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**ANALYSIS OF REVENUES AND COSTS FOR
WHEAT SHIPMENTS ORIGINATED IN NORTH DAKOTA
ON THE BNSF RAILROAD**

**Denver Tolliver
John Bitzan**

UGPTI Departmental Publication No. 144

March 2002

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*Analysis of Revenues and Costs for Wheat Shipments Originated
in North Dakota on the BNSF Railroad*

Denver Tolliver
John Bitzan

Upper Great Plains Transportation Institute
North Dakota State University

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Disclaimer

This report includes a series of estimates of revenue-to-variable cost ratios. The estimates use the best available data given the short time frame for the study. More accurate estimates of revenue-to-variable cost ratios may be obtained by using detailed operational characteristics of specific movements. However, a higher level of detail would require a longer time frame. Moreover, the revenue-to-variable cost ratio estimates provided in this report are not intended to be used as evidence in any proceeding.

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INTRODUCTION

An analysis of railroad revenues and costs has been conducted for this hearing. The revenue-cost study is restricted to wheat movements originated in North Dakota by the BNSF railroad. The purpose of the study is to provide background information about the rates and costs of various railroad service levels. The primary objectives are to:

1. Analyze the costs and revenue-cost ratios of wheat movements from North Dakota to major markets
2. Assess the relative efficiencies of BNSF service levels and shipment sizes
3. Place BNSF revenue-cost ratios in the context of rate reasonableness

This report is organized into four main parts. Part 1 describes the Uniform Railroad Costing System (URCS), the costing model used in this study. Part 2 presents revenue-to-variable cost ratios computed from the 2000 waybill sample. A state version of the sample was provided to the North Dakota Public Service Commission by the Surface Transportation Board (STB). This file includes the variable cost of each sample movement, as computed by the STB. In Part 3, revenue-cost estimates are presented for wheat movements from North Dakota to Portland and Minneapolis based on March 2002 rates. In addition, the costs of various BNSF service options are compared, including the 110-car single-origin and 110-car two-origin options. Finally, in Part 4 the revenue-to-variable cost ratios are placed in the context of rate reasonableness.

THE UNIFORM RAILROAD COSTING SYSTEM

The Uniform Railroad Costing System (URCS) is the general purpose costing system of the Surface Transportation Board. The focus in this study is on applications of URCS, not its design. However, a general understanding of URCS is necessary to discern how the movement costs were obtained. The Uniform Railroad Costing System includes three phases. Phase I is a statistical analysis phase. Periodically, statistical studies are performed by the STB to determine how groups of railroad expenses (e.g., running track maintenance) vary with activity (e.g., gross ton-miles). This information is used in Phase II to compute the annual percent variable of expense account groups.

Each year, the STB applies Phase II of URCS to each Class I railroad's expense and operating statistics using the most recent year of validated data. The result of the Phase II analysis is a series of variable unit costs and cost factors that are stored in Worktable E. Worktable E is the starting point for a cost analysis. Phase III of URCS uses Worktable E factors to estimate the variable and fully allocated costs of particular movements.

Fully Allocated and Variable Costs

URCS variable costs reflect an intermediate-run time period. During this period, equipment investment is considered to be 100 percent variable. A return on equipment investment is included in the URCS variable costs based on the current cost of capital. However, roadway investment costs are considered to be 50 percent variable with traffic. Thus, the URCS variable costs reflect a return on investment for half of the railroad's roadway, track, and structures.

URCS fully allocated costs reflect a long-run time period during which all investment costs are variable. The fully allocated cost of a shipment includes the variable cost plus a percentage allocation of common and fixed costs to each shipment. Theoretically, if the rate for each movement on a railroad's system equals its fully allocated cost, the carrier will earn adequate revenues including a return on all equipment and roadway investment equal to the current cost of capital rate. However, since many railroad costs cannot be attributed to individual shipments, the method of assigning these common and fixed costs is arbitrary. Thus, in examining revenue-cost ratios, more weight should be placed on revenue-to-variable cost ratios than revenue-to-fully-allocated cost ratios.

URCS Minimal Parameters

A certain number of parameters must be specified before URCS can be used to analyze a movement. These minimal parameters include:

- (1) The carrier code
- (2) The distance of the shipment
- (3) The type of shipment, as related to the carrier's role
- (4) The type of freight car
- (5) The number of freight cars
- (6) The type of movement, as related to service level
- (7) The car owner (private or railroad)
- (8) The commodity type (the STCC Code)¹

¹The Standard Transportation Commodity Codes used in URCS are a combination of 3-,4-, and 5-digit codes. The code used in this study is 0113: grain. The STCC is used only to estimate loss and damage costs.

- (9) The weight of the shipment (in tons per car)

Most of these parameters are self-explanatory. However, some require a brief explanation.

The type of shipment describes a carrier’s participation in the movement. URCS approaches the problem of interline cost calculations by analyzing each carrier’s movement and tabulating the results. A carrier's movement is referred as a “leg” of the trip. URCS will calculate costs for as many as 4 legs. In a URCS analysis, each railroad is assigned one of the movement codes shown in Figure 1. Figure 2 illustrates the expected sequence of movement codes for various single-line and interline movements and the number of legs in the movement.

| Figure 1. URCS Line-Haul Movement Type Codes | |
|---|----|
| Originated & Terminated | OT |
| Originated & Delivered | OD |
| Received & Delivered | RD |
| Received & Terminated | RT |

| Figure 2. Sequence of Movement Codes for Line-Haul Movements | |
|---|-----------------------------------|
| Number of Legs | Sequence of Movement Types |
| 1 | OT |
| 2 | OD RT |
| 3 | OD RD RT |
| 4 | OD RD RD RT |

The URCS costing approach is governed by the type of movement. One of three choices must be specified:

1. Individual or single car
2. Multi-car
3. Unit train

URCS calculates “unit train” costs on a trainload basis. The shipment is assumed to comprise the entire train. According to the URCS Users Guide, a shipment must include at least 50 cars before it can be costed as a unit train. Presumably, this criterion was used by the STB when estimating the costs of waybill movements. A multi-car movement must include at least six cars.

When a multi-car or a unit-train movement is specified, URCS automatically incorporates a series of adjustments developed in Ex Parte No. 270.² These adjustments recognize that multi-car and unit-train movements do not utilize yard and clerical services to the same degree as single-car shipments.³ Clerical costs are adjusted by assuming that 25 percent of the cost is associated with the shipment while the remaining 75 percent varies with the number of carloads. The clerical cost per carload declines as the fixed portion of the expense is spread over more carloads.

URCS also reduces car-day cost at origin and destination by 50 percent when a multi-car or unit-train movement is specified, reflecting reduced loading/unloading, switching, and waiting time per car. Locomotive switching costs at origin and destination are reduced by 50 percent for

²Ex Parte 270 (Sub-No. 9).

³Surface Transportation Board. *Uniform Railroad Costing System User Guide*.

a multi-car shipment and 75 percent for a unit train. In addition, URCS eliminates intertrain and intratrain switching costs for unit-train shipments.⁴

If unit-train and multi-car costs are lower than the system average, then single-car costs must be greater than the system average. Therefore, the cost reductions given to unit-train and multi-car shipments must be balanced with offsetting increases in single-car costs. After this “make-whole” adjustment, the weighted-average of a railroad’s single-car, multi-car, and unit-train industry switching costs should agree with an unweighted estimate developed using the average switching minutes from the carrier’s Worktable E. Similar reconciliations are performed for car day and clerical costs. Line-haul switching adjustments are made to single and multi-car shipments on a car-mile basis to offset the elimination of intertrain and intratrain switching costs for unit-train shipments.

URCS Detailed Parameters

URCS allows the specification of 64 additional parameters. When values are not specified for these inputs, URCS uses default values. Some of the most important parameters are:

- Distances traveled by type of train service (way, through, and unit train)
- Frequency of intertrain/intratrain switches
- Car-days consumed during certain railroad activities (e.g., loading or unloading, industry switching, intertrain or intratrain switching, and running)
- Train weights and power units

⁴Interchange switching costs are included for unit-train shipments but at a reduced level.

Way and Through Train Miles

Way trains operate primarily between freight stations located on branch lines and railroad classification yards. The STB defines way trains as "trains operated primarily to gather and distribute cars in road service and to move them between way stations or way points."⁵ A way train movement does not occur when a shipment is picked up or delivered within a terminal area served by a yard switching crew. Through trains are primarily operated between two or more major concentration or distribution points.⁶ As illustrated later, the average way train tends to be much smaller than the average through or unit train. Train size is an important cost factor. Crew train-mile costs don't vary much with the size of the train. Thus, larger trains yield lower labor costs per ton-mile. Train size also results in economies of utilization of locomotive power and train supplies.

Intertrain and Intratrain Switches

A single-car shipment is typically switched and classified several times enroute. It may be switched from one train to another or repositioned within the same train. A minimum of two intertrain switches usually occur, one each at the originating and terminating classification yards. In addition, a single-car shipment may require several additional intratrain or intertrain switches at intermediate locations. In a series of special studies, the ICC determined that the average single carload receives an intratrain or intertrain switch every 200 miles. Each intratrain or intertrain switch requires one-half day of yard time plus locomotive switching expenses. These

⁵Surface Transportation Board: Reporting Instructions for Schedule 755 of the R-1 Report.

⁶Ibid.

intermediate events can become a costly item on a lengthy trip – e.g., from North Dakota to Portland.

Car-Days at Industry

Car days at industry consist of loading, unloading, and switching time. The URCS default value is 2 days for each loading or unloading event, which is consistent with the 48 hours of free time typically allotted for single-car shipments. URCS reduces the loading or unloading time to 1 day for multi-car and unit-train shipments. Car days in industry switching reflect the time required for a car to be spotted or pulled at an industry location, including the time waiting to be switched. URCS allows 1 day for each switching event for individual cars, and one-half day for multi-car and unit-train switching events. For an individual covered hopper car shipment, URCS assigns a total of 8 industry days at origin and destination (2 days loading or unloading at the origin and destination, 1 day spotting cars at each, and 1 day pulling cars from each).

Average Trains Weights

This parameter, which is often referred to as average trailing tons, includes the commodity, freight car, trailer, and container weights. It is the average weight of the loaded and empty train movements. In 2000, the average BNSF unit-train consisted of 9,224 trailing tons. A 110-car train results in an average trailing weight of 9,598 tons. In comparison, the average BNSF through train weighs 5,026 tons, while the average way train weighs only 1,739 tons. As noted earlier, train crew and locomotive costs per ton-mile are typically lower in larger trains.

Locomotive Units per Train

URCS estimates road locomotive ownership, fuel, servicing, and related costs based on the average number of power units per train. In 2000, the average BNSF unit train was powered by 2.8 locomotive units. In comparison, the average through train was powered by 3.2 locomotives, in spite of the fact that the average through train weight was only 55 percent of the average unit-train weight. In 2000, the average BNSF way train was powered by 2.2 units.

With this brief background description of URCS, the main topic of the report is introduced – revenue-cost ratios for wheat movements from North Dakota to various markets.

WAYBILL REVENUE TO VARIABLE COST RATIOS FOR BNSF WHEAT SHIPMENTS

In addition to examining the revenue-to-variable cost ratios to Minneapolis and Portland using the current BNSF rate structure and operationally-specific costing techniques, this statement also examines revenue-to-variable cost ratios for BNSF wheat shipments from North Dakota to all major markets using the 2000 railroad waybill sample.⁷ The railroad waybill sample is a stratified random sample of terminating railroad traffic in the United States. The sample includes data on individual railroad shipments, including the shipment origin, the shipment destination, the commodity shipped, the number of cars in the movement, the weight per car, the distance of the movement, the reported revenue for the shipment, the STB estimated cost for the movement, the railroads involved in the movement, and other various data items.

⁷All wheat markets that have at least three receivers are examined.

The variable costs in the waybill sample reflect a mixture of shipment weights, including both 100-ton and 111-ton weights. In estimating the costs of interline movements, the STB applies individual Class I carrier Worktable E files to individual legs of the movement. If a short-line or regional railroad is included in a movement, the STB applies regional URCS costs to the railroad's leg of the movement.

An examination of revenue-to-variable cost (RVC) ratios from the railroad waybill sample provides a useful measure of the profitability realized by the BNSF on North Dakota wheat shipments.⁸ The costs encompassed in the railroad revenue-to-variable cost ratios from the waybill sample serve as a comparison for the revenue-to-variable cost ratios calculated using movement specific characteristics. Moreover, the waybill revenue-to-variable cost ratios reflect a rate structure more representative of the traditional BNSF rate structure, when the so-called inverse rate structure was not in place. Finally, the revenue-to-variable cost ratios from the railroad waybill sample include all major markets, providing a representative view of the profitability of all BNSF wheat shipments originating in North Dakota.

Before examining the revenue-to-variable cost ratios, a few caveats should be mentioned. First, waybill revenues do not necessarily reflect contract revenues for those shipments made under a confidential contract. Thus, to the extent that shipments are occurring under a confidential contract rate, the revenue-to-variable cost ratios may overstate actual revenue-to-variable cost ratios. Moreover, it is unclear whether COT premiums or discounts are reflected in the waybill revenues. Second, the costs calculated by the Surface Transportation Board on the

⁸The revenue-to-variable cost ratios calculated are for the entire movement and may reflect profits realized by other railroads in addition to the BNSF. Reported revenue-to-variable cost ratios include those for all wheat movements originating on the BNSF system.

railroad waybill sample reflect average BNSF system operational characteristics. These costs may not be as accurate as costs calculated using operational characteristics specific to individual movements. Nonetheless, the waybill reported revenue-to-variable cost ratios still provide insight into the profitability realized by the BNSF on North Dakota wheat shipments.

Table 1 shows weighted average waybill sample revenue-to-variable cost ratios by destination region (Bureau of Economic Analysis Region (BEA)), crop reporting district, and shipment size.⁹ Similarly, Table 2 shows the weighted average waybill sample revenue-to-variable cost ratios by destination region and shipment size, without separating the crop reporting districts. As the tables show, the revenue-to-variable cost ratios for several destination markets suggest profitable shipments. For example, all shipment sizes of wheat traveling from North Dakota to Duluth show a weighted average revenue-to-variable cost ratio in excess of 2.8, with multi-car shipment and unit-train shipments to this market showing weighted average revenue-to-variable cost ratios in excess of 3 and 4, respectively. Another profitable market is Minneapolis with a weighted average revenue-to-variable cost ratio of nearly 2.4 for single car shipments, and in excess of 3 and 4 for multi-car and unit-train shipments. Portland shows a weighted average revenue-to-variable cost ratio of 2.16 for single-car shipments, 2.67 for multiple-car shipments, 2.81 for 52-car shipments, and 3.17 for shipments of more than 110 cars. Finally, shipments to Fargo-Moorhead and Omaha also show high revenue-to-variable cost ratios.

⁹Only crop reporting districts with at least three shippers capable of handling the particular shipment size are included, and only destination BEAs with at least three receivers are included. Thus, the statistics shown do not violate any confidentiality restrictions.

**Table 1: Revenue-to-Variable Cost Ratios for BNSF Wheat Shipments from North Dakota CRDS - 2000 Waybill Sample
(Weighted Average by Carloads)**

| Destination BEA | Crop Reporting District | (1-25 Cars) | (26-51 Cars) | (52-109 Cars) | (110+ Cars) |
|--|--------------------------------|--------------------|---------------------|----------------------|--------------------|
| Chicago-Gary-Kenosha, IL-IN-WI | 1-North West | 2.39 | 2.20 | 2.88 | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 2-North Central | 2.04 | . | . | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 3 North East | 1.62 | 1.71 | 2.03 | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 4-West Central | 1.67 | . | . | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 5-Central | 1.55 | 1.99 | 2.45 | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 6-East Central | 1.78 | 1.72 | . | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 7-South West | 2.29 | 2.10 | 2.67 | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 8-South Central | 1.65 | 2.14 | . | . |
| Chicago-Gary-Kenosha, IL-IN-WI | 9-South East | 1.65 | 1.70 | . | . |
| Des Moines, IA-IL-MO | 3 North East | . | 1.88 | . | . |
| Des Moines, IA-IL-MO | 6-East Central | . | 1.92 | . | . |
| Duluth-Superior, MN-WI | 1-North West | . | 3.73 | 4.12 | . |
| Duluth-Superior, MN-WI | 2-North Central | 2.65 | . | . | . |
| Duluth-Superior, MN-WI | 3 North East | 2.92 | 2.86 | . | . |
| Duluth-Superior, MN-WI | 4-West Central | 2.28 | . | . | . |
| Duluth-Superior, MN-WI | 5-Central | 2.52 | 3.27 | . | . |
| Duluth-Superior, MN-WI | 6-East Central | 2.73 | 3.04 | 4.14 | . |
| Duluth-Superior, MN-WI | 7-South West | 2.42 | 2.71 | . | . |
| Duluth-Superior, MN-WI | 8-South Central | 2.98 | 3.13 | . | . |
| Duluth-Superior, MN-WI | 9-South East | 2.69 | . | . | . |
| Fargo-Moorhead, ND-MN | 1-North West | . | 2.30 | . | . |
| Fargo-Moorhead, ND-MN | 2-North Central | 2.16 | . | . | . |
| Fargo-Moorhead, ND-MN | 3 North East | . | 2.62 | . | . |
| Houston-Galveston-Brazoria, TX | 2-North Central | 1.33 | . | . | . |
| Houston-Galveston-Brazoria, TX | 3 North East | 1.25 | 1.34 | . | . |
| Houston-Galveston-Brazoria, TX | 6-East Central | . | 1.14 | . | . |
| Kansas City, MO-KS | 1-North West | 2.42 | . | . | . |
| Kansas City, MO-KS | 3 North East | 2.04 | 2.08 | . | . |
| Kansas City, MO-KS | 5-Central | 1.87 | . | . | . |
| Kansas City, MO-KS | 8-South Central | 2.00 | . | . | . |
| Kansas City, MO-KS | 9-South East | 1.53 | . | . | . |
| Los Angeles-Riverside-Orange County, CA-AZ | 1-North West | 1.37 | . | . | . |

**Table 1: Revenue-to-Variable Cost Ratios for BNSF Wheat Shipments from North Dakota CRDS - 2000 Waybill Sample
(Weighted Average by Carloads)**

| Destination BEA | Crop Reporting District | (1-25 Cars) | (26-51 Cars) | (52-109 Cars) | (110+ Cars) |
|--|--------------------------------|--------------------|---------------------|----------------------|--------------------|
| Los Angeles-Riverside-Orange County, CA-AZ | 8-South Central | . | 1.36 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 1-North West | 2.76 | 2.81 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 3 North East | 2.31 | 3.13 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 4-West Central | 1.80 | 3.14 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 5-Central | 2.21 | . | 4.16 | . |
| Minneapolis-St. Paul, MN-WI-IA | 6-East Central | 2.36 | . | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 8-South Central | 2.14 | 3.09 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 9-South East | 2.40 | . | . | . |
| New Orleans, LA-MS | 3 North East | 1.36 | . | 1.46 | . |
| New Orleans, LA-MS | 5-Central | . | . | 1.90 | . |
| New Orleans, LA-MS | 7-South West | 1.75 | . | 1.77 | . |
| New Orleans, LA-MS | Unidentified | . | . | . | 1.69 |
| Oklahoma City, OK | 2-North Central | 1.68 | . | . | . |
| Oklahoma City, OK | 3 North East | 1.72 | . | . | . |
| Omaha, NE-IA-MO | 3 North East | 2.43 | 2.19 | . | . |
| Omaha, NE-IA-MO | 6-East Central | . | 2.45 | . | . |
| Portland-Salem, OR-WA | 1-North West | 2.32 | 2.91 | 3.00 | . |
| Portland-Salem, OR-WA | 3 North East | 1.59 | . | . | . |
| Portland-Salem, OR-WA | 6-East Central | 2.08 | 1.95 | . | . |
| Portland-Salem, OR-WA | 7-South West | 2.21 | 2.67 | 2.74 | . |
| Portland-Salem, OR-WA | 8-South Central | 1.86 | . | . | . |
| Portland-Salem, OR-WA | Unidentified | . | . | . | 3.17 |
| Salt Lake City-Ogden, UT-ID | 1-North West | . | 1.35 | . | . |
| San Antonio, TX | 8-South Central | . | 1.08 | . | . |
| San Francisco-Oakland-San Jose, CA | 1-North West | 1.60 | . | . | . |
| San Francisco-Oakland-San Jose, CA | 3 North East | 1.49 | . | . | . |
| St. Louis, MO-IL | 1-North West | . | 2.34 | 2.54 | . |
| St. Louis, MO-IL | 2-North Central | 1.61 | . | . | . |
| St. Louis, MO-IL | 3 North East | 1.46 | 1.64 | 2.09 | . |
| St. Louis, MO-IL | 5-Central | 1.38 | 1.62 | . | . |
| St. Louis, MO-IL | 6-East Central | 1.50 | 1.67 | 1.85 | . |
| St. Louis, MO-IL | 7-South West | 1.80 | . | . | . |

**Table 1: Revenue-to-Variable Cost Ratios for BNSF Wheat Shipments from North Dakota CRDS - 2000 Waybill Sample
(Weighted Average by Carloads)**

| Destination BEA | Crop Reporting District | (1-25 Cars) | (26-51 Cars) | (52-109 Cars) | (110+ Cars) |
|------------------------|--------------------------------|--------------------|---------------------|----------------------|--------------------|
| St. Louis, MO-IL | 8-South Central | 1.76 | 2.11 | . | . |
| St. Louis, MO-IL | 9-South East | . | 1.50 | . | . |
| Wichita, KS-OK | 3 North East | 1.85 | . | . | . |

**Table 2: Revenue-to-Variable Cost Ratios for BNSF Wheat Shipments from North Dakota
2000 Waybill Sample
(Weighted Average by Carloads)**

| Destination BEA | (1-25 Cars) | (26-51 Cars) | (52-109 Cars) | (110+ Cars) |
|--|--------------------|---------------------|----------------------|--------------------|
| Chicago-Gary-Kenosha, IL-IN-WI | 1.76 | 1.83 | 2.52 | . |
| Des Moines, IA-IL-MO | . | 1.90 | . | . |
| Duluth-Superior, MN-WI | 2.82 | 3.09 | 4.13 | . |
| Fargo-Moorhead, ND-MN | 2.16 | 2.37 | . | . |
| Houston-Galveston-Brazoria, TX | 1.28 | 1.24 | . | . |
| Kansas City, MO-KS | 1.99 | 2.08 | . | . |
| Los Angeles-Riverside-Orange County, CA-AZ | 1.37 | 1.36 | . | . |
| Minneapolis-St. Paul, MN-WI-IA | 2.38 | 3.00 | 4.16 | . |
| New Orleans, LA-MS | 1.54 | . | 1.71 | 1.69 |
| Oklahoma City, OK | 1.70 | . | . | . |
| Omaha, NE-IA-MO | 2.43 | 2.32 | . | . |
| Portland-Salem, OR-WA | 2.16 | 2.67 | 2.81 | 3.17 |
| Salt Lake City-Ogden, UT-ID | . | 1.35 | . | . |
| San Antonio, TX | . | 1.08 | . | . |
| San Francisco-Oakland-San Jose, CA | 1.58 | . | . | . |
| St. Louis, MO-IL | 1.53 | 1.77 | 2.25 | . |
| Wichita, KS-OK | 1.85 | . | . | . |

DETAILED ANALYSIS OF WHEAT MOVEMENTS TO PORTLAND

The waybill analysis has painted a comprehensive picture of revenue-cost ratios for North Dakota shipments to major markets. This section of the statement focuses on current rates to Portland. It also includes an analysis of 110-car unit trains and 110-car co-loading service levels. Shipment costs are computed using the 2000 Uniform Railroad Costing System (URCS) and BNSF cost factors.¹⁰ Rates are derived from Item 43538 of the BNSF's current rate book, which is effective as of March 2, 2002. These rates are applicable to wheat movements in 286,000-pound rail cars, which appear to offer the greatest mainline efficiency and profit potential for the BNSF. The following service levels are analyzed for movements from North Dakota to Portland:

- 1-car
- 26-car
- 52-car
- 110-car multiple-origin (55 cars per station)
- 110-car single-origin unit train

Only a few stations in North Dakota currently originate 110-car shipments. However, rate-cost relationships are analyzed for all stations in order to present a meaningful comparison of the relative efficiencies of BNSF service levels. Because few stations currently originate 110-car shipments, the summary statistics presented in Table 3 are not weighted by shipment volumes -

¹⁰The 2000 URCS costs used in this study are not indexed for price inflation. For many years, railroad productivity gains have exceeded price inflation, thus resulting in a negative productivity-adjusted RCAF.

i.e., they represent simple averages or means. The standard deviations and minimum and maximum values describe the variation in RVC ratios among stations.

| Service Level | Average Revenue-Variable Cost Ratio | Minimum Revenue-Variable Cost Ratio | Maximum Revenue-Variable Cost Ratio | Standard Deviation of RVC Ratio |
|---------------|-------------------------------------|-------------------------------------|-------------------------------------|---------------------------------|
| 1-Car | 1.85 | 1.72 | 2.11 | 0.09 |
| 26-Car | 2.44 | 2.24 | 2.85 | 0.14 |
| 52-Car | 2.71 | 2.49 | 3.09 | 0.15 |
| 55-Car | 3.07 | 2.80 | 3.55 | 0.18 |
| 110-Car | 3.11 | 2.83 | 3.54 | 0.18 |

The statistics shown in Table 3 reflect 84 individual stations. These stations are a subset of the 92 stations listed in the latest revision of Item 43538. Stations located on the Red River Valley & Western Railroad are excluded from the analysis, as are stations for which routes could not be determined. As Table 3 shows, the average revenue-to-variable cost ratios computed from current rates are very similar to the revenue-variable cost (RVC) ratios computed from the waybill sample.

The variable costs shown in Table 3 reflect the governing provisions of the tariff. For example, all of the 52-car and 110-car service options require 24 hour loading and unloading. Apparently, shuttle loaders and unloaders receive origin-destination efficiency discounts if they load and unload in 15 hours. However, these arrangements are not analyzed because they are not specified in BNSF's public tariff. Moreover, given the data available for this study, it is not possible to analyze the efficiencies attributable to shipper volume commitments associated with the BNSF's shuttle program.

Using 15 hours for loading and unloading times would reduce the estimated URCS variable costs. However, some offsetting reductions in the tariff rate would also occur. Thus, it cannot be assumed that the revenue-cost ratios for the 110-car train would be greater than those shown in Table 3 if the origin-destination efficiency gains and discounts were included.

The simple means shown in Table 3 reflect an average cost difference between the single-origin and two-origin 110-car service levels of approximately \$55 per car. The costing methods and parameters used in deriving these estimates are included in the description of key movement parameters and assumptions presented next.

Pacific Northwest Destinations

Because of time limitations, only shipments destined for Portland are analyzed. Shipments to other coastal destinations—such as Kalama, Tacoma, or Seattle—are not reflected in the revenue-cost comparisons presented in this section. However, shipments to many coastal destinations are reflected in the waybill statistics presented earlier.

The BNSF 110-car receiver in the Portland area is located at Terminal 5 in the River Gate Industrial Complex.¹¹ It is owned and operated by Columbia Grain, Inc. Two Cargill facilities and a facility owned by Louis Dreyfus Corporation are located at Terminal 4, southeast of East St. John's. The main BNSF yard is located in Vancouver, Washington. It is approximately 6 miles from the Vancouver yard to either Terminal 5 in River Gate or Terminal 4, where the other elevators are located.

¹¹Another shuttle unloader is located in Vancouver, Washington. However, in this study the movements are assumed to terminate in Portland.

All 110-car train distances are computed directly from North Dakota origins to River Gate. Distances for other shipments are computed to Vancouver, Washington. Six miles are added for delivery to port terminals.¹²

Origin Classification Yards and Way-Train Miles

Without adjustments, URCS would assign 18 loaded way-train miles to each shipment. This is the BNSF's system average. As noted above, 6 way train miles may be incurred at destination, thus allowing only 12 way-train miles at origin. The use of this default factor may significantly understate way-train miles for BNSF wheat shipments from North Dakota. North Dakota has an extensive branch-line system. With the exception of 110-car trains, all shipments probably require some classification and train blocking near the origin. Most of these origin classification yards (also known as division or transition points) are readily apparent – e.g., Minot and Grand Forks. Others (such as Lakota and Dickinson) have been identified by shippers who receive service from these yards.

Table 4 (shown later) lists the loaded way-train miles assigned to each station, based on distances to specific classification yards for westward movements.¹³ As a result of this adjustment, an average of 58 origin way-train miles are assigned to non-unit train shipments. This distance accounts for situations where a car destined for Portland must first be hauled east to a classification yard. These circuitous movements are necessary in order for the railroad to operate large through trains between classification yards. Because origin circuitry is taken into

¹²The total distance to Portland terminals is the same for all types of shipments when they are originated at a mainline division point such as Jamestown or Minot. However, the shuttle-train movement consists of all "unit-train miles" while distances for other classes of shipments reflect way and/or through train miles.

¹³Shipments originated at mainline classification yards are assigned no way-train miles at origin.

account and shipments are routed from the origin classification yard to Vancouver, a circuitry multiplier is not applied to the trip distance.

Intertrain or Intratrain Switches

A 110-car unit train is assumed to run through classification yards, stopping only for crew changes. In effect, a unit train does not require intertrain or intratrain switching. URCS automatically eliminates these switches from the cost calculation. However, a 110-car train that is co-loaded at origin requires a train switch in North Dakota. Conceivably, this switch may occur at one of the stations if the co-loaders are located on the same line segment so that the second block can be picked-up enroute to Portland. If the co-loaders are not situated in a direct line of movement to Portland, the two 55-car blocks may be switched together in the nearest classification yard. Afterwards, the co-loaded shipment should function in much the same manner as a unit train, passing through intermediate yards and moving directly to River Gate.

Although individual 52-car and 26-car shipments are often referred to as “unit trains,” in actuality they are large multi-car shipments. The intermediate yard switches required for multi-car and single-car shipments are unknown. In a default analysis, URCS computes a switch every 200 miles. This means that eight intertrain switches will be assigned to a loaded multiple-car shipment from Grafton to Portland. This is too many switches for a 52-car or 26-car block. The only way to determine the average number of intertrain switches enroute to Portland is to perform a detailed analysis of internal BNSF records, which is not possible for this study. However, some logical assumptions can be drawn from operational and traffic data.

If grain flows from North Dakota to the Pacific Northwest (PNW) are sufficient, a 52-car block may be matched with other multiple-car shipments to form a large grain train (e.g., 100

cars or more) headed for the Pacific Coast. Since nearly 90 percent of the carloads of wheat shipped from North Dakota to the PNW are consigned in 25 car blocks or greater, it seems feasible for BNSF to assemble 52-car and 26-car blocks into large grain trains.¹⁴ After such a train leaves Minot, the cars may remain intact until they reach Pasco or Vancouver.

The following factors are reflected in the estimated intertrain or intratrain switches for 26-car and 52-car shipments shown later in Table 4: (1) the location of the station and the origin classification yard, (2) the distance from the classification yard to Portland, and (3) whether the shortest movement path follows the northern or southern route through Montana. Shipments originated from stations assigned to the Minot, Williston, Glendive, or Terry classification yards are allocated 3 intertrain/intratrain switches, except for shipments originated at these locations. This allocation allows for an intertrain switch between the origin transition point and Vancouver – e.g., at Spokane or Pasco. Shipments originated at one of the origin transition points are assigned only 2 switches.

Shipments originated from stations assigned to Dickinson, Mandan, Jamestown, Dilworth, or Grand Forks classification yards are allotted 4 intertrain/intratrain switches except for shipments originated at these cities, which are assigned 3 switches. As a general rule, 26-car shipments are assigned an additional intertrain switch. These smaller blocks may move farther from origin before being consolidated into a through grain train. No adjustment in intertrain or intratrain switching is made for single-car shipments. Thus, each single-car shipment is assigned an intertrain or intratrain switch every 200 miles.

¹⁴This weighted-average was computed from the North Dakota waybill sample.

Origin Co-Loading

Figure 3 shows a portion of the rail network in northeastern North Dakota. This network is used to illustrate potential train operations in a co-loading scenario. In this example, Thompson and Reynolds are assumed to originate a 110-car shipment. Local trains operate regularly between Grand Forks and Fargo. In this scenario, a train from Grand Forks drops 55 empty cars at Thompson. The same train (or another local) drops 55 cars at Reynolds. After the cars are loaded at the two stations, they are hauled to Grand Forks and consolidated into a single 110-car train. Thus, an intertrain switch occurs in Grand Forks. However, when the 110-car train departs the yard in Grand Forks, it moves directly to Portland as a unit train.

The primary assumption underlying the co-loading cost analysis is that each 55-car block is moved to and from the origin classification yard in a local train, where it is matched with another 55-car block. This abstraction is necessary in order for a cost to be assigned to each station. In this costing approach, the co-loader for Reynolds could be located at Thompson, Grand Forks, or at a station north of Grand Forks (such as Grafton or Crystal). The cost assigned to the shipment from Reynolds consists of:

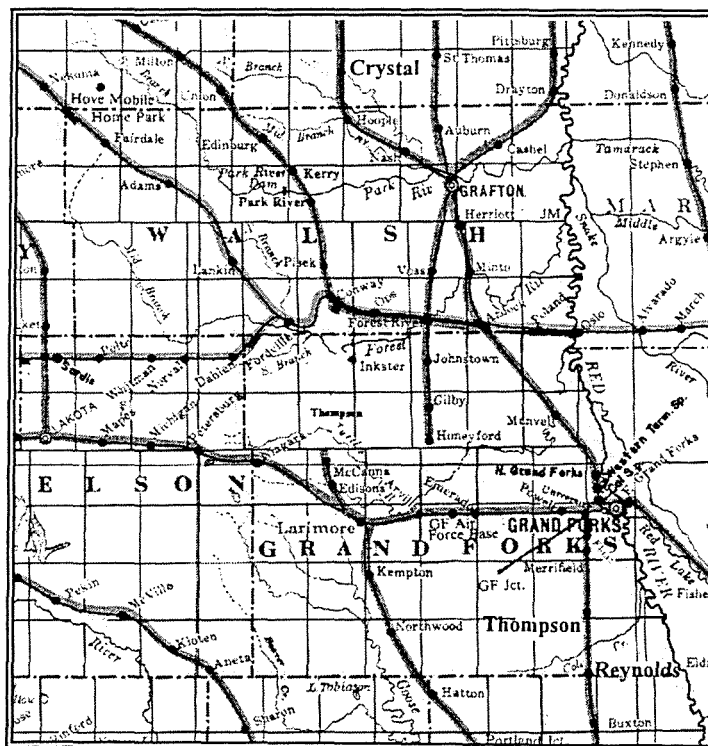


Figure 3. Rail Network in Grand Forks Area

1. The origin switching, car ownership, and clerical cost applicable to a 55-car shipment
2. Way train costs to and from the Grand Forks yard
3. Unit train costs for a 110-car train from the classification yard to destination

The costing approach allows a revenue-cost ratio to be computed for individual stations. However, it must be noted that more efficient origin train operations are possible. In one scenario, a 110-car train from Grand Forks drops 55 empty cars at Thompson and 55 cars at Reynolds. The cars dropped at each station must be loaded within 24 hours. In the interim, the locomotives may return to Grand Forks or remain at Reynolds with the cars. After the cars are loaded, the cars at Reynolds are pulled by a locomotive set and moved to Thompson where the other 55 cars are switched into the train. When the train departs Thompson, it consists of 110 loaded cars destined for the same location, and is operated as a unit train from that time forth. For this type of analysis, a weighted-average RVC ratio must be computed. Because of the detailed assumptions required, specific scenarios such as this one are not analyzed in this study.

Industry Switching

As noted earlier, URCS reduces average industry switching minutes by 75 percent for "unit train" shipments. This adjustment is typically applied to consignments of 50 cars or more. In this study, 52-car and 55-car shipments are given this reduction, as well as 110-car shipments. The adjustment results in an average of 1.38 minutes per car per switch. This factor allows about 1 hour and 10 minutes for BNSF to spot or pull a 52-car block at origin or destination. This is ample time if only one switch is required.

The URCS switching factor probably overstates the 110-car train switching time. It allows two and one-half hours. The true average is probably less than a minute per car.

However, further reductions to the URCS average cannot be justified without documented field studies. An error of one minute per car means about a \$20 difference in the variable cost per car.

Car Days

URCS computes car days based on long-standing operational estimates and typical tariff free times. The BNSF tariff requires that all 110-car and 52-car shipments be loaded within 24 hours. The same time limit is assumed for unloading at Portland. However, 48 hours of loading or unloading time is assumed for 26-car and single-car shipments at origin and destination.

Car days running reflect the average speed for BNSF road trains (approximately 22.25 mph). In URCS, each intertrain switch is assumed to require one-half day. Based on these factors, URCS computes a movement cycle of about 21 car days for a single-car shipment from Grand Forks to Portland. In comparison, URCS computes 8 days for a 110-car unit-train movement from Grand Forks to Portland.

These cycle times cannot be verified at present. Apparently, 3 or 4 car trips per month have been achieved in 110-car unit-train service from North Dakota to the PNW. The URCS 110-car unit-train estimate is very close to these rules-of-thumb. The 21 day cycle for the single car is equivalent to about 1.4 trips per month. Actual single-car cycle times are rumored to be greater than 21 days. However, these longer cycle times can be verified only through a study of BNSF data. Given the uncertainty that exists regarding cycle times, the URCS car ownership costs for single-car and 26-car shipments should be interpreted cautiously. Each additional covered hopper car-day is equivalent to about \$13.30 in variable cost.

Train Weights and Power

The cost analysis focuses on 286,000-pound cars. The statistics presented in this section of the statement are specific to these heavier cars. A 110-car train of 143-ton covered hopper cars weighs 15,730 tons. The average trailing weight of this train is approximately 9,600 tons, loaded and empty. This is a true unit train in terms of consist and weight. In 2000, the average BNSF unit train consisted of 103 cars weighing an average of 9,224 trailing tons. Thus, the BNSF unit train statistics used in URCS accurately describe the characteristics of a 110-car train of 286,000-pound cars. Therefore, no adjustments to train weights or power are needed for the 110-car trains.

However, a 52-car shipment of 286,000-pound cars results in an average trailing weight of approximately 4,500 tons, which is nearly as heavy as the BNSF's average through train. On average, a 26-car shipment of 286,000-pound cars weighs 2,250 tons. In essence, a 26-car shipment of 286,000-pound cars is heavier than BNSF's average way train, which averages 1,739 tons. For these reasons, some adjustments are needed to the default URCS parameters to more accurately represent the economies of train size offered by these larger shipments.

As noted earlier, BNSF tries to consolidate multi-car and single-car grain shipments headed for the Pacific Northwest into large grain trains. This is the most cost-effective operational scenario. The exact size of these trains is unknown. However, they are believed to include at least 100 cars. This nominal train size is used to estimate an adjusted through train cost for 52-car and 26-car shipments traveling to the PNW.

In addition to adjusting the default through-train weight, it is necessary to adjust the average number of through-train power units to fit the heavier train. The Davis Formula is used

for this purpose. It is described later in a technical supplement. The Davis Formula is used to estimate the train resistance of grain and unit train consists and the tonnage ratings of locomotives typically used on these trains.

As noted earlier, approximately 2.78 locomotive units are used to haul the system-average BNSF unit train of 9,224 average trailing tons. These units are assumed to be in the 4,000- to 4,500-horsepower (hp) range, with a median rating of 4,400-hp.¹⁵ The locomotives used on a through grain train are typically less powerful than the newer unit-train locomotives. For example, the SD40-2 and GP40 units frequently used in grain and mixed freight service are rated at 3,000-hp.

The Davis Formula predicts that 1.28 3,000-horsepower units would be required for each 4,400-hp unit at moderate grades of less than 1 percent.¹⁶ Assuming that the number of helper unit-miles is the same for both types of trains, a 100-car grain train weighing 8,300 tons would require an average of 3.55 units for the loaded and empty movement from North Dakota to Portland.

The calculations underlying this adjustment are shown in the technical supplement. A similar calculation is used to adjust the number of way train locomotives needed to haul a loaded 52-car block to the classification yard.¹⁷

The background discussion of costing techniques is now concluded. The following section of the report presents detailed RVC ratios for individual stations.

¹⁵These locomotives could be SD70, SD75, DASH-8, DASH-9, AC-4400, or other high performance units.

¹⁶The analysis also considers the fact that the hypothetical 100-car grain train weighs less than the 103-car unit train being pulled by the 4,400-hp units.

¹⁷Three 2,000-2,500 horsepower units would be needed.

Rate-Cost Ratios for Wheat Shipments from North Dakota to Portland

Tables 4 and 5 show the estimated variable costs, fully allocated costs, and the revenue-cost ratios of wheat shipments for each of five BNSF rate and service levels. The distance from each station to Portland is shown in Table 4, as well as the loaded way-train miles and computed intertrain or intratrain switches.

| Table 4 | | | | | | |
|--|-------------|-------------------------------------|---------------------------------------|--|--------------------------------------|--|
| Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland | | | | | | |
| by Station and Service Level | | | | | | |
| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intratrain Switches | Variable Cost per Car | Fully- Allocated Cost per Car |
| ALAMO | 1 | 1,322 | 137 | 7 | \$2,477 | \$3,379 |
| ALAMO | 26 | 1,322 | 137 | 5 | \$1,815 | \$2,475 |
| ALAMO | 52 | 1,322 | 137 | 4 | \$1,501 | \$2,048 |
| ALAMO | 55 | 1,322 | 131 | 1 | \$1,312 | \$1,790 |
| ALAMO | 110 | 1,322 | 0 | 0 | \$1,251 | \$1,706 |
| ALTON | 1 | 1,557 | 50 | 8 | \$2,741 | \$3,738 |
| ALTON | 26 | 1,557 | 50 | 5 | \$1,983 | \$2,705 |
| ALTON | 52 | 1,557 | 50 | 4 | \$1,715 | \$2,339 |
| ALTON | 55 | 1,557 | 44 | 1 | \$1,502 | \$2,049 |
| ALTON | 110 | 1,551 | 0 | 0 | \$1,458 | \$1,989 |
| ARVILLA | 1 | 1,535 | 28 | 8 | \$2,692 | \$3,673 |
| ARVILLA | 26 | 1,535 | 28 | 5 | \$1,938 | \$2,643 |
| ARVILLA | 52 | 1,535 | 28 | 4 | \$1,689 | \$2,303 |
| ARVILLA | 55 | 1,535 | 22 | 1 | \$1,477 | \$2,014 |
| ARVILLA | 110 | 1,491 | 0 | 0 | \$1,404 | \$1,915 |
| AYR | 1 | 1,585 | 47 | 8 | \$2,778 | \$3,789 |
| AYR | 26 | 1,585 | 47 | 5 | \$2,010 | \$2,742 |
| AYR | 52 | 1,585 | 47 | 4 | \$1,741 | \$2,375 |
| AYR | 55 | 1,585 | 41 | 1 | \$1,527 | \$2,082 |
| AYR | 110 | 1,505 | 0 | 0 | \$1,416 | \$1,932 |
| BEACH | 1 | 1,261 | 47 | 6 | \$2,321 | \$3,166 |
| BEACH | 26 | 1,261 | 47 | 5 | \$1,660 | \$2,265 |
| BEACH | 52 | 1,261 | 47 | 4 | \$1,425 | \$1,944 |
| BEACH | 55 | 1,261 | 41 | 1 | \$1,234 | \$1,684 |
| BEACH | 110 | 1,261 | 0 | 0 | \$1,196 | \$1,631 |
| BELFIELD | 1 | 1,304 | 90 | 7 | \$2,415 | \$3,294 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intratrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|----------------|-------------|-----------------------------|-------------------------------|--|------------------------------|-------------------------------------|
| BELFIELD | 26 | 1,304 | 90 | 5 | \$1,749 | \$2,385 |
| BELFIELD | 52 | 1,304 | 90 | 4 | \$1,475 | \$2,012 |
| BELFIELD | 55 | 1,304 | 84 | 1 | \$1,284 | \$1,751 |
| BELFIELD | 110 | 1,304 | 0 | 0 | \$1,235 | \$1,684 |
| BEREA | 1 | 1,505 | 37 | 8 | \$2,657 | \$3,624 |
| BEREA | 26 | 1,505 | 37 | 5 | \$1,914 | \$2,611 |
| BEREA | 52 | 1,505 | 37 | 4 | \$1,661 | \$2,266 |
| BEREA | 55 | 1,505 | 31 | 1 | \$1,452 | \$1,981 |
| BEREA | 110 | 1,505 | 0 | 0 | \$1,416 | \$1,932 |
| BERTHOLD | 1 | 1,288 | 103 | 6 | \$2,403 | \$3,278 |
| BERTHOLD | 26 | 1,288 | 103 | 5 | \$1,744 | \$2,379 |
| BERTHOLD | 52 | 1,288 | 103 | 4 | \$1,462 | \$1,994 |
| BERTHOLD | 55 | 1,288 | 97 | 1 | \$1,273 | \$1,736 |
| BERTHOLD | 110 | 1,288 | 0 | 0 | \$1,220 | \$1,664 |
| BISBEE | 1 | 1,521 | 78 | 8 | \$2,712 | \$3,699 |
| BISBEE | 26 | 1,521 | 78 | 5 | \$1,971 | \$2,689 |
| BISBEE | 52 | 1,521 | 78 | 4 | \$1,685 | \$2,298 |
| BISBEE | 55 | 1,521 | 72 | 1 | \$1,477 | \$2,014 |
| BISBEE | 110 | 1,433 | 0 | 0 | \$1,351 | \$1,843 |
| BISMARCK | 1 | 1,431 | 12 | 7 | \$2,533 | \$3,455 |
| BISMARCK | 26 | 1,431 | 12 | 5 | \$1,810 | \$2,469 |
| BISMARCK | 52 | 1,431 | 12 | 4 | \$1,584 | \$2,161 |
| BISMARCK | 55 | 1,431 | 6 | 1 | \$1,379 | \$1,881 |
| BISMARCK | 110 | 1,431 | 0 | 0 | \$1,349 | \$1,841 |
| BOTTINEAU | 1 | 1,404 | 99 | 7 | \$2,563 | \$3,496 |
| BOTTINEAU | 26 | 1,404 | 99 | 5 | \$1,866 | \$2,545 |
| BOTTINEAU | 52 | 1,404 | 99 | 4 | \$1,574 | \$2,148 |
| BOTTINEAU | 55 | 1,404 | 93 | 1 | \$1,376 | \$1,877 |
| BOTTINEAU | 110 | 1,404 | 0 | 0 | \$1,325 | \$1,807 |
| BOWBELLS | 1 | 1,376 | 71 | 7 | \$2,502 | \$3,413 |
| BOWBELLS | 26 | 1,376 | 71 | 5 | \$1,808 | \$2,466 |
| BOWBELLS | 52 | 1,376 | 71 | 4 | \$1,542 | \$2,103 |
| BOWBELLS | 55 | 1,376 | 65 | 1 | \$1,344 | \$1,834 |
| BOWBELLS | 110 | 1,330 | 0 | 0 | \$1,258 | \$1,716 |
| BOWMAN | 1 | 1,291 | 116 | 6 | \$2,417 | \$3,297 |
| BOWMAN | 26 | 1,291 | 116 | 5 | \$1,760 | \$2,401 |
| BOWMAN | 52 | 1,291 | 116 | 4 | \$1,467 | \$2,001 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|---------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| BOWMAN | 55 | 1,291 | 110 | 1 | \$1,279 | \$1,744 |
| BOWMAN | 110 | 1,291 | 0 | 0 | \$1,223 | \$1,668 |
| BOYLE | 1 | 1,339 | 21 | 7 | \$2,411 | \$3,288 |
| BOYLE | 26 | 1,339 | 21 | 5 | \$1,719 | \$2,345 |
| BOYLE | 52 | 1,339 | 21 | 4 | \$1,496 | \$2,041 |
| BOYLE | 55 | 1,339 | 15 | 1 | \$1,298 | \$1,771 |
| BOYLE | 110 | 1,339 | 0 | 0 | \$1,266 | \$1,727 |
| BREMEN | 1 | 1,402 | 97 | 7 | \$2,559 | \$3,490 |
| BREMEN | 26 | 1,402 | 97 | 5 | \$1,862 | \$2,539 |
| BREMEN | 52 | 1,402 | 97 | 4 | \$1,572 | \$2,144 |
| BREMEN | 55 | 1,402 | 91 | 1 | \$1,374 | \$1,874 |
| BREMEN | 110 | 1,402 | 0 | 0 | \$1,323 | \$1,805 |
| BUFFALO | 1 | 1,531 | 63 | 8 | \$2,714 | \$3,702 |
| BUFFALO | 26 | 1,531 | 63 | 5 | \$1,968 | \$2,684 |
| BUFFALO | 52 | 1,531 | 63 | 4 | \$1,691 | \$2,307 |
| BUFFALO | 55 | 1,531 | 57 | 1 | \$1,482 | \$2,021 |
| BUFFALO | 110 | 1,531 | 0 | 0 | \$1,440 | \$1,964 |
| BUXTON | 1 | 1,539 | 32 | 8 | \$2,701 | \$3,685 |
| BUXTON | 26 | 1,539 | 32 | 5 | \$1,946 | \$2,654 |
| BUXTON | 52 | 1,539 | 32 | 4 | \$1,693 | \$2,310 |
| BUXTON | 55 | 1,539 | 26 | 1 | \$1,481 | \$2,021 |
| BUXTON | 110 | 1,533 | 0 | 0 | \$1,442 | \$1,966 |
| CANDO | 1 | 1,508 | 65 | 8 | \$2,683 | \$3,660 |
| CANDO | 26 | 1,508 | 65 | 5 | \$1,944 | \$2,652 |
| CANDO | 52 | 1,508 | 65 | 4 | \$1,669 | \$2,277 |
| CANDO | 55 | 1,508 | 59 | 1 | \$1,462 | \$1,994 |
| CANDO | 110 | 1,420 | 0 | 0 | \$1,339 | \$1,827 |
| CASSELTON | 1 | 1,548 | 80 | 8 | \$2,751 | \$3,753 |
| CASSELTON | 26 | 1,548 | 80 | 5 | \$2,002 | \$2,731 |
| CASSELTON | 52 | 1,548 | 80 | 4 | \$1,711 | \$2,334 |
| CASSELTON | 55 | 1,548 | 74 | 1 | \$1,502 | \$2,048 |
| CASSELTON | 110 | 1,522 | 0 | 0 | \$1,432 | \$1,953 |
| CHURCHS FERRY | 1 | 1,493 | 50 | 7 | \$2,650 | \$3,615 |
| CHURCHS FERRY | 26 | 1,493 | 50 | 5 | \$1,914 | \$2,610 |
| CHURCHS FERRY | 52 | 1,493 | 50 | 4 | \$1,652 | \$2,253 |
| CHURCHS FERRY | 55 | 1,493 | 44 | 1 | \$1,444 | \$1,970 |
| CHURCHS FERRY | 110 | 1,405 | 0 | 0 | \$1,326 | \$1,809 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| CLEVELAND | 1 | 1,512 | 93 | 8 | \$2,711 | \$3,698 |
| CLEVELAND | 26 | 1,512 | 93 | 5 | \$1,977 | \$2,696 |
| CLEVELAND | 52 | 1,512 | 93 | 4 | \$1,679 | \$2,290 |
| CLEVELAND | 55 | 1,512 | 87 | 1 | \$1,472 | \$2,008 |
| CLEVELAND | 110 | 1,493 | 0 | 0 | \$1,405 | \$1,917 |
| DEVILS LAKE | 1 | 1,474 | 31 | 7 | \$2,609 | \$3,558 |
| DEVILS LAKE | 26 | 1,474 | 31 | 5 | \$1,875 | \$2,557 |
| DEVILS LAKE | 52 | 1,474 | 31 | 4 | \$1,630 | \$2,223 |
| DEVILS LAKE | 55 | 1,474 | 25 | 1 | \$1,423 | \$1,940 |
| DEVILS LAKE | 110 | 1,424 | 0 | 0 | \$1,343 | \$1,832 |
| DICKINSON | 1 | 1,324 | 6 | 7 | \$2,378 | \$3,243 |
| DICKINSON | 26 | 1,324 | 6 | 5 | \$1,688 | \$2,303 |
| DICKINSON | 52 | 1,324 | 6 | 4 | \$1,478 | \$2,017 |
| DICKINSON | 55 | 1,324 | 0 | 1 | \$1,281 | \$1,747 |
| DICKINSON | 110 | 1,324 | 0 | 0 | \$1,253 | \$1,709 |
| DOYON | 1 | 1,458 | 15 | 7 | \$2,574 | \$3,511 |
| DOYON | 26 | 1,458 | 15 | 5 | \$1,842 | \$2,512 |
| DOYON | 52 | 1,458 | 15 | 4 | \$1,611 | \$2,197 |
| DOYON | 55 | 1,458 | 9 | 1 | \$1,404 | \$1,915 |
| DOYON | 110 | 1,440 | 0 | 0 | \$1,358 | \$1,852 |
| ELDRIDGE | 1 | 1,525 | 106 | 8 | \$2,739 | \$3,737 |
| ELDRIDGE | 26 | 1,525 | 106 | 5 | \$2,003 | \$2,732 |
| ELDRIDGE | 52 | 1,525 | 106 | 4 | \$1,694 | \$2,311 |
| ELDRIDGE | 55 | 1,525 | 100 | 1 | \$1,487 | \$2,029 |
| ELDRIDGE | 110 | 1,480 | 0 | 0 | \$1,394 | \$1,901 |
| EPPING | 1 | 1,208 | 23 | 6 | \$2,227 | \$3,038 |
| EPPING | 26 | 1,208 | 23 | 5 | \$1,579 | \$2,154 |
| EPPING | 52 | 1,208 | 23 | 4 | \$1,368 | \$1,867 |
| EPPING | 55 | 1,208 | 17 | 1 | \$1,181 | \$1,610 |
| EPPING | 110 | 1,208 | 0 | 0 | \$1,148 | \$1,565 |
| FARGO | 1 | 1,567 | 99 | 8 | \$2,793 | \$3,810 |
| FARGO | 26 | 1,567 | 99 | 5 | \$2,042 | \$2,785 |
| FARGO | 52 | 1,567 | 99 | 4 | \$1,734 | \$2,365 |
| FARGO | 55 | 1,567 | 93 | 1 | \$1,523 | \$2,078 |
| FARGO | 110 | 1,539 | 0 | 0 | \$1,447 | \$1,974 |
| GARDNER | 1 | 1,570 | 32 | 8 | \$2,745 | \$3,744 |
| GARDNER | 26 | 1,570 | 32 | 5 | \$1,979 | \$2,700 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| GARDNER | 52 | 1,570 | 32 | 4 | \$1,724 | \$2,351 |
| GARDNER | 55 | 1,570 | 26 | 1 | \$1,509 | \$2,059 |
| GARDNER | 110 | 1,560 | 0 | 0 | \$1,466 | \$2,000 |
| GLADSTONE | 1 | 1,336 | 18 | 7 | \$2,404 | \$3,279 |
| GLADSTONE | 26 | 1,336 | 18 | 5 | \$1,713 | \$2,337 |
| GLADSTONE | 52 | 1,336 | 18 | 4 | \$1,493 | \$2,036 |
| GLADSTONE | 55 | 1,336 | 12 | 1 | \$1,295 | \$1,766 |
| GLADSTONE | 110 | 1,336 | 0 | 0 | \$1,263 | \$1,723 |
| GLEN ULLIN | 1 | 1,377 | 59 | 7 | \$2,494 | \$3,402 |
| GLEN ULLIN | 26 | 1,377 | 59 | 5 | \$1,798 | \$2,452 |
| GLEN ULLIN | 52 | 1,377 | 59 | 4 | \$1,540 | \$2,101 |
| GLEN ULLIN | 55 | 1,377 | 53 | 1 | \$1,342 | \$1,831 |
| GLEN ULLIN | 110 | 1,377 | 0 | 0 | \$1,301 | \$1,774 |
| GLENFIELD | 1 | 1,446 | 141 | 7 | \$2,655 | \$3,622 |
| GLENFIELD | 26 | 1,446 | 141 | 5 | \$1,952 | \$2,663 |
| GLENFIELD | 52 | 1,446 | 141 | 4 | \$1,623 | \$2,214 |
| GLENFIELD | 55 | 1,446 | 135 | 1 | \$1,425 | \$1,943 |
| GLENFIELD | 110 | 1,446 | 0 | 0 | \$1,363 | \$1,859 |
| GRACE CITY | 1 | 1,433 | 128 | 7 | \$2,627 | \$3,583 |
| GRACE CITY | 26 | 1,433 | 128 | 5 | \$1,925 | \$2,626 |
| GRACE CITY | 52 | 1,433 | 128 | 4 | \$1,608 | \$2,194 |
| GRACE CITY | 55 | 1,433 | 122 | 1 | \$1,410 | \$1,923 |
| GRACE CITY | 110 | 1,433 | 0 | 0 | \$1,351 | \$1,843 |
| GRAND FORKS | 1 | 1,513 | 6 | 8 | \$2,644 | \$3,607 |
| GRAND FORKS | 26 | 1,513 | 6 | 5 | \$1,892 | \$2,581 |
| GRAND FORKS | 52 | 1,513 | 6 | 4 | \$1,663 | \$2,269 |
| GRAND FORKS | 55 | 1,513 | 0 | 1 | \$1,451 | \$1,980 |
| GRAND FORKS | 110 | 1,513 | 0 | 0 | \$1,424 | \$1,942 |
| HAMBERG | 1 | 1,396 | 91 | 7 | \$2,546 | \$3,472 |
| HAMBERG | 26 | 1,396 | 91 | 5 | \$1,849 | \$2,522 |
| HAMBERG | 52 | 1,396 | 91 | 4 | \$1,565 | \$2,135 |
| HAMBERG | 55 | 1,396 | 85 | 1 | \$1,367 | \$1,865 |
| HAMBERG | 110 | 1,396 | 0 | 0 | \$1,318 | \$1,797 |
| HAMLET | 1 | 1,304 | 119 | 7 | \$2,438 | \$3,325 |
| HAMLET | 26 | 1,304 | 119 | 5 | \$1,777 | \$2,424 |
| HAMLET | 52 | 1,304 | 119 | 4 | \$1,481 | \$2,020 |
| HAMLET | 55 | 1,304 | 113 | 1 | \$1,291 | \$1,761 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-----------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| HAMLET | 110 | 1,304 | 0 | 0 | \$1,235 | \$1,684 |
| HANNAFORD | 1 | 1,466 | 161 | 7 | \$2,699 | \$3,682 |
| HANNAFORD | 26 | 1,466 | 161 | 5 | \$1,993 | \$2,719 |
| HANNAFORD | 52 | 1,466 | 161 | 4 | \$1,647 | \$2,246 |
| HANNAFORD | 55 | 1,466 | 155 | 1 | \$1,448 | \$1,975 |
| HANNAFORD | 110 | 1,466 | 0 | 0 | \$1,381 | \$1,884 |
| HARWOOD | 1 | 1,558 | 20 | 8 | \$2,719 | \$3,708 |
| HARWOOD | 26 | 1,558 | 20 | 5 | \$1,954 | \$2,666 |
| HARWOOD | 52 | 1,558 | 20 | 4 | \$1,710 | \$2,332 |
| HARWOOD | 55 | 1,558 | 14 | 1 | \$1,496 | \$2,040 |
| HARWOOD | 110 | 1,548 | 0 | 0 | \$1,455 | \$1,985 |
| HEBRON | 1 | 1,365 | 47 | 7 | \$2,468 | \$3,366 |
| HEBRON | 26 | 1,365 | 47 | 5 | \$1,773 | \$2,418 |
| HEBRON | 52 | 1,365 | 47 | 4 | \$1,526 | \$2,082 |
| HEBRON | 55 | 1,365 | 41 | 1 | \$1,328 | \$1,812 |
| HEBRON | 110 | 1,365 | 0 | 0 | \$1,290 | \$1,759 |
| HETTINGER | 1 | 1,332 | 157 | 7 | \$2,507 | \$3,420 |
| HETTINGER | 26 | 1,332 | 157 | 5 | \$1,845 | \$2,517 |
| HETTINGER | 52 | 1,332 | 157 | 4 | \$1,515 | \$2,067 |
| HETTINGER | 55 | 1,332 | 151 | 1 | \$1,326 | \$1,809 |
| HETTINGER | 110 | 1,332 | 0 | 0 | \$1,260 | \$1,718 |
| HILLSBORO | 1 | 1,553 | 46 | 8 | \$2,732 | \$3,726 |
| HILLSBORO | 26 | 1,553 | 46 | 5 | \$1,974 | \$2,693 |
| HILLSBORO | 52 | 1,553 | 46 | 4 | \$1,710 | \$2,332 |
| HILLSBORO | 55 | 1,553 | 40 | 1 | \$1,498 | \$2,043 |
| HILLSBORO | 110 | 1,547 | 0 | 0 | \$1,454 | \$1,984 |
| JAMESTOWN | 1 | 1,474 | 6 | 7 | \$2,589 | \$3,532 |
| JAMESTOWN | 26 | 1,474 | 6 | 5 | \$1,850 | \$2,524 |
| JAMESTOWN | 52 | 1,474 | 6 | 4 | \$1,625 | \$2,216 |
| JAMESTOWN | 55 | 1,474 | 0 | 1 | \$1,416 | \$1,932 |
| JAMESTOWN | 110 | 1,474 | 0 | 0 | \$1,388 | \$1,894 |
| KELSO | 1 | 1,559 | 52 | 8 | \$2,745 | \$3,744 |
| KELSO | 26 | 1,559 | 52 | 5 | \$1,987 | \$2,710 |
| KELSO | 52 | 1,559 | 52 | 4 | \$1,717 | \$2,342 |
| KELSO | 55 | 1,559 | 46 | 1 | \$1,504 | \$2,052 |
| KELSO | 110 | 1,553 | 0 | 0 | \$1,460 | \$1,991 |
| LAKOTA | 1 | 1,449 | 6 | 7 | \$2,554 | \$3,484 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intratrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-----------|------|----------------------|------------------------|---------------------------------|-----------------------|------------------------------|
| LAKOTA | 26 | 1,449 | 6 | 5 | \$1,823 | \$2,487 |
| LAKOTA | 52 | 1,449 | 6 | 4 | \$1,601 | \$2,183 |
| LAKOTA | 55 | 1,449 | 0 | 1 | \$1,394 | \$1,901 |
| LAKOTA | 110 | 1,449 | 0 | 0 | \$1,366 | \$1,863 |
| LARIMORE | 1 | 1,541 | 34 | 8 | \$2,706 | \$3,690 |
| LARIMORE | 26 | 1,541 | 34 | 5 | \$1,950 | \$2,660 |
| LARIMORE | 52 | 1,541 | 34 | 4 | \$1,696 | \$2,313 |
| LARIMORE | 55 | 1,541 | 28 | 1 | \$1,484 | \$2,024 |
| LARIMORE | 110 | 1,485 | 0 | 0 | \$1,398 | \$1,907 |
| LEEDS | 1 | 1,505 | 62 | 8 | \$2,677 | \$3,651 |
| LEEDS | 26 | 1,505 | 62 | 5 | \$1,938 | \$2,644 |
| LEEDS | 52 | 1,505 | 62 | 4 | \$1,666 | \$2,273 |
| LEEDS | 55 | 1,505 | 56 | 1 | \$1,458 | \$1,989 |
| LEEDS | 110 | 1,393 | 0 | 0 | \$1,315 | \$1,794 |
| LUVERNE | 1 | 1,479 | 174 | 7 | \$2,728 | \$3,721 |
| LUVERNE | 26 | 1,479 | 174 | 5 | \$2,020 | \$2,755 |
| LUVERNE | 52 | 1,479 | 174 | 4 | \$1,662 | \$2,267 |
| LUVERNE | 55 | 1,479 | 168 | 1 | \$1,463 | \$1,995 |
| LUVERNE | 110 | 1,479 | 0 | 0 | \$1,393 | \$1,900 |
| MEDINA | 1 | 1,503 | 84 | 8 | \$2,691 | \$3,671 |
| MEDINA | 26 | 1,503 | 84 | 5 | \$1,958 | \$2,670 |
| MEDINA | 52 | 1,503 | 84 | 4 | \$1,668 | \$2,275 |
| MEDINA | 55 | 1,503 | 78 | 1 | \$1,462 | \$1,994 |
| MEDINA | 110 | 1,502 | 0 | 0 | \$1,414 | \$1,928 |
| MINOT | 1 | 1,311 | 6 | 7 | \$2,359 | \$3,218 |
| MINOT | 26 | 1,311 | 6 | 5 | \$1,674 | \$2,284 |
| MINOT | 52 | 1,311 | 6 | 4 | \$1,466 | \$1,999 |
| MINOT | 55 | 1,311 | 0 | 1 | \$1,269 | \$1,731 |
| MINOT | 110 | 1,311 | 0 | 0 | \$1,241 | \$1,693 |
| NEW SALEM | 1 | 1,398 | 80 | 7 | \$2,540 | \$3,465 |
| NEW SALEM | 26 | 1,398 | 80 | 5 | \$1,840 | \$2,510 |
| NEW SALEM | 52 | 1,398 | 80 | 4 | \$1,565 | \$2,134 |
| NEW SALEM | 55 | 1,398 | 74 | 1 | \$1,366 | \$1,864 |
| NEW SALEM | 110 | 1,398 | 0 | 0 | \$1,320 | \$1,800 |
| NIAGARA | 1 | 1,472 | 29 | 7 | \$2,604 | \$3,552 |
| NIAGARA | 26 | 1,472 | 29 | 5 | \$1,871 | \$2,552 |
| NIAGARA | 52 | 1,472 | 29 | 4 | \$1,627 | \$2,220 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
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| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-------------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| NIAGARA | 55 | 1,472 | 23 | 1 | \$1,420 | \$1,937 |
| NIAGARA | 110 | 1,472 | 0 | 0 | \$1,386 | \$1,891 |
| NORTH GRAND FORKS | 1 | 1,520 | 13 | 8 | \$2,660 | \$3,628 |
| NORTH GRAND FORKS | 26 | 1,520 | 13 | 5 | \$1,907 | \$2,601 |
| NORTH GRAND FORKS | 52 | 1,520 | 13 | 4 | \$1,671 | \$2,280 |
| NORTH GRAND FORKS | 55 | 1,520 | 7 | 1 | \$1,460 | \$1,991 |
| NORTH GRAND FORKS | 110 | 1,520 | 0 | 0 | \$1,430 | \$1,950 |
| NORTHGATE | 1 | 1,389 | 84 | 7 | \$2,530 | \$3,452 |
| NORTHGATE | 26 | 1,389 | 84 | 5 | \$1,835 | \$2,503 |
| NORTHGATE | 52 | 1,389 | 84 | 4 | \$1,557 | \$2,124 |
| NORTHGATE | 55 | 1,389 | 78 | 1 | \$1,359 | \$1,854 |
| NORTHGATE | 110 | 1,343 | 0 | 0 | \$1,270 | \$1,732 |
| NORWICH | 1 | 1,320 | 15 | 7 | \$2,379 | \$3,245 |
| NORWICH | 26 | 1,320 | 15 | 5 | \$1,693 | \$2,309 |
| NORWICH | 52 | 1,320 | 15 | 4 | \$1,476 | \$2,014 |
| NORWICH | 55 | 1,320 | 9 | 1 | \$1,280 | \$1,746 |
| NORWICH | 110 | 1,320 | 0 | 0 | \$1,249 | \$1,704 |
| PALERMO | 1 | 1,265 | 80 | 6 | \$2,352 | \$3,209 |
| PALERMO | 26 | 1,265 | 80 | 5 | \$1,697 | \$2,315 |
| PALERMO | 52 | 1,265 | 80 | 4 | \$1,435 | \$1,958 |
| PALERMO | 55 | 1,265 | 74 | 1 | \$1,246 | \$1,700 |
| PALERMO | 110 | 1,265 | 0 | 0 | \$1,199 | \$1,636 |
| PEAK | 1 | 1,515 | 47 | 8 | \$2,679 | \$3,654 |
| PEAK | 26 | 1,515 | 47 | 5 | \$1,935 | \$2,639 |
| PEAK | 52 | 1,515 | 47 | 4 | \$1,673 | \$2,282 |
| PEAK | 55 | 1,515 | 41 | 1 | \$1,464 | \$1,996 |
| PEAK | 110 | 1,515 | 0 | 0 | \$1,425 | \$1,944 |
| PETERSBURG | 1 | 1,466 | 23 | 7 | \$2,591 | \$3,535 |
| PETERSBURG | 26 | 1,466 | 23 | 5 | \$1,858 | \$2,535 |
| PETERSBURG | 52 | 1,466 | 23 | 4 | \$1,620 | \$2,210 |
| PETERSBURG | 55 | 1,466 | 17 | 1 | \$1,413 | \$1,928 |
| PETERSBURG | 110 | 1,466 | 0 | 0 | \$1,381 | \$1,884 |
| PILLSBURY | 1 | 1,486 | 181 | 7 | \$2,743 | \$3,742 |
| PILLSBURY | 26 | 1,486 | 181 | 5 | \$2,035 | \$2,775 |
| PILLSBURY | 52 | 1,486 | 181 | 4 | \$1,670 | \$2,278 |
| PILLSBURY | 55 | 1,486 | 175 | 1 | \$1,471 | \$2,006 |
| PILLSBURY | 110 | 1,486 | 0 | 0 | \$1,399 | \$1,908 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
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| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intratrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|----------------|-------------|-----------------------------|-------------------------------|--|------------------------------|-------------------------------------|
| POWERS LAKE | 1 | 1,283 | 98 | 6 | \$2,392 | \$3,263 |
| POWERS LAKE | 26 | 1,283 | 98 | 5 | \$1,734 | \$2,365 |
| POWERS LAKE | 52 | 1,283 | 98 | 4 | \$1,456 | \$1,986 |
| POWERS LAKE | 55 | 1,283 | 92 | 1 | \$1,267 | \$1,728 |
| POWERS LAKE | 110 | 1,283 | 0 | 0 | \$1,216 | \$1,658 |
| RAY | 1 | 1,218 | 33 | 6 | \$2,249 | \$3,068 |
| RAY | 26 | 1,218 | 33 | 5 | \$1,600 | \$2,182 |
| RAY | 52 | 1,218 | 33 | 4 | \$1,380 | \$1,882 |
| RAY | 55 | 1,218 | 27 | 1 | \$1,192 | \$1,626 |
| RAY | 110 | 1,218 | 0 | 0 | \$1,157 | \$1,578 |
| REEDER | 1 | 1,314 | 139 | 7 | \$2,468 | \$3,366 |
| REEDER | 26 | 1,314 | 139 | 5 | \$1,808 | \$2,466 |
| REEDER | 52 | 1,314 | 139 | 4 | \$1,494 | \$2,038 |
| REEDER | 55 | 1,314 | 133 | 1 | \$1,305 | \$1,780 |
| REEDER | 110 | 1,314 | 0 | 0 | \$1,244 | \$1,696 |
| REYNOLDS | 1 | 1,534 | 27 | 8 | \$2,690 | \$3,670 |
| REYNOLDS | 26 | 1,534 | 27 | 5 | \$1,935 | \$2,640 |
| REYNOLDS | 52 | 1,534 | 27 | 4 | \$1,687 | \$2,302 |
| REYNOLDS | 55 | 1,534 | 21 | 1 | \$1,476 | \$2,013 |
| REYNOLDS | 110 | 1,528 | 0 | 0 | \$1,437 | \$1,960 |
| RICHARDTON | 1 | 1,350 | 32 | 7 | \$2,435 | \$3,321 |
| RICHARDTON | 26 | 1,350 | 32 | 5 | \$1,742 | \$2,376 |
| RICHARDTON | 52 | 1,350 | 32 | 4 | \$1,509 | \$2,058 |
| RICHARDTON | 55 | 1,350 | 26 | 1 | \$1,311 | \$1,788 |
| RICHARDTON | 110 | 1,350 | 0 | 0 | \$1,276 | \$1,741 |
| ROSS | 1 | 1,250 | 65 | 6 | \$2,320 | \$3,164 |
| ROSS | 26 | 1,250 | 65 | 5 | \$1,666 | \$2,273 |
| ROSS | 52 | 1,250 | 65 | 4 | \$1,417 | \$1,933 |
| ROSS | 55 | 1,250 | 59 | 1 | \$1,229 | \$1,676 |
| ROSS | 110 | 1,250 | 0 | 0 | \$1,186 | \$1,617 |
| RUGBY | 1 | 1,366 | 61 | 7 | \$2,480 | \$3,383 |
| RUGBY | 26 | 1,366 | 61 | 5 | \$1,788 | \$2,438 |
| RUGBY | 52 | 1,366 | 61 | 4 | \$1,530 | \$2,087 |
| RUGBY | 55 | 1,366 | 55 | 1 | \$1,333 | \$1,818 |
| RUGBY | 110 | 1,366 | 0 | 0 | \$1,291 | \$1,760 |
| SCRANTON | 1 | 1,303 | 128 | 7 | \$2,444 | \$3,333 |
| SCRANTON | 26 | 1,303 | 128 | 5 | \$1,785 | \$2,435 |

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| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intratrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|------------|------|----------------------|------------------------|---------------------------------|-----------------------|------------------------------|
| SCRANTON | 52 | 1,303 | 128 | 4 | \$1,481 | \$2,020 |
| SCRANTON | 55 | 1,303 | 122 | 1 | \$1,293 | \$1,763 |
| SCRANTON | 110 | 1,303 | 0 | 0 | \$1,234 | \$1,683 |
| SELZ | 1 | 1,377 | 72 | 7 | \$2,504 | \$3,416 |
| SELZ | 26 | 1,377 | 72 | 5 | \$1,810 | \$2,469 |
| SELZ | 52 | 1,377 | 72 | 4 | \$1,543 | \$2,105 |
| SELZ | 55 | 1,377 | 66 | 1 | \$1,345 | \$1,835 |
| SELZ | 110 | 1,377 | 0 | 0 | \$1,301 | \$1,774 |
| SPIRITWOOD | 1 | 1,486 | 18 | 7 | \$2,615 | \$3,568 |
| SPIRITWOOD | 26 | 1,486 | 18 | 5 | \$1,875 | \$2,558 |
| SPIRITWOOD | 52 | 1,486 | 18 | 4 | \$1,639 | \$2,235 |
| SPIRITWOOD | 55 | 1,486 | 12 | 1 | \$1,430 | \$1,951 |
| SPIRITWOOD | 110 | 1,486 | 0 | 0 | \$1,399 | \$1,908 |
| STANLEY | 1 | 1,257 | 72 | 6 | \$2,335 | \$3,185 |
| STANLEY | 26 | 1,257 | 72 | 5 | \$1,681 | \$2,293 |
| STANLEY | 52 | 1,257 | 72 | 4 | \$1,426 | \$1,945 |
| STANLEY | 55 | 1,257 | 66 | 1 | \$1,237 | \$1,687 |
| STANLEY | 110 | 1,257 | 0 | 0 | \$1,192 | \$1,626 |
| STEELE | 1 | 1,475 | 56 | 7 | \$2,630 | \$3,587 |
| STEELE | 26 | 1,475 | 56 | 5 | \$1,900 | \$2,592 |
| STEELE | 52 | 1,475 | 56 | 4 | \$1,635 | \$2,231 |
| STEELE | 55 | 1,475 | 50 | 1 | \$1,430 | \$1,950 |
| STEELE | 110 | 1,475 | 0 | 0 | \$1,389 | \$1,895 |
| STERLING | 1 | 1,456 | 37 | 7 | \$2,588 | \$3,530 |
| STERLING | 26 | 1,456 | 37 | 5 | \$1,861 | \$2,539 |
| STERLING | 52 | 1,456 | 37 | 4 | \$1,613 | \$2,201 |
| STERLING | 55 | 1,456 | 31 | 1 | \$1,408 | \$1,920 |
| STERLING | 110 | 1,456 | 0 | 0 | \$1,372 | \$1,871 |
| SUTTON | 1 | 1,453 | 148 | 7 | \$2,671 | \$3,643 |
| SUTTON | 26 | 1,453 | 148 | 5 | \$1,966 | \$2,682 |
| SUTTON | 52 | 1,453 | 148 | 4 | \$1,632 | \$2,226 |
| SUTTON | 55 | 1,453 | 142 | 1 | \$1,433 | \$1,954 |
| SUTTON | 110 | 1,453 | 0 | 0 | \$1,369 | \$1,868 |
| TAPPEN | 1 | 1,488 | 69 | 7 | \$2,658 | \$3,626 |
| TAPPEN | 26 | 1,488 | 69 | 5 | \$1,927 | \$2,628 |
| TAPPEN | 52 | 1,488 | 69 | 4 | \$1,651 | \$2,252 |
| TAPPEN | 55 | 1,488 | 63 | 1 | \$1,445 | \$1,971 |

Table 4
Estimated Costs of BNSF Wheat Shipments from North Dakota to Portland
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| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| TAPPEN | 110 | 1,488 | 0 | 0 | \$1,401 | \$1,911 |
| THOMPSON | 1 | 1,527 | 20 | 8 | \$2,675 | \$3,649 |
| THOMPSON | 26 | 1,527 | 20 | 5 | \$1,921 | \$2,621 |
| THOMPSON | 52 | 1,527 | 20 | 4 | \$1,679 | \$2,291 |
| THOMPSON | 55 | 1,527 | 14 | 1 | \$1,468 | \$2,002 |
| THOMPSON | 110 | 1,521 | 0 | 0 | \$1,431 | \$1,952 |
| VALLEY CITY | 1 | 1,510 | 42 | 8 | \$2,668 | \$3,639 |
| VALLEY CITY | 26 | 1,510 | 42 | 5 | \$1,924 | \$2,625 |
| VALLEY CITY | 52 | 1,510 | 42 | 4 | \$1,667 | \$2,274 |
| VALLEY CITY | 55 | 1,510 | 36 | 1 | \$1,458 | \$1,988 |
| VALLEY CITY | 110 | 1,510 | 0 | 0 | \$1,421 | \$1,938 |
| WAHPETON | 1 | 1,591 | 53 | 8 | \$2,791 | \$3,807 |
| WAHPETON | 26 | 1,591 | 53 | 5 | \$2,023 | \$2,759 |
| WAHPETON | 52 | 1,591 | 53 | 4 | \$1,748 | \$2,385 |
| WAHPETON | 55 | 1,591 | 47 | 1 | \$1,534 | \$2,092 |
| WAHPETON | 110 | 1,577 | 0 | 0 | \$1,481 | \$2,021 |
| WEST FARGO | 1 | 1,563 | 95 | 8 | \$2,784 | \$3,798 |
| WEST FARGO | 26 | 1,563 | 95 | 5 | \$2,033 | \$2,773 |
| WEST FARGO | 52 | 1,563 | 95 | 4 | \$1,729 | \$2,358 |
| WEST FARGO | 55 | 1,563 | 89 | 1 | \$1,519 | \$2,072 |
| WEST FARGO | 110 | 1,537 | 0 | 0 | \$1,445 | \$1,971 |
| WHEATLAND | 1 | 1,542 | 74 | 8 | \$2,738 | \$3,735 |
| WHEATLAND | 26 | 1,542 | 74 | 5 | \$1,990 | \$2,715 |
| WHEATLAND | 52 | 1,542 | 74 | 4 | \$1,704 | \$2,325 |
| WHEATLAND | 55 | 1,542 | 68 | 1 | \$1,495 | \$2,039 |
| WHEATLAND | 110 | 1,528 | 0 | 0 | \$1,437 | \$1,960 |
| WHITE EARTH | 1 | 1,238 | 53 | 6 | \$2,293 | \$3,128 |
| WHITE EARTH | 26 | 1,238 | 53 | 5 | \$1,641 | \$2,239 |
| WHITE EARTH | 52 | 1,238 | 53 | 4 | \$1,403 | \$1,914 |
| WHITE EARTH | 55 | 1,238 | 47 | 1 | \$1,215 | \$1,658 |
| WHITE EARTH | 110 | 1,238 | 0 | 0 | \$1,175 | \$1,602 |
| WILDROSE | 1 | 1,308 | 123 | 7 | \$2,447 | \$3,337 |
| WILDROSE | 26 | 1,308 | 123 | 5 | \$1,785 | \$2,435 |
| WILDROSE | 52 | 1,308 | 123 | 4 | \$1,485 | \$2,026 |
| WILDROSE | 55 | 1,308 | 117 | 1 | \$1,296 | \$1,768 |
| WILDROSE | 110 | 1,308 | 0 | 0 | \$1,238 | \$1,689 |
| WILLISTON | 1 | 1,191 | 6 | 6 | \$2,190 | \$2,988 |

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| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Intertrain/ Intrain Switches | Variable Cost per Car | Fully-Allocated Cost per Car |
|-------------|------|----------------------|------------------------|------------------------------|-----------------------|------------------------------|
| WILLISTON | 26 | 1,191 | 6 | 5 | \$1,545 | \$2,107 |
| WILLISTON | 52 | 1,191 | 6 | 4 | \$1,349 | \$1,839 |
| WILLISTON | 55 | 1,191 | 0 | 1 | \$1,161 | \$1,584 |
| WILLISTON | 110 | 1,191 | 0 | 0 | \$1,132 | \$1,545 |
| WILLOW CITY | 1 | 1,387 | 82 | 7 | \$2,526 | \$3,446 |
| WILLOW CITY | 26 | 1,387 | 82 | 5 | \$1,831 | \$2,497 |
| WILLOW CITY | 52 | 1,387 | 82 | 4 | \$1,554 | \$2,120 |
| WILLOW CITY | 55 | 1,387 | 76 | 1 | \$1,357 | \$1,851 |
| WILLOW CITY | 110 | 1,387 | 0 | 0 | \$1,310 | \$1,786 |
| WINDSOR | 1 | 1,516 | 97 | 8 | \$2,720 | \$3,710 |
| WINDSOR | 26 | 1,516 | 97 | 5 | \$1,985 | \$2,707 |
| WINDSOR | 52 | 1,516 | 97 | 4 | \$1,683 | \$2,296 |
| WINDSOR | 55 | 1,516 | 91 | 1 | \$1,477 | \$2,015 |
| WINDSOR | 110 | 1,489 | 0 | 0 | \$1,402 | \$1,912 |
| YORK | 1 | 1,387 | 82 | 7 | \$2,526 | \$3,446 |
| YORK | 26 | 1,387 | 82 | 5 | \$1,831 | \$2,497 |
| YORK | 52 | 1,387 | 82 | 4 | \$1,554 | \$2,120 |
| YORK | 55 | 1,387 | 76 | 1 | \$1,357 | \$1,851 |
| YORK | 110 | 1,387 | 0 | 0 | \$1,310 | \$1,786 |
| ZAHL | 1 | 1,333 | 148 | 7 | \$2,501 | \$3,412 |
| ZAHL | 26 | 1,333 | 148 | 5 | \$1,837 | \$2,505 |
| ZAHL | 52 | 1,333 | 148 | 4 | \$1,514 | \$2,066 |
| ZAHL | 55 | 1,333 | 142 | 1 | \$1,325 | \$1,807 |
| ZAHL | 110 | 1,333 | 0 | 0 | \$1,261 | \$1,720 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|----------|------|----------------------|--------------|-----------------------------|------------------------------------|
| ALAMO | 1 | 1,322 | \$4,698 | 1.9 | 1.39 |
| ALAMO | 26 | 1,322 | \$4,473 | 2.47 | 1.81 |
| ALAMO | 52 | 1,322 | \$4,250 | 2.83 | 2.08 |
| ALAMO | 55 | 1,322 | \$4,196 | 3.2 | 2.34 |
| ALAMO | 110 | 1,322 | \$4,088 | 3.27 | 2.4 |
| ALTON | 1 | 1,557 | \$4,797 | 1.75 | 1.28 |
| ALTON | 26 | 1,557 | \$4,574 | 2.31 | 1.69 |
| ALTON | 52 | 1,557 | \$4,349 | 2.54 | 1.86 |
| ALTON | 55 | 1,557 | \$4,295 | 2.86 | 2.1 |
| ALTON | 110 | 1,551 | \$4,187 | 2.87 | 2.11 |
| ARVILLA | 1 | 1,535 | \$4,797 | 1.78 | 1.31 |
| ARVILLA | 26 | 1,535 | \$4,574 | 2.36 | 1.73 |
| ARVILLA | 52 | 1,535 | \$4,349 | 2.58 | 1.89 |
| ARVILLA | 55 | 1,535 | \$4,295 | 2.91 | 2.13 |
| ARVILLA | 110 | 1,491 | \$4,187 | 2.98 | 2.19 |
| AYR | 1 | 1,585 | \$4,797 | 1.73 | 1.27 |
| AYR | 26 | 1,585 | \$4,574 | 2.28 | 1.67 |
| AYR | 52 | 1,585 | \$4,349 | 2.5 | 1.83 |
| AYR | 55 | 1,585 | \$4,295 | 2.81 | 2.06 |
| AYR | 110 | 1,505 | \$4,187 | 2.96 | 2.17 |
| BEACH | 1 | 1,261 | \$4,432 | 1.91 | 1.4 |
| BEACH | 26 | 1,261 | \$4,208 | 2.53 | 1.86 |
| BEACH | 52 | 1,261 | \$3,984 | 2.8 | 2.05 |
| BEACH | 55 | 1,261 | \$3,930 | 3.18 | 2.33 |
| BEACH | 110 | 1,261 | \$3,822 | 3.2 | 2.34 |
| BELFIELD | 1 | 1,304 | \$4,537 | 1.88 | 1.38 |
| BELFIELD | 26 | 1,304 | \$4,314 | 2.47 | 1.81 |
| BELFIELD | 52 | 1,304 | \$4,089 | 2.77 | 2.03 |
| BELFIELD | 55 | 1,304 | \$4,035 | 3.14 | 2.3 |
| BELFIELD | 110 | 1,304 | \$3,927 | 3.18 | 2.33 |
| BEREA | 1 | 1,505 | \$4,797 | 1.81 | 1.32 |
| BEREA | 26 | 1,505 | \$4,574 | 2.39 | 1.75 |
| BEREA | 52 | 1,505 | \$4,349 | 2.62 | 1.92 |
| BEREA | 55 | 1,505 | \$4,295 | 2.96 | 2.17 |
| BEREA | 110 | 1,505 | \$4,187 | 2.96 | 2.17 |
| BERTHOLD | 1 | 1,288 | \$4,797 | 2 | 1.46 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-----------|------|----------------------|--------------|-----------------------------|------------------------------------|
| BERTHOLD | 26 | 1,288 | \$4,574 | 2.62 | 1.92 |
| BERTHOLD | 52 | 1,288 | \$4,349 | 2.97 | 2.18 |
| BERTHOLD | 55 | 1,288 | \$4,295 | 3.37 | 2.47 |
| BERTHOLD | 110 | 1,288 | \$4,187 | 3.43 | 2.52 |
| BISBEE | 1 | 1,521 | \$4,797 | 1.77 | 1.3 |
| BISBEE | 26 | 1,521 | \$4,574 | 2.32 | 1.7 |
| BISBEE | 52 | 1,521 | \$4,349 | 2.58 | 1.89 |
| BISBEE | 55 | 1,521 | \$4,295 | 2.91 | 2.13 |
| BISBEE | 110 | 1,433 | \$4,187 | 3.1 | 2.27 |
| BISMARCK | 1 | 1,431 | \$4,797 | 1.89 | 1.39 |
| BISMARCK | 26 | 1,431 | \$4,574 | 2.53 | 1.85 |
| BISMARCK | 52 | 1,431 | \$4,349 | 2.75 | 2.01 |
| BISMARCK | 55 | 1,431 | \$4,295 | 3.11 | 2.28 |
| BISMARCK | 110 | 1,431 | \$4,187 | 3.1 | 2.27 |
| BOTTINEAU | 1 | 1,404 | \$4,797 | 1.87 | 1.37 |
| BOTTINEAU | 26 | 1,404 | \$4,574 | 2.45 | 1.8 |
| BOTTINEAU | 52 | 1,404 | \$4,349 | 2.76 | 2.03 |
| BOTTINEAU | 55 | 1,404 | \$4,295 | 3.12 | 2.29 |
| BOTTINEAU | 110 | 1,404 | \$4,187 | 3.16 | 2.32 |
| BOWBELLS | 1 | 1,376 | \$4,758 | 1.9 | 1.39 |
| BOWBELLS | 26 | 1,376 | \$4,190 | 2.32 | 1.7 |
| BOWBELLS | 52 | 1,376 | \$4,190 | 2.72 | 1.99 |
| BOWBELLS | 55 | 1,376 | \$4,190 | 3.12 | 2.29 |
| BOWBELLS | 110 | 1,330 | \$4,148 | 3.3 | 2.42 |
| BOWMAN | 1 | 1,291 | \$4,511 | 1.87 | 1.37 |
| BOWMAN | 26 | 1,291 | \$4,287 | 2.44 | 1.79 |
| BOWMAN | 52 | 1,291 | \$4,063 | 2.77 | 2.03 |
| BOWMAN | 55 | 1,291 | \$4,009 | 3.14 | 2.3 |
| BOWMAN | 110 | 1,291 | \$3,901 | 3.19 | 2.34 |
| BOYLE | 1 | 1,339 | \$4,511 | 1.87 | 1.37 |
| BOYLE | 26 | 1,339 | \$4,288 | 2.49 | 1.83 |
| BOYLE | 52 | 1,339 | \$4,063 | 2.72 | 1.99 |
| BOYLE | 55 | 1,339 | \$4,009 | 3.09 | 2.26 |
| BOYLE | 110 | 1,339 | \$3,901 | 3.08 | 2.26 |
| BREMEN | 1 | 1,402 | \$4,797 | 1.87 | 1.37 |
| BREMEN | 26 | 1,402 | \$4,574 | 2.46 | 1.8 |
| BREMEN | 52 | 1,402 | \$4,349 | 2.77 | 2.03 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|---------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| BREMEN | 55 | 1,402 | \$4,295 | 3.13 | 2.29 |
| BREMEN | 110 | 1,402 | \$4,187 | 3.16 | 2.32 |
| BUFFALO | 1 | 1,531 | \$4,797 | 1.77 | 1.3 |
| BUFFALO | 26 | 1,531 | \$4,574 | 2.32 | 1.7 |
| BUFFALO | 52 | 1,531 | \$4,349 | 2.57 | 1.88 |
| BUFFALO | 55 | 1,531 | \$4,295 | 2.9 | 2.12 |
| BUFFALO | 110 | 1,531 | \$4,187 | 2.91 | 2.13 |
| BUXTON | 1 | 1,539 | \$4,797 | 1.78 | 1.3 |
| BUXTON | 26 | 1,539 | \$4,574 | 2.35 | 1.72 |
| BUXTON | 52 | 1,539 | \$4,349 | 2.57 | 1.88 |
| BUXTON | 55 | 1,539 | \$4,295 | 2.9 | 2.13 |
| BUXTON | 110 | 1,533 | \$4,187 | 2.9 | 2.13 |
| CANDO | 1 | 1,508 | \$4,797 | 1.79 | 1.31 |
| CANDO | 26 | 1,508 | \$4,574 | 2.35 | 1.72 |
| CANDO | 52 | 1,508 | \$4,349 | 2.61 | 1.91 |
| CANDO | 55 | 1,508 | \$4,295 | 2.94 | 2.15 |
| CANDO | 110 | 1,420 | \$4,187 | 3.13 | 2.29 |
| CASSELTON | 1 | 1,548 | \$4,797 | 1.74 | 1.28 |
| CASSELTON | 26 | 1,548 | \$4,574 | 2.28 | 1.67 |
| CASSELTON | 52 | 1,548 | \$4,349 | 2.54 | 1.86 |
| CASSELTON | 55 | 1,548 | \$4,295 | 2.86 | 2.1 |
| CASSELTON | 110 | 1,522 | \$4,187 | 2.92 | 2.14 |
| CHURCHS FERRY | 1 | 1,493 | \$4,797 | 1.81 | 1.33 |
| CHURCHS FERRY | 26 | 1,493 | \$4,574 | 2.39 | 1.75 |
| CHURCHS FERRY | 52 | 1,493 | \$4,349 | 2.63 | 1.93 |
| CHURCHS FERRY | 55 | 1,493 | \$4,295 | 2.97 | 2.18 |
| CHURCHS FERRY | 110 | 1,405 | \$4,187 | 3.16 | 2.32 |
| CLEVELAND | 1 | 1,512 | \$4,797 | 1.77 | 1.3 |
| CLEVELAND | 26 | 1,512 | \$4,574 | 2.31 | 1.7 |
| CLEVELAND | 52 | 1,512 | \$4,349 | 2.59 | 1.9 |
| CLEVELAND | 55 | 1,512 | \$4,295 | 2.92 | 2.14 |
| CLEVELAND | 110 | 1,493 | \$4,187 | 2.98 | 2.18 |
| DEVILS LAKE | 1 | 1,474 | \$4,797 | 1.84 | 1.35 |
| DEVILS LAKE | 26 | 1,474 | \$4,574 | 2.44 | 1.79 |
| DEVILS LAKE | 52 | 1,474 | \$4,349 | 2.67 | 1.96 |
| DEVILS LAKE | 55 | 1,474 | \$4,295 | 3.02 | 2.21 |
| DEVILS LAKE | 110 | 1,424 | \$4,187 | 3.12 | 2.29 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| DICKINSON | 1 | 1,324 | \$4,478 | 1.88 | 1.38 |
| DICKINSON | 26 | 1,324 | \$4,254 | 2.52 | 1.85 |
| DICKINSON | 52 | 1,324 | \$4,029 | 2.73 | 2 |
| DICKINSON | 55 | 1,324 | \$3,975 | 3.1 | 2.27 |
| DICKINSON | 110 | 1,324 | \$3,867 | 3.09 | 2.26 |
| DOYON | 1 | 1,458 | \$4,797 | 1.86 | 1.37 |
| DOYON | 26 | 1,458 | \$4,574 | 2.48 | 1.82 |
| DOYON | 52 | 1,458 | \$4,349 | 2.7 | 1.98 |
| DOYON | 55 | 1,458 | \$4,295 | 3.06 | 2.24 |
| DOYON | 110 | 1,440 | \$4,187 | 3.08 | 2.26 |
| ELDRIDGE | 1 | 1,525 | \$4,797 | 1.75 | 1.28 |
| ELDRIDGE | 26 | 1,525 | \$4,574 | 2.28 | 1.67 |
| ELDRIDGE | 52 | 1,525 | \$4,349 | 2.57 | 1.88 |
| ELDRIDGE | 55 | 1,525 | \$4,295 | 2.89 | 2.12 |
| ELDRIDGE | 110 | 1,480 | \$4,187 | 3 | 2.2 |
| EPPING | 1 | 1,208 | \$4,652 | 2.09 | 1.53 |
| EPPING | 26 | 1,208 | \$4,427 | 2.8 | 2.05 |
| EPPING | 52 | 1,208 | \$4,203 | 3.07 | 2.25 |
| EPPING | 55 | 1,208 | \$4,149 | 3.51 | 2.58 |
| EPPING | 110 | 1,208 | \$4,041 | 3.52 | 2.58 |
| FARGO | 1 | 1,567 | \$4,797 | 1.72 | 1.26 |
| FARGO | 26 | 1,567 | \$4,574 | 2.24 | 1.64 |
| FARGO | 52 | 1,567 | \$4,349 | 2.51 | 1.84 |
| FARGO | 55 | 1,567 | \$4,295 | 2.82 | 2.07 |
| FARGO | 110 | 1,539 | \$4,187 | 2.89 | 2.12 |
| GARDNER | 1 | 1,570 | \$4,797 | 1.75 | 1.28 |
| GARDNER | 26 | 1,570 | \$4,574 | 2.31 | 1.69 |
| GARDNER | 52 | 1,570 | \$4,349 | 2.52 | 1.85 |
| GARDNER | 55 | 1,570 | \$4,295 | 2.85 | 2.09 |
| GARDNER | 110 | 1,560 | \$4,187 | 2.86 | 2.09 |
| GLADSTONE | 1 | 1,336 | \$4,613 | 1.92 | 1.41 |
| GLADSTONE | 26 | 1,336 | \$4,388 | 2.56 | 1.88 |
| GLADSTONE | 52 | 1,336 | \$4,164 | 2.79 | 2.05 |
| GLADSTONE | 55 | 1,336 | \$4,110 | 3.17 | 2.33 |
| GLADSTONE | 110 | 1,336 | \$4,002 | 3.17 | 2.32 |
| GLEN ULLIN | 1 | 1,377 | \$4,710 | 1.89 | 1.38 |
| GLEN ULLIN | 26 | 1,377 | \$4,486 | 2.5 | 1.83 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|----------------|-------------|-----------------------------|---------------------|------------------------------------|---|
| GLEN ULLIN | 52 | 1,377 | \$4,262 | 2.77 | 2.03 |
| GLEN ULLIN | 55 | 1,377 | \$4,208 | 3.14 | 2.3 |
| GLEN ULLIN | 110 | 1,377 | \$4,100 | 3.15 | 2.31 |
| GLENFIELD | 1 | 1,446 | \$4,797 | 1.81 | 1.32 |
| GLENFIELD | 26 | 1,446 | \$4,574 | 2.34 | 1.72 |
| GLENFIELD | 52 | 1,446 | \$4,349 | 2.68 | 1.96 |
| GLENFIELD | 55 | 1,446 | \$4,295 | 3.01 | 2.21 |
| GLENFIELD | 110 | 1,446 | \$4,187 | 3.07 | 2.25 |
| GRACE CITY | 1 | 1,433 | \$4,797 | 1.83 | 1.34 |
| GRACE CITY | 26 | 1,433 | \$4,574 | 2.38 | 1.74 |
| GRACE CITY | 52 | 1,433 | \$4,349 | 2.7 | 1.98 |
| GRACE CITY | 55 | 1,433 | \$4,295 | 3.05 | 2.23 |
| GRACE CITY | 110 | 1,433 | \$4,187 | 3.1 | 2.27 |
| GRAND FORKS | 1 | 1,513 | \$4,797 | 1.81 | 1.33 |
| GRAND FORKS | 26 | 1,513 | \$4,574 | 2.42 | 1.77 |
| GRAND FORKS | 52 | 1,513 | \$4,349 | 2.61 | 1.92 |
| GRAND FORKS | 55 | 1,513 | \$4,295 | 2.96 | 2.17 |
| GRAND FORKS | 110 | 1,513 | \$4,187 | 2.94 | 2.16 |
| HAMBERG | 1 | 1,396 | \$4,797 | 1.88 | 1.38 |
| HAMBERG | 26 | 1,396 | \$4,574 | 2.47 | 1.81 |
| HAMBERG | 52 | 1,396 | \$4,349 | 2.78 | 2.04 |
| HAMBERG | 55 | 1,396 | \$4,295 | 3.14 | 2.3 |
| HAMBERG | 110 | 1,396 | \$4,187 | 3.18 | 2.33 |
| HAMLET | 1 | 1,304 | \$4,713 | 1.93 | 1.42 |
| HAMLET | 26 | 1,304 | \$4,490 | 2.53 | 1.85 |
| HAMLET | 52 | 1,304 | \$4,265 | 2.88 | 2.11 |
| HAMLET | 55 | 1,304 | \$4,211 | 3.26 | 2.39 |
| HAMLET | 110 | 1,304 | \$4,103 | 3.32 | 2.44 |
| HANNAFORD | 1 | 1,466 | \$4,797 | 1.78 | 1.3 |
| HANNAFORD | 26 | 1,466 | \$4,574 | 2.29 | 1.68 |
| HANNAFORD | 52 | 1,466 | \$4,349 | 2.64 | 1.94 |
| HANNAFORD | 55 | 1,466 | \$4,295 | 2.97 | 2.17 |
| HANNAFORD | 110 | 1,466 | \$4,187 | 3.03 | 2.22 |
| HARWOOD | 1 | 1,558 | \$4,797 | 1.76 | 1.29 |
| HARWOOD | 26 | 1,558 | \$4,574 | 2.34 | 1.72 |
| HARWOOD | 52 | 1,558 | \$4,349 | 2.54 | 1.86 |
| HARWOOD | 55 | 1,558 | \$4,295 | 2.87 | 2.11 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue- Variable Cost Ratio | Revenue- Fully Allocated Cost Ratio |
|-----------|------|-------------------------|-----------------|------------------------------------|--|
| HARWOOD | 110 | 1,548 | \$4,187 | 2.88 | 2.11 |
| HEBRON | 1 | 1,365 | \$4,681 | 1.9 | 1.39 |
| HEBRON | 26 | 1,365 | \$4,456 | 2.51 | 1.84 |
| HEBRON | 52 | 1,365 | \$4,233 | 2.77 | 2.03 |
| HEBRON | 55 | 1,365 | \$4,179 | 3.15 | 2.31 |
| HEBRON | 110 | 1,365 | \$4,071 | 3.16 | 2.31 |
| HETTINGER | 1 | 1,332 | \$4,606 | 1.84 | 1.35 |
| HETTINGER | 26 | 1,332 | \$4,382 | 2.38 | 1.74 |
| HETTINGER | 52 | 1,332 | \$4,158 | 2.74 | 2.01 |
| HETTINGER | 55 | 1,332 | \$4,104 | 3.1 | 2.27 |
| HETTINGER | 110 | 1,332 | \$3,996 | 3.17 | 2.33 |
| HILLSBORO | 1 | 1,553 | \$4,797 | 1.76 | 1.29 |
| HILLSBORO | 26 | 1,553 | \$4,574 | 2.32 | 1.7 |
| HILLSBORO | 52 | 1,553 | \$4,349 | 2.54 | 1.86 |
| HILLSBORO | 55 | 1,553 | \$4,295 | 2.87 | 2.1 |
| HILLSBORO | 110 | 1,547 | \$4,187 | 2.88 | 2.11 |
| JAMESTOWN | 1 | 1,474 | \$4,797 | 1.85 | 1.36 |
| JAMESTOWN | 26 | 1,474 | \$4,574 | 2.47 | 1.81 |
| JAMESTOWN | 52 | 1,474 | \$4,349 | 2.68 | 1.96 |
| JAMESTOWN | 55 | 1,474 | \$4,295 | 3.03 | 2.22 |
| JAMESTOWN | 110 | 1,474 | \$4,187 | 3.02 | 2.21 |
| KELSO | 1 | 1,559 | \$4,797 | 1.75 | 1.28 |
| KELSO | 26 | 1,559 | \$4,574 | 2.3 | 1.69 |
| KELSO | 52 | 1,559 | \$4,349 | 2.53 | 1.86 |
| KELSO | 55 | 1,559 | \$4,295 | 2.85 | 2.09 |
| KELSO | 110 | 1,553 | \$4,187 | 2.87 | 2.1 |
| LAKOTA | 1 | 1,449 | \$4,797 | 1.88 | 1.38 |
| LAKOTA | 26 | 1,449 | \$4,574 | 2.51 | 1.84 |
| LAKOTA | 52 | 1,449 | \$4,349 | 2.72 | 1.99 |
| LAKOTA | 55 | 1,449 | \$4,295 | 3.08 | 2.26 |
| LAKOTA | 110 | 1,449 | \$4,187 | 3.07 | 2.25 |
| LARIMORE | 1 | 1,541 | \$4,797 | 1.77 | 1.3 |
| LARIMORE | 26 | 1,541 | \$4,574 | 2.35 | 1.72 |
| LARIMORE | 52 | 1,541 | \$4,349 | 2.56 | 1.88 |
| LARIMORE | 55 | 1,541 | \$4,295 | 2.89 | 2.12 |
| LARIMORE | 110 | 1,485 | \$4,187 | 2.99 | 2.2 |
| LEEDS | 1 | 1,505 | \$4,797 | 1.79 | 1.31 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| LEEDS | 26 | 1,505 | \$4,574 | 2.36 | 1.73 |
| LEEDS | 52 | 1,505 | \$4,349 | 2.61 | 1.91 |
| LEEDS | 55 | 1,505 | \$4,295 | 2.95 | 2.16 |
| LEEDS | 110 | 1,393 | \$4,187 | 3.18 | 2.33 |
| LUVERNE | 1 | 1,479 | \$4,797 | 1.76 | 1.29 |
| LUVERNE | 26 | 1,479 | \$4,574 | 2.26 | 1.66 |
| LUVERNE | 52 | 1,479 | \$4,349 | 2.62 | 1.92 |
| LUVERNE | 55 | 1,479 | \$4,295 | 2.94 | 2.15 |
| LUVERNE | 110 | 1,479 | \$4,187 | 3.01 | 2.2 |
| MEDINA | 1 | 1,503 | \$4,797 | 1.78 | 1.31 |
| MEDINA | 26 | 1,503 | \$4,574 | 2.34 | 1.71 |
| MEDINA | 52 | 1,503 | \$4,349 | 2.61 | 1.91 |
| MEDINA | 55 | 1,503 | \$4,295 | 2.94 | 2.15 |
| MEDINA | 110 | 1,502 | \$4,187 | 2.96 | 2.17 |
| MINOT | 1 | 1,311 | \$4,797 | 2.03 | 1.49 |
| MINOT | 26 | 1,311 | \$4,574 | 2.73 | 2 |
| MINOT | 52 | 1,311 | \$4,349 | 2.97 | 2.18 |
| MINOT | 55 | 1,311 | \$4,295 | 3.38 | 2.48 |
| MINOT | 110 | 1,311 | \$4,187 | 3.37 | 2.47 |
| NEW SALEM | 1 | 1,398 | \$4,758 | 1.87 | 1.37 |
| NEW SALEM | 26 | 1,398 | \$4,535 | 2.46 | 1.81 |
| NEW SALEM | 52 | 1,398 | \$4,310 | 2.75 | 2.02 |
| NEW SALEM | 55 | 1,398 | \$4,256 | 3.12 | 2.28 |
| NEW SALEM | 110 | 1,398 | \$4,148 | 3.14 | 2.3 |
| NIAGARA | 1 | 1,472 | \$4,797 | 1.84 | 1.35 |
| NIAGARA | 26 | 1,472 | \$4,574 | 2.45 | 1.79 |
| NIAGARA | 52 | 1,472 | \$4,349 | 2.67 | 1.96 |
| NIAGARA | 55 | 1,472 | \$4,295 | 3.02 | 2.22 |
| NIAGARA | 110 | 1,472 | \$4,187 | 3.02 | 2.21 |
| NORTH GRAND FORKS | 1 | 1,520 | \$4,797 | 1.8 | 1.32 |
| NORTH GRAND FORKS | 26 | 1,520 | \$4,574 | 2.4 | 1.76 |
| NORTH GRAND FORKS | 52 | 1,520 | \$4,349 | 2.6 | 1.91 |
| NORTH GRAND FORKS | 55 | 1,520 | \$4,295 | 2.94 | 2.16 |
| NORTH GRAND FORKS | 110 | 1,520 | \$4,187 | 2.93 | 2.15 |
| NORTHGATE | 1 | 1,389 | \$4,758 | 1.88 | 1.38 |
| NORTHGATE | 26 | 1,389 | \$4,190 | 2.28 | 1.67 |
| NORTHGATE | 52 | 1,389 | \$4,190 | 2.69 | 1.97 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| NORTHGATE | 55 | 1,389 | \$4,190 | 3.08 | 2.26 |
| NORTHGATE | 110 | 1,343 | \$4,148 | 3.27 | 2.39 |
| NORWICH | 1 | 1,320 | \$4,797 | 2.02 | 1.48 |
| NORWICH | 26 | 1,320 | \$4,574 | 2.7 | 1.98 |
| NORWICH | 52 | 1,320 | \$4,349 | 2.95 | 2.16 |
| NORWICH | 55 | 1,320 | \$4,295 | 3.36 | 2.46 |
| NORWICH | 110 | 1,320 | \$4,187 | 3.35 | 2.46 |
| PALERMO | 1 | 1,265 | \$4,763 | 2.02 | 1.48 |
| PALERMO | 26 | 1,265 | \$4,539 | 2.67 | 1.96 |
| PALERMO | 52 | 1,265 | \$4,315 | 3.01 | 2.2 |
| PALERMO | 55 | 1,265 | \$4,261 | 3.42 | 2.51 |
| PALERMO | 110 | 1,265 | \$4,153 | 3.46 | 2.54 |
| PEAK | 1 | 1,515 | \$4,797 | 1.79 | 1.31 |
| PEAK | 26 | 1,515 | \$4,574 | 2.36 | 1.73 |
| PEAK | 52 | 1,515 | \$4,349 | 2.6 | 1.91 |
| PEAK | 55 | 1,515 | \$4,295 | 2.93 | 2.15 |
| PEAK | 110 | 1,515 | \$4,187 | 2.94 | 2.15 |
| PETERSBURG | 1 | 1,466 | \$4,797 | 1.85 | 1.36 |
| PETERSBURG | 26 | 1,466 | \$4,574 | 2.46 | 1.8 |
| PETERSBURG | 52 | 1,466 | \$4,349 | 2.68 | 1.97 |
| PETERSBURG | 55 | 1,466 | \$4,295 | 3.04 | 2.23 |
| PETERSBURG | 110 | 1,466 | \$4,187 | 3.03 | 2.22 |
| PILLSBURY | 1 | 1,486 | \$4,797 | 1.75 | 1.28 |
| PILLSBURY | 26 | 1,486 | \$4,574 | 2.25 | 1.65 |
| PILLSBURY | 52 | 1,486 | \$4,349 | 2.6 | 1.91 |
| PILLSBURY | 55 | 1,486 | \$4,295 | 2.92 | 2.14 |
| PILLSBURY | 110 | 1,486 | \$4,187 | 2.99 | 2.19 |
| POWERS LAKE | 1 | 1,283 | \$4,704 | 1.97 | 1.44 |
| POWERS LAKE | 26 | 1,283 | \$4,481 | 2.58 | 1.89 |
| POWERS LAKE | 52 | 1,283 | \$4,256 | 2.92 | 2.14 |
| POWERS LAKE | 55 | 1,283 | \$4,202 | 3.32 | 2.43 |
| POWERS LAKE | 110 | 1,283 | \$4,094 | 3.37 | 2.47 |
| RAY | 1 | 1,218 | \$4,671 | 2.08 | 1.52 |
| RAY | 26 | 1,218 | \$4,447 | 2.78 | 2.04 |
| RAY | 52 | 1,218 | \$4,223 | 3.06 | 2.24 |
| RAY | 55 | 1,218 | \$4,169 | 3.5 | 2.56 |
| RAY | 110 | 1,218 | \$4,061 | 3.51 | 2.57 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| REEDER | 1 | 1,314 | \$4,566 | 1.85 | 1.36 |
| REEDER | 26 | 1,314 | \$4,342 | 2.4 | 1.76 |
| REEDER | 52 | 1,314 | \$4,118 | 2.76 | 2.02 |
| REEDER | 55 | 1,314 | \$4,064 | 3.11 | 2.28 |
| REEDER | 110 | 1,314 | \$3,956 | 3.18 | 2.33 |
| REYNOLDS | 1 | 1,534 | \$4,797 | 1.78 | 1.31 |
| REYNOLDS | 26 | 1,534 | \$4,574 | 2.36 | 1.73 |
| REYNOLDS | 52 | 1,534 | \$4,349 | 2.58 | 1.89 |
| REYNOLDS | 55 | 1,534 | \$4,295 | 2.91 | 2.13 |
| REYNOLDS | 110 | 1,528 | \$4,187 | 2.91 | 2.14 |
| RICHARDTON | 1 | 1,350 | \$4,645 | 1.91 | 1.4 |
| RICHARDTON | 26 | 1,350 | \$4,420 | 2.54 | 1.86 |
| RICHARDTON | 52 | 1,350 | \$4,197 | 2.78 | 2.04 |
| RICHARDTON | 55 | 1,350 | \$4,143 | 3.16 | 2.32 |
| RICHARDTON | 110 | 1,350 | \$4,035 | 3.16 | 2.32 |
| ROSS | 1 | 1,250 | \$4,734 | 2.04 | 1.5 |
| ROSS | 26 | 1,250 | \$4,509 | 2.71 | 1.98 |
| ROSS | 52 | 1,250 | \$4,285 | 3.02 | 2.22 |
| ROSS | 55 | 1,250 | \$4,231 | 3.44 | 2.52 |
| ROSS | 110 | 1,250 | \$4,123 | 3.48 | 2.55 |
| RUGBY | 1 | 1,366 | \$4,797 | 1.93 | 1.42 |
| RUGBY | 26 | 1,366 | \$4,574 | 2.56 | 1.88 |
| RUGBY | 52 | 1,366 | \$4,349 | 2.84 | 2.08 |
| RUGBY | 55 | 1,366 | \$4,295 | 3.22 | 2.36 |
| RUGBY | 110 | 1,366 | \$4,187 | 3.24 | 2.38 |
| SCRANTON | 1 | 1,303 | \$4,452 | 1.82 | 1.34 |
| SCRANTON | 26 | 1,303 | \$4,229 | 2.37 | 1.74 |
| SCRANTON | 52 | 1,303 | \$4,004 | 2.7 | 1.98 |
| SCRANTON | 55 | 1,303 | \$3,950 | 3.06 | 2.24 |
| SCRANTON | 110 | 1,303 | \$3,842 | 3.11 | 2.28 |
| SELZ | 1 | 1,377 | \$4,797 | 1.92 | 1.4 |
| SELZ | 26 | 1,377 | \$4,574 | 2.53 | 1.85 |
| SELZ | 52 | 1,377 | \$4,349 | 2.82 | 2.07 |
| SELZ | 55 | 1,377 | \$4,295 | 3.19 | 2.34 |
| SELZ | 110 | 1,377 | \$4,187 | 3.22 | 2.36 |
| SPIRITWOOD | 1 | 1,486 | \$4,797 | 1.83 | 1.34 |
| SPIRITWOOD | 26 | 1,486 | \$4,574 | 2.44 | 1.79 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| SPIRITWOOD | 52 | 1,486 | \$4,349 | 2.65 | 1.95 |
| SPIRITWOOD | 55 | 1,486 | \$4,295 | 3 | 2.2 |
| SPIRITWOOD | 110 | 1,486 | \$4,187 | 2.99 | 2.19 |
| STANLEY | 1 | 1,257 | \$4,748 | 2.03 | 1.49 |
| STANLEY | 26 | 1,257 | \$4,524 | 2.69 | 1.97 |
| STANLEY | 52 | 1,257 | \$4,299 | 3.02 | 2.21 |
| STANLEY | 55 | 1,257 | \$4,245 | 3.43 | 2.52 |
| STANLEY | 110 | 1,257 | \$4,137 | 3.47 | 2.54 |
| STEELE | 1 | 1,475 | \$4,797 | 1.82 | 1.34 |
| STEELE | 26 | 1,475 | \$4,574 | 2.41 | 1.76 |
| STEELE | 52 | 1,475 | \$4,349 | 2.66 | 1.95 |
| STEELE | 55 | 1,475 | \$4,295 | 3 | 2.2 |
| STEELE | 110 | 1,475 | \$4,187 | 3.01 | 2.21 |
| STERLING | 1 | 1,456 | \$4,797 | 1.85 | 1.36 |
| STERLING | 26 | 1,456 | \$4,574 | 2.46 | 1.8 |
| STERLING | 52 | 1,456 | \$4,349 | 2.7 | 1.98 |
| STERLING | 55 | 1,456 | \$4,295 | 3.05 | 2.24 |
| STERLING | 110 | 1,456 | \$4,187 | 3.05 | 2.24 |
| SUTTON | 1 | 1,453 | \$4,797 | 1.8 | 1.32 |
| SUTTON | 26 | 1,453 | \$4,574 | 2.33 | 1.71 |
| SUTTON | 52 | 1,453 | \$4,349 | 2.67 | 1.95 |
| SUTTON | 55 | 1,453 | \$4,295 | 3 | 2.2 |
| SUTTON | 110 | 1,453 | \$4,187 | 3.06 | 2.24 |
| TAPPEN | 1 | 1,488 | \$4,797 | 1.8 | 1.32 |
| TAPPEN | 26 | 1,488 | \$4,574 | 2.37 | 1.74 |
| TAPPEN | 52 | 1,488 | \$4,349 | 2.63 | 1.93 |
| TAPPEN | 55 | 1,488 | \$4,295 | 2.97 | 2.18 |
| TAPPEN | 110 | 1,488 | \$4,187 | 2.99 | 2.19 |
| THOMPSON | 1 | 1,527 | \$4,797 | 1.79 | 1.31 |
| THOMPSON | 26 | 1,527 | \$4,574 | 2.38 | 1.75 |
| THOMPSON | 52 | 1,527 | \$4,349 | 2.59 | 1.9 |
| THOMPSON | 55 | 1,527 | \$4,295 | 2.93 | 2.15 |
| THOMPSON | 110 | 1,521 | \$4,187 | 2.93 | 2.15 |
| VALLEY CITY | 1 | 1,510 | \$4,797 | 1.8 | 1.32 |
| VALLEY CITY | 26 | 1,510 | \$4,574 | 2.38 | 1.74 |
| VALLEY CITY | 52 | 1,510 | \$4,349 | 2.61 | 1.91 |
| VALLEY CITY | 55 | 1,510 | \$4,295 | 2.95 | 2.16 |

Table 5
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| VALLEY CITY | 110 | 1,510 | \$4,187 | 2.95 | 2.16 |
| WAHPETON | 1 | 1,591 | \$4,797 | 1.72 | 1.26 |
| WAHPETON | 26 | 1,591 | \$4,574 | 2.26 | 1.66 |
| WAHPETON | 52 | 1,591 | \$4,349 | 2.49 | 1.82 |
| WAHPETON | 55 | 1,591 | \$4,295 | 2.8 | 2.05 |
| WAHPETON | 110 | 1,577 | \$4,187 | 2.83 | 2.07 |
| WEST FARGO | 1 | 1,563 | \$4,797 | 1.72 | 1.26 |
| WEST FARGO | 26 | 1,563 | \$4,574 | 2.25 | 1.65 |
| WEST FARGO | 52 | 1,563 | \$4,349 | 2.52 | 1.84 |
| WEST FARGO | 55 | 1,563 | \$4,295 | 2.83 | 2.07 |
| WEST FARGO | 110 | 1,537 | \$4,187 | 2.9 | 2.12 |
| WHEATLAND | 1 | 1,542 | \$4,797 | 1.75 | 1.28 |
| WHEATLAND | 26 | 1,542 | \$4,574 | 2.3 | 1.68 |
| WHEATLAND | 52 | 1,542 | \$4,349 | 2.55 | 1.87 |
| WHEATLAND | 55 | 1,542 | \$4,295 | 2.87 | 2.11 |
| WHEATLAND | 110 | 1,528 | \$4,187 | 2.91 | 2.14 |
| WHITE EARTH | 1 | 1,238 | \$4,710 | 2.05 | 1.51 |
| WHITE EARTH | 26 | 1,238 | \$4,486 | 2.73 | 2 |
| WHITE EARTH | 52 | 1,238 | \$4,262 | 3.04 | 2.23 |
| WHITE EARTH | 55 | 1,238 | \$4,208 | 3.46 | 2.54 |
| WHITE EARTH | 110 | 1,238 | \$4,100 | 3.49 | 2.56 |
| WILDROSE | 1 | 1,308 | \$4,709 | 1.92 | 1.41 |
| WILDROSE | 26 | 1,308 | \$4,485 | 2.51 | 1.84 |
| WILDROSE | 52 | 1,308 | \$4,261 | 2.87 | 2.1 |
| WILDROSE | 55 | 1,308 | \$4,207 | 3.25 | 2.38 |
| WILDROSE | 110 | 1,308 | \$4,099 | 3.31 | 2.43 |
| WILLISTON | 1 | 1,191 | \$4,618 | 2.11 | 1.55 |
| WILLISTON | 26 | 1,191 | \$4,395 | 2.85 | 2.09 |
| WILLISTON | 52 | 1,191 | \$4,170 | 3.09 | 2.27 |
| WILLISTON | 55 | 1,191 | \$4,116 | 3.55 | 2.6 |
| WILLISTON | 110 | 1,191 | \$4,008 | 3.54 | 2.6 |
| WILLOW CITY | 1 | 1,387 | \$4,797 | 1.9 | 1.39 |
| WILLOW CITY | 26 | 1,387 | \$4,574 | 2.5 | 1.83 |
| WILLOW CITY | 52 | 1,387 | \$4,349 | 2.8 | 2.05 |
| WILLOW CITY | 55 | 1,387 | \$4,295 | 3.17 | 2.32 |
| WILLOW CITY | 110 | 1,387 | \$4,187 | 3.2 | 2.34 |
| WINDSOR | 1 | 1,516 | \$4,797 | 1.76 | 1.29 |

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue- Variable Cost Ratio | Revenue- Fully Allocated Cost Ratio |
|---------|------|-------------------------|-----------------|------------------------------------|--|
| WINDSOR | 26 | 1,516 | \$4,574 | 2.3 | 1.69 |
| WINDSOR | 52 | 1,516 | \$4,349 | 2.58 | 1.89 |
| WINDSOR | 55 | 1,516 | \$4,295 | 2.91 | 2.13 |
| WINDSOR | 110 | 1,489 | \$4,187 | 2.99 | 2.19 |
| YORK | 1 | 1,387 | \$4,797 | 1.9 | 1.39 |
| YORK | 26 | 1,387 | \$4,574 | 2.5 | 1.83 |
| YORK | 52 | 1,387 | \$4,349 | 2.8 | 2.05 |
| YORK | 55 | 1,387 | \$4,295 | 3.17 | 2.32 |
| YORK | 110 | 1,387 | \$4,187 | 3.2 | 2.34 |
| ZAHL | 1 | 1,333 | \$4,690 | 1.87 | 1.37 |
| ZAHL | 26 | 1,333 | \$4,466 | 2.43 | 1.78 |
| ZAHL | 52 | 1,333 | \$4,242 | 2.8 | 2.05 |
| ZAHL | 55 | 1,333 | \$4,188 | 3.16 | 2.32 |
| ZAHL | 110 | 1,333 | \$4,080 | 3.24 | 2.37 |

REVENUE-COST RATIOS FOR WHEAT SHIPMENTS FROM NORTH DAKOTA TO MINNEAPOLIS

In this section of the report, shipment costs and revenue-cost ratios are presented for wheat movements from North Dakota to Minneapolis. The rates used in this comparison are derived from BNSF Tariff Item 45096. Only three service levels are analyzed: (1) single-car, (2) 26-car, and (3) 52-car. Table 6 presents summary statistics for these service levels.

Because of the shorter trip distances to Minneapolis, fewer adjustments are needed to URCS. Way and through train miles are based on BNSF division points. Intertrain and intratrain switches are assigned by URCS, using a 200-mile distance interval. The origin-destination and train size adjustments developed for 52-car movements to Portland are also implemented for 52-car shipments to Minneapolis. However, no adjustments are made for 26-

car or single-car shipments. According to the waybill sample, over 50 percent of wheat shipments from North Dakota to Minnesota and Wisconsin are single-car shipments or multi-car blocks of less than 25 cars. Given this movement pattern, BNSF's system-average through train characteristics are probably reflective of the mix of car block sizes and commodities that move in eastbound trains.

| Service Level | Average Revenue-Variable Cost Ratio | Minimum Revenue-Variable Cost Ratio | Maximum Revenue-Variable Cost Ratio | Standard Deviation of RVC Ratio |
|----------------------|--|--|--|--|
| 1-Car | 2.26 | 1.81 | 3.30 | 0.25 |
| 26-Car | 3.15 | 2.48 | 4.86 | 0.36 |
| 52-Car | 4.04 | 3.14 | 6.64 | 0.50 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|-----------|------|----------------------|------------------------|-----------------------|------------------------------|
| ALAMO | 1 | 591 | 119 | \$1,433 | \$1,954 |
| ALAMO | 26 | 591 | 119 | \$1,046 | \$1,426 |
| ALAMO | 52 | 591 | 119 | \$756 | \$1,032 |
| ALTON | 1 | 367 | 44 | \$1,058 | \$1,444 |
| ALTON | 26 | 367 | 44 | \$671 | \$916 |
| ALTON | 52 | 367 | 44 | \$493 | \$673 |
| ARVILLA | 1 | 345 | 22 | \$1,010 | \$1,378 |
| ARVILLA | 26 | 345 | 22 | \$623 | \$850 |
| ARVILLA | 52 | 345 | 22 | \$465 | \$634 |
| AYR | 1 | 280 | 41 | \$933 | \$1,273 |
| AYR | 26 | 280 | 41 | \$546 | \$745 |
| AYR | 52 | 280 | 41 | \$396 | \$540 |
| BEACH | 1 | 606 | 63 | \$1,410 | \$1,923 |
| BEACH | 26 | 606 | 63 | \$1,023 | \$1,395 |
| BEACH | 52 | 606 | 63 | \$762 | \$1,040 |
| BEREA | 1 | 306 | 67 | \$990 | \$1,351 |
| BEREA | 26 | 306 | 67 | \$603 | \$823 |
| BEREA | 52 | 306 | 67 | \$430 | \$587 |
| BERTHOLD | 1 | 495 | 23 | \$1,222 | \$1,667 |
| BERTHOLD | 26 | 495 | 23 | \$835 | \$1,139 |
| BERTHOLD | 52 | 495 | 23 | \$631 | \$861 |
| BISBEE | 1 | 453 | 72 | \$1,201 | \$1,639 |
| BISBEE | 26 | 453 | 72 | \$814 | \$1,111 |
| BISBEE | 52 | 453 | 72 | \$594 | \$810 |
| BOTTINEAU | 1 | 565 | 93 | \$1,376 | \$1,877 |
| BOTTINEAU | 26 | 565 | 93 | \$989 | \$1,349 |
| BOTTINEAU | 52 | 565 | 93 | \$723 | \$986 |
| BOWBELLS | 1 | 537 | 65 | \$1,314 | \$1,793 |
| BOWBELLS | 26 | 537 | 65 | \$927 | \$1,265 |
| BOWBELLS | 52 | 537 | 65 | \$686 | \$936 |
| BOWMAN | 1 | 539 | 164 | \$1,395 | \$1,902 |
| BOWMAN | 26 | 539 | 164 | \$1,008 | \$1,374 |
| BOWMAN | 52 | 539 | 164 | \$707 | \$965 |
| BOYLE | 1 | 528 | 86 | \$1,318 | \$1,798 |
| BOYLE | 26 | 528 | 86 | \$931 | \$1,270 |
| BOYLE | 52 | 528 | 86 | \$680 | \$928 |
| BREMEN | 1 | 381 | 142 | \$1,155 | \$1,575 |
| BREMEN | 26 | 381 | 142 | \$768 | \$1,047 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|----------------|-------------|-----------------------------|-------------------------------|------------------------------|-------------------------------------|
| BREMEN | 52 | 381 | 142 | \$528 | \$720 |
| BUFFALO | 1 | 280 | 41 | \$933 | \$1,273 |
| BUFFALO | 26 | 280 | 41 | \$546 | \$745 |
| BUFFALO | 52 | 280 | 41 | \$396 | \$540 |
| BUXTON | 1 | 349 | 26 | \$1,019 | \$1,390 |
| BUXTON | 26 | 349 | 26 | \$632 | \$862 |
| BUXTON | 52 | 349 | 26 | \$470 | \$641 |
| CANDO | 1 | 440 | 59 | \$1,173 | \$1,600 |
| CANDO | 26 | 440 | 59 | \$786 | \$1,072 |
| CANDO | 52 | 440 | 59 | \$577 | \$787 |
| CASSELTON | 1 | 263 | 24 | \$896 | \$1,222 |
| CASSELTON | 26 | 263 | 24 | \$509 | \$694 |
| CASSELTON | 52 | 263 | 24 | \$374 | \$510 |
| CHURCHS FERRY | 1 | 425 | 44 | \$1,140 | \$1,555 |
| CHURCHS FERRY | 26 | 425 | 44 | \$753 | \$1,027 |
| CHURCHS FERRY | 52 | 425 | 44 | \$558 | \$761 |
| CLEVELAND | 1 | 355 | 19 | \$1,022 | \$1,394 |
| CLEVELAND | 26 | 355 | 19 | \$635 | \$866 |
| CLEVELAND | 52 | 355 | 19 | \$475 | \$648 |
| DEVILS LAKE | 1 | 406 | 25 | \$1,098 | \$1,498 |
| DEVILS LAKE | 26 | 406 | 25 | \$711 | \$970 |
| DEVILS LAKE | 52 | 406 | 25 | \$533 | \$727 |
| DICKINSON | 1 | 543 | 0 | \$1,272 | \$1,735 |
| DICKINSON | 26 | 543 | 0 | \$885 | \$1,207 |
| DICKINSON | 52 | 543 | 0 | \$680 | \$928 |
| DOYON | 1 | 390 | 9 | \$1,063 | \$1,450 |
| DOYON | 26 | 390 | 9 | \$676 | \$922 |
| DOYON | 52 | 390 | 9 | \$512 | \$699 |
| EDINBURG | 1 | 387 | 64 | \$1,102 | \$1,503 |
| EDINBURG | 26 | 387 | 64 | \$715 | \$975 |
| EDINBURG | 52 | 387 | 64 | \$519 | \$708 |
| ELDRIDGE | 1 | 342 | 6 | \$993 | \$1,355 |
| ELDRIDGE | 26 | 342 | 6 | \$606 | \$827 |
| ELDRIDGE | 52 | 342 | 6 | \$458 | \$625 |
| EPPING | 1 | 575 | 103 | \$1,398 | \$1,906 |
| EPPING | 26 | 575 | 103 | \$1,011 | \$1,379 |
| EPPING | 52 | 575 | 103 | \$736 | \$1,003 |
| FARGO | 1 | 244 | 5 | \$854 | \$1,165 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|-------------|------|----------------------|------------------------|-----------------------|------------------------------|
| FARGO | 26 | 244 | 5 | \$467 | \$637 |
| FARGO | 52 | 244 | 5 | \$349 | \$477 |
| GARDNER | 1 | 265 | 26 | \$900 | \$1,228 |
| GARDNER | 26 | 265 | 26 | \$513 | \$700 |
| GARDNER | 52 | 265 | 26 | \$377 | \$514 |
| GLADSTONE | 1 | 531 | 89 | \$1,325 | \$1,807 |
| GLADSTONE | 26 | 531 | 89 | \$938 | \$1,279 |
| GLADSTONE | 52 | 531 | 89 | \$684 | \$933 |
| GLEN ULLIN | 1 | 490 | 48 | \$1,235 | \$1,684 |
| GLEN ULLIN | 26 | 490 | 48 | \$848 | \$1,156 |
| GLEN ULLIN | 52 | 490 | 48 | \$631 | \$860 |
| GLENFIELD | 1 | 337 | 98 | \$1,058 | \$1,443 |
| GLENFIELD | 26 | 337 | 98 | \$671 | \$916 |
| GLENFIELD | 52 | 337 | 98 | \$470 | \$642 |
| GRACE CITY | 1 | 350 | 111 | \$1,087 | \$1,482 |
| GRACE CITY | 26 | 350 | 111 | \$700 | \$954 |
| GRACE CITY | 52 | 350 | 111 | \$487 | \$665 |
| GRAND FORKS | 1 | 323 | 0 | \$962 | \$1,312 |
| GRAND FORKS | 26 | 323 | 0 | \$575 | \$784 |
| GRAND FORKS | 52 | 323 | 0 | \$436 | \$595 |
| HAMBERG | 1 | 387 | 148 | \$1,168 | \$1,593 |
| HAMBERG | 26 | 387 | 148 | \$781 | \$1,065 |
| HAMBERG | 52 | 387 | 148 | \$535 | \$730 |
| HAMLET | 1 | 573 | 101 | \$1,393 | \$1,900 |
| HAMLET | 26 | 573 | 101 | \$1,006 | \$1,373 |
| HAMLET | 52 | 573 | 101 | \$733 | \$1,000 |
| HANNAFORD | 1 | 317 | 78 | \$1,014 | \$1,384 |
| HANNAFORD | 26 | 317 | 78 | \$627 | \$856 |
| HANNAFORD | 52 | 317 | 78 | \$444 | \$606 |
| HARWOOD | 1 | 253 | 14 | \$874 | \$1,192 |
| HARWOOD | 26 | 253 | 14 | \$487 | \$664 |
| HARWOOD | 52 | 253 | 14 | \$361 | \$493 |
| HEBRON | 1 | 502 | 60 | \$1,261 | \$1,720 |
| HEBRON | 26 | 502 | 60 | \$874 | \$1,192 |
| HEBRON | 52 | 502 | 60 | \$646 | \$882 |
| HENSLER | 1 | 484 | 42 | \$1,222 | \$1,666 |
| HENSLER | 26 | 484 | 42 | \$835 | \$1,138 |
| HENSLER | 52 | 484 | 42 | \$623 | \$850 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|----------------|-------------|-----------------------------|-------------------------------|------------------------------|-------------------------------------|
| HETTINGER | 1 | 498 | 123 | \$1,305 | \$1,780 |
| HETTINGER | 26 | 498 | 123 | \$918 | \$1,252 |
| HETTINGER | 52 | 498 | 123 | \$654 | \$892 |
| HILLSBORO | 1 | 363 | 40 | \$1,050 | \$1,432 |
| HILLSBORO | 26 | 363 | 40 | \$662 | \$904 |
| HILLSBORO | 52 | 363 | 40 | \$488 | \$666 |
| JAMESTOWN | 1 | 336 | 0 | \$980 | \$1,337 |
| JAMESTOWN | 26 | 336 | 0 | \$593 | \$809 |
| JAMESTOWN | 52 | 336 | 0 | \$451 | \$615 |
| KELSO | 1 | 369 | 46 | \$1,063 | \$1,450 |
| KELSO | 26 | 369 | 46 | \$676 | \$922 |
| KELSO | 52 | 369 | 46 | \$496 | \$677 |
| LAKOTA | 1 | 381 | 0 | \$1,044 | \$1,424 |
| LAKOTA | 26 | 381 | 0 | \$657 | \$896 |
| LAKOTA | 52 | 381 | 0 | \$501 | \$683 |
| LARIMORE | 1 | 351 | 28 | \$1,023 | \$1,396 |
| LARIMORE | 26 | 351 | 28 | \$636 | \$868 |
| LARIMORE | 52 | 351 | 28 | \$473 | \$645 |
| LEEDS | 1 | 437 | 56 | \$1,166 | \$1,591 |
| LEEDS | 26 | 437 | 56 | \$779 | \$1,063 |
| LEEDS | 52 | 437 | 56 | \$573 | \$782 |
| LUVERNE | 1 | 304 | 65 | \$986 | \$1,345 |
| LUVERNE | 26 | 304 | 65 | \$599 | \$817 |
| LUVERNE | 52 | 304 | 65 | \$427 | \$583 |
| MEDINA | 1 | 364 | 28 | \$1,042 | \$1,421 |
| MEDINA | 26 | 364 | 28 | \$654 | \$893 |
| MEDINA | 52 | 364 | 28 | \$487 | \$664 |
| MILTON | 1 | 399 | 76 | \$1,128 | \$1,539 |
| MILTON | 26 | 399 | 76 | \$741 | \$1,011 |
| MILTON | 52 | 399 | 76 | \$535 | \$730 |
| MINOT | 1 | 472 | 0 | \$1,172 | \$1,598 |
| MINOT | 26 | 472 | 0 | \$785 | \$1,071 |
| MINOT | 52 | 472 | 0 | \$602 | \$820 |
| MINTO | 1 | 356 | 33 | \$1,034 | \$1,411 |
| MINTO | 26 | 356 | 33 | \$647 | \$883 |
| MINTO | 52 | 356 | 33 | \$479 | \$653 |
| NEW ROCKFORD | 1 | 368 | 129 | \$1,126 | \$1,536 |
| NEW ROCKFORD | 26 | 368 | 129 | \$739 | \$1,008 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|--------------|------|----------------------|------------------------|-----------------------|------------------------------|
| NEW ROCKFORD | 52 | 368 | 129 | \$511 | \$697 |
| NEW SALEM | 1 | 469 | 27 | \$1,189 | \$1,622 |
| NEW SALEM | 26 | 469 | 27 | \$802 | \$1,094 |
| NEW SALEM | 52 | 469 | 27 | \$603 | \$823 |
| NIAGARA | 1 | 404 | 23 | \$1,094 | \$1,492 |
| NIAGARA | 26 | 404 | 23 | \$707 | \$964 |
| NIAGARA | 52 | 404 | 23 | \$530 | \$724 |
| NORTHGATE | 1 | 550 | 78 | \$1,343 | \$1,832 |
| NORTHGATE | 26 | 550 | 78 | \$956 | \$1,304 |
| NORTHGATE | 52 | 550 | 78 | \$703 | \$959 |
| NORWICH | 1 | 481 | 9 | \$1,192 | \$1,625 |
| NORWICH | 26 | 481 | 9 | \$805 | \$1,097 |
| NORWICH | 52 | 481 | 9 | \$613 | \$836 |
| PALERMO | 1 | 518 | 46 | \$1,273 | \$1,736 |
| PALERMO | 26 | 518 | 46 | \$886 | \$1,208 |
| PALERMO | 52 | 518 | 46 | \$661 | \$902 |
| PEAK | 1 | 296 | 57 | \$968 | \$1,321 |
| PEAK | 26 | 296 | 57 | \$581 | \$793 |
| PEAK | 52 | 296 | 57 | \$417 | \$569 |
| PETERSBURG | 1 | 398 | 17 | \$1,081 | \$1,474 |
| PETERSBURG | 26 | 398 | 17 | \$694 | \$946 |
| PETERSBURG | 52 | 398 | 17 | \$523 | \$713 |
| PILLSBURY | 1 | 297 | 58 | \$971 | \$1,324 |
| PILLSBURY | 26 | 297 | 58 | \$583 | \$796 |
| PILLSBURY | 52 | 297 | 58 | \$418 | \$571 |
| POWERS LAKE | 1 | 552 | 80 | \$1,347 | \$1,838 |
| POWERS LAKE | 26 | 552 | 80 | \$960 | \$1,310 |
| POWERS LAKE | 52 | 552 | 80 | \$706 | \$962 |
| PROSPER | 1 | 256 | 17 | \$881 | \$1,201 |
| PROSPER | 26 | 256 | 17 | \$494 | \$673 |
| PROSPER | 52 | 256 | 17 | \$365 | \$498 |
| RAY | 1 | 565 | 93 | \$1,376 | \$1,877 |
| RAY | 26 | 565 | 93 | \$989 | \$1,349 |
| RAY | 52 | 565 | 93 | \$723 | \$986 |
| REEDER | 1 | 516 | 141 | \$1,344 | \$1,834 |
| REEDER | 26 | 516 | 141 | \$957 | \$1,306 |
| REEDER | 52 | 516 | 141 | \$677 | \$924 |
| REYNOLDS | 1 | 344 | 21 | \$1,008 | \$1,375 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|------------|------|----------------------|------------------------|-----------------------|------------------------------|
| REYNOLDS | 26 | 344 | 21 | \$621 | \$847 |
| REYNOLDS | 52 | 344 | 21 | \$463 | \$632 |
| RHAME | 1 | 552 | 177 | \$1,423 | \$1,941 |
| RICHARDTON | 1 | 517 | 75 | \$1,294 | \$1,765 |
| RICHARDTON | 26 | 517 | 75 | \$907 | \$1,237 |
| RICHARDTON | 52 | 517 | 75 | \$666 | \$908 |
| ROSS | 1 | 533 | 61 | \$1,306 | \$1,781 |
| ROSS | 26 | 533 | 61 | \$919 | \$1,253 |
| ROSS | 52 | 533 | 61 | \$681 | \$929 |
| RUGBY | 1 | 527 | 55 | \$1,292 | \$1,763 |
| RUGBY | 26 | 527 | 55 | \$905 | \$1,235 |
| RUGBY | 52 | 527 | 55 | \$673 | \$918 |
| SCRANTON | 1 | 527 | 152 | \$1,368 | \$1,866 |
| SCRANTON | 26 | 527 | 152 | \$981 | \$1,339 |
| SCRANTON | 52 | 527 | 152 | \$692 | \$943 |
| SELZ | 1 | 406 | 167 | \$1,209 | \$1,650 |
| SELZ | 26 | 406 | 167 | \$822 | \$1,122 |
| SELZ | 52 | 406 | 167 | \$560 | \$764 |
| SPIRITWOOD | 1 | 325 | 86 | \$1,032 | \$1,408 |
| SPIRITWOOD | 26 | 325 | 86 | \$645 | \$880 |
| SPIRITWOOD | 52 | 325 | 86 | \$455 | \$620 |
| STANLEY | 1 | 526 | 54 | \$1,290 | \$1,760 |
| STANLEY | 26 | 526 | 54 | \$903 | \$1,232 |
| STANLEY | 52 | 526 | 54 | \$672 | \$916 |
| STEELE | 1 | 392 | 56 | \$1,103 | \$1,504 |
| STEELE | 26 | 392 | 56 | \$716 | \$976 |
| STEELE | 52 | 392 | 56 | \$523 | \$714 |
| STERLING | 1 | 411 | 75 | \$1,145 | \$1,561 |
| STERLING | 26 | 411 | 75 | \$758 | \$1,033 |
| STERLING | 52 | 411 | 75 | \$548 | \$748 |
| SUTTON | 1 | 330 | 91 | \$1,043 | \$1,423 |
| SUTTON | 26 | 330 | 91 | \$656 | \$895 |
| SUTTON | 52 | 330 | 91 | \$461 | \$629 |
| TAPPEN | 1 | 379 | 43 | \$1,074 | \$1,466 |
| TAPPEN | 26 | 379 | 43 | \$687 | \$938 |
| TAPPEN | 52 | 379 | 43 | \$507 | \$691 |
| THOMPSON | 1 | 337 | 14 | \$993 | \$1,354 |
| THOMPSON | 26 | 337 | 14 | \$605 | \$826 |

Table 7
Estimated Costs of BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Loaded Way Train Miles | Variable Cost Per Car | Fully Allocated Cost Per Car |
|----------------|-------------|-----------------------------|-------------------------------|------------------------------|-------------------------------------|
| THOMPSON | 52 | 337 | 14 | \$454 | \$620 |
| VALLEY CITY | 1 | 301 | 62 | \$979 | \$1,336 |
| VALLEY CITY | 26 | 301 | 62 | \$592 | \$808 |
| VALLEY CITY | 52 | 301 | 62 | \$424 | \$578 |
| WAHPETON | 1 | 286 | 47 | \$946 | \$1,291 |
| WAHPETON | 26 | 286 | 47 | \$559 | \$763 |
| WAHPETON | 52 | 286 | 47 | \$404 | \$551 |
| WEST FARGO | 1 | 248 | 9 | \$863 | \$1,177 |
| WEST FARGO | 26 | 248 | 9 | \$476 | \$649 |
| WEST FARGO | 52 | 248 | 9 | \$355 | \$484 |
| WHEATLAND | 1 | 269 | 30 | \$909 | \$1,240 |
| WHEATLAND | 26 | 269 | 30 | \$522 | \$712 |
| WHEATLAND | 52 | 269 | 30 | \$382 | \$521 |
| WILLISTON | 1 | 592 | 0 | \$1,341 | \$1,829 |
| WILLISTON | 26 | 592 | 0 | \$954 | \$1,301 |
| WILLISTON | 52 | 592 | 0 | \$735 | \$1,002 |
| WILLOW CITY | 1 | 548 | 76 | \$1,338 | \$1,826 |
| WILLOW CITY | 26 | 548 | 76 | \$951 | \$1,298 |
| WILLOW CITY | 52 | 548 | 76 | \$700 | \$955 |
| WINDSOR | 1 | 351 | 15 | \$1,013 | \$1,382 |
| WINDSOR | 26 | 351 | 15 | \$626 | \$854 |
| WINDSOR | 52 | 351 | 15 | \$470 | \$641 |
| YORK | 1 | 548 | 76 | \$1,338 | \$1,826 |
| YORK | 26 | 548 | 76 | \$951 | \$1,298 |
| YORK | 52 | 548 | 76 | \$700 | \$955 |
| ZAHL | 1 | 602 | 130 | \$1,457 | \$1,987 |
| ZAHL | 26 | 602 | 130 | \$1,070 | \$1,459 |
| ZAHL | 52 | 602 | 130 | \$771 | \$1,051 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-----------|------|----------------------|--------------|-----------------------------|------------------------------------|
| ALAMO | 1 | 591 | \$3,678 | 2.57 | 1.88 |
| ALAMO | 26 | 591 | \$3,448 | 3.3 | 2.42 |
| ALAMO | 52 | 591 | \$3,308 | 4.37 | 3.21 |
| ALTON | 1 | 367 | \$1,926 | 1.82 | 1.33 |
| ALTON | 26 | 367 | \$1,696 | 2.53 | 1.85 |
| ALTON | 52 | 367 | \$1,557 | 3.16 | 2.31 |
| ARVILLA | 1 | 345 | \$2,113 | 2.09 | 1.53 |
| ARVILLA | 26 | 345 | \$1,883 | 3.02 | 2.22 |
| ARVILLA | 52 | 345 | \$1,744 | 3.75 | 2.75 |
| AYR | 1 | 280 | \$2,033 | 2.18 | 1.6 |
| AYR | 26 | 280 | \$1,803 | 3.3 | 2.42 |
| AYR | 52 | 280 | \$1,664 | 4.2 | 3.08 |
| BEACH | 1 | 606 | \$3,231 | 2.29 | 1.68 |
| BEACH | 26 | 606 | \$3,001 | 2.93 | 2.15 |
| BEACH | 52 | 606 | \$2,862 | 3.75 | 2.75 |
| BEREA | 1 | 306 | \$2,124 | 2.14 | 1.57 |
| BEREA | 26 | 306 | \$1,894 | 3.14 | 2.3 |
| BEREA | 52 | 306 | \$1,755 | 4.08 | 2.99 |
| BERTHOLD | 1 | 495 | \$3,322 | 2.72 | 1.99 |
| BERTHOLD | 26 | 495 | \$3,092 | 3.7 | 2.71 |
| BERTHOLD | 52 | 495 | \$2,953 | 4.68 | 3.43 |
| BISBEE | 1 | 453 | \$2,718 | 2.26 | 1.66 |
| BISBEE | 26 | 453 | \$2,488 | 3.06 | 2.24 |
| BISBEE | 52 | 453 | \$2,349 | 3.95 | 2.9 |
| BISMARCK | 1 | 436 | \$2,583 | 2.15 | 1.58 |
| BISMARCK | 26 | 436 | \$2,353 | 2.9 | 2.12 |
| BISMARCK | 52 | 436 | \$2,214 | 3.81 | 2.8 |
| BOTTINEAU | 1 | 565 | \$2,882 | 2.09 | 1.54 |
| BOTTINEAU | 26 | 565 | \$2,651 | 2.68 | 1.97 |
| BOTTINEAU | 52 | 565 | \$2,512 | 3.48 | 2.55 |
| BOWBELLS | 1 | 537 | \$3,472 | 2.64 | 1.94 |
| BOWBELLS | 26 | 537 | \$3,242 | 3.5 | 2.56 |
| BOWBELLS | 52 | 537 | \$3,103 | 4.52 | 3.32 |
| BOWMAN | 1 | 539 | \$2,972 | 2.13 | 1.56 |
| BOWMAN | 26 | 539 | \$2,742 | 2.72 | 2 |
| BOWMAN | 52 | 539 | \$2,603 | 3.68 | 2.7 |
| BOYLE | 1 | 528 | \$2,876 | 2.18 | 1.6 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|---------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| BOYLE | 26 | 528 | \$2,646 | 2.84 | 2.08 |
| BOYLE | 52 | 528 | \$2,506 | 3.68 | 2.7 |
| BREMEN | 1 | 381 | \$2,814 | 2.44 | 1.79 |
| BREMEN | 26 | 381 | \$2,584 | 3.37 | 2.47 |
| BREMEN | 52 | 381 | \$2,445 | 4.63 | 3.4 |
| BUFFALO | 1 | 280 | \$2,033 | 2.18 | 1.6 |
| BUFFALO | 26 | 280 | \$1,803 | 3.3 | 2.42 |
| BUFFALO | 52 | 280 | \$1,664 | 4.2 | 3.08 |
| BUXTON | 1 | 349 | \$1,926 | 1.89 | 1.39 |
| BUXTON | 26 | 349 | \$1,696 | 2.68 | 1.97 |
| BUXTON | 52 | 349 | \$1,557 | 3.31 | 2.43 |
| CANDO | 1 | 440 | \$2,639 | 2.25 | 1.65 |
| CANDO | 26 | 440 | \$2,409 | 3.07 | 2.25 |
| CANDO | 52 | 440 | \$2,269 | 3.93 | 2.88 |
| CASSELTON | 1 | 263 | \$2,006 | 2.24 | 1.64 |
| CASSELTON | 26 | 263 | \$1,776 | 3.49 | 2.56 |
| CASSELTON | 52 | 263 | \$1,637 | 4.38 | 3.21 |
| CHURCHS FERRY | 1 | 425 | \$2,455 | 2.15 | 1.58 |
| CHURCHS FERRY | 26 | 425 | \$2,225 | 2.95 | 2.17 |
| CHURCHS FERRY | 52 | 425 | \$2,085 | 3.74 | 2.74 |
| CLEVELAND | 1 | 355 | \$2,313 | 2.26 | 1.66 |
| CLEVELAND | 26 | 355 | \$2,083 | 3.28 | 2.41 |
| CLEVELAND | 52 | 355 | \$1,944 | 4.09 | 3 |
| DEVILS LAKE | 1 | 406 | \$2,386 | 2.17 | 1.59 |
| DEVILS LAKE | 26 | 406 | \$2,156 | 3.03 | 2.22 |
| DEVILS LAKE | 52 | 406 | \$2,017 | 3.78 | 2.77 |
| DICKINSON | 1 | 543 | \$2,929 | 2.3 | 1.69 |
| DICKINSON | 26 | 543 | \$2,699 | 3.05 | 2.24 |
| DICKINSON | 52 | 543 | \$2,560 | 3.76 | 2.76 |
| DOYON | 1 | 390 | \$2,334 | 2.2 | 1.61 |
| DOYON | 26 | 390 | \$2,104 | 3.11 | 2.28 |
| DOYON | 52 | 390 | \$1,965 | 3.84 | 2.81 |
| EDINBURG | 1 | 387 | \$2,268 | 2.06 | 1.51 |
| EDINBURG | 26 | 387 | \$2,038 | 2.85 | 2.09 |
| EDINBURG | 52 | 387 | \$1,900 | 3.66 | 2.68 |
| ELDRIDGE | 1 | 342 | \$2,274 | 2.29 | 1.68 |
| ELDRIDGE | 26 | 342 | \$2,044 | 3.37 | 2.47 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| ELDRIDGE | 52 | 342 | \$1,905 | 4.16 | 3.05 |
| EPPING | 1 | 575 | \$3,612 | 2.58 | 1.89 |
| EPPING | 26 | 575 | \$3,382 | 3.35 | 2.45 |
| EPPING | 52 | 575 | \$3,243 | 4.41 | 3.23 |
| FARGO | 1 | 244 | \$1,846 | 2.16 | 1.58 |
| FARGO | 26 | 244 | \$1,616 | 3.46 | 2.54 |
| FARGO | 52 | 244 | \$1,477 | 4.23 | 3.1 |
| GARDNER | 1 | 265 | \$1,915 | 2.13 | 1.56 |
| GARDNER | 26 | 265 | \$1,685 | 3.28 | 2.41 |
| GARDNER | 52 | 265 | \$1,546 | 4.1 | 3.01 |
| GLADSTONE | 1 | 531 | \$2,939 | 2.22 | 1.63 |
| GLADSTONE | 26 | 531 | \$2,709 | 2.89 | 2.12 |
| GLADSTONE | 52 | 531 | \$2,570 | 3.76 | 2.75 |
| GLEN ULLIN | 1 | 490 | \$2,796 | 2.26 | 1.66 |
| GLEN ULLIN | 26 | 490 | \$2,566 | 3.03 | 2.22 |
| GLEN ULLIN | 52 | 490 | \$2,427 | 3.85 | 2.82 |
| GLENFIELD | 1 | 337 | \$3,494 | 3.3 | 2.42 |
| GLENFIELD | 26 | 337 | \$3,264 | 4.86 | 3.57 |
| GLENFIELD | 52 | 337 | \$3,124 | 6.64 | 4.87 |
| GRACE CITY | 1 | 350 | \$2,481 | 2.28 | 1.67 |
| GRACE CITY | 26 | 350 | \$2,251 | 3.22 | 2.36 |
| GRACE CITY | 52 | 350 | \$2,112 | 4.33 | 3.18 |
| GRAND FORKS | 1 | 323 | \$1,937 | 2.01 | 1.48 |
| GRAND FORKS | 26 | 323 | \$1,707 | 2.97 | 2.18 |
| GRAND FORKS | 52 | 323 | \$1,568 | 3.6 | 2.64 |
| HAMBERG | 1 | 387 | \$2,814 | 2.41 | 1.77 |
| HAMBERG | 26 | 387 | \$2,584 | 3.31 | 2.43 |
| HAMBERG | 52 | 387 | \$2,445 | 4.57 | 3.35 |
| HAMLET | 1 | 573 | \$3,678 | 2.64 | 1.94 |
| HAMLET | 26 | 573 | \$3,448 | 3.43 | 2.51 |
| HAMLET | 52 | 573 | \$3,308 | 4.51 | 3.31 |
| HANNAFORD | 1 | 317 | \$2,279 | 2.25 | 1.65 |
| HANNAFORD | 26 | 317 | \$2,049 | 3.27 | 2.39 |
| HANNAFORD | 52 | 317 | \$1,910 | 4.3 | 3.15 |
| HARWOOD | 1 | 253 | \$1,899 | 2.17 | 1.59 |
| HARWOOD | 26 | 253 | \$1,669 | 3.43 | 2.51 |
| HARWOOD | 52 | 253 | \$1,530 | 4.24 | 3.11 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-----------|------|----------------------|--------------|-----------------------------|------------------------------------|
| HEBRON | 1 | 502 | \$2,831 | 2.24 | 1.65 |
| HEBRON | 26 | 502 | \$2,601 | 2.98 | 2.18 |
| HEBRON | 52 | 502 | \$2,462 | 3.81 | 2.79 |
| HENSLER | 1 | 484 | \$2,879 | 2.36 | 1.73 |
| HENSLER | 26 | 484 | \$2,649 | 3.17 | 2.33 |
| HENSLER | 52 | 484 | \$2,510 | 4.03 | 2.95 |
| HETTINGER | 1 | 498 | \$2,848 | 2.18 | 1.6 |
| HETTINGER | 26 | 498 | \$2,618 | 2.85 | 2.09 |
| HETTINGER | 52 | 498 | \$2,479 | 3.79 | 2.78 |
| HILLSBORO | 1 | 363 | \$1,926 | 1.84 | 1.35 |
| HILLSBORO | 26 | 363 | \$1,696 | 2.56 | 1.88 |
| HILLSBORO | 52 | 363 | \$1,557 | 3.19 | 2.34 |
| JAMESTOWN | 1 | 336 | \$2,274 | 2.32 | 1.7 |
| JAMESTOWN | 26 | 336 | \$2,044 | 3.45 | 2.53 |
| JAMESTOWN | 52 | 336 | \$1,905 | 4.23 | 3.1 |
| KELSO | 1 | 369 | \$1,926 | 1.81 | 1.33 |
| KELSO | 26 | 369 | \$1,696 | 2.51 | 1.84 |
| KELSO | 52 | 369 | \$1,557 | 3.14 | 2.3 |
| LAKOTA | 1 | 381 | \$2,280 | 2.18 | 1.6 |
| LAKOTA | 26 | 381 | \$2,050 | 3.12 | 2.29 |
| LAKOTA | 52 | 381 | \$1,911 | 3.82 | 2.8 |
| LARIMORE | 1 | 351 | \$2,140 | 2.09 | 1.53 |
| LARIMORE | 26 | 351 | \$1,910 | 3 | 2.2 |
| LARIMORE | 52 | 351 | \$1,771 | 3.75 | 2.75 |
| LEEDS | 1 | 437 | \$2,562 | 2.2 | 1.61 |
| LEEDS | 26 | 437 | \$2,332 | 2.99 | 2.19 |
| LEEDS | 52 | 437 | \$2,192 | 3.82 | 2.8 |
| LUVERNE | 1 | 304 | \$2,257 | 2.29 | 1.68 |
| LUVERNE | 26 | 304 | \$2,027 | 3.39 | 2.48 |
| LUVERNE | 52 | 304 | \$1,887 | 4.41 | 3.24 |
| MEDINA | 1 | 364 | \$2,340 | 2.25 | 1.65 |
| MEDINA | 26 | 364 | \$2,110 | 3.22 | 2.36 |
| MEDINA | 52 | 364 | \$1,971 | 4.05 | 2.97 |
| MILTON | 1 | 399 | \$2,338 | 2.07 | 1.52 |
| MILTON | 26 | 399 | \$2,108 | 2.84 | 2.08 |
| MILTON | 52 | 399 | \$1,969 | 3.68 | 2.7 |
| MINOT | 1 | 472 | \$3,290 | 2.81 | 2.06 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|--------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| MINOT | 26 | 472 | \$3,060 | 3.9 | 2.86 |
| MINOT | 52 | 472 | \$2,921 | 4.86 | 3.56 |
| MINTO | 1 | 356 | \$2,001 | 1.93 | 1.42 |
| MINTO | 26 | 356 | \$1,771 | 2.74 | 2.01 |
| MINTO | 52 | 356 | \$1,632 | 3.41 | 2.5 |
| NEW ROCKFORD | 1 | 368 | \$2,611 | 2.32 | 1.7 |
| NEW ROCKFORD | 26 | 368 | \$2,381 | 3.22 | 2.36 |
| NEW ROCKFORD | 52 | 368 | \$2,242 | 4.39 | 3.22 |
| NEW SALEM | 1 | 469 | \$2,689 | 2.26 | 1.66 |
| NEW SALEM | 26 | 469 | \$2,459 | 3.07 | 2.25 |
| NEW SALEM | 52 | 469 | \$2,320 | 3.85 | 2.82 |
| NIAGARA | 1 | 404 | \$2,183 | 2 | 1.46 |
| NIAGARA | 26 | 404 | \$1,953 | 2.76 | 2.03 |
| NIAGARA | 52 | 404 | \$1,814 | 3.42 | 2.51 |
| NORTHGATE | 1 | 550 | \$3,472 | 2.59 | 1.9 |
| NORTHGATE | 26 | 550 | \$3,242 | 3.39 | 2.49 |
| NORTHGATE | 52 | 550 | \$3,103 | 4.41 | 3.24 |
| NORWICH | 1 | 481 | \$3,133 | 2.63 | 1.93 |
| NORWICH | 26 | 481 | \$2,903 | 3.61 | 2.65 |
| NORWICH | 52 | 481 | \$2,764 | 4.51 | 3.3 |
| PALERMO | 1 | 518 | \$3,473 | 2.73 | 2 |
| PALERMO | 26 | 518 | \$3,243 | 3.66 | 2.68 |
| PALERMO | 52 | 518 | \$3,104 | 4.69 | 3.44 |
| PEAK | 1 | 296 | \$2,119 | 2.19 | 1.6 |
| PEAK | 26 | 296 | \$1,889 | 3.25 | 2.38 |
| PEAK | 52 | 296 | \$1,749 | 4.19 | 3.07 |
| PETERSBURG | 1 | 398 | \$2,244 | 2.08 | 1.52 |
| PETERSBURG | 26 | 398 | \$2,014 | 2.9 | 2.13 |
| PETERSBURG | 52 | 398 | \$1,875 | 3.59 | 2.63 |
| PILLSBURY | 1 | 297 | \$2,194 | 2.26 | 1.66 |
| PILLSBURY | 26 | 297 | \$1,963 | 3.36 | 2.47 |
| PILLSBURY | 52 | 297 | \$1,824 | 4.36 | 3.2 |
| POWERS LAKE | 1 | 552 | \$3,558 | 2.64 | 1.94 |
| POWERS LAKE | 26 | 552 | \$3,328 | 3.47 | 2.54 |
| POWERS LAKE | 52 | 552 | \$3,189 | 4.52 | 3.31 |
| PROSPER | 1 | 256 | \$1,980 | 2.25 | 1.65 |
| PROSPER | 26 | 256 | \$1,749 | 3.54 | 2.6 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| PROSPER | 52 | 256 | \$1,610 | 4.41 | 3.23 |
| RAY | 1 | 565 | \$3,588 | 2.61 | 1.91 |
| RAY | 26 | 565 | \$3,358 | 3.4 | 2.49 |
| RAY | 52 | 565 | \$3,219 | 4.46 | 3.27 |
| REEDER | 1 | 516 | \$2,892 | 2.15 | 1.58 |
| REEDER | 26 | 516 | \$2,662 | 2.78 | 2.04 |
| REEDER | 52 | 516 | \$2,523 | 3.73 | 2.73 |
| REYNOLDS | 1 | 344 | \$1,926 | 1.91 | 1.4 |
| REYNOLDS | 26 | 344 | \$1,696 | 2.73 | 2 |
| REYNOLDS | 52 | 344 | \$1,557 | 3.36 | 2.46 |
| RHAME | 1 | 552 | \$3,020 | 2.12 | 1.56 |
| RICHARDTON | 1 | 517 | \$2,888 | 2.23 | 1.64 |
| RICHARDTON | 26 | 517 | \$2,658 | 2.93 | 2.15 |
| RICHARDTON | 52 | 517 | \$2,519 | 3.78 | 2.77 |
| ROSS | 1 | 533 | \$3,511 | 2.69 | 1.97 |
| ROSS | 26 | 533 | \$3,281 | 3.57 | 2.62 |
| ROSS | 52 | 533 | \$3,142 | 4.61 | 3.38 |
| RUGBY | 1 | 527 | \$2,668 | 2.06 | 1.51 |
| RUGBY | 26 | 527 | \$2,437 | 2.69 | 1.97 |
| RUGBY | 52 | 527 | \$2,298 | 3.41 | 2.5 |
| SCRANTON | 1 | 527 | \$2,934 | 2.14 | 1.57 |
| SCRANTON | 26 | 527 | \$2,704 | 2.76 | 2.02 |
| SCRANTON | 52 | 527 | \$2,565 | 3.71 | 2.72 |
| SELZ | 1 | 406 | \$2,884 | 2.38 | 1.75 |
| SELZ | 26 | 406 | \$2,654 | 3.23 | 2.37 |
| SELZ | 52 | 406 | \$2,515 | 4.49 | 3.29 |
| SPIRITWOOD | 1 | 325 | \$2,246 | 2.18 | 1.6 |
| SPIRITWOOD | 26 | 325 | \$2,016 | 3.13 | 2.29 |
| SPIRITWOOD | 52 | 325 | \$1,877 | 4.13 | 3.03 |
| STANLEY | 1 | 526 | \$3,492 | 2.71 | 1.98 |
| STANLEY | 26 | 526 | \$3,262 | 3.61 | 2.65 |
| STANLEY | 52 | 526 | \$3,123 | 4.65 | 3.41 |
| STEELE | 1 | 392 | \$2,450 | 2.22 | 1.63 |
| STEELE | 26 | 392 | \$2,220 | 3.1 | 2.27 |
| STEELE | 52 | 392 | \$2,081 | 3.98 | 2.91 |
| STERLING | 1 | 411 | \$2,507 | 2.19 | 1.61 |
| STERLING | 26 | 411 | \$2,277 | 3.01 | 2.2 |

Table 8
Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis
by Station and Service Level

| Station | Cars | Loaded Trip Distance | Rate Per Car | Revenue-Variable Cost Ratio | Revenue-Fully Allocated Cost Ratio |
|-------------|------|----------------------|--------------|-----------------------------|------------------------------------|
| STERLING | 52 | 411 | \$2,138 | 3.9 | 2.86 |
| SUTTON | 1 | 330 | \$2,370 | 2.27 | 1.67 |
| SUTTON | 26 | 330 | \$2,140 | 3.26 | 2.39 |
| SUTTON | 52 | 330 | \$2,001 | 4.34 | 3.18 |
| TAPPEN | 1 | 379 | \$2,410 | 2.24 | 1.64 |
| TAPPEN | 26 | 379 | \$2,180 | 3.17 | 2.33 |
| TAPPEN | 52 | 379 | \$2,040 | 4.03 | 2.95 |
| THOMPSON | 1 | 337 | \$1,937 | 1.95 | 1.43 |
| THOMPSON | 26 | 337 | \$1,707 | 2.82 | 2.07 |
| THOMPSON | 52 | 337 | \$1,568 | 3.45 | 2.53 |
| VALLEY CITY | 1 | 301 | \$2,124 | 2.17 | 1.59 |
| VALLEY CITY | 26 | 301 | \$1,894 | 3.2 | 2.34 |
| VALLEY CITY | 52 | 301 | \$1,755 | 4.14 | 3.04 |
| WAHPETON | 1 | 286 | \$1,745 | 1.84 | 1.35 |
| WAHPETON | 26 | 286 | \$1,515 | 2.71 | 1.99 |
| WAHPETON | 52 | 286 | \$1,376 | 3.41 | 2.5 |
| WEST FARGO | 1 | 248 | \$1,846 | 2.14 | 1.57 |
| WEST FARGO | 26 | 248 | \$1,616 | 3.39 | 2.49 |
| WEST FARGO | 52 | 248 | \$1,477 | 4.17 | 3.05 |
| WHEATLAND | 1 | 269 | \$2,028 | 2.23 | 1.64 |
| WHEATLAND | 26 | 269 | \$1,798 | 3.44 | 2.52 |
| WHEATLAND | 52 | 269 | \$1,659 | 4.34 | 3.18 |
| WILLISTON | 1 | 592 | \$3,655 | 2.73 | 2 |
| WILLISTON | 26 | 592 | \$3,425 | 3.59 | 2.63 |
| WILLISTON | 52 | 592 | \$3,286 | 4.47 | 3.28 |
| WILLOW CITY | 1 | 548 | \$2,775 | 2.07 | 1.52 |
| WILLOW CITY | 26 | 548 | \$2,544 | 2.67 | 1.96 |
| WILLOW CITY | 52 | 548 | \$2,405 | 3.43 | 2.52 |
| WINDSOR | 1 | 351 | \$2,303 | 2.27 | 1.67 |
| WINDSOR | 26 | 351 | \$2,073 | 3.31 | 2.43 |
| WINDSOR | 52 | 351 | \$1,933 | 4.11 | 3.01 |
| YORK | 1 | 548 | \$2,592 | 1.94 | 1.42 |
| YORK | 26 | 548 | \$2,361 | 2.48 | 1.82 |
| YORK | 52 | 548 | \$2,222 | 3.17 | 2.33 |
| ZAHL | 1 | 602 | \$3,687 | 2.53 | 1.86 |
| ZAHL | 26 | 602 | \$3,457 | 3.23 | 2.37 |
| ZAHL | 52 | 602 | \$3,318 | 4.31 | 3.16 |

CAVEATS REGARDING REVENUE-COST ESTIMATES

The shipment costs reflected in Tables 4-9 are based on limited public information. Logical train operating assumptions have been drawn from traffic and network data. A strong effort has been made to account for inefficiencies in origin train movements as a result of way train operations over North Dakota's extensive branch-line network. However, several caveats should be considered when evaluating the results of the analysis.

1. Car ownership costs assume efficient car-day cycles based on typical time requirements for activities such as loading, unloading, switching, and running. In general, these car-day estimates reflect average uncongested conditions. Dwell times for cars in specific yards (such as Northtown and Pasco) may exceed the URCS average. Each covered hopper car day adds \$13.23 to the estimated shipment cost.
2. The number of intertrain or intratrain switches required for a non-unit train shipment may vary for individual movements. Each intratrain or intertrain switch adds approximately \$23 to the variable shipment cost.¹⁸
3. Shipments from North Dakota to the PNW may be destined for locations other than Portland. The variable costs of movements to Kalama, Longview, Tacoma, or Seattle will be different from the estimated costs to Portland, although the rate is the same for these destinations. Generally, distances from North Dakota stations to Seattle and Tacoma are shorter than distances from North Dakota stations to Portland.¹⁹ In

¹⁸This unit cost includes both car ownership and locomotive switching expenses.

¹⁹These distance comparisons are based on the shortest BNSF routes.

comparison, distances from North Dakota stations to Kalama and Longview are farther than distances from North Dakota stations to Portland.

4. Variable and fully allocated costs for branch-line stations do not reflect normal track maintenance costs or reinvestment needs. The URCS gross ton-mile cost assigns system average track maintenance expenses to each movement based on the weight of the car and its contents. The BNSF does not realize significant economies of density on branch lines with light traffic densities – e.g., less than 1 million gross ton-miles per mile. Most of the maintenance and reinvestment needs on these lines are incurred for a minimal level of traffic. For these reasons, the revenue-cost ratios for branch-line stations may present an inflated picture of profitability. A railroad must recover its long-run track maintenance costs in order to justify reinvestment in branch lines. Theoretically, it is possible to compute a high revenue-variable cost ratio for a shipper located on a marginally profitable or unprofitable branch line. This anomaly should be considered when evaluating the revenue-cost ratios and descriptions of profits presented in this statement.
5. Revenue-cost ratios are computed for all stations listed in the BNSF public tariff. The fact that a station is listed in the tariff does not necessarily mean that wheat shipments to Portland or Minneapolis originated from that station. The summary revenue-cost statistics presented in Tables 3 and 6 are unweighted averages for all stations listed in BNSF's tariffs. Because of time lags in the collection of monthly grain movement data from elevators, it is not possible to compute current weighted-average RVC ratios. If the RVC ratios are weighted by actual shipments made during March 2002, or any subsequent month, these weighted values may differ from the simple means shown in

Tables 3 and 6. However, the waybill revenue-cost ratios shown in Tables 1 and 2 are weighted by the shipments that occurred in 2000. The revenue-cost ratios derived from the waybill sample are quite similar to the ones computed using current BNSF rates and specific operational parameters. For example, Table 2 shows that the weighted-average RVC ratios computed from the waybill sample are 2.38, 3.00, and 4.16 for wheat movements to Minneapolis in 1-car, 26-car, and 52-car consignments. The comparable RVC ratios computed from current rates are 2.26, 3.15, and 4.04, respectively (Table 6).

6. The current BNSF tariff may reflect rate anomalies as a result of balancing rates between eastern and western markets. Thus, unusual revenue-cost ratios may exist for individual stations such as Glenfield. Moreover, the current rate structure is a “snapshot in time.” The results of this study are best interpreted by considering both the current and historical waybill revenue-cost ratios.

PLACING REVENUE-TO-VARIABLE COST RATIOS IN THE CONTEXT OF RATE REASONABLENESS

In order to understand the meaning of the revenue-to-variable cost ratios presented in the previous sections, it is useful to examine simplified rate reasonableness guidelines used by the Surface Transportation Board.²⁰ These guidelines provide insight into equity considerations and revenue adequacy considerations that should be taken into account when making an assessment of the magnitude of a particular rail rate.

²⁰Ex Parte 347(Sub-No. 2), “Rate Guidelines–Non-Coal Proceedings,” decided December 27, 1996.

Although a revenue-to-variable cost ratio of 180 percent is often used as a baseline for comparison, rail rates above the 180 percent of variable costs are not necessarily unreasonable. The 180 percent of variable cost figure comes from a Congressional determination that rates exceeding this level can be examined for market dominance. That is, if a rail rate exceeds 180 percent of variable costs, then the shipper can try to establish market dominance by examining the extent of intramodal and intermodal competition. If a rate above 180 percent is shown, and it is shown that intramodal and intermodal competition do not serve to effectively discipline rates, then market dominance is established. Subsequently, the Surface Transportation Board examines other measures in making an assessment of whether or not rates are reasonable.

In its simplified rail rate guidelines, the Surface Transportation Board uses three measures to establish the reasonableness of a rail rate. These measures consider the equity of similarly situated shippers, the revenue adequacy needs of the railroad, and the reasonableness of the carrier's revenue requirements borne by a shipper or group of shippers. The three measures include: the revenue shortfall allocation method (RSAM), the average revenue-to-variable cost percentage for all shipments with revenue-to-variable cost percentages above 180 ($RVC_{>180}$), and the average revenue-to-variable cost ratio on comparable shipments (RVC_{COMP}). The following paragraphs will describe the rationale for each of these measures, show the magnitude of each of these for the BNSF, and compare the revenue-to-variable cost ratios previously shown to the BNSF measures.

As recognized by the Surface Transportation Board, none of these measures can be used alone to make an assessment of whether a rate is reasonable, but in combination they provide a good baseline for examining the level of various rates. RSAM measures the uniform markup

above variable cost that would be needed from every shipper of potentially captive traffic (traffic with revenue-to-variable cost ratios above 180 percent) in order for the carrier to recover all of its costs.²¹ The RSAM recognizes the need for differential pricing by the railroad, and the railroad's need for revenue adequacy.

$RVC_{>180}$ measures the average markup for all of the railroad's traffic that moves at rates exceeding variable costs by 180 percent or more. The idea behind the $RVC_{>180}$ measure is that a particular shipper should not be bearing an unreasonable share of the carrier's revenue requirements relative to other potentially captive traffic. Moreover, an interesting comparison between the $RVC_{>180}$ and the RSAM can be made. An $RVC_{>180}$ that exceeds the RSAM suggests that the railroad is meeting its revenue adequacy requirements. Such a finding may be further justification for a rate reduction.

RVC_{COMP} measures the average markup on traffic of similar commodities moving under similar transportation conditions. It is designed to serve as a comparison with traffic that has a similar elasticity of demand. The idea is that a shipper should not be penalized for being on a railroad that has higher revenue needs from its potentially captive traffic. Because of the short time frame for performing this analysis, we are not able to provide revenue-to-variable cost ratios for comparable traffic in this statement.

Table 9 shows the RSAM and the $RVC_{>180}$ for the BNSF in the most recent four years calculated by the STB. In the RSAM column, there are two numbers listed. The difference between the two columns is an efficiency adjustment. The first column, which includes an

²¹The three measure definitions are those specified by the Surface Transportation Board in Ex Parte 347 (Sub-No. 2).

efficiency adjustment, eliminates all movements that have revenues of less than URCS variable costs in calculating the revenue shortfall that must be paid by captive shippers. The rationale for this adjustment is that captive shippers should not be forced to cross-subsidize shipments that are not earning their attributable costs. The second column does not include any such adjustment. The size of the adjustment that should be used is an empirical question. The American Association of Railroads (AAR) argues that the adjustment is too large, with URCS variable costs reflecting some unattributable costs, while many shippers argue that the full adjustment serves as a proxy for railroad inefficiencies. The STB suggests that a number between the adjusted and the unadjusted is appropriate, since there are assets in the railroad industry that would not warrant replacement when they become unusable.

| Table 9: BNSF RSAM and for the 4 Years Most Recently Computed by the STB | | |
|---|-------------|------------------------------|
| Year | RSAM | RVC_{>180} |
| 1996 | 231-309 | 262 |
| 1997 | 243-324 | 262 |
| 1998 | 188-258 | 266 |
| 1999 | 185-248 | 263 |
| 1996-1999 Average | 212-285 | 263 |

As Table 9 shows, the RSAM is below average revenue-to-variable cost ratios for North Dakota wheat to many markets, whether an efficiency adjustment is made or not. Moreover, the number of revenue-to-variable cost ratios that exceed the RSAM increases when such an efficiency adjustment is made. Similarly, many North Dakota wheat shipments show revenue-to-variable cost ratios that exceed the average charged by BNSF to potentially captive shippers.

Finally, a comparison between the RSAM and the average revenue-to-variable cost ratio charged to potentially captive shippers by the BNSF shows that in the most recent year, the average revenue-to-variable cost ratio charged to potentially captive shippers exceeds the RSAM with or without the efficiency adjustment. This suggests that BNSF is charging an average rate to its captive shippers that exceeds the average rate necessary for the railroad to cover all of its costs, including a return on investment. This may suggest that the BNSF's rates to some North Dakota shippers exceed reasonable limits.

SUMMARY AND CONCLUSION

In summary, the waybill analysis of revenue-to-variable cost ratios and the analysis of current revenue-to-variable cost ratios for BNSF wheat movements to Portland and Minneapolis paint a similar picture. Both analyses suggest that North Dakota wheat shipments to Portland and Minneapolis are highly profitable for the BNSF. For all service levels in either analysis, the average revenue-to-variable cost ratio to either market is at or above 1.85. Moreover, for all service levels of 26 cars or more to either market, the average revenue-to-variable cost ratios exceed 2.43. For all service levels of 52 cars or more to either market, the average revenue-to-variable cost ratios exceed 2.7.

Revenue-to-variable cost ratios at this level appear high when one considers them in the context of the STB's simplified rate reasonableness guidelines. In 1999, the RSAM – which shows the average markup above variable cost that would be needed from every shipper of potentially captive traffic in order for the carrier to recover all of its costs – for the BNSF was between 1.85 and 2.48. Thus, North Dakota wheat shippers are paying more than one might expect, given the revenue adequacy needs of the BNSF. Moreover, the average rate paid by potentially captive shippers on the BNSF system was 263 percent of variable costs in 1999. The fact that this is higher than the RSAM for the BNSF in the same year suggests that the BNSF is charging a rate to its potentially captive shippers on average that is higher than the rate necessary to achieve revenue adequacy. However, high revenue-cost ratios must be considered within the context of railroad productivity and efficiency gains.

Railroads have become much more productive since deregulation in 1980. Studies by the STB have shown that railroad rates for grain transportation have declined in real terms, while

railroad productivity has grown at one of the highest rates of any industry in the United States. The STB's 2000 rate study shows that revenue per ton for Farm Products shipments in the Western United States dropped by more than 28 percent in constant dollars between 1984-1999, despite an increase in average haul of 17 percent.²² Specific rate trends could not be developed for North Dakota shipments in time for this statement. However, it is likely that North Dakota wheat rates have also declined in real terms since 1980.

As the cost estimates show, 110-car trains offer a new level of efficiency in long-distance grain transportation. North Dakota elevators that can load 110-car trains within 24 hours will pay much lower freight bills in the future. Moreover, with expedited loading and unloading, and no intermediate yard switching, BNSF can move wheat from eastern North Dakota to the PNW in 4 days. An 8-day car cycle benefits the railroad, shippers, and private car owners. Service and efficiency benefits such as these are important considerations in an evaluation of railroad rates and service levels. Finally, the caveats noted earlier regarding the use of system-average costs should be considered, especially in interpreting the profitability of shipments originated from branch-line stations.

²²Email communication from William Gelston of Federal Railroad Administration.

TECHNICAL SUPPLEMENT

This section of the report presents a technical description of the Davis Formula and illustrates the calculation of a locomotive adjustment factor for grain trains. The Davis Formula is one method of measuring train and grade resistance and computing locomotive tonnage ratings.

Train resistance is measured in pounds per ton. It reflects many forces such as: (1) rolling resistance, (2) flange resistance, (3) journal (axle) resistance, (4) track resistance, (5) air resistance, and (6) curve resistance. The Davis Formula is an empirically derived equation of the form:

$$R = 1.3 + \frac{29}{w} + bv + \frac{cav^2}{wn}$$

where:

R = train resistance in lb/ton

w = axle weight of a locomotive or car (in tons)

n = number of axles

a = cross-sectional area of a locomotive or car (in square-feet)

b = coefficient that defines speed-dependent resistance

c = streamlining coefficient used to define resistance that varies with the square of speed

v = train speed in mph

The Davis Formula is often adjusted to reflect modern axle types and car dimensions.

The results obtained from applying the original formula can be multiplied by a K-factor of .85 to better represent modern equipment and operating characteristics.

Table 10 illustrates the calculation of the train resistance factor for a loaded covered hopper car at a velocity of 20 mph. Table 11 shows the calculation of the train resistance factor for an empty covered hopper car at the same speed, while Table 12 shows the calculation of

locomotive resistance. These resistance factors are used in Table 13 to estimate the tonnage ratings of 4,400-hp and 3,000-hp locomotives in unit train and grain train service, respectively, on a moderate .5 percent grade. The most important aspect of this calculation is the ratio of the number of 3,000-hp units required for a grain train versus the number of 4,400-hp units required for a unit train. This ratio of 1.28 is applied to the system average BNSF unit-train power requirement of 2.784 locomotives to derive the number of units needed for a 100-car grain train (3.55).

| Table 10. Calculation of Train Resistance for Loaded 286,000-pound Covered Hopper Car | |
|--|--------------|
| Factor | Value |
| Gross car weight | 143 |
| <i>w</i> | 35.75 |
| <i>n</i> | 4 |
| <i>v</i> | 20 |
| <i>v</i> ² | 400 |
| <i>a</i> | 125 |
| <i>b</i> | 0.045 |
| <i>c</i> | 0.0005 |
| <i>cav</i> ² | 25 |
| <i>wn</i> | 143 |
| Unadjusted result | 3.19 |
| K-factor | 0.85 |
| Adjusted result | 2.71 |

Table 11. Calculation of Train Resistance for Empty Covered Hopper Car

| Factor | Value |
|-------------------------|--------------|
| Gross car weight | 32 |
| <i>w</i> | 8 |
| <i>n</i> | 4 |
| <i>v</i> | 20 |
| <i>v</i> ² | 400 |
| <i>a</i> | 125 |
| <i>b</i> | 0.045 |
| <i>c</i> | 0.0005 |
| <i>cav</i> ² | 25 |
| <i>wn</i> | 32 |
| Unadjusted result | 6.61 |
| K-factor | 0.85 |
| Adjusted result | 5.62 |

| Table 12. Calculation of Train Resistance for 195-Ton 6-Axle Locomotive | |
|--|--------------|
| Factor | Value |
| Gross weight | 195 |
| w | 32.5 |
| n | 6 |
| v | 20 |
| v ² | 400 |
| a | 120 |
| b | 0.03 |
| c | 0.0017 |
| cav ² | 81.6 |
| wn | 195 |
| Unadjusted result | 3.21 |

Table 13. Calculation of Power Requirements for a 110-Car Unit Train and a 100-Car Grain Train on Moderate Grades

| Factor | Unit Train | Grain Train |
|------------------------------|-------------------|--------------------|
| Normal Car Resistance / Ton | 2.71 | 2.74 |
| Percent Grade | 0.5 | 0.5 |
| Car Grade Resistance / Ton | 10 | 10 |
| Total Car Resistance per Ton | 12.71 | 12.74 |
| Locomotive Resistance / Ton | 3.21 | 3.21 |
| Locomotive Weight | 195 | 195 |
| Locomotive Resistance | 626.1 | 626.1 |
| Locomotive Grade Resistance | 1,950 | 1,950 |
| Total Locomotive Resistance | 2,576 | 2,576 |
| Locomotive Horsepower | 4,400 | 3,000 |
| Minimum Grade Speed | 20 | 20 |
| Tractive Effort | 67,760 | 46,200 |
| Locomotive Drawbar Force | 65,184 | 43,624 |
| Tonnage Rating per Unit | 5,129 | 3,423 |
| Tons in Train | 15730 | 13450 |
| Power Units per Train | 3.07 | 3.93 |

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