UNITED STATES SENATE

Committee on Commerce, Science and Transportation

Hearing on Rail Freight Transportation in North Dakota

Senator Byron Dorgan, Presiding

March 27, 2002
Bismarck, North Dakota

Testimony of Gene C. Griffin
Upper Great Plains Transportation Institute
North Dakota State University

TABLE OF CONTENTS

110-CAR SHUTTLE TRAIN PROGRAM 2

IMPLEMENTATION OF THE 110-CAR SHUTTLE TRAIN PROGRAM 3

INVERSE RATE ON WHEAT TO THE PACIFIC NORTHWEST (PNW) 4

RAIL REVENUE/COST RATIOS 6

ROAD IMPACTS 13

ADEQUACY OF RAIL REGULATION 14

LIST OF TABLES

Table 1. Average Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland by Service Level 10

Table 2. Average Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis by Service Level 11

Table 3. Illustration of the Relative Efficiencies of 110-Car Components 12

UNITED STATES SENATE

Committee on Commerce, Science and Transportation

Hearing on Rail Freight Transportation in North Dakota

Senator Byron Dorgan, Presiding

March 27, 2002
Bismarck, North Dakota

Abbreviated Remarks

Good afternoon. For the record my name is Gene Griffin, Director of the Upper Great Plains Transportation Institute, North Dakota State University. A number of Institute Research Fellows were collectively responsible for developing the testimony forwarded to the Committee: Denver Tolliver, Senior Research Fellow; John Bitzan, Advanced Research Fellow; and Mark Berwick, Associate Research Fellow.

I would like to preface my statement by pointing out that the United States production agriculture industry is critically dependent on an efficient and effective transportation and distribution logistical system. Recent research suggests that it is the distribution system which makes the U.S. grain producing industry competitive in the global economy. It is also important to recognize that some of those efficiencies must be passed on through the supply chain to have an impact on the delivered price of grain and processed commodities. Regardless of exactly how the distribution of efficiency gains eventually takes place, it should be emphasized that an efficient, reliable, and equitable transportation system is critical to the viability of agriculture in the United States, one of the major industrial sectors of the U.S. economy.

There appears to be three fundamental issues that are causing a great deal of consternation among grain producers and shippers, as well as those public sector entities responsible for transportation. They are: (1) the 110-car shuttle train program being developed by the BNSF; (2) the manner in which this program is being implemented; and (3) the so-called inverse rate structure. There is a great deal of anecdotal evidence regarding all three of these issues as well as much second-hand information. There is little hard reliable data to evaluate these from a research perspective, thus my remarks will be largely conceptual in nature and somewhat speculative. However, I will present more conclusive findings on rail cost and rate relationships as well as an estimate of the road impacts that could result from the 110-car system. Finally, I will conclude with a general statement about my perceptions of the adequacy of the regulatory system as it applies to rail pricing and service.

110-CAR SHUTTLE TRAIN PROGRAM

The 110-car shuttle train program introduces a new level of efficiency for the BNSF in transporting wheat to export and domestic markets. This is a trend that began over a hundred years ago and was introduced into North Dakota grain marketing around 1980. The traditional effects of increased concentration in the country elevator industry and increased truck traffic into select locations is predictable. Presumably, it has a positive impact on farm prices as well. The impacts of increased rail shipment size are not significantly different from the effects of other changes such as in farm production technology, larger farm equipment, truck technology, and highway quality and capacity.

As in all change, there are winners and losers resulting from the transformation taking place in the rail grain system. It is intuitive how each will react to such changes. However, there are fundamental

questions that need to be addressed. Does the states' grain producing sector need continued advances in the grain handling and transportation system to remain economically viable in a highly competitive global market system? Are cost efficiencies gained by railroads reflected, to some degree, in rail rates? What are the impacts on traffic patterns of both local and long haul trucking and what are the corresponding impacts on the local, state, and federal road and highway system? Although this is not a complete set of questions of all the important issues, a final question is the method of implementation of these systems. Do they provide an equal opportunity for all shippers to compete for fewer viable number of country grain stations. This seems to be an issue with the implementation of the 110-car shuttle train program.

IMPLEMENTATION OF THE 110-CAR SHUTTLE TRAIN PROGRAM

There is no documentable evidence or data available to address this issue because of the private and proprietary nature of contracts, thus it is speculative in nature. However, there are allegations that special contract rate agreements have been developed with certain shippers giving them an advantage over others in developing a 110-car facility. These contracts most likely take the form of rebates on shipments of grain conforming to certain loading, unloading, origin, and consignment size standards.

The issue seems to be that this method of promoting the movement of a 110-car system has not been widely available to all or even a majority of shippers. This would appear to conflict with basic human nature, although it may be warranted from a business perspective. Recent experimental economic research indicates that as human beings, we have an inherent bias towards fairness within

groups.[1] However, it should be noted that it would be unreasonable to expect that a large number of the existing country elevators would be able to participate in this program without an extensive amount of excess storage and throughput capacity being developed. Excess capacity that would be paid for, in the most part, by producers, especially if the facilities are dominated by farmer-owned cooperative facilities. It does seem that there might have been a mechanism to limit the development of such facilities consistent with the demand, while still being seemingly fairer in the eyes of country grain elevator interests.

The most controversial of the three issues mentioned in the beginning of this statement appears to be the so-called inverse rate.

INVERSE RATE ON WHEAT TO THE PACIFIC NORTHWEST (PNW)

There is hearsay that BNSF has instituted contract rates for wheat originating at shuttle facilities to the Pacific Northwest market that are inversely proportional to distance. In other words, they charge a lower rate for a longer haul. Thus, rates to the PNW from western North Dakota are higher than similar rates from eastern North Dakota. Since these are contract rates they are proprietary in nature and are not published. However, if they do exist, it intuitively seems to be unfair. That does not mean there is not a sound business reason for the implementation.

It should be pointed out that this is not the first instance in which there has been inverse rates to the PNW. Railroads published inverse rates on wheat to the PNW from North Dakota in the 1960's and 70's in an effort to promote wheat sales to the Pacific Rim countries off the PNW. This program,

---

[1]Karl Sigmund, Ernst Fehr, and Martin Nowak, The Economics of Fair Play, Scientific American, January, 2002.

although successful, was eliminated and replaced with distance-based rates sometime in the 1980's, due in part to criticism from producers.

A major issue with such rates is if they displace wheat from more traditional market territory in western North Dakota? If it does, such rates may be in violation of regulations governing rail rates. Also, the question of its effect on farm prices is another issue, albeit, a difficult one to answer.

Another question is the impact on filling traditional markets with wheat of different characteristics from different producing areas of the region. The markets in Asia are extremely conscious of specific milling and baking characteristics and have come to depend on quality and end-use performance traits associated with the hard red spring wheats produced in the drier, less disease-prone areas of western North Dakota and eastern Montana. However, under the current inverse rate structure, spring wheats produced in the eastern part of the region are now more likely to move to PNW terminals for eventual shipment to Asian destinations, rather than traditional domestic or gulf export positions.

These wheats, which under normal conditions are not tributary to PNW markets, are typically lower in protein content and often have lower gluten strength. Challenges in functionality and performance are also more likely to arise due to negative impacts resulting from disease pressures more often associated with eastern production areas.[2]

---

[2]Personal Communications, Neal Fisher, Administrator, North Dakota State Wheat Commission, Bismarck, ND, March 21, 2002.

Increased incidence of processor concerns has been noted by US Wheat Associates personnel in regional offices in Asia and is thought to be related to the inverse rate structure. This could harm the overall market development efforts that have been so successful over the past four decades.

As stated earlier, much of what has been addressed is speculative and conceptual in nature. There are two issues that can be addressed in a more definitive and researchable manner, rail revenue/cost ratios and the impact on roads.

RAIL REVENUE/COST RATIOS

Two types of analysis were performed to make an assessment of the reasonableness of rail rates to North Dakota wheat shippers: (1) an analysis of BNSF revenue-to-variable cost ratios for wheat originating in North Dakota from the 2000 annual railroad waybill sample, and (2) an analysis of BNSF revenue-to-variable cost ratios for wheat originating in North Dakota and terminating in Minneapolis or Portland using the current rate structure and an operationally specific costing methodology.

The 2000 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.

While all of these revenue-to-variable cost ratios seem high, one must put them in the context of rate reasonableness guidelines to determine if they are unreasonably high. 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.

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}).

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. 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 the analysis, revenue-to-variable cost ratios for comparable traffic were not developed.

STB estimates of the RSAM for BNSF indicate that it is below the average revenue-to-variable cost ratios for North Dakota wheat to many markets. 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 would seem to indicate that the BNSF's rates to many North Dakota shippers may exceed reasonable limits.

While rates on the BNSF for North Dakota wheat shipments appear to be high relative to costs, it is important to note that the overall rate levels associated with larger shipment sizes are lower for North Dakota shippers. Thus, these larger service level options provide a benefit to North Dakota shippers.

The waybill analysis further provides a comprehensive picture of revenue-cost ratios for North Dakota shipments to major markets. This section focuses on current rates to Portland. It also includes an analysis of shuttle trains and 110-car co-loading service levels. Shipment costs are computed using the 2000 Uniform Railroad Costing System (URCS) and BNSF cost factors. 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. 1-car

2. 26-car

3. 52-car

4. 110-car multiple-origin (55 cars per station)

5. 110-car single-origin train

Only a few stations in North Dakota currently originate 110-car shipments. However, rates 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 1 are not weighted by shipment volumes - i.e., they represent simple averages or means.

TABLE 1. Average Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Portland by Service Level

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 1 reflect 84 individual stations. These stations are a subset of the 92 stations listed in the latest revision of Item 43538.

The revenue-cost ratios for wheat from selected origins to Minneapolis are shown in Table 2. 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.

TABLE 2. Average Revenue-Cost Ratios for BNSF Wheat Shipments from North Dakota to Minneapolis by Service Level

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

An important economic question is: What are the relative efficiency gains of 110-car unit train movements to the Pacific Northwest? DP-144 presents detailed comparisons for 84 stations in North Dakota. One of these stations, Hillsboro, is used to illustrate the magnitude of the potential efficiency gains.

Hillsboro is located 40 miles south of Grand Forks and 1,553 miles from Portland. An existing shuttle-train facility is located in the vicinity of Hillsboro. In the BNSF tariff, single-car, 26-car, 52-car, and 110-car rates are published for Hillsboro. In addition, a 110-car co-loading rate is published for Hillsboro. Table 3 shows the estimated variable cost for shipping wheat from Hillsboro to Portland in 286,000-pound rail cars. The costing methods and data used in these calculations are documented in DP-144.

As Table 3 shows, the estimated variable cost for the 110-car single-origin shipment is 47 percent lower than the estimated variable cost of a single-car shipment from the same origin. Moreover, the estimated 110-car cost is 25 percent lower than the estimated variable cost of a 26-car shipment. Although an individual 52-car shipment is often referred to as a "unit train," it does not offer the same efficiencies as a 110-car train. Typically, a 52-car shipment must be matched with one of similar size or with several smaller multi-car blocks before a large grain train can be assembled. On average, the single origin 110-car shipment results in a 15 percent savings in comparison to the 52-car shipment.

TABLE 3. Illustration of the Relative Efficiencies of 110-Car Consignments

Service Level	**Variable Cost per Car**
1-Car	$2,732
26-Car	$1,974
52-Car	$1,710
110-Car Two-Origin	$1,498
110-Car Single-Origin	$1,454

This comparison probably understates the efficiency gains from shuttle trains because there are certain operational and car utilization effects that cannot be captured with a costing formula. Nevertheless, the illustration suggests that 110-car trains offer the potential for large efficiency gains, greatly reducing the cost of long-distance movements to the Pacific Northwest.

ROAD IMPACTS

One reason the 110-car shuttle program and the so-called inverse rate structure mentioned previously are controversial is because of the potential road impacts resulting from each. The UGPTI examined case studies of Jamestown, Berthold, and Milton in order to make an assessment of some of the potential road impacts resulting from these programs.

The Jamestown case study showed an average incremental distance hauled as a result of the shuttle facility of 5.3 miles for every bushel. For Berthold, the extra distance from the shuttle program was estimated at 1.8 miles. For Milton, the extra distance from the shuttle program was estimated at 4.5 miles per bushel. It is important to note that these estimates are based on simulated case studies, and some movements may be much farther than the estimated incremental miles. Moreover, it is fair to say that there was not sufficient time to conduct an adequate analysis of the road impacts. A more detailed study is needed before definitive conclusions about highway impacts can be drawn.

In summary, producer marketing decisions are based on board prices, elevator and community loyalty, and other variables. Because of the rate incentives at only some elevator facilities, provided by the railroad, board prices may be higher resulting in longer truck movements. It is difficult to quantify the longer movements, and truck costs would be a determinant of those movements. There may be

cases in the future where facilities are located where the highway infrastructure is not adequate to handle the truck traffic. In these specific cases, large infrastructure investments may need to be made.

ADEQUACY OF RAIL REGULATION

The recent controversy surrounding the 110-car shuttle train program and inverse rates raises a larger question concerning the adequacy of rail regulation and, additionally, how should railroads be regulated, if at all. There seems to be a popular perception among certain groups, such as the country grain marketing industry, that the Surface Transportation Board (STB) has been less than effective in interpreting and applying rail regulatory laws. Further, there is a perception that the STB has a positive bias towards the rail industry. This leads to the question of "Why hasn't anyone used the simplified rate guidelines procedure to challenge a rate?" In view of these perceptions, should current railroad regulation be changed in someway to strengthen the interests of the shipper? A more fundamental question arises regarding treating railroads like other industries. Should railroads be totally deregulated and subject to oversight by the Federal Trade Commission and the Department of Justice, governed by antitrust law, and stripped of their antitrust immunity? Would shippers and railroads both be better off under such a scenario?

These are merely questions which raise issues of a subjective nature. Economics, political science and other disciplines can provide valuable insights into such questions, but the answers still remain largely subjective. Thus, it is highly appropriate that these issues be debated before and decided by the United States Congress.