contracted qualified bridge inspector.

In finalizing the purchase it is imperative that all maps, agreements, leases and licenses are included and turned over. Also in setting up the clerical staffing and duties, items such as handling the licenses, leases, estimates, assessments and other related paper work must be addressed and accounted for.

Rehabilitation of the Northern Line

The five year rehabilitation plan as described will place the entire line in Class 3 condition. The total cost in current dollars is estimated at $12,384,850, or $39,007 per mile over five years. Through the duration of the rehabilitation, regular maintenance would be an on-going requirement at an estimated annual cost of $656,791, or $2,069 per mile. At the completion of the rehabilitation, from year six on, regular maintenance must continue, plus an on-going capital program estimated at $1,855,769, or $5,844.94 per mile This results in a total annual engineering expense of $2,512,560, or $7,914 per mile.

TABLE 24

5-Year Rehabilitation Totals

Year #1			
	Track	2,713,860	
	Bridges	370,500	3,084,360
Year #2			
	Track	2,384,259	
	Bridges	372,000	2,756,259
Year #3			
	Track	2,729,011	
	Bridges	267,500	2,996,511
Year #4			
	Track	2,129,755	2,129,755
Year #5			
	Track	1,417,965	1,417,965
Total Estimated Cost to Rehabilitate			**$12,384,850**

The above numbers are stated in current dollars. Assuming a 5% general inflation rate, rehabilitation totals would actually appear as follows:

Year #1	$ 3,084,360
Year #2	$ 2,894,072
Year #3	$ 3,303,653
Year #4	$ 2,465,457
Year #5	$ 1,723,545
Estimated Total	**$13,471,087**

Addendum B contains all the Engineering facts and supporting figures detailing the rehabilitation plan, annual maintenance plan and the capital requirements after rehabilitation.

PART IV-OPERATING ANALYSIS OF THE LINE

Operating Scenarios

Details of the operations of the line were analyzed under various scenarios by Transportation Operations, Inc. (TOI) of Plymouth, Michigan. TOI loaded the "track chart" information, (including track conditions and speeds, elevations and curvature) into a computer model known as a Train Performance Calculator (TPC) to make detailed simulations of trains operating on the line under various situations. The complete operations, including train service, engineering expense, equipment expense and all other normal categories of costs were carefully examined in TOI's short line cost/revenue model to determine the economic viability of the line and estimate reasonable costs of running the Northern Line as an independent short line.

Impact of Operations Following Rehabilitation of Line

The engineering plan described earlier suggested a rehabilitation of the line in segments, with each of the first five years rebuilding one segment of the line per year, with the segment in the worst condition rehabilitated first. The consequence of the rebuilding provides for the elimination of all slow orders due to track conditions. Under current track conditions, a train operating between Norfolk and Chadron requires longer running time than allowed under Federal Hours of Service Laws for two crews to complete the run. With once a week service to industries, approximately five hours of station switching time is required in each direction to handle on line business. With the slow orders eliminated after rehabilitation, two crews can handle the operation of the train between Norfolk and Chadron and still have enough time to do necessary on line switching.

Another significant factor in the increased track speed is equipment utilization. Substantial rail-car time is consumed in operations over the slower track. With an increase in train speeds, car hire expense is reduced and materially less locomotive time is spent getting over the road. In addition, a rehabilitated line with sufficient annual maintenance levels will minimize the potential for derailments and the consequential losses and damage to equipment, lading and track.

Costs of Operations

Various cost scenarios for the operation of the Northern Line by a short line were examined. The following tables show a comparison of costs under several different traffic levels. We examined the 1989 traffic level, then added traffic to the line in increments of 1,000 car loads. We then provided estimated summary costs at each incremental level of business. All of these costs exclude depreciation, line lease expense and/or debt service.

TABLE 25(A)

Summary of costs of operations of Northern Line as a Regional Carrier

Carloads	4000	5000	6,000	7,000
Service Level (Round Trips per Week)	1/wk	1/wk	1.2/wk	1.4/wk
(000 Omitted)				
Fuel	$ 174.6	$ 174.6	$ 209.6	$ 244.5
Transportation	$ 482.2	$ 504.6	$ 552.9	$ 600.5
Way & Structures	$2,849.4	$2,857.5	$2,865.7	$2,873.8
Equipment	$ 120.1	$ 124.6	$ 149.5	$ 174.4
Car Hire	$ 794.9	$ 985.2	$1,139.3	$1,281.5
Gen'l & Admin	$ 476.7	$ 595.9	$ 715.1	$ 834.3
Total Costs	$4,898.0	$5,242.4	$5,632.0	$6,009.0
Cost Per Car	$1,225	$1,048	$ 939	$ 858
Est. cost per bushel (corn @ 3400 bu. per car)	$.3602	$.3084	$.2761	$.2525

TABLE 25(B)

Summary of costs of operations of Northern Line as a Regional Carrier, Cont'd.

Carloads	8,000	9,000	10,000	11,000
Service Level (Round Trips per Week)	1.6 trips	1.8 trips	2 trips	2.2 trips
(000 Omitted)				
Fuel	$ 279.4	$ 314.3	$ 349.3	$ 384.2
Transportation	$ 647.5	$ 694.0	$ 739.4	$ 785.0
Way & Structures	$2,881.9	$2,890.1	$2,898.3	$2,906.4
Equipment	$ 199.3	$ 224.2	$ 249.2	$ 274.1
Car Hire	$1,411.7	$1,529.9	$1,636.1	$1,730.3
Gen'l & Admin	$ 953.5	$1,073.0	$1,191.8	$1,311.0
Total Costs	$6,373.4	$6,725.2	$7,064.0	$7,391.0
Cost Per Car	$ 797	$ 747	$ 706	$ 672
Est. cost per bushel (corn @ 3400 bu. per car)	$.2343	$.2198	$.2078	$.1976

TABLE 25(C)

Summary of costs of operations of Northern Line as a Regional Carrier, Cont'd.

Carloads	12,000	13,000	14,000	15,000
Service Level (Round Trips per Week)	2.4 trips	2.6 trips	2.8 trips	3.0 trips
(000 Omitted)				
Fuel	$ 419.1	$ 454.1	$ 489.0	$ 523.9
Transportation	$ 829.7	$ 873.7	$ 917.1	$ 960.1
Way & Structures	$2,914.6	$2,922.7	$2,930.9	$2,939.0
Equipment	$ 299.0	$ 323.9	$ 348.8	$ 373.7
Car Hire	$1,812.5	$1,882.7	$1,940.9	$1,987.1
Gen'l & Admin	$1,430.2	$1,549.4	$1,669.0	$1,787.7
Total Costs	$7,705.0	$8,006.4	$8,295.2	$8,571.4
Cost Per Car	$ 642	$ 616	$ 593	$ 571
Est. cost per bushel (corn @ 3400 bu. per car)	$.1888	$.1811	$.1743	$.1681

TABLE 25(D)

Summary of costs of operations of Northern Line as a Regional Carrier, Cont'd.

Carloads	16,000	17,000	18,000	19,000
Service Level (Round Trips per Week)	3.2 trips	3.4 trips	3.6 trips	3.8 trips
(000 Omitted)				
Fuel	$ 558.8	$ 593.0	$ 628.7	$ 663.6
Transportation	$1,002.2	$1,043.8	$1,084.9	$1,125.3
Way & Structures	$2,947.2	$2,955.3	$2,963.4	$2,971.6
Equipment	$ 399.0	$ 423.6	$ 448.5	$ 473.4
Car Hire	$2,021.2	$2,043.4	$2,053.6	$2,051.8
Gen'l & Admin	$1,906.9	$2,026.1	$2,145.3	$2,264.5
Total Costs	$8,835.0	$9,086.0	$9,324.4	$9,550.2
Cost Per Car	$ 552	$ 534	$ 518	$ 503
Est. cost per bushel (corn @ 3400 bu. per car)	$.1624	$.1572	$.1524	$.1478

Assumptions in Costing

The TOI short line cost revenue model was developed from comparing actual operating results of short line railroad operations throughout the United States. The model is a spread sheet and is extremely versatile, allowing for the dynamics of each individual operation and assumptions that can be made from the operating territory. We find generally that the model is slightly conservative, but a very realistic approach to costing short line operations. In other words, a prudent short line manager can often maintain costs at a level slightly lower than the model predicts. The model should be used as a reasonable target for operating costs. TOI has used the model for the analysis of many potential short lines, and it has proven itself very accurate in the assessment of the viability of a multitude of lines.

There are a number of cost categories that require further discussion. The following statements will address several issues involving this Northern Line plus our assumptions for the model used for the analysis of the line.

Car Supply and Car Hire Expense

Note: Because of the very large impact car supply makes on an operation, we feel it is necessary to go into additional detail in our assessment of the car supply and car hire expense situation (and options) as we see it for the Northern Line.

One of the most important ingredients of starting a short line operation is car supply and knowing it's associated cost. The Northern Line's main income comes from handling grain and agriculture products. Having a secure car supply is of prime importance in todays environment and the survival of this line absolutely depends on it. The traffic volumes handled by an independent line can be no greater than the car supply and car utilization.

Probably the most important element of negotiations with the selling carrier and other connecting Class I carriers will involve car supply. The most desirable car supply agreement is worthless if the Class I carrier cannot provide the cars when required. This is an area of great risk for a short line in the Midwest. Substantial savings can be made in avoiding equipment leases or purchases, but when grain is ready to move, you can be sure that car supply will be extremely tight.

Very few rail cars of any type, and especially grain covered hopper cars, have been built since 1980. Due to the larger railroads current intent not to invest in new "general" types of rolling stock, and most private investors being apprehensive about investing in new rail equipment, the supply of grain covered hopper cars is now quite low as compared to earlier in the past decade. For the past several years during peak harvest times shippers have repeatedly experienced grain hopper car shortages which resulted in lost markets or at least lost profit for themselves, and also erosion of traffic from the railroads. Short hauls have become almost the exclusive domain of the trucks, and long hauls have been limited to mostly unit train moves. Even the long hauls are being subordinated in many cases to reduced rail miles moving grain to river terminals and final movement by barge. The issue of who should purchase the rail cars, the grain companies or the railroads will be a hot debate for many years to come. In the meanwhile, railroads will be losing this valuable revenue opportunity to other modes.

In the past, most short lines have depended upon their "parent" or connecting Class I railroad to supply equipment. In the past (1985 and before) the car supply was strong and in many cases surplus, therefore making car supply arrangements between the Class I and the short line both simple and beneficial for both parties. Beginning around 1985 however, through attrition and nearly no new car replacement, the nation's general grain car supply started to dwindle. Today even the Class I carriers experience car shortages during peak demands, and short lines are at the mercy of the Class I railroads for what little car supply is available to them. Class I carriers are often strongly criticized by shippers on their own lines when cars are furnished to short lines for loading.

Private grain hopper car supply prior to 1985 was also healthy. A number of short lines had negotiated very attractive agreements a few years ago with the private car owners. The short lines would allow their markings to be placed on the private cars, and in return the short line would receive the cars free while on their line, and in some cases the short line would receive a portion of the car's off line earnings. Today however, we know of no private car owner that is offering such attractive (free per diem) leases. The average cost to lease a grain car will be approximately $400 per month, and most leases will only be for one to three years in duration.

Car hire is perhaps the most often underestimated cost in a short line analysis. We have found that very conservative numbers must be used when developing the economics of a short line operation. For the purpose of our cost model, with service at one round trip per week, and the substantial mileage involved in this operation, we are conservatively using a formula of 10 days per loaded car handled (except private cars) at an average of $15 per day (combined incremental hourly car hire and mileage cost) in our cost model. Private owned cars (not owned by a railroad) are not charged on an hourly basis, but calculated at an estimated $.32 per loaded car mile, based on our estimate of private cars to each individual station. As car loads are increased, the model considers the changes in service levels and recalculates the car time on line accordingly.

TOI suggests that if the Northern Line is purchased from the CNW, shippers should carefully consider acquiring a reasonable fleet of grain covered hopper cars. The following options of lease vs purchase gives a general view of the cost of acquiring a car fleet today. The actual number of cars required to be leased or purchased will have to be carefully examined at some not to distant time to determine the markets served and the equipment required by the new short line.

I. **Lease Option with Railroad Markings Per Car**

a. Cars offered for lease will be 10-12 years old and have an average per diem value of approximately $11.00-$13.00 per day and a mileage rate of approximately 6.1 cents per mile. It's our understanding the current short-haul (CNW market) allows for the cars to be off line approximately 15 days per month, making one and one half trips per month. Railroad marked cars receive both hourly and mileage earnings on all time the cars are off of the owning railroad. Based on information from CNW the average off-line trip of existing moves would be 170 miles, one way. The monthly earnings, cost and bottom line exposure to the short line would be estimated as follows:

$12.00 x 15 days off line =	$180.00	per diem
$.061 x 170 miles x 2 x 1.5=	31.11	off line mileage
	$211.00	approximate earnings
Cost -	$400.00	monthly lease (Net)
	+ $100.00	monthly tax/ins/maints
	$500.00	monthly cost
	- $211.00	avg. earnings
	$289.00	monthly exposure

b. The same type of car (assuming the short line gains new markets to the Gulf and to the Pacific Rim), will average about 1200 miles one way with only one trip per month per car:

$12.00 x 21 days off line	= $252.00	per diem
$.061 x 1200 mi. x 2 x 1	= $ 73.20	off line mileage
	$325.20	approximate earnings
Cost -	$400.00	monthly payments
	+ $150.00	mo. tax/ins/maints*
	$550.00	monthly cost
	- $325.00	avg. earnings
	$225.00	monthly exposure

*It is assumed that car maintenance will increase approximately $50.00 per car, per month for these longer distance markets.

II. **Purchase Option with Railroad Markings Per Car**

Used Cars:

a. Used cars can be purchased for approximately $25,000 per car. Used cars will have an average per diem value of approximately $12.00 per day, and a mileage rate of 6.1 cents. Financing the cars for ten years at 13.5% will cost about $381.00 per car, per month in principal and interest. Using the same example of short haul for existing CNW markets, the monthly earnings, cost and bottom line exposure would be as follows:

$12.00 x 15 days off line =	$180.00	per diem
$.61 x 170 miles x 2 x 1.5=	$ 31.00	off line mileage
	$211.00	approximate earnings
cost -	$381.00	monthly payments
	+ $100.00	monthly tax/ins/maints
	$481.00	monthly cost
	- $211.00	earnings
	$270.00	monthly exposure

b. Same as above for new Gulf and Pacific Rim markets:

$12.00 x 21 days off line =	$252.00	per diem
$.61 x 1200 mi x 2 x 1 =	$146.00	off line mileage
	$398.00	approximate earnings
cost -	$381.00	monthly payments
	+ $125.00	monthly tax/ins/maints
	$506.00	monthly cost
	- $398.00	earnings
	$108.00	monthly exposure

New Cars:

a. New cars can be purchased for approximately $45,400 per car. New cars will have an average per diem value of approximately $19.92 on a 10 year average, (1st year $21.84, 10th year $17.76), and a mileage rate of 7.9 cents (10 year average). Financing the cars for 15 years at 13.5% will cost approximately $590.00 per car, per month in principal and interest. Using the same examples of short haul for existing CNW markets, the monthly earnings, cost and bottom line exposure would be as follows:

$19.92 x 15 days off line	= $299.00	per diem
$.79 x 170 miles x 2 x 1.5	= $ 40.00	off line mileage
	$339.00	approximate earnings
Cost -	$590.00	monthly payments
	+ $ 65.00	monthly tax/ins/maints
	$655.00	monthly cost
	- $339.00	earnings
	$316.00	monthly exposure

b. Same as above for new Gulf and Pacific Rim markets:

$19.92 x 21 days off line	= $418.00	per diem
$.079 x 1200 mi. x 2 x 1	= $190.00	off line mileage
	$608.00	approximate earnings
Cost -	$590.00	monthly payments
	+ $115.00	monthly tax/ins/maints
	$705.00	monthly cost
	- $608.00	earnings
	$97.00	monthly exposure

It must also be recognized that some months may not be as active as assumed above and therefore the exposure may be greater to the short line.

Having displayed these options, it is prudent to compare each of the alternatives to determine the most realistic direction to take for an independent operator of the Northern Line.

Car Hire and Car Supply solely from Class I Connections:

Five thousand annual car loads at 10 car days times $15 per day in car time result in mileage charges of **$750,000** per year.

Lease of Equipment:

Five thousand annual car loads in short haul service, with 1.5 trips per month and a small cushion for bad ordered equipment, would require a fleet of approximately 280 cars in service. Net exposure of $289 per car per month would total about **$971,000** per year.

Five thousand annual car loads in long haul service, with 1 trip per month and a small cushion for bad ordered equipment, would require a fleet of approximately 425 cars in service. Net exposure of $225 per car per month would total about **$1,147,500** per year.

Purchase of Equipment:

Five thousand annual car loads in short haul service, with 1.5 trips per month and a small cushion for bad ordered equipment, would require a fleet of approximately 280 cars in service. Net exposure of $316 per car per month would total about **$1,061,760** per year for new cars. For used cars the net exposure ($270) would be **$907,200** per year.

Five thousand annual car loads in long haul service, with 1 trip per month and a small cushion for bad ordered equipment, would require a fleet of approximately 425 cars in service, net exposure of $97 per car per month would total about **$494,700** per year for new cars. For used cars the net exposure ($108) would be **$550,800** per year.

The most difficult factor is to determine the reliability of Class I car supply, and the markets available to a short line. We talked in another portion of this report about the independent short line obtaining older equipment for captive moves. However, markets involving interchange of equipment beyond the short line makes this exercise necessary as a separate analysis.

Based upon the above assumptions it would be advantageous for the short line to purchase Used equipment or to carefully find and negotiate a Used car lease to be at or lower than the above Used car purchase assumption. These options should only be taken if secure equipment arrangements cannot be made with the CNW (or other connections), and if the grain markets stay mostly as they are today (CNW short haul). However, if the market shifts and expands to the Gulf and/or Pacific Rim then strong consideration should be given to purchasing new grain cars.

Certainly a great deal of additional analysis will be required regarding equipment.

Employees and Wage Rates

Employees required for the Northern Line would most likely be drawn from experienced railroad people in the area, particularly displaced or laid-off CNW employees. Success of the line as an independent would require wage rates at about 60 to 70% of the existing wage scales of the line today. In addition, very innovative work rules would need to be in place to insure the flexibility required for an independent short line operation. For our calculations we included the following employees (including relief) and pay rates in our model to operate the railroad at current traffic and service levels:

TABLE 26

Employee Type	No. of Employees	Wage Scale
Trainmen	3	$ 9.05/hr.
Enginemen	3	$10.32/hr.
Clerks/Dispatchers	5	$ 8.61/hr.
Signal Maintainers	1	$11.60/hr.*
Trackmen	13	$ 7.92/hr.
Mechanical/Locomotive	2	$ 9.76/hr.*
Mechanical/Car Dept.	1	$ 9.24/hr.
Total	**28**	

*Possible contractor arrangement.

For supervision, at least initially, we made the following assumptions:

TABLE 27

	Supervisory Position	Estimated Salary
1	Chief Operating/Exec. Officer	$ 65,000
1	General Manager	$ 55,000
1	Business Manager	$ 50,000
1	Chief Engineer	$ 40,000
1	Ch. Mech. Officer/Rd. Foreman	$ 40,000
1	Track Supervisor	$ 25,000
6	Total	$275,000

The grand total number of employees including management is assumed at 34 for modeling purposes.

In addition, an assumption of $142,250 annually is estimated to cover costs of legal fees; accounting and auditing; programming and computer support; and misc. outside contractors. Fringe benefits are calculated at 40% on straight time wages and 15% on overtime wages.

Train Operations

Train operating assumptions, which drive many other areas of cost in the TOI model, are based on four crew starts per week, with each crew on duty for 12 hours, the maximum time allowed under the Federal Hours of Service Laws. Crew size is one trainman and one engineer.

Car Department Expense

Car Department Expense is generally conservative in our model, primarily because many short lines with foreign equipment operating over their line generally can cover their car department expense with billable repairs of foreign line equipment. For this purpose, we included the full cost of car department labor (one employee) without any consideration of offsetting billing. The addition of foreign cars might provide enough revenue to justify the employment of an additional carman.

Locomotive Fuel

The model bases fuel consumption on a system average basis. We used the TPC simulations to verify trip consumption, but there is additional fuel consumed in idle time when units are not shut down and in terminal switching. We assume that management of this short line will set a priority to establish fuel conservation efforts to shut down units whenever possible as well as taking units off line (idle them) when they are not required to pull a train, such as down hill and flat terrain. We are currently using an estimate of 21 gallons per locomotive operating hour, at $1.05 per gallon.

Locomotive Expense

We assumed that at current operating levels, the line would require five EMD, four axle GP-7 or GP-9 locomotives, providing 1,500 to 1,750 horsepower per unit. The estimated purchase price assumed for these units was $125,000 per unit, which currently would buy a reasonable unit of this type in good working order. Locomotive expense includes locomotive repairs at $9.81 per operating hour, locomotive inspection at $2.48 per operating hour, End of Train Device/Radio equipment at $.60 per operating hour and interest on locomotive financing at $9.06 per operating hour.

Liability Insurance

Liability insurance varies greatly in short lines because of the various dynamics of a rail operation, such as track condition, train speeds, urban areas operated in, number of employees, hazardous materials handled, derailment history, etc. As a rule of thumb, an operation with good track conditions in a rural area should have liability insurance expense equal to about 12 1/2 per cent of the total straight time payroll. The model estimated expenses for liability insurance accordingly.

Trackage Rights

The TOI model assumes that the majority of traffic handled to and from this line will move via trackage rights over the CNW to their yard at Norfolk and between Chadron and Crawford to the BN. Trackage rights charges are based on an estimated cost of $.25 per car mile. This is certainly a negotiable issue for discussion at the time of line purchase.

Operating Taxes

We were unsure exactly where this short line would stand from a tax obligation standpoint, so in the absence of time to determine exact rates, state operating taxes are estimated at $200 per mile of Railroad owned.

Engineering Assumptions

While detailed discussion regarding the Engineering plan is elsewhere in this report, the model makes certain assumptions based on the information developed by the engineering estimates. For the base operations, we used actual labor expenses, plus a 15% overtime factor. As traffic assumptions are increased in the model, automatic assumptions on incremental costs are calculated. These costs include requirements for additional labor and fringes; material and contractors.

Should significant movements of heavy unit trains, such as BN coal trains be considered, the cost assumptions for incremental engineering expense would have to be increased accordingly. The incremental increases did not consider continual movement of heavy trains with larger, heavier motive power, which would require additional rail and bridge considerations.

Miscellaneous Expenses

The model calculates reasonable estimates of various miscellaneous costs that are often neglected in short line costing. We have examined costs of numerous short lines to develop reasonable figures for the following miscellaneous categories:

- Freight Train Supplies
- Yard and Station Supplies
- Travel Expenses
- Equipment Rental
- Furniture and Equipment
- Stationery and Printing
- Postage
- Publishing and Subscriptions
- Telephone and Utilities
- Motor Vehicles (Non-Engineering Dept.)
- Taxis-Meals-Lodging for Crews
- Safety and Casualty
- Building Leases and Rentals (None estimated for this line)
- General and Employee Claims
- Derailments (based on a calculation of $7.50 per crew hour with current track conditions)
- Car Accounting and Information Systems @ $2.50 per car
- Contingencies @ 5% of total operating expenses except engineering.

Addendum A-Background Information on Highway Impact

Addendum B-Background Information on Rail Engineering Study

Addendum C-Background Information on Operating Analysis

Addendum D-Background Information on Hazardous Materials Statements

NOTE: THE TECHNICAL ADDENDUMS ARE PRINTED UNDER SEPARATE COVER AND ARE AVAILABLE UPON REQUEST. REQUESTS SHOULD BE SUBMITTED TO:

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