ACUB

THE COMMISSION ON THE COSTS OF TRANSPORTING GRAIN BY RAIL

REPORT

VOLUME I
OCTOBER 1976

VOLUME I

To His Excellency the Governor General in Council,

MAY IT PLEASE YOUR EXCELLENCY,

I, the Commissioner appointed by an Order in Council dated 18th April, 1975, to conduct an inquiry to determine the costs and revenues of grain traffic and the relationship of such costs and revenues:

BEG TO SUBMIT TO YOUR EXCELLENCY

VOLUME I OF MY REPORT

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PREFACE TO THE REPORT

The determination of the cost of transporting statutory grain by rail is obviously a complex and controversial task. Unfortunately, past attempts to identify these costs have usually resulted in increasing, rather than decreasing, the complexity and controversy of the subject. In an effort to reverse this pattern, I sought to conduct this Inquiry in a manner which would stimulate open and complete participation by all parties. For this reason, I attempted to afford all participants the maximum possible access to the relevant railway data, to an understanding of existing costing procedures, and to a thorough examination of all positions and viewpoints. The responsiveness of the parties to these efforts and the consequent excellence of their submissions furnished what I hope is clear evidence of the achievement of this goal.

The volumes of this report conform to the major tasks of this Commission. Volume I is dedicated solely to the first task, namely, the development of the total costs and revenues of transporting statutory grain by rail under contemporary conditions. The second task, the development of cost profiles for different categories of Prarie railway

lines used for transporting grain, and the third task, the assessment of the impact upon railway costs of moving grain under different grain handling and transportation assumptions will be dealt with in Volume II of this report which will be submitted by the end of this year.

In this volume, I have set forth the results of my analysis of the many railway costing issues that were placed before me. I have attempted to summarize the position of the parties on each of the issues and the basis on which I resolved them. I have attempted to furnish sufficient detail to provide the reader with a general insight into the manner in which my costs were developed. In some cases, however, the issues were too complex and required too many pages of text, tables, and calculations to explain in complete detail in this volume. These details will be presented in the Technical Appendix to Volume I which will be submitted shortly.

I should like to acknowledge the contributions to this report of Mr. Victor Stechishin and Mr. Frank Trotter who formed the Commission Research Staff. I would also like to express my appreciation of the extensive work of the numerous participants in this Inquiry. To select a few out of this list for specific recognition would be an injustice to the others. To all, I am most appreciative of your help and assistance.

Finally, I would like to express my sincere thanks to my staff (Ms. Dunlap, Thompson, James, and Faulk) for their efforts in the production of this report and to acknowledge the consideration and understanding of the spouses of those who spent many long days participating in the Inquiry and in the preparation of this report.

CHAPTER I

INTRODUCTION

This Commission was created pursuant to Part I, Sections 2 and 3 of the Inquiries Act, R.S.c. 154, s.1. Those sections state:

> 2. The Governor in Council may, whenever he deems it expedient, cause inquiry to be made into and concerning any matter connected with the good government of Canada or the conduct of any part of the public business thereof.
>
> 3. Where an inquiry as described in section 2 is not regulated by any special law, the Governor in Council may, by a commission in the case, appoint persons as commissioners by whom the inquiry shall be conducted.

This Commission was authorized by Order-in-Council No. PC 1975-873 dated April 18, 1975 (see Appendix A). The Order-in-Council authorized the appointment of the Commissioner "to conduct an inquiry to determine the costs and revenues of grain traffic and the relationships of such costs and revenues."

Subsequent to the issuance of the document appointing the Commissioner (Commission Document), the Commission's Terms of Reference were issued (see Appendix B). The purpose of the Commission was described on page 1 of this document as follows:

> One of the outstanding issues that requires resolution in the Western grain transportation problem is to establish revenue and reliable cost data pertaining to the rail movement of grain and grain products as defined in sections 271 and 414 of the Railway Act (hereinafter referred to as grain). In order to provide some independent answers to this problem Carl M. Snavely, Jr. has been appointed under Part I of the Inquiries Act to determine the costs and revenues of grain traffic and the relationships of such costs and revenues and report his findings to the Minister of Transport and the Minister Responsible for the Canadian Wheat Board.

To achieve this objective, the Commission was required to perform five specific tasks outlined in Section 3 of the Terms of Reference:

> 3.2 - To identify the total costs and revenues to the railways of transporting grain under contemporary conditions.
>
> 3.3 - To evaluate contemporary railway costing practices using Canadian Transport Commission Order R-6313 as a base; assess the adequacy of the order and the practices as a basis for costing of grain and recommend changes if considered necessary.
>
> 3.4 - To identify and review any other railway grain costing issues which are of concern to those affected and to recommend changes if required.
>
> 3.5 - To develop a series of typical cost profiles for different categories of Prairie railway line used for transporting grain. These profiles to be sufficiently detailed, such that, interested parties will be able to derive the order of magnitude of grain transportation costs for typical categories of line.

3.6 - To assess the impact upon railway costs of moving grain under a series of different grain handling and transportation assumptions.

There were certain language differences in the Commission's mandate set forth in the Commission Document and the Order-in-Council and the tasks outlined in the Terms of Reference. In all instances, the Terms of Reference were more restrictive than the Commission Document and the Order-in-Council. These language differences resulted in different interpretations of the Commission's objectives by the parties that appeared before it. The Commission supported the view that the Order-in-Council and the Commission Document together with the relevant portions of the Inquiries Act were the controlling documents and that the Terms of Reference were merely particulars from the general mandate. It followed that any irresolvable inconsistencies between the general mandate and the particulars of the Terms of Reference must be settled in favor of the Commission Document. Nevertheless, the intent of the Commission Document as well as the written words were considered. The relevant language differences in the three documents were as follows:

1. Definition of Grain: The Commission Document refers to grain in generic terms while Section 1 of the Terms of Reference restricts grain to only those commodities included under Sections 271 and 414 of the Railway Act.

2. Study Period and Conditions: The Commission Document does not specify a particular time period for the cost and revenue study while Term of Reference 3.2 requires the study to be for "contemporary conditions."

3. Definition of Costs and Revenues: The Order-in-Council (and by reference the Commission Document), as well as Section 1 of the Terms of Reference, instruct the Commission to establish cost and revenue data pertaining to rail transportation of grain, whereas, Term of Reference 3.2 instructs the Commission to identify the total costs and revenues to the railways of transporting grain.

4. Cost-Revenue Relationships: The Commission Document directs the Commission to inquire into the relationships of the costs and revenues whereas Term of Reference 3.2 requires only that they be identified.

The Commission concluded that this Inquiry was intended to deal exclusively with grain and grain products as defined under Sections 271 and 414 of the Railway Act, i.e., statutory grain. Early on, certain parties argued that the exclusion of non-statutory grain could distort the Commission's findings. The submissions before this Commission demonstrated that statutory grain can be analyzed as a separate commodity group and that the exclusion of non-statutory grain did not distort the results.

The specification of contemporary conditions under Term of Reference 3.2 was consistent with the Commission Document and merely clarified a particular condition under which the Inquiry was to be performed. The Commission interpreted the term to mean that the cost and revenue study was to be conducted for a period marked by characteristics

of the present. The Commission could have selected 1973, 1974, or 1975 for this purpose or perhaps an average of the three years and met the criteria of contemporary conditions; for ease of study preparation, the 1974 calendar year period was selected.

Neither the Commission Document nor the Terms of Reference made any mention whether the costs and revenues were to be determined for an ongoing railway system or one destined for demise. Contemporary conditions imply that costs and revenues reflect whatever type of system existed during the contemporary period. There is no doubt that certain parts of the railway system used for the carriage of statutory grain were operated during the years 1973 through 1975 as if they were destined for abandonment.

> The Commissioner: Would it follow that, barring any regulatory requirement to maintain service or any influence from outside, that if the railways continued over the next 10 or 15 years to treat their plant (grain-gathering lines) as they have in the past, that effectively the asset would liquidate itself?
>
> Mr. Saunders: Yes. That is exactly what concerned me and that is the reason I said in answer to your earlier question that I felt something had gone awry between the time that we had the findings of the MacPherson Commission and the National Transportation Act and the subsequent implementation because unless this program were converted into a long-run, ongoing program, the

> inevitable result would be the elimination of these lines, as you indicated in your question.*

Thus, by strict definition, the Commission should have developed costs for some grain-gathering branch lines as if they were candidates for abandonment. However, all parties agreed that the intent and objective of the Inquiry was to develop costs under contemporary conditions for railway systems that were ongoing in all respects.

The Commission did not consider the development of costs under contemporary conditions to require inclusion of all costs incurred by the railways in transporting grain in the study year as a cost of an ongoing system. For example, if grain-gathering lines in the system during the study year were abandoned shortly thereafter, the Commission believes the costs attributable to these lines would not be attributable to the rail transportation of statutory grain under contemporary conditions. The Commission has distinguished between those costs actually incurred by the railway and, within limitations, the costs related to the effort actually required to perform grain transportation by rail.

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*Transcript Volume 1, pages 73 and 74. See also Transcript Volume 18, pages 3551 and 3552.

The intent of the Commission's mandate extended beyond identification of the costs directly incurred by the railways in the transportation of statutory grain. Its task was to develop the costs directly related to the rail transportation of grain, whether these costs were borne by the railways, governments, or railway shareholders. However, the Commission has distinguished between costs incurred by the railways and costs incurred by others.

The Commission rejected suggestions that the use of the term "directly related to the rail transportation of grain," required it to include in the costs such elements as the cost of movement of grain from the farm to the primary elevators, the cost of operating, maintaining, and owning the elevators, the cost of cleaning, fobbing, and other handling activities, or the cost to the Provinces of maintaining the road system used to haul grain.*

The Commission's mandate was to determine reliable cost and revenue data pertaining to the transportation of statutory grain by rail. Whether such costs should include variable costs only, variable plus constant costs, whether they should be based on accounting expenditures only, economic costs only, or a mixture of both were issues of the

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*Exhibit AMS-17, page 3.

Inquiry. These issues cannot and should not be decided by an interpretation of the Commission Document, the Order-in-Council, or the Terms of Reference. The Commission was not limited to consideration of variable costs. But, by the same token, the Commission rejected the interpretation that the use of the words "total costs" in Term of Reference 3.2 required it to include an allocation of constant costs to the grain traffic.

The Commission mandate to determine the relationship between revenues and costs was interpreted in its most limited context, namely, a comparison of relevant dollars of cost to relevant dollars of revenue. The Commission did not consider its mandate to include a determination of:

- an appropriate rate level for statutory grain traffic;
- a method of compensating the railways for any shortfall in revenue that may be found to exist under contemporary conditions; or
- the ability of statutory grain shippers to pay either the present rate level or any other rate level.

CONDUCT OF THE INQUIRY

From discussions held with interested parties at four preliminary regional meetings, the Commission determined that the interest of all parties would best be served by conducting the Inquiry in two phases. The first phase was

conducted informally through meetings of a Technical Committee, on which all parties who so desired were entitled to representation. A full listing of the members of the Technical Committee is shown in Appendix C. In addition, numerous other persons and parties attended meetings of the Committee as interested observers. The full Technical Committee met six times between late July 1975 and early February 1976 to examine railway costing techniques, methodologies, and data availability. In addition, several meetings of portions of the Committee were held to examine specific topics.

The informal phase of the Inquiry culminated in the filing of submissions, by all interested parties, on April 2, 1976. To provide the parties and the Commission the opportunity to test, validate, and expand upon their positions, theories, and methodologies, initial public hearings were held at Winnipeg, Manitoba commencing April 19, 1976. The Commission, on this occasion, sat for 18 days and the hearings produced 3,561 pages of transcript.

On June 11, 1976, the parties filed rebuttal submissions. Rebuttal hearings commenced on June 21, 1976 at Regina, Saskatchewan and ran for 13 days producing an additional 2,459 pages of transcript. Five days of additional rebuttal hearings were held at Orillia, Ontario, commencing

July 26, 1976, and produced the final 1,039 pages of the total 7,059 pages of transcript.

During the course of the 36 days of public hearings, 49 sponsors of submissions were cross-examined by all interested parties and by the Commission. In total, 36 submissions, seven volumes of working papers, and 213 hearing exhibits were received.

The submissions and hearing exhibits represented the results of field surveys, computer analyses, and studies performed by many individuals representing the railways, Prairie Provinces, grain companies, grain growers, and others. Without the tremendous efforts of these individuals, the detail and depth of this Inquiry would not have been possible.

DATA AVAILABILITY

To assist all parties in the presentations of their positions before this Commission, a considerable amount of time of each Technical Committee meeting was devoted to an examination of available railway data sources and railway service and costing reports. Over the 7-month period the Technical Committee was operative, this Commission assembled more than 10,000 pages, 15 boxes of computer printouts, and 65 books of railway costing information and data.

Some of these were distributed to all members of the Technical Committee and made available to representatives of other parties requesting them from the Commission. Others were made available only to Technical Committee members upon request. Some of these were designated as confidential by the supplying party and were made available to Technical Committee representatives provided they:

- demonstrated that the confidential data was a required input to their submission; and
- agreed in writing not to use or disclose such data in any other proceedings or research effort without the expressed permission of the supplying party.

The cooperation of all parties in the production and dissemination of data which permitted this most comprehensive examination and analysis of the costs and revenues associated with the transportation of statutory grain by rail, warrants special commendation from the Commission. One of the Commission's initial goals was to ensure that all parties had adequate opportunity to present their positions. The cooperation of the railway companies and the efforts of their employees in the production and supplying of data to the parties made possible the successful attainment of this objective. For the first time in the history of railway cost ascertainment, parties other than the railways and the Canadian Transport Commission, were enabled

and encouraged to develop independent and comprehensive cost estimates of railway operations.

COST AND REVENUE STUDIES

Statutory grain traffic consists of direct shipment traffic and traffic which has been processed en route--commonly referred to as milling-in-transit (MIT) traffic. Direct shipment traffic is loaded at the primary elevator and moves directly to the statutory rate destination in a single car. Milling-in-transit traffic moves from the primary elevator origin to an intermediate point where it is unloaded for additional refinement or storage. The original shipment is reloaded in two or more different railway cars and transported to a statutory rate destination. The same statutory rate is applicable to the line-haul movement of both types of traffic. On MIT traffic, the railways receive additional revenues for stop-off, demurrage, out-of-line movement, and/or diversion. The level of these additional charges is not set by statute and is considered as compensation for additional costs incurred on MIT traffic. Consideration of these additional revenues and costs fell outside the Commission's mandate.

The development of the costs and revenues of transporting grain by rail required several distinct phases of analysis. They were:

- identification of the specific traffic to be costed;
- identification of the railway services performed in transporting the study traffic;
- accumulation of the railway output or work units required to perform the services;
- development of unit and/or specific costs directly or indirectly associated with the output units and application of these costs to the output units to develop total costs; and
- identification of the revenues associated with the study traffic.

The Commission received two complete studies of the costs and revenues attendant to the transportation of statutory grain by rail. One study consisting of several submissions was presented on behalf of the Canadian National Railways (CN), CP Rail (CP), and Northern Alberta Railways (NAR). The other was presented on behalf of the Provinces of Alberta, Manitoba, and Saskatchewan (Provinces). Other parties presented submissions setting forth their positions on various aspects of cost and revenue ascertainment.

The subsequent chapters of this volume summarize the results of the Commission's analysis of the submissions, its findings and recommendations, and its determination of the costs and revenues of transporting statutory grain by rail under contemporary conditions. The Technical Appendix to this volume, submitted under separate cover, provides the details of the Commission analysis and findings.

CHAPTER II

TRAFFIC, OPERATING AND REVENUE CHARACTERISTICS

This chapter presents a summary of traffic, operating, and revenue characteristics associated with the rail transportation of grain and grain products under statutory rates. The data presented herein are based on the calendar year 1974 and were derived from the records of the Canadian National and CP Rail. For the most part, the validity and accuracy of these data were not challenged by any of the parties to this Inquiry. Further details of the traffic, operating, and revenue characteristics are included in the Technical Appendix.

TRAFFIC CHARACTERISTICS

This Inquiry examined the traffic characteristics of all grain and grain products transported by rail in year 1974 under statutory rates as referred to in Sections 271 and 414 of the Railway Act. The traffic included all grain and most grain products originating west of Thunder Bay/ Armstrong and destined to Armstrong,* Thunder Bay,* Churchill

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*Some of the grain moves on a combination of statutory rates to Armstrong or Thunder Bay and non-statutory rates from Armstrong or Thunder Bay to eastern ports for export.

Prince Rupert, Vancouver, or Victoria* for export. The statutory grain traffic comprised about 16 percent of the 1974 system total revenue ton-miles of the Canadian National Railways, CP Rail, and Northern Alberta Railways combined, and about 25 percent of their combined system total revenue ton-miles for traffic handled in Western Canada.

The statutory grain included in the study can be grouped into the following general categories:**

Barley	Bran
Buckwheat	Barley Cleanings and Meals
Corn	Crushed Oats and Barley
Oats	Corn Meal and Flour
Rye	Wheat Flour
Wheat	Malt
Flaxseed	Rolled Oats and Wheat
Rapeseed	Rye Meal and Flour
Linseed Oil Cake and Meal	Rapeseed Oil Cake and Meal
Soya Bean Meal	Sunflower Seed Oil Cake
Sweepings and Screenings	Weed Seed Oil Cake and Meal

In 1974 Canadian National and CP Rail terminated 336,813 carloads and 20,589,693 tons of statutory grain traffic. Of these, 326,535 carloads (or 97 percent of the total) were direct shipment traffic, and 10,278 carloads

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*Victoria is not specifically included by statute. CNR carries grain to Victoria at the statutory rate applicable to Vancouver as a result of a gentlemen's agreement between Sir Henry Thornton and the President of the Victoria Chamber of Commerce expressed in a letter from the CNR dated July 3, 1923.

**There may be restrictions to the inclusion of some specific commodities within these general categories.

were MIT traffic. Wheat and barley were the major commodities and accounted for about 90 percent of the total volume.

The preponderance of the statutory grain traffic originated at primary elevator locations in the Prairie Provinces of Alberta, Manitoba, and Saskatchewan and moved east, west, or north to (or through) the six destinations. Thunder Bay was by far the most important destination and accounted for 64 percent of the total carloads and tons terminated. Appendix D shows the total carloads and tons of statutory grain terminated in year 1974 by type of shipment, terminating railway, and destination.

The grain carloads in the study originated at a total of 1,658 separate loading stations (830 on CN, 828 on CP) in Western Canada located on an extensive branch, secondary, and main line railway system. Table 1 shows the number of stations on CN and CP, respectively, that loaded cars to each statutory rate destination and illustrates that many stations loaded cars to more than one destination. As shown, 1,617 of the 1,658 loading stations, or 98 percent, loaded cars to Thunder Bay and 1,342, or 81 percent, loaded cars to Vancouver.

TABLE 1

Number of CN and CP Stations
Loading Statutory Grain Cars in 1974

Destination	Number of Stations		
	CN*	CP*	Total
Armstrong & East	256	NA	256
Thunder Bay	797	820	1617
Churchill	409	NA	409
Prince Rupert	366	NA	366
Vancouver	626	716	1342
Victoria	331	NA	331

*The tabulation excludes traffic originating on the NAR and delivered to the CN or CP at Edmonton or CN at Grande Prairie.

Canadian National loaded an average of 197 cars per station, and CP Rail an average of 195 cars. Approximately 80 percent of these stations on each railway loaded no more than 300 cars in 1974--an average of less than one car per day (Table 2).

TABLE 2

Distribution of Stations
By Number of Cars Loaded in 1974
(Direct Shipment Only)

• Cars Loaded	Number of Stations		
	CN*	CP*	Total
1 - 50	160	107	267
51 - 100	137	173	310
101 - 200	223	254	477
201 - 300	139	153	292
301 - 500	129	113	242
501 - 750	34	21	55
751 - 1,000	6	4	10
1,000 or more	2	3	5
Total	830	828	1,658

*The tabulation excludes traffic originating on the NAR and delivered to the CN or CP at Edmonton or CN at Grande Prairie.

OPERATING CHARACTERISTICS

The railway grain handling network can be divided into three component parts. They are: (1) the grain gathering lines, (2) the assembly and distribution yards, and (3) the main lines. The hub of the network is the assembly and distribution yards. These yards, generally located on the main lines, serve as storage yards for empty cars which are to be distributed to the primary elevators for loading, and

assembly yards for the make-up of trains for movement to the statutory rate destinations. In concert with the Canadian Wheat Board, the railways operate wayfreights between the assembly and distribution yards and the primary elevators located on the grain gathering lines. These trains leave the yards with empty cars that are set off en route at the elevator locations and return to the yards with loaded cars picked up en route at the elevators. Additional cars are switched by yard crews to and from primary elevators at assembly and distribution yard locations.

Within the yards, the loaded cars are classified according to destination and made up into outbound "blocks." Dependent on the volume of cars available, the "blocks" are either added to trains arriving from other assembly yards or made up into complete grain trains that move directly to destination. Similarly, the yard crews break up trains returning empty cars, switch them into storage tracks and, as required, switch the empty cars into outbound trains for positioning on the gathering network.

The main line network links each railway's assembly and distribution yards to statutory rate destinations. Through freight trains operate over these lines carrying loaded statutory grain cars--often in trainload lots--from the assembly and distribution yards to the statutory rate

destinations. In the reverse direction, the trains return empty grain cars--often in trainload lots--to the assembly and distribution yards. These lines are also served by wayfreights which pick up and set out grain cars at primary elevators.

The movement of loaded cars from origins to destinations and their return requires railway efforts measured in physical work units or output units. These units can be counted and tabulated for any particular movement or series of movements. Examples of output units are gross ton-miles, locomotive unit-miles, caboose miles, yard and train switching minutes, car miles, and gallons of fuel consumed.

CP Rail developed the output units incurred in the transportation of statutory grain traffic from a sample of 1974 direct shipments. The cars carrying the sample shipments were traced through their entire loaded and empty route cycle. In the tracing process, the cars were identified with the actual trains on which they moved. The output units associated with each sample shipment were developed, and accumulated and expanded to produce the total output units attributable to direct shipments of statutory grain.

Canadian National developed output units by a somewhat less specific method. From various operating records, CN developed train characteristics and statistics for different types of trains operating throughout their system and car statistics for different types of freight cars. Given the 1974 carloads of study traffic and the origins and destinations, divisional and other operating personnel determined the routes the statutory grain shipments would have followed in 1974. Total output units attributable to the 1974 movement of direct shipment statutory grain were then developed by associating the carloads and routes, with the train and car statistics data.

Both railways made special studies of switching minutes attributable to cars in statutory grain service at assembly and distribution yards, destination yards, and primary elevator locations.

With the exception of the yard switching times developed by CP Rail and the car cycle-days and miles developed by Canadian National,* the annual output units developed by the railways were accepted by all parties to the Inquiry as reliable estimates of the 1974 annual output units attributable to statutory grain.

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*The Commission's comments on the output units questioned by one or more parties during the formal Inquiry are found in Chapter IV.

TABLE 3

1974 Average Operating Characteristics Per Car by Railway and by Destination

Destination	Average Per Car				
	Loaded Haul (Miles)	Revenue Tons	Car Cycle Days	Switching Minutes	Empty Return Ratio
Canadian National					
1. East of Armstrong	810	67.6	12.6	20.7	35.2%
2. Thunder Bay	849	57.3	20.2	38.8	85.3%
3. Churchill	921	53.7	26.6	20.0	87.7%
4. Prince Rupert	1,171	62.1	26.4	31.6	74.4%
5. Vancouver	991	58.9	26.7	48.9	70.2%
6. Victora	1,048	56.2	29.5	104.9	81.3%
AVERAGE	916	57.8	22.7	41.0	79.9%
CP Rail					
1. Thunder Bay	827	64.4	20.5	32.7	81.6%
2. Vancouver	923	67.6	28.5	45.1	85.0%
AVERAGE	856	65.5	22.9	36.5	82.7%

After analyzing the record of this Inquiry and the methods and working papers supporting the development of the output units, the Commission concluded that the railway estimates were valid and adopted them for its cost determination. These estimates are shown in Appendix E. Table 3 shows average operating characteristics per car by railway and by destination. The Table indicates that, with the exception of CP Rail's significantly higher average load

per car,* both railways exhibited similar output units per car. There were, however, some rather significant differences in operating characteristics among the various destinations served by each railway.

REVENUE CHARACTERISTICS

In 1974, the railways received $141.643 million in revenue directly and indirectly associated with the carriage of statutory grain. Of this total, $89.326 million or 63 percent was derived from the statutory rates; and $51.925 million or 37 percent was paid by the Federal Government under the branch line subsidy program.** The balance of $.392 million was derived from miscellaneous sources, mainly rentals received for elevator sites. The amount and source of revenue received by each railway are shown in Appendix F. The average statutory revenues per ton and per bushel are shown in Table 4.

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*The lower average tons per car for CN is caused by the use of smaller box cars on many of its grain gathering lines because of light weight rail and/or the maintenance condition of the lines.

**The Federal Government also paid $3.309 million to the railways in 1974 for the repair of box cars that were placed exclusively in grain service. As detailed in Chapter IV, these revenues were credited against the railways' car repair costs and we treated the payment as a cost incurred by the Federal Government for rail transportation of statutory grain.

Table 4

Statutory Revenue Per Ton and Per Bushel

Railway/ Destination	Average Statutory Revenue Per	
	Ton	Bushel*
Canadian National		
Armstrong	$4.17	$0.13
Thunder Bay	4.09	0.12
Churchill	4.33	0.13
Prince Ruppert	4.57	0.14
Vancouver	4.59	0.14
Victoria	4.70	0.14
TOTAL	$4.28	$0.13
CP Rail		
Thunder Bay	$4.08	$0.12
Vancouver	4.69	0.14
TOTAL	$4.28	$0.13
NAR		
CN Interchange	$1.85	$0.06
CP Interchange	1.85	0.06
TOTAL	$1.85	$0.06

* Based on 60 pounds per bushel.

The substantive revenue issue placed before this Commission concerned the branch line subsidies paid to the railways and centered on whether subsidy payments for

non-grain dependent lines* should be attributed to statutory grain. There is support for the proposition that the branch line subsidy is, for the most part, a subsidy for the carriage of statutory grain. However, the fact remains that the branch line subsidy by definition is a line related subsidy and not a commodity related subsidy. Even if a light density branch line originated no statutory grain and all other commodities originated and terminated were carried at compensatory rates, this would not ensure that the line would be profitable; i.e., a subsidy still could be claimed and paid. The subsidy payments for the grain dependent lines were appropriately credited to grain as were all of the line related costs. Attribution of all of the subsidy revenues received on the non-grain dependent lines to statutory grain would logically require the attribution of the line related costs to statutory grain. The Commission rejected arguments that statutory grain traffic should be credited with the subsidy revenues received for operating non-grain dependent lines.

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*As detailed in Chapter IV grain dependent lines are defined as branch lines whose continued existence is solely dependent on statutory grain traffic.

CHAPTER III

CURRENT COSTING CONCEPTS AND METHODOLOGIES

Today's railway costing concepts and methodologies are the result of a long process of development that commenced many years ago. Some original concepts and methodologies have stood the test of time while others changed with the growth of the pool of knowledge and understanding of railway cost behavior.

This Inquiry was a continuation of the ongoing process of railway cost development. The basic concepts and methodologies adopted by this Commission are, in part, the result of many prior investigations, studies, and proceedings. Two such efforts had significant impact and dictated to a considerable extent the basis of the cost estimates presented herein.

The first of these was the investigation of the Royal Commission on Transportation (MacPherson Commission) conducted in 1959-1961. Volume III of the MacPherson Commission Report is one of the most comprehensive documentations of grain costing procedures and concepts produced and established many of the basic costing principles which are incorporated in this Commission's costing procedures and findings.

The costing procedures and methodologies espoused by the MacPherson Commission were further refined in the 1967-1969 Cost Inquiry of the Canadian Transport Commission (CTC). This Inquiry culminated in Order No. R-6313 (Cost Order) which forms the basis for the conduct of railway cost determinations for regulatory purposes. The Canadian Transport Commission Inquiry was concerned primarily with development of costing procedures for minimum and maximum rate regulation and for determining the branch line and passenger service losses incurred by the railways. One of the principal objectives of the current Inquiry was to determine whether the concepts set forth in Order No. R-6313 and the methodologies and procedures used by the railways were appropriate and sufficient for determining the costs of transporting statutory grain by rail.

The balance of this chapter presents the basic costing concepts adopted by this Commission and a description of the general methodologies employed in the development of railway variable costs.

BASIC COST CONCEPTS

The cost study presented in this report, as well as those presented to the Commission by the railways and the Provinces of Alberta, Manitoba, and Saskatchewan, stem

from interpretations of the costing concepts set forth in the Cost Order.

Cost Categories

The total costs of a railway operation are divisible into two major categories: variable costs and constant costs. The Canadian Transport Commission adopted the following definition of variable costs in Reasons for Order No. R-6313 at page 337:

> Variable cost may be defined as the long-run marginal cost of output, being the cost of producing a permanent and quantitatively small change in the traffic flow of output, when all resource cost inputs are optimally adjusted to change.

This definition was adopted by all parties and was adopted by this Commission for the purposes of its cost determination. The principal distinguishing feature of variable costs is that they can be directly or indirectly associated with the production of particular output levels or work units.

Constant costs, within limits, cannot be associated with variations in output levels and are frequently termed "fixed" costs. This designation gives rise to the misconception that constant costs are fixed for all levels of output and consequently must be those costs which occur at

zero output. The proper notion of constant costs was best expressed in the Canadian National submission to this Commission:

> Constant costs are not defined as those at zero output, but rather those which remain at any given output level after the variable unit costs have been applied to all the output. They are not literally constant, or unvarying, but may fluctuate with the output level if curvature exists. Their name would more accurately be 'costs which cannot be associated with output units at this level'. (Exhibit CN-2, Page 20)

Costs and Expenses

Some differences in the estimates of costs arose because of the inclusion or exclusion of costs which were not an actual cash outlay. "Expenses" refer to actual dollar expenditures which are entered in the financial records of the railways. "Costs" properly refer to the consumption of resources and need not give rise to an accounting entry.

During this Commission's public hearings, these differences were explored in considerable detail. Some parties argued that the appropriate costs were the costs of the resources consumed. Others referred to the concept of "opportunity cost"--i.e., the cost of using economic resources in one venture is the benefit foregone by employing them in their best alternative use. Others argued that only actual expenses were relevant. We have accepted the broader

economic concept of costs for this study and have developed the costs of transporting grain by rail accordingly.

Specificity

Item 6 of Order No. R-6313 at page 437 requires that:

> Whenever specific costs are known or can be readily determined from company records, such costs shall be used in lieu of averaged or allocated costs.

This Commission has adopted the requirement of specificity as an appropriate directive in the development of the costs of transporting statutory grain by rail.

The railway companies and the Provinces undertook many special studies and analyses for this Inquiry. These studies and analyses were designed to isolate the activities of the railways related to statutory grain transportation from their total system activities. The results of these studies identified grain specific outputs and/or costs which, in addition to other specific costs readily available from railway records, have been incorporated into the findings of this Commission. To the extent system average or allocated costs are used without comment, we found that such costs were valid for determining reliable costs of transporting statutory grain traffic. Where we believe

that additional specificity should be incorporated in future grain costing, we have included recommendations to that effect.

While accepting the principle of specificity, the Commission is compelled to note that, contrary to the belief of some, the substitution of specific costs for system average or allocated costs does not necessarily result in substantial improvements in the accuracy or reliability of the cost estimate.

Specific costs are determined from the railways' accounting records or special studies which enable the identification of costs specific to a particular traffic, geographical area, and/or service performed. Special studies often require considerable time and effort and, therefore, the availability of specific costs is dependent to a considerable extent on the degree of disaggregation in the railways' accounting systems. The Canadian National internal accounting system permits a greater potential for and flexibility in the development of specific costs than does the accounting system of CP Rail.

Specific costs are no more reliable and accurate than the underlying records or special studies from which they are obtained. The mere recording of dollars in a particular

account does not necessarily produce a better estimate of costs than the application of a computed system average unit cost to the specific output units of a particular traffic or service. Indeed, it is quite possible that the specific accounting dollars are nothing more than a prorata distribution of total system dollars on a service unit basis. Hence, there may be no difference between the accounting dollars and the dollars derived on the unit cost basis.

Similarly, there is no improvement in the reliability and precision of the costs if there are no significant differences in the costs of providing the same service in different areas. Thus, if a ton-mile of traffic creates the same amount of wear and tear on the roadbed and track throughout the system, and the labor and material costs of performing roadway maintenance work and productivity are the same throughout the system, then no improvement in the cost estimate is gained by the use of area specific costs in lieu of system average costs.

The availability of specific cost data is limited by the existence of a substantial body of joint and common costs. In many instances only a limited degree of specificity can be obtained. For example, the wages paid to the crew for the operation of a particular train can be

identified from existing records. However, these wages cannot be identified with particular cars or tons of freight in the train. They must be allocated.

The ongoing maintenance of the records required to develop specific costs can be quite expensive. While increased specificity in cost finding is a desirable objective, the cost of attaining this objective may far outweigh the minimal improvement in precision and reliability that results from the increased degree of specificity. In some instances, it is necessary to sacrifice some degree of specificity in favor of efficiency and economy in the cost finding process.

GENERAL METHODOLOGY AND DATA SOURCES

A substantial part of the costing effort is expended in the development of the unit costs related to identifiable output units. This effort is concerned with the cause, nature, and variability of railway costs. As a prelude to discussions of the issues involved in grain costing, it is necessary to describe briefly the sources of cost data, and the general methods used to convert raw cost data into variable unit costs.

Data Sources and Reference Documents

The Annual Reports of Canadian National, CP Rail, and Northern Alberta Railways filed with the Canadian Transport Commission and the data contained in their internal accounting and data collection systems are the source of most railway cost data. These data are augmented by special studies of both expenses and output measures as required for particular cost determinations.

The railways are required to prepare their Annual Reports to the Canadian Transport Commission in conformance with the accounting procedures and format set forth in the Uniform Classification of Accounts. The Canadian Transport Commission does not require the railways to maintain their internal accounting system in conformance with the Uniform Classification of Accounts provided the internal system can be reconciled with and restated into the Uniform Classification requirements. As a result, CP Rail basically follows the Uniform Classification requirements while Canadian National has adopted a markedly different accounting system. The fundamental difference between these two systems is the degree of disaggregation of the accounting records. The Canadian National system contains many times more individual accounts than does the CP Rail system. While it has been suggested by some that Canadian National

maintains "two sets of books"--one set for Canadian Transport Commission purposes and one set for internal purposes--the Commission found that this was not the case. The Canadian National internal accounting system can be reconciled to the Uniform Classication--albeit with a considerable amount of effort and calculation.

Both railways maintain certain portions of their accounting system on a geogrgaphical basis. Those expenses which can be identified by location are maintained by sections of contiguous geography--usually identical to an operating division or area. CP Rail has 25 divisions and Canadian National has 16 areas. For costing purposes, the balance of CP's expenses are recorded as system expenses, whereas Canadian National's are separated between regional expenses and headquarters expenses.

A significant difference between the accounting system of the two railways lies in the road property accounts. CP Rail maintains primary road property accounts for 430 property sections; Canadian National currently maintains primary road property accounts on a system basis only.

Throughout its Inquiry the Commission and the parties were hampered to some extent by the differences in the accounting systems of the two railways--which, among other

things, made a direct comparison of some of the railway unit costs meaningless. This Commission was not given a mandate to recommend specific accounting systems or changes to existing accounting systems for either railway except where such changes would directly impact on the development of more reliable costs of transporting statutory grain. However, the Commission believes it would be remiss in its duties if it did not make known its views on this matter.

Canadian National's development of its own accounting system provides support for the contentions of many Canadian and United States students of railway costing that the Uniform Classification of Accounts* is not adequate for the determination of railway costs. In Section 307 of the Railroad Rehabilitation and Regulatory Reform Act of 1976, the United States Congress has directed the Interstate Commerce Commission to review the existing Uniform System of Accounts and to develop a revised system which:

> ...assures that the most accurate cost and revenue data can be obtained with respect to light

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*United States railroads are required by the Interstate Commerce Commission to maintain their accounts under the "Uniform System of Accounts" which is substantially the same as the "Uniform Classification of Accounts" except for the provision dealing with assets. The Uniform Classification provides for depreciation accounting whereas the Uniform System provides for addition and betterment accounting.

density lines, main line operations, factors relevant in establishing fair and reasonable rates, and other regulatory areas of responsibility..

This Commission notes that CP Rail has developed costing techniques that are far more sophisticated and exacting using the Uniform Classification of Accounts than have most, if not all, major U.S. railroads using the Uniform System of Accounts. A substantially greater disaggregated system--such as that of Canadian National--is not necessarily the panacea to the development of reliable and precise costs.

There is sufficient evidence to indicate that the Uniform Classification of Accounts may be archaic and may be an impediment to improvements in railway cost finding. The Commission recommends that the Canadian Transport Commission inquire into the adequacy of the Uniform Classification of Accounts as a basis for development of costs for regulatory purposes.

The Canadian Transport Commission's Order No. R-6314* required CP Rail and Canadian National each to file a Costing Manual with them. These manuals were to set forth the methodologies employed in the development of costs for regulatory purposes and were to be approved by the Canadian

*In the Matter of Costing Manuals Referred to in Order No. R-6313.

Transport Commission. Any subsequent changes to the manuals were to be filed with the Canadian Transport Commission for their review and approval.

The Commission would be derelict in its duties if it did not comment on the present status of the Costing Manuals. Though Order No. R-6314 was issued on August 5, 1969, the manuals filed by the railways have not yet been approved by the Canadian Transport Commission. The CTC and the railways apparently have not been able to resolve their differences in the seven years since the issuance of the Order. During the early stages of this Inquiry, we also found that the Costing Manuals on file with the Canadian Transport Commission did not, in some respects, reflect the railways' current costing procedures--a deficiency that was remedied shortly thereafter.

The testimony presented by the Canadian Transport Commission's staff consultant during the 1969 Cost Inquiry indicated that one of the purposes of the manuals was to provide a document--available to the public--that explained railway costing procedures. We found that in some instances, the manuals were vague and non-informative and did not provide a full and complete description of the railways' costing methodologies. This was particularly the case with the Canadian National Manual which is

written in terms of the Uniform Classification of Accounts rather than the internal accounting classification actually used in cost development. The translation of this manual into the Canadian National internal accounting system was sufficiently difficult and complex to render it of little value as a reference document.

The Commission strongly recommends that the Canadian National Costing Manual be rewritten in terms of the accounting system on which the costs are actually calculated and, that by December 31, 1976, the Canadian Transport Commission complete a final review of the costing manuals of both railways for clarity, accuracy, and completeness and issue a report identifying the sections of each manual it has approved and the reasons for withholding approval on the remaining sections.

Determination of Variable Unit Costs

While the differences in accounting systems and difficulties with the costing manuals caused the Commission and the non-railway parties some difficulty, these problems were overcome and, in final analysis, did not detract from the validity of the cost evidence available to the Commission. The ultimate objective of the methodologies described in the Costing Manuals of both railways is to relate expenses and/or costs to their causes. Since

constant costs cannot be related to specific identifiable causes, this objective requires methodologies which identify the variable unit costs (or specific costs) and thus isolate the constant portion.

As many costs vary with changes in multidimensional outputs, the task of variable cost development involves the identification of the appropriate service units or outputs and the assignment of costs to these causative factors. The four techniques employed by the railways, the Prairie Provinces, and this Commission in the development of variable costs of transportating grain are described in the following sections.

Direct Assignment

Both railway accounting systems are disaggregated to a degree where a small number of accounts can be directly assigned. This method is a form of specific costing and results in the total dollars under analysis being assigned directly to a particular service, equipment, line, or traffic. This procedure implicitly results in costs being assigned on the basis of 100 percent variability.

Direct Analysis

Direct analysis assigns expenses in direct proportion to the independent variable--usually related output units

generated in the provision of the service. Arithmetically, this involves dividing the total dollars of a particular expense item by the total number of output units, e.g., the total yard locomotive fuel expense divided by yard switching minutes. This procedure treats the expense item as being 100 percent variable with the output units.

Regression Analysis

Regression analysis is a statistical technique employed in railway costing to allocate expenses to one or more independent variables. Though not a requirement of the regression technique, the independent variable(s), used in railway costing is selected on the basis of causality. The statistical procedure involves the development of a relationship between the expense and the independent variable(s) such that the total variation in the expense explained by the variable(s) is maximized.

This approach assumes the costs may not be 100 percent variable with changes in output levels within the range tested. To the extent that the relationship does not explain the total variation in expenses, the cost is not 100 percent variable. If the unexplained expense (constant or residual cost) is positive, the cost is less than 100 percent variable with output. And, if the

unexplained expense is negative, the cost is more than 100 percent variable.

A simple linear regression relates the expense to a single causative factor, e.g., yard masters and clerks expense regressed on yard switching minutes. A multiple linear regression relates the expense to more than one causative factor, e.g., track and roadway maintenance expense regressed on gross ton-miles, switching minutes, miles of road, and gradient. This technique creates a specific unit cost for each causative factor and a single unexplained or residual cost.

Indirect Allocation

The development of variable unit costs under the methodologies employed by the railways is a two-stage process. The first stage involves the development of those unit costs directly associated with physical output units and those costs which can be directly assigned.

The second stage involves those costs which are not directly caused by physical output units or which cannot be directly assigned. These costs commonly are referred to as overhead costs and are found to be caused by and to vary with changes in the first stage cost elements. The overhead

costs are related to the first stage costs by direct analysis or regression analysis methods. This results in the development of overhead unit costs per dollar of cost directly associated with physical output units.

In many instances, indirect allocation is the most logical procedure for handling overhead cost elements at this time. However, the substantial number of items that are now handled on an indirect allocation basis creates an unwarranted complexity in the costing systems of the two railways and, more importantly, results in a loss of specificity in the costing process. The Commission recommends that the Canadian Transport Commission and the railways undertake a detailed review and analysis of costs assigned on an indirect basis with a view to revisions in the current procedures.

Normalization of Recorded Expenditures

Approximately two-thirds of all railway variable cost analyses involve the averaging of data of the study year's expenses and physical outputs with that of one or more prior years. The rationale for this approach is that expenses recorded in the accounts of the company in any single year may not reflect the costs of providing the transportation services that year. For example, roadway

maintenance is programmed and the cost in any one year may not reflect the actual "wear and tear" incurred during that year.

Prior year(s) expenses are brought forward to the current year by the application of appropriate labour and material price indices. The procedure is straightforward and recognizes the fact that the purchasing power of the dollar does not remain constant over time. This normalization procedure does not remove the effect of technological changes and/or changes in labour and capital productivity. The averaging process gives rise to the possibility of combining non-homogeneous observations, so that the benefits from productivity increases or the disbenefits from physical operating constraints become diluted.

The Commission adopted the railway procedures of averaging price-normalized cost observations and accepted the indices as developed by them. However, in so doing, the Commission recognized that this may result in some misstatement of 1974 costs. It has not been demonstrated that the averaged unit cost - output unit combinations resulted in variable costs that were biased either up or down.

The Commission recommends that the Canadian Transport Commission undertake an investigation to determine the

appropriate number of years to be utilized in the averaging or normalizing of expenditures and output units and to determine the nature, extent, and impact of productivity changes on the unit costs developed on a normalized basis.

Conclusions

The Commission's review and analysis of the procedures utilized by the railways to develop variable unit costs and to assign costs directly to specific services, led to the conclusion that overall these methodologies were valid for costing in general and grain costing in particular. The Commission fully agreed with the opinions expressed by representatives of the railways and the Provinces that overall the methodologies employed represent a degree of sophistication and precision that puts Canadian National and CP Rail at the forefront of railway cost ascertainment.

There were, however, certain specific areas of cost development where the Commission believes that further research could lead to improvement in the specificity and reliability of the cost estimates. Each area was the subject of inquiry before this Commission and has a direct bearing on the Commission's findings. The Commission's findings and conclusions on these issues are detailed in Chapter IV.

CHAPTER IV

GRAIN COSTING ISSUES

The parties that appeared before this Commission in both the informal (Technical Committee) and formal (Public Hearing) stages of the Inquiry devoted much of their time and effort to the development of rationale and the collection and analysis of various data in support of divergent positions on numerous conceptual and methodological issues bearing on the development of reliable costs of transporting statutory grain by rail. Likewise, the Commission and its staff have devoted considerable time and effort in analysis and review of the positions and supporting facts presented by the parties as well as in the development of its own data and analyses.

The sum total of the issues raised by the parties and the Commission probably cover most, if not all, of the cost finding issues currently being debated before agencies regulating railways, utilities, telecommunication companies, and others. The issues presented to this Commission ran the gamut from conceptual considerations directed at the very foundations of rail cost finding to disagreements regarding the appropriateness of detailed methodological procedures. The issues were both highly significant and

relatively inconsequential vis-a-vis the impact of their resolution on the total costs of transporting statutory grain. Finally, some of the issues raised, while possibly significant to the future costs and revenues associated with the transportation of grain by rail, were deemed outside the Commission's mandate.

Much of the effort expended before this Commission was directed towards areas of disagreement. There are, however, some major areas of agreement among the parties. The most important area concerns the basic framework or assumption under which this Commission should develop the total costs of transporting statutory grain by rail. Irrespective of the railways' past practices, there was general agreement that the costs should be developed for an ongoing, viable railway system and not for a system in a going out-of-business posture that was destined for abandonment. There must be no misunderstanding about the costs developed by this Commission as compared to the costs approved by the Canadian Transport Commission for purposes of determining branch line subsidies under Sections 256 and 258 of the Railway Act. It must be recognized that costing for subsidy purposes is premised on the line in question being operated at a loss and in a posture of a to-be-abandoned property.

The costs attendant to continued operation of such a line are not and cannot be considered the costs that would be incurred if the line were operated on an ongoing, viable basis.

There also was implicit agreement among the parties that a strict interpretation of Cost Order No. R-6313 as it applied to any section of the Railway Act and/or a strict application of the methodologies set forth in the railways' Costing Manuals would not produce a reliable estimate of the costs of transporting statutory grain by rail. This area of agreement notwithstanding, many of the costing concepts and methodologies currently employed by the railways and accepted by the Canadian Transport Commission were not questioned by the parties and were accepted by this Commission.

This chapter is devoted to a presentation of the Commission's findings on the costing issues within the Commission's mandate. Many of these issues were raised and debated previously during the Canadian Transport Commission Cost Inquiry. For a variety of reasons, they were unresolved at that time and interim procedures were implemented. These interim procedures were accompanied by Canadian Transport Commission recommendations and/or directives that additional research be undertaken for future resolution of the issues. Regrettably, little progress was made on

resolution of these issues in the seven years subsequent to the issuance of the Cost Order.

In arriving at its findings, the Commission has carefully and thoroughly reviewed and considered the written presentations, oral testimony, cross-examination, and exhibits of all parties and the written and oral presentations made to the Technical Committee. A statement detailing the positions of the various parties on each of the issues as well as the Commission's analyses is included in the Technical Appendix.

VARIABLE COSTS

The variable cost issues raised before this Commission centered around the appropriate degree of variability of railway unit costs. In general, the railways contended that the unit costs approved by the Canadian Transport Commission reflect a variability level that is lower than the actual variability of their costs. The Provinces and others contended that some of the unit costs overstated the degree of variability and that, in some instances, the costs were assumed to be 100 percent cent variable without justification.

Costs with Variability Exceeding 100 Percent

The objective of regression analysis techniques is to measure the variation of expense in an individual account or group of accounts with changes in the level of relevant outputs. In some of the regression analyses conducted by the railways, the constant or residual portion of the cost category under examination has a negative value. This implies the variability of the cost relationship exceeds 100 percent within the range of the observations. Before approval, the Canadian Transport Commission reduces the variable unit costs derived from regressions with negative constant costs so that the total variable costs just equal the total expenses, i.e., the CTC does not approve variable unit costs of more than 100 percent.

There is no statistical requirement, no general theory of economics, and no pragmatic reasons which suggest that the Canadian Transport Commission's arbitrary limit on the variability of unit costs is valid. This practice is a misinterpretation of the negative constant caused by extending its meaning beyond the range of the observations.

This Commission found no basis for adjusting variable unit costs from regressions with negative constants. All

variable unit costs derived from regression analysis used in our study are unadjusted and leave negative constants where they occurred.

Communications Expense

Reasons for Order No. R-6313 directs both railways to use a variability factor of 70 percent for Rail Communications Expense and Rail Communications Depreciation. This procedure involves taking 70 percent of the total dollars in the account group and dividing the result by the appropriate causative factor. The CTC also directed that further examination of the variability be undertaken.

CP Rail conducted cross-sectional analyses of Rail Communications Expenses and Depreciation for 72 U.S. Class I railroads for the years 1969 and 1973. On the basis of these results, CP Rail concluded that these two account groups were 100 percent variable. Canadian National made no such analysis and retained the 70 percent variability factor in their unit costs.

This Commission had considerable reservation about applying the experience of U.S. railroads to Canadian railways. The imputation of the cost variability of the multitude of regional and sub-regional U.S. railroads to the two transcontinental Canadian railways with system

revenues and expenses that rank with the largest U.S. railroads is tenuous at best. On the other hand, the Commission recognized that the 70 percent variability prescribed by the CTC was as an interim measure and was based on the percent variable then used by the U.S. railroads.

The support furnished by CP Rail and the results of the Commission's own further testing indicated that the variability of communications expense and depreciation was about 100 percent. Accordingly, we treated this expense as 100 percent variable for both Canadian National and CP Rail.

General Expenses

Reasons for Order No. R-6313 contains a comparable directive to CP Rail, concerning General Expenses. At that time, Canadian National treated these expenses on a regression analysis basis which produced a 55 percent variability. CP Rail used a general overhead ratio which produced a variability of about 75 percent. The Canadian Transport Commission directed CP Rail to use a variability factor of 60 percent and to undertake further study of this matter. Canadian National was permitted to continue to use the regression analysis technique.

For this Inquiry, CP Rail conducted regression analyses of General Expenses against total direct expenses for 72 U.S. Class I Railroads for the years 1969 and 1973. On the basis of these results, CP Rail treated General Expenses as 100 percent variable with the independent explanatory expense dollars. Canadian National's regression basis of computing general expenses produced results which were over 100 percent variable. The Provinces did not find these data persuasive and argued that these expenses should be treated as 60 percent variable for CP Rail as directed by the CTC in Order No. R-6313.

This Commission found that the analysis furnished by CP Rail, the Commission's own further testing, and the 1974 variability of Canadian National's General Expense unit costs supported CP Rail's treatment of General Expenses as 100 percent variable.

Locomotive and Freight Car Maintenance

Canadian National and CP Rail utilize direct analysis to determine Locomotive and Freight Car Maintenance unit costs. The implication of this approach is that these costs are 100 percent variable with output. The Prairie Provinces argued that this approach was unsubstantiated and overstated the costs attributable to statutory

grain for maintenance of the locomotives and freight cars used in its transportation.

In support of this contention, the Provinces referred to the cost formula used by the U.S. Interstate Commerce Commission (ICC) which treats locomotive repair costs as 68 percent variable and freight car repair costs as 86 percent variable. The Provinces contended that it was inconsistent for the railways to accept ICC cost formula factors to separate total freight car maintenance expense into its time related and mileage related components and to reject them in determining the variability of the expense. The Provinces suggested that studies should be instituted by both railways to substantiate the 100 percent variability assumption.

Putting aside our reservations concerning the validity of the variability percents used by the ICC, we have even stronger reservations about applying these percents to the locomotive and freight car maintenance expenses of Canadian railways. The Commission found considerable logic in the assumption that freight car and locomotive repair costs are 100 percent variable with quantitatively small changes in output when all resource cost inputs are optimally adjusted to change. We have used the direct analysis method in our cost studies. However, to put this area of disagreement

to rest, the Commission recommends that the application of direct analysis to these two expense groupings be tested against normalized time-series analyses of CP and CN cost experience.

Changed Procedures Since the MacPherson Commission

The Provinces noted that the costing procedures adopted by Canadian National utilized direct analysis for costing certain expense items, rather than the regression techniques which they had utilized before the MacPherson Commission. These changed procedures pertained to analysis of the following expenses:

- Maintenance of Fuel and Water Stations
- Yard Locomotive Enginehouse, and Other Expenses
- Station Employees and Expenses
- Train Locomotive Other Supplies and Enginehouse Expenses.

The Canadian National conducted no formal studies to justify these changes and the Provinces contended that some constant costs might be expected--with the result that the variable costs would be reduced. Canadian National contended that past regression models for these expense elements had shown them to be at or near 100 percent variable. This Commission found that merely switching from one procedure to

another was not sufficient reason to question the validity of Canadian National's assumption of 100 percent variability based on the results of historical regression analyses. We have adopted the cost estimating procedures as submitted by Canadian National.

Train Costs

The assignment of train related costs are an integral part of the development of variable costs of any traffic. The railways relate train costs to a particular traffic on the basis of either the gross ton-miles or the number of cars of the train. Both approaches assume that the train costs are 100 percent variable with volume (either tons or cars). This implies that the railway system, on average, will always adjust so that trains are moving at either length or weight capacity. If this were the case, then the system train-miles would vary directly with gross ton-miles.

The Provinces questioned this procedure on the grounds that the assumed relationship had not been statistically verified. Therefore, they concluded the current railway method of cost assignment could result in a cost overstatement.

The Commission tested this relationship on the available data of Canadian National and CP Rail by regressing

the number of train-miles (CN) or train hours (CP) on the respective gross ton-miles. In each case, a three-year average (1972-74) of area or division level data was utilized. For both CP Rail and Canadian National, the analysis yielded a strong statistical correlation. When calculated for the average of the data observations, these two regressions produced a computed variability of 71 percent for CN and 49 percent for CP. These statistical results indicate that the railways' general procedure of assigning train-related costs to quantitatively small output changes needs reexamination and that the procedure may, in fact, result in a cost overstatement of variable costs related to small changes in traffic volume.

However, since a large percentage of statutory grain originations occur on grain dependent branch lines, and since much of the grain is transported in solid grain trains from the gathering yards to export positions, the train-miles related to statutory grain traffic may be seen to be properly treated as 100 percent variable with the totality of statutory grain ton-miles. On this basis, we have concluded that the variations in train-miles (hours) for statutory grain were adequately explained by variations in the number of gross ton-miles. For the purposes of costing the transportation of grain by rail, this

Commission accepted the procedure as detailed in the railway Costing Manuals. However, we strongly urge the Canadian Transport Commission to investigate the assumptions of variability which underly the railway procedures of translating costs derived on the basis of one output unit into costs based on another output unit. The variability of costs with output units is an area which has been of some concern to this Commission. Of even greater concern, however, is our unease with the procedures which imply certain variability of one output characteristic with another.

Conclusions

In general, this Commission found the railways' contention that the unit costs approved by the Canadian Transport Commission understated the actual variability of their costs to be valid and has reflected this fact in its cost study.

The issue of the variability of certain unit costs has been the subject of considerable debate before this Commission as well as before the MacPherson Commission and the Canadian Transport Commission. This Commission believes that it is time to "close the books" on variability issues. This is not to suggest that there should be no additional

research in this area but rather that a solid point of reference be established for continuing research.

In this regard, we believe that regression analysis is now a time proven and accepted method for determining railway variable unit costs and that the results derived therefrom are superior to those derived from direct analysis where the variability of expenses is predicated on special studies or, in some cases, assumed on a pragmatic basis. The Commission recommends that regression analysis be used whenever the required input data can be accumulated on a cross-sectional basis. Further, the Commission urges the Canadian Transport Commission to require the railways to undertake whatever studies it deems appropriate to settle the variability issue on those cost elements which do not lend themselves to regression analysis.

CONSTANT COSTS

Perhaps the most incisive statement regarding constant cost made by any witness before this Commission was:

> ...I believe it is quite clear from my submission that I believe that notwithstanding the unmeasurable importance of the task which you have been given I believe that you have been given a task without objectives... (Transcript Volume 3, page 393).

In hindsight and with the benefit of the knowledge and understanding acquired throughout this Commission's tenure, it must be concluded that this statement succinctly placed the constant cost issue in perspective. On the one hand, the Provinces and most other non-railway parties contended that the allocation of constant costs was part of rate making and/or revenue need determination and not part of cost finding. The railways, on the other hand, contended that the Commission's mandate to determine the total cost of transporting statutory grain by rail required that some allowance or allocation of constant costs be included.

Constant costs are those costs which cannot be identified with particular output units, particular traffic, or particular movements. They represent the residual dollars which remain after deduction of all variable or assignable costs from the total costs. There is no question that constant costs are incurred by the railways and that, over the long run, the revenues they receive minus the variable costs they incur must be equal to or be greater than their total constant costs, if they are to be viable and ongoing enterprises.

Under contemporary conditions, most rail rates are set by the railways on a market competitive basis. One

objective of cost determination is to establish the minimum revenue level which must be obtained so as not to undermine the financial integrity of the firm. This minimum level is equal to the variable cost of producing the transportation service. The actual rate is set in the market place by the rate-maker whose objective is to maximize the traffic's contribution to the constant cost burden of the railway. Thus, constant cost contribution is not part of the cost finding procedure, but arises from the rate making procedure.

Statutory grain rates are not market competitive rates. For this reason, the railways contend that the development of total cost requires an approximation of the constant cost coverage that would be expected if statutory grain rates were set on a market basis. The railways claim that total costs, including constant costs, must be covered if the railway is to be an ongoing, viable enterprise and that, since grain is a substantial portion of total traffic, it's contribution is most important to the well being of the system.

There is some support for their position in Section 278(2) of the Railway Act which provides that the Canadian Transport Commission may fix a rate on captive* traffic at

*Section 278(1) of the Railway Act defines captive traffic as traffic for which there is no alternative, effective and competitive service by a common carrier other than a rail carrier or carriers or a combination of rail carriers.

an amount equal to the calculated variable cost* plus 150 percent of that variable cost. This amount represents the traffic's net contribution to total constant costs. However, it must be noted that this section of the Act refers to rate making and not cost finding.

The issue before this Commission in respect to constant costs was whether or not its mandate to develop total costs required it to allocate some portion of constant costs in recognition of the fact that the rates on statutory grain were not set on a market basis. We are convinced the attribution of constant costs to a particular traffic is a function of rate making and not cost finding except when the addition or elimination of a traffic changes the total system constant costs. We have determined that the line-related costs of the grain dependent lines are variable with total statutory grain traffic and have included such costs in our variable cost calculations. The evidence presented clearly established that the 1974 system constant costs of both CP Rail and Canadian National would be the same with or without the statutory grain traffic. For these reasons, we have concluded that the railways' total cost of transporting statutory grain was their total variable costs as we have defined and calculated them.

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*Section 278(3) stipulates that variable cost be based on a 30,000 pound carload.

The Commission does not disagree with the railways' contention that their total system revenues must be equal to their total system costs if they are to be ongoing, viable enterprises; nor does it disagree with the railways' contention that because statutory grain makes up a substantial portion of their total traffic its contribution above variable cost may be critical to the ongoing, viability of their systems. However, the revenue need of the railways was outside the Commission's mandate as was a determination of whether or not statutory grain shippers can afford to pay a rail rate equal to or greater than the variable costs incurred by the railways in transporting their traffic.

The Commission is concerned that its conclusion may lead readers of this report to an erroneous and possibly damaging conclusion; to wit: if the railways receive revenues from statutory grain traffic equal to the calculated variable costs, then an ongoing, viable grain transportation system will be assured.

Given statutory grain revenues equal to variable costs, the financial integrity of the system would be no greater with the grain traffic than it would be without it. Although revenues at this level would remove the present negative influence on system viability, the grain traffic would not make a positive contribution to the maintenance

of an ongoing, viable railway system--this would still rest solely on the excess of revenues over variable costs of all other traffic. The establishment of revenues for statutory grain just equal to its variable costs will require the remaining 84 percent of the system revenue ton-miles to produce net revenues (revenues minus variable costs) equal to 100 percent of the total constant costs. If the other traffic fails to do so, then in the long run the entire rail system--including the portion used by statutory grain--will fail.

Without detracting from our conclusion that constant cost allocation is not a function of cost finding, we believe that the substantial evidence submitted on this subject requires comment. This evidence was centered on estimates of the rate that would be charged on statutory grain if it were set on a market basis and on the ability of the shipper to pay such a rate.

Of the methods suggested for developing a surrogate for a market based statutory grain rate, the Commission was most impressed with the proposal of United Grain Growers. To develop a surrogate for a market rate and, hence, revenue contribution of statutory grain, they proposed that the variable costs of transporting statutory grain by rail be increased by the ratio of rail revenues

to the rail variable costs on other bulk commodities transported by rail in Western Canada and sold on the world market.

The evidence on the ability of the shipper to pay a market based rate, at best, was inconclusive and did not provide a basis for even a value judgment on this matter.

In the final analysis, however, the Commission believes that as long as export grain rates are not set on a market basis, the question of the appropriate revenue contribution is a public policy issue. Its resolution lies in the area of railway system viability rather than in estimates of the rate that would be set on a market basis and determinations of the shipper's ability to pay such a rate.

For reasons indicated previously, the development of system constant cost is not relevant to determining the cost of transporting statutory grain. However, the material presented to the Commission on this matter deserves notice in terms of its potential for improvement in the cost finding process.

For the most part, railway cost ascertainment efforts have been directed to the development of variable costs under the assumption that the constant or residual costs could be treated only on a system basis. The evidence

presented indicates that some constant costs can be segregated by geography and that others, normally treated as constant, are in fact variable with the total movement of a particular traffic. This Commission believes that research into the character, composition, and behavior of constant costs may well produce increased specificity and accuracy in the cost ascertainment process; more meaningful evaluation of the revenue contribution of various traffic segments; and a more meaningful base for public policy decisions.

CAPITAL COSTS

It is frequently said that costing is more an art than a science. However valid this statement is for costing in general it certainly is true in the determination of the cost of capital. No single subject before this Commission generated more controversy than did the determination of the cost of capital.

The cost of capital funds devoted to the transportation of statutory grain by rail can be estimated only through a combination of known facts, analytical techniques and informed judgment. Through this process, the Commission derived the appropriate cost of capital funds for the rail assets utilized in the carriage of grain.

It must be emphasized that there is no single, specific, calculable number which can be pointed to as the "true" cost of capital funds for either railway. The capital funds cost which this Commission found appropriate is our best estimate of the "true" cost.

The use of the term capital cost is sometimes misleading and often misunderstood. For clarity, the Commission adopted the following terminology:

- Capital cost - the sum of the depreciation expense and the capital funds cost.
- Depreciation expense - the provision for recovery of funds invested in depreciable assets.
- Capital funds cost - the cost of debt and equity funds including, where appropriate, a provision for income tax on equity funds.
- Capital funds rate - the percentage rate applied against the net asset base to derive the capital funds cost.

Depreciation expense as derived under the Uniform Classification of Accounts is not a current cash expenditure, but rather an attribution of previous capital expenditures to current operations. The capital funds cost is the payment to the company's debt and equity holders for the provision of investment funds. This cost is translated into a cash expenditure* only upon achievement of required

*The cash expenditure can take the form of interest payments, dividend payments or reinvestment in the company (retained earnings).

revenue levels. The company must meet its interest payments to debt holders if it is to remain solvent over the long run. But, the payment of dividends to equity shareholders and/or the retention of earnings for capital reinvestment is a cash outlay which can be forestalled. The fact that a company fails to pay dividends (or retain earnings) does not mean that the cost has not been incurred. Any such failure will evidence itself in cost increases elsewhere such as an increase in the capital funds rate on debt and/or equity instruments. In the extreme, it can result in a loss of access to capital markets. Similarly, the fact that depreciation charges are not a cash expense does not mean that the company does not incur the cost. The physical state of any depreciable asset deteriorates year by year and its future earnings potential is correspondingly diminished.

The primary issues relating to capital costs raised by the parties before this Commission were:

- the valuation of the asset base used to compute capital cost;
- the degree of risk inherent in the transportation of statutory grain vis-a-vis CP Rail and CP Limited; and
- the propriety of imputing to Canadian National a capital funds rate applicable to the transportation of statutory grain by CP Rail.

Each of these issues is discussed below and is treated in further detail in the Technical Appendix.

Valuation of the Asset Base

The railways proposed that depreciation expense be based on the current value of the company's investment rather than its original costs as prescribed under the Uniform Classification of Accounts and reaffirmed by Cost Order No. R-6313. They further proposed that the capital funds cost should be computed on the current value basis for assets acquired subsequent to December 31, 1974 and on the original cost basis for assets acquired prior to that date. The railways contended that this procedure would avoid granting windfall profits to equity holders of in-investments made prior to January 1, 1975. These proposals resulted in depreciation expense based on current value and capital funds cost based on historical value in the cost studies presented by CP Rail and Canadian National.

The railways argued that the high rate of inflation during recent years has resulted in a situation whereby depreciation charges calculated on original cost do not provide sufficient funds to replace the assets as they are retired. This failure requires the shortfall in replace-

ment capital to be "made up" from either new equity and debt capital or from retained earnings that could otherwise be used to purchase growth-related assets.

They further contended that the change to a current value asset base would produce a stable equity funds rate reflecting the "real" investor-required return instead of a floating equity funds rate reflecting the "nominal" investor-required return which includes an allowance for anticipated future inflation.

There is no doubt that during times of inflation, simple recovery of the original capital investment over the life of the asset will not provide sufficient funds to replace that asset when it is retired. However, this condition does not necessarily lead to the conclusion that the continued use of original cost depreciation will lead to the ultimate dissipation of the railways' assets. The reason is that, under a condition of inflation, the return to investors incorporates an allowance for the expectation that inflation will continue. Indeed, included in the allowance is provision for the likelihood that much, or possibly all, of the company's retained earnings will have to be devoted to replacing existing assets. In severe inflation, the allowance would reflect the expectation that new debt or equity issues will be required to furnish replacement capital.

This Commission is convinced that capital cost must be treated as a single cost entity made up of two components, namely, the capital funds cost and the depreciation expense. As long as these two component parts collectively produce sufficient dollars to (1) cover interest, fixed charges, and income taxes, (2) replace existing assets, and (3) permit access to capital markets sufficient to purchase new assets required for growth, the company will remain an on-going, viable enterprise.

The replacement of existing assets is not necessarily the exclusive responsiblity of the depreciation component of capital cost. The burden of this function may be borne in the capital funds rate through an allowance for anticipated inflation. Thus, if anticipation is borne out by reality, the investor requirements would include an inflation premium which would produce approximately the same dollars of cost as would be produced by the additional depreciation expense under the railways' proposed current value concept.

The principal distinction between the railways' proposed current value concept and the original cost depreciation procedures now in use lies in their effect on the risks of unanticipated inflation. Under the existing system, that risk is borne completely by the investors. If their inflation premium is, say, five percent, but infla-

tion turns out to be 10 percent, they are deprived of approximately five percent of their investment. Conversely, if they anticipate 10 percent, but prices rise only five percent, they experience a five percent supplement. Under the railways' proposed current cost depreciation system, these risks are removed. The investor need not concern himself with the possibility that his original investment will lose value; that value will be redefined each year as inflation occurs. In effect, it is the railways' customers (or the Government in the case of subsidies) who bear the risks of unanticipated inflation under a current value depreciation system.

Thus, the real question posed by the issue of the current value vs. original cost valuation is whether the risk of unanticipated inflation should be borne by the users of the railways' services or the company's investors and debt holders. It has not been demonstrated to our satisfaction that there is any advantage to be gained by shifting the risk of unanticipated inflation away from the company's investors to the users of the railways' services. Furthermore, there is no indication that the financial markets cannot respond to the risk of unanticipated inflation or that they will not be able to bear this risk in the future.

Even if this shift in risk were desirable, a change from an original cost to a current value system would create serious additional problems and uncertainties in the cost calculation. First of all, there is no accepted method for restating the railways' assets on a current value basis which would adequately account for changes in real capital productivity. Nor has anyone defined how the market-determined nominal cost of funds rate should be translated into a "real" cost of funds rate. Illustrative of this problem is the fact that the railways' made what was essentially an arbitrary adjustment to their recommended nominal cost of funds rate to reflect their use of a current value depreciation base. Interestingly, the calculated increase in depreciation costs was substantially greater than the reduction in investor return requirements.

The income tax laws also pose serious problems. Under present Canadian income tax law, the difference between reducing balance depreciation expense (capital cost allowance) calculated on an original cost basis and depreciation expense calculated on a current value basis would be subject to corporate income tax.

Finally, there is no procedure for flowing through the benefits of current value valuation to debt and preferred

stockholders. Specifically, the railways did not propose increasing interest or preferred dividend payments on a re-evaluation of the principal value of debt or preferred stock to reflect decreases in the purchasing power of the dollars originally loaned to the railway. Failure to do so, however, would cause the increase in valuation from original to current value on assets purchased with debt or preferred equity funds to flow as a windfall to the common shareholder.

Both cost of capital experts* who appeared before this Commission agreed that capital can be attracted in the face of anticipated inflation through recovery of the appropriate capital funds cost calculated under either the original cost asset base and nominal cost of funds rate method or the current value asset base and real cost of funds rate method. This Commission found that the problems inherent in determining a current value asset base and a real cost of funds rate; the lack of justification for shifting the risk of unanticipated inflation from the investor to the consumer; and the complications induced by existing income tax laws, dictated the use of an original cost asset

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*Dr. Myron Gordon on behalf of the Provinces of Alberta, Manitoba, and Saskatchewan and Dr. David Quirin on behalf of CP Rail, Canadian National, and Northern Alberta Railways.

base in determining the capital cost incurred by the railways in the transportation of statutory grain.

Degree of Risk Attendant to the Transportation of Statutory Grain

One of the principal differences in the capital funds cost determined by the railways and that determined by the Provinces related to markedly different evaluations of the risk associated with the transportation of statutory grain, the overall rail activities of CP Rail and the aggregate corporate activities of CP Limited.

By way of background, both cost of capital experts agreed that CP Limited was the legal entity that obtained equity and debt funds in the capital markets. Both experts viewed CP Rail as a separate division of CP Limited and CP Grain* as a separate component of CP Rail. There was also agreement that it was possible to develop different capital structures and capital funds rates for separate divisions of a company as well as for the company itself.

The Provinces and others contended that the stable, and counter-cyclical nature of the statutory grain movement made it a less risky operation than CP Rail's overall

*The term CP Grain was used by the Provinces to denote the totality of CP Rail's statutory grain transportation system.

operations. For much the same reasons, the Provinces further contended that CP Rail's system operations were, in turn, less risky than those of CP Limited. The railways, on the other hand, contended that there was no discernible difference in business risk between CP Limited and CP Rail. They argued further that under contemporary conditions, CP Grain was probably more risky than either CP Limited or CP Rail. This greater risk was the result of Government policies which required the railways to carry grain at a statutory rate level so low that the revenues received did not cover variable costs. As a separate enterprise or division of CP Rail, CP Grain was a loss operation and was therefore infinitely risky. The railways did not propose a separate cost of funds rate for CP Grain.

To support their contention, the Provinces presented, through their expert, an analysis of the "Beta factor" coefficients for CP Limited, CP Rail, and CP Grain. These coefficients purported to measure the extent to which the earnings fluctuations of these three "entities" corresponded with the earnings fluctuations of the aggregate average of all equity investments in a diversified portfolio. The railways' expert questioned both the conceptual basis and the statistical reliability of the Provinces' analysis. Specifically, he challenged the concept that risk was entirely a function of the covariance of market returns of

individual investments with the returns of a portfolio of diversified investments. He also disputed the Provinces' translation between market-related Beta coefficients and coefficients developed from book earnings and ton-mile data.

As discussed more thoroughly in the Technical Appendix, this Commission was sufficiently persuaded by the railways' arguments to reject the "Beta factor" comparison between CP Limited and CP Rail as an adequate basis for differentiating between the risk of these two entities. It concluded that there was no identifiable difference in the risk between the parent company and its railway division.

The relative risk of CP Grain compared to either CP Rail or CP Limited was more difficult for this Commission to evaluate. We agree with the railways that under current conditions CP Grain is infinitely risky in that its revenues fail to cover its variable costs. The Provinces did not dispute this conclusion but based their evaluation on the premise that the current revenue shortfall will be eliminated in the future as a result of actions taken pursuant to our findings and those of the Grain Handling and Transportation Commission conducted by the Hon. Emmett M. Hall, Q.C.

This Commission found some merit in the Provinces' position that the volume and nature of statutory grain traffic could make it a somewhat less risky operation than CP Rail as a system. Futhermore, to assume no future change in the risk conditions that existed in 1974 is unrealistic and will lead to nonsense estimates of the capital funds cost attributable to CP Grain.

However, the degree of risk associated with the future operation of CP Grain will depend in large measure on the actions taken by the Federal Government as a result of the two current Inquiries. Thus, in a sense, there is a symbiotic relationship between the future risk of CP Grain, and the findings of the two Commissions and the actions ultimately taken by the Federal Government on these findings.

This Commission concluded that the realistic approach was to assume that the risk of CP Grain was identical to that of CP Rail for the purpose of determining the capital funds cost of transporting statutory grain. Due to the present uncertainties of future government actions, the Commission recommends that any future determinations of the cost of transporting statutory grain by rail include an evaluation of the risk factor under the then extant conditions.

CP Rail's Capital Funds Cost

The development of the capital funds cost for CP Rail required determination of an appropriate capital structure and the capital funds rate applicable to each element in that structure. For reasons set forth in the previous section, this Commission approached the development of these factors under the assumption that there was no significant difference in risk among CP Limited, CP Rail, and CP Grain.

Capital Structure

A capital structure is normally comprised of three general types of capital instruments--debt, preferred stock, and common equity. An overall capital funds cost is determined by weighting the cost of funds rate for each capital instrument by the relative proportion of the total capital structure represented by each instrument. The sum of the weighted capital funds rates is the overall capital funds rate for the entity under study.

Since the capital funds rate for each component of the structure is different, since income taxes apply only to the equity components and since the structure itself affects the risk of the respective components, the composition of the capital structure has considerable influence on the overall average capital funds rate.

The evidence presented to the Commission contained the following four different capital structures which could be utilized to develop an average capital funds rate applicable to the transportation of statutory grain.

TABLE 5

Capital Structures Potentially Applicable To The Transportation of Statutory Grain

Item	Capital Structure			
	CP Limited			
	Consolidated	Corporate	CP Rail	CP Grain
Debt				
Long Term Debt	32.4%	19.3%	17.6%	N/A
4% Debentures	7.2	13.5	12.4	N/A
Sub-Total Debt	39.6%	32.8%	30.0%	60.0%
Equity				
Preferred Stock Shares	0.9	1.7	2.4	N/A
Preference Stock Shares	0.4	0.7	5.1	N/A
Common Stock Shares	59.1*	64.8	62.5	N/A
Sub-Total Equity	60.4%	67.2%	70.0%	40.0%
Total Debt and Equity	100.0%	100.0%	100.0%	100.0%

N/A: Details of debt and equity components were not provided.

*Includes minority shareholders interest in subsidiary companies.

The major difference between the capital structures of CP Limited Consolidated (hereinafter referred to as CP Limited) and CP Limited Corporate is the exclusion from the latter of both the equity and debt of CP Limited's subsidiary companies.

The capital structure for CP Rail, a division of CP Limited, had its genesis in an exhibit accepted in 1949 for regulatory purposes by the Board of Transport Commissioners, predecessor to the Canadian Transport Commission. The CP Rail capital structure shown above was used by the Canadian Transport Commission in determining CP Rail's capital funds rate for 1974. The capital structure for CP Grain was developed by the Provinces. It represents their expert's judgment as to the amount of debt which CP Grain could support as a division of CP Rail. This structure was predicated upon the Provinces' position that CP Grain had less risk than CP Limited or CP Rail--a position which this Commission has not adopted.

This Commission adopted the capital structure of CP Limited for the following reasons:

- Common shareholders purchase and hold shares of CP Limited and not CP Rail or CP Limited, Corporate.
- The debt of the subsidiaries and divisions of CP Limited is not entirely independent of the

debt and debt structure of the parent company. This conclusion is based on the premise that the parent would attempt to rescue an insolvent division or subsidiary.

- CP Limited operates according to centralized cash management and consolidates the capital activities of its divisions and subsidiaries.

- The capital funds rate applicable to the debt instruments of CP Limited is influenced by the relative amounts of debt and equity outstanding by the consolidated company.

- CP Limited bonds are one of the more recent sources of debt capital available to the consolidated company and its divisions; the existing capital structure was just sufficient for bond financing at the present bond rating level--hence, it would be inappropriate to use even higher debt levels.

- The substantial unfunded pension liabilities of CP Limited understate the company's long term liabilities--thus, it would be inappropriate to use lower debt levels such as those for CP Rail employed by the Canadian Transport Commission.

- A comparison of the CP Limited capital structure with those of solvent U.S. Class I railroads suggests that the CP Limited's structure is appropriate for CP Rail.

- CP Rail's 1974 earnings produced such a low interest coverage that it could not sustain a higher debt ratio than that of CP Limited.

Deferred income taxes* are reported as liabilities in CP Limited's Annual Report to Shareholders. However, the

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*Deferred income taxes arise from the difference between book tax liability, which reflects straight line depreciation, and taxes actually paid, which reflect declining balance depreciation.

capital structure of CP Limited shown in CP Rail's Exhibit CP-24 and on Table 5 of this report does not include deferred income taxes. The exclusion of deferred income taxes from the capital structure has the same effect as prorating deferred income taxes on the basis of the other capital structure components and including them in the capital structure. This treatment results in accumulated deferred income taxes receiving a before-tax and after-tax capital funds rate equal to the structure's weighted average capital funds rate.

The Provinces' expert witness and others contended that the total deferred tax liability was an interest-free loan from the Federal Government which should be treated as a form of debt at a zero capital funds rate.

In their determination of a capital funds rate, the railways excluded deferred taxes from the capital structure which, as indicated above, had the same effect as including them at the weighted average capital funds rate. The railways initially argued that this treatment of deferred taxes was justified on the grounds that it produced an offset to the understatement of capital funds cost caused by the exclusion of a working capital allowance from the net asset base attributed to statutory grain. However, when questioned on the specific matter

of including deferred taxes in the capital structure, the railways' expert witness contended that deferred taxes could be included in the structure as contingent equity with a capital funds rate equal to that applicable to common equity.

The Commission found that the elimination of deferred taxes from the capital structure resulted in an overstatement of the capital funds rate and, therefore, an overstatement in the capital funds cost. We have no conceptual problem with either the debt at zero interest rate approach advocated by the Provinces or the contingent equity at the common equity rate approach advocated by the railways--provided this latter approach is consistently followed and full account is taken of the implications of its use. The allowance for declining balance depreciation effectively results in a reduction of the prescribed corporate income tax rate. Treating deferred taxes as common equity requires downward adjustment to the corporate income tax rate to reflect the effective tax rate paid rather than the prescribed tax rate. Failure to make this downward adjustment results in an overstatement of the pretax capital funds rate because it charges for current taxes accrued but not paid and then also recovers a return, equal to the common equity rate,

on all past deferred taxes. If the rate compensates the railway for current taxes which are now being deferred, it should not again compensate the railway for the accumulation of taxes deferred in previous years.

The CP Rail capital structure used by the Canadian Transport Commission for regulatory purposes includes an allowance of $70 million for working capital in the equity portion of the structure. CP Rail contended that this $70 million allowance, developed in 1948, was inadequate because of the inflation that has occured since that date. They suggested that a $150 million allowance would be more reflective of current working capital requirements. For reasons unknown to this Commission, the railways have not requested and the Canadian Transport Commission has not required, a working capital allowance be included in the investment base even though it has been included in the capital structure. In our opinion, working capital is an asset required for the performance of the rail transportation service. Working capital is clearly a necessary part of doing business and the investment in working capital incurs a capital funds cost just like any other required asset such as rails, freight cars, and locomotives.

This Commission found there is little factual support for including a specific working capital allowance of either $70 million or $150 million in the capital structure or the investment base. To the extent that book equity reflects net current assets--which it does--there already is some allowance for working capital in CP Limited's capital structure. However, net current assets usually do not include the cost of service rendered but not invoiced, nor do they reflect the offsetting cost of goods and services received but not yet payable. The appropriate working capital allowance therefore requires a detailed study of the lead and lag in cash flows--an undertaking beyond the scope of this Inquiry.

Whether the use of book equity of CP Limited understated or overstated working capital in the capital structure was therefore not clear. What was clear was that there should be some working capital allowance in the investment base applicable to the transportation of statutory grain. However, we could not include such allowance because of the lack of a cash flow analysis to determine the appropriate working capital requirement.

To offset the absence of a working capital allowance in the investment base applicable to statutory grain, the

Commission proposed to apply the overstatement of the capital funds cost resulting from the railways' treatment of deferred taxes. Whether proper treatment of these two components would result in the attribution of higher or lower capital funds costs to statutory grain cannot be determined by this Commission in the absence of a study to determine the amount of working capital actually required by statutory grain.* Given this unknown, the Commission believed that its use of two offsetting errors, although admittedly an expedient, was the fairest way to deal with a very thorny problem. Accordingly, the Commission has not adjusted CP Limited's capital structure to explicitly include either deferred income taxes or an allowance for working capital and has not included an allowance for working capital in the net asset base applicable to statutory grain.

The Commission recommends that the railways undertake the lead-lag studies required to develop an appropriate working capital allowance and submit them to the

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*Assuming arguendo the railways' estimated total working capital requirement of $150 million, the Commission found that the inclusion of a prorata portion of the working capital allowance on the net investment applicable to grain transportation produced an increase in capital funds cost that was approximately equal to the decrease that resulted from adjusting CP Limited's capital structure to include deferred taxes as debt at a zero capital funds rate.

Canadian Transport Commission for review and approval. Upon approval, this allowance should be included in both the capital structure and the investment base.

CP Limited's capital structure also treated capital acquired through donations and grants as common equity. The Provinces and others proposed that the assets acquired through donations and grants be eliminated from the capital structure and the asset valuation base or that they be included in the capital structure at zero cost. The relative merit of this position depends on the nature of the donation or grant. In some cases, a grant from the government compensates investors for the premature retirement of an asset. An example might be the abandonment and relocation of a line segment to make room for a highway. In such cases, the grant is appropriately part of shareholders' equity. In other cases, the grant is for an asset which investors would otherwise have had to purchase, and its value should probably be included in the capital structure at zero interest. Resolution of this issue would require a detailed study of the history of CP's donations and grants, an undertaking well beyond the scope of this Inquiry. Since the relative amounts of money involved had little net effect on the cost of funds rate, the Commission included donations and grants capital as a component of equity for purposes of developing a capital structure.

Capital Funds Rate

CP Rail used a capital funds rate on long term debt of 4.99 percent. This rate was developed by weighting the cost rate of each of the components of embedded debt contained in CP Rail's capital structure. From the 1974 Annual Report to Shareholders, the Provinces calculated an average embedded debt rate for CP Limited of 6.75 percent. The 6.75 percent average rate was calculated by dividing reported interest payments in 1974 by the average 1973 and 1974 year-end debt outstanding.

From our review of the submissions and supporting documentation of the railways and the Provinces, and in light of the capital structure adopted, we concluded that the appropriate 1974 average capital funds rate for debt capital was 6.75 percent.

The capital cost experts retained by the Provinces and the railways utilized seven approaches to determine an appropriate capital funds rate on CP Limited's common equity. These were:

- earnings rates of comparable risk companies;
- earnings/price ratios for CP Limited;
- observed growth in CP Limited's earnings and dividends (discounted cash flow model);

- rates of return allowed by Canadian regulatory agencies;
- rates of return earned historically on common equities and bond/equity yield differential;
- measurement of systematic risk (beta statistic); and
- informed judgement of an investment dealer.

The Provinces relied upon measures of systematic risk and the discounted cash flow model. From these measures, the Provinces estimated that CP Limited's common equity cost rate ranged from 10 percent to 13 percent. Under the theory that CP Grain was less risky than CP Limited, the Provinces concluded the cost of funds rate for CP Grain common equity was 11.0 to 11.5 percent after taxes. In their cost estimates, the Provinces adopted 11.5 percent after taxes as the appropriate capital funds rate for the common equity used in transporting statutory grain by CP Rail. This rate is identical to that approved for 1974 by the Canadian Transport Commission.

The railways presented evidence using virtually all the listed approaches for measuring the capital funds rate applicable to common equity. Estimates ranged from 15 to 20 percent after taxes and concentrated between 16 and 18 percent. The railways selected 17.5 percent after taxes as the appropriate capital funds rate for CP Limited's common equity.

This Commission has reviewed the submissions, rebuttals, and summary arguments of the parties on this matter and has restated certain of the capital funds rates to reflect present conditions. With the exception of a single test, based on CP Limited's unusually high 1974 earnings, the Commission's tests produced capital funds rates for common shareholders' equity ranging from 13.0 percent to 17.8 percent, with a concentration of results around 14.5 percent. A comparison of the various estimates of capital funds rates produced from the tests and analyses made by the railways, the Provinces, and this Commission are shown in Appendix G.* This Commission concluded that 14.5 percent after taxes was the appropriate capital funds rate to be applied to CP Limited's common equity capital.

Preferred and Preference equity combined comprise only 1.3 percent of the capital structure of CP Limited. The Canadian Transport Commission has approved capital funds rates of 7.34 percent and 0.72 percent on Preferred and Preference stock respectively. These rates were utilized by both the railways and the Provinces in their cost estimates and were adopted by this Commission.

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*The Commission's evaluation of the results of each of these tests is contained in the Technical Appendix to this report.

The foregoing capital funds rates adopted by this Commission refer to the distribution of after-tax earnings of the company. These rates must be adjusted to produce the necessary pre-tax earnings required to cover the after-tax capital funds cost. In 1974, the prescribed corporate tax rate was 52.35 percent and the ratio to adjust after-tax earnings to before-tax earnings was 2.0986 [100.00 divided by (100.00 - 52.35)]. Since interest expense on debt is a tax deductible corporate expense, the 6.75 composite interest rate is not adjusted for income taxes.

The adoption of the debt/equity capital structure of CP Limited and the determination of the debt and equity capital funds rates by this Commission provided the required inputs for determining the weighted average capital funds rate to be applied to CP Rail's net investment employed in the transportation of statutory grain. As developed in Table 6, the weighted average capital funds rate for CP Rail was 11.31 percent after taxes and 20.80 percent before taxes.

TABLE 6

Average Capital Funds Rate Applicable to CP Rail's Net Investment Employed in the Transportation of Statutory Grain

Item	Percent of Capital Structure	Cost of Funds Rate		Weighted Average Cost of Funds	
		After Tax	Before Tax	After Tax	Before Tax
Long Term Debt & 4% Debentures	39.6%	6.75%	6.75%	2.67%	2.67%
Preferred Stock	0.9	7.34	15.40	0.07	0.14
Preference Stock	0.4	0.72	1.51	0.00	0.01
Common Stock	59.1	14.50	30.43	8.57	17.98
TOTAL/Weighted Average	100.0%	xxx	xxx	11.31%	20.80%

Canadian National's Capital Funds Cost

The general question of the appropriate average capital funds rate to be used in determining the capital funds cost for Canadian National has been debated many times.* The issues raised during those debates were again raised

*Under Section 276 of the Railway Act, the Canadian Transport Commission is required to apply the weighted average capital funds rate determined appropriate for Canadian Pacific to Canadian National.

before this Commission. With respect to the transportation of statutory grain, however, these issues may be influenced by the facts that: there is no price competition between the two railways; the revenues from statutory rates are less than variable costs; and the Federal Government is making up some of the revenue shortfall through branch line subsidies.

The railways' position was that the appropriate capital funds rate for CP Rail should be attributed to the Canadian National. The Provinces contended that Canadian National is a Crown corporation whose capital is supplied by the Federal Government and, therefore, the capital funds rate is the embedded interest rate of Federal Government loans to Canadian National. The Provinces determined that the embedded interest rate was 5.94 percent. This rate contrasts dramatically with the railways' proposed rate of 24.89 percent before taxes and the 20.80 percent found appropriate for CP Rail by this Commission.

The railways and the Provinces took opposite sides on three major issues involved in the determination of the appropriate cost of funds rate for Canadian National. They were:

- is Canadian National operated as an extension of government policy or as a commercially viable enterprise?
- are the historical reasons for imputing the capital funds rate of CP rail to Canadian National for costing purposes applicable to the costing of statutory grain traffic?
- is opportunity cost or the actual cost of funds acquired the appropriate measure of the capital funds rate for Canadian National?

Commercial Status of Canadian National

The Provinces contended that the Government of Canada did not create Canadian National as a commercial enterprise from which it intended to earn a return on its investment. And, more importantly, while the government has publicly encouraged the operation of Canadian National on a sound, commercial basis, it has used the railway as a means of advancing public policies which is counter to the concept of commercial viability. The Provinces supported this position by reference to Canadian National submissions before the MacPherson Royal Commission and the Turgeon Royal Commission on Transportation and to statements made by various railway and government representatives. The Provinces concluded that the only basis for using a capital funds rate higher than the government interest rate was that Canadian National imposed a risk burden on taxpayers that was not reflected in the government interest rate.

Canadian National contended that its mandate was to operate as a commercially viable enterprise as evidenced by the Drayton-Acworth Report, statements by Government representatives, and statements by the presidents of Canadian National before Parliamentary Sessional Committees.

The record before this Commission demonstrates that the Federal Government has overtly announced its intention that Canadian National should be operated as a commercially viable, self-sustaining enterprise. It is not clear, however, that the Government's declared intent has been consistently reflected in its actions relative to Canadian National. Thus, in spite of its pronouncements, the Government's true objectives in this regard are obscure. As a consequence, this Commission found them an unsuitable basis for a decision on the appropriate cost of funds rate for Canadian National.

Applicability of the "Yardstick" Railway Concept

Historically the use of CP Rail's capital funds rate for determining costs on Canadian National has been justified on the grounds that it was necessary to protect CP Rail as a competing, privately owned railway system. This justification recognized that use of the lower government debt rate as the capital funds rate for Canadian National would provide Canadian National with an undue cost and

hence pricing advantage where it competed for traffic with CP Rail. As a result, CP Rail would be compelled to accept an average capital funds rate equal to the long-term Government debt rate which in turn would prohibit CP Rail from attracting debt or equity capital in the private financial markets.

The Provinces contended that there is no price competition for statutory grain traffic. Therefore, regardless of the validity of the yardstick railway concept in general, it does not apply in this situation. The Provinces also pointed out that equality of costs and therefore the ability to compete on a price basis is predicated on all costs and not just capital funds costs. Thus, they concluded that there is no more economic justification for assigning CP Rail's capital funds rate to Canadian National than there is for assigning other CP Rail unit costs to Canadian National or other Canadian National unit costs to CP Rail.

The Commission has agreed with the Provinces. Even though the statutory rates set a maximum level only and, therefore, export grain traffic can be subject to price competition, the level of the rates precludes such competition at today's costs of producing the service. Thus, as a practical matter, the yardstick railway concept was irrelevant to the findings of this Commission.

Opportunity Cost vs. Actual Cost

Opportunity cost represents the alternative value of the resources which are consumed in the provision of the railway service. The railways' economic justification for attributing CP Rail's capital funds rate to Canadian National was that this rate measured the opportunity costs to society for funds invested in Canadian National. Since the risk of the two railways was virtually the same, and since CP Rail's capital funds rate measured the compensation necessary to attract capital from the economy under these conditions of risk, the CP Rail rate was the true economic cost of funds invested in Canadian National. The use of this rate ensured that optimum economic choices were made in the use of funds in the public sector.

The Provinces took the position that the use of the opportunity cost concept in determining the capital funds rate for Canadian National required a full opportunity cost approach to all resources employed in Canadian National, including the determination and recognition of all social benefits and costs. They contended that such measurement cannot be accomplished with the data base available to this Commission and concluded that the opportunity cost approach could not be implemented. Further, the Provinces argued that even if this approach were accepted, the opportunity cost

should reflect costs at the time the government provided the capital funds to the Canadian National, not the current opportunity cost of new funds. The Provinces proposed that if opportunity cost were adopted, it must be calculated on a historical or embedded cost basis. The Provinces contended that the appropriate capital funds rate for Canadian National was 5.94 percent* --the Federal Government's embedded interest rate on capital used by Canadian National.

Our objective was to identify the cost of transporting statutory grain by rail. The appropriate cost of funds rate, in this Commission's view, was a rate which fairly and adequately compensated investors for the risks associated with statutory grain transportation. The risks were inherent in the business and were unrelated to the ownership of the enterprise. In the case of CP Rail, the owners (and other investors) require payment, direct and specific, for the risk they incur. Such payment is their condition for the provision of further capital. In the case of the Canadian National, the owners--the Federal Government--choose not to require full risk compensation. Instead they elect to subsidize the railway by offering capital at a rate below that which the enterprise's risk would otherwise

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*This rate was computed by dividing the 1974 interest paid by Canadian National by the 1973-1974 end of year debt outstanding after elimination of interest free government loans and amounts payable to affiliates.

require. This choice is largely a policy option, one from which the Government could withdraw if it so desired.

This Commission was not in a position to incorporate government policy into the cost calculations. Rather, it sought to measure cost--in this case capital funds cost--according to the inanimate economic forces of supply and demand in the presence of risk. The source of such measurement was the capital markets, and the most comparable specific measure was the capital funds cost of CP Rail. Accordingly, this Commission used the cost of funds rate which it adopted for CP Rail as the rate to be applied to Canadian National.

A related issue was whether the rate found to be applicable to Canadian National should include an allowance for income tax. In theory, the Canadian National is a taxable corporation. In practice, it has not paid any significant income taxes since it was organized. Income taxes are accounted for as an expense like any other cost. If they are incurred, they should be included as an element of cost. But if they are not incurred, they should not be included and, therefore should not be reflected in the capital funds rate. Since Canadian National paid no income taxes in 1974, its cost of funds rate was that applicable to CP Rail after the payment of income taxes, which was 11.31 percent.

One of the principal reasons why Canadian National does not pay income taxes is the large total annual interest payment owed to the Federal Government for outstanding debt. Though this Commission did not make a detailed analysis, there was reason to suspect that the Canadian National was over-capitalized and that the government's book debt and equity investment was substantially greater than the real original cost value of the property. Further, the basis on which government money has been supplied to Canadian National (i.e., debt with interest, debt without interest, and equity) does not appear to follow any consistent pattern.

At first glance our conclusion that CP Rail's after tax rate of 11.31 percent was the appropriate capital funds rate for Canadian National may not appear to be consistent with our conclusion as to the proper basis for determining the rate. However, a more careful consideration will reveal that these conclusions are logically consistent. In the case of CP Rail, the cost of capital funds provided by the combined debt and equity investors of CP Limited was $11.31 per $100.00 of investment. In the process of acquiring funds to cover these costs, CP Limited must also pay $9.49 to the government in its role as tax collector. In the case of Canadian National, the cost of funds provided

by its debt and equity investors (for all intents and purposes the Federal Government) was also $11.31 per $100.00 of investment.* The fact that the $11.31 per $100.00 of investment was all paid as interest to the government and that the goverment received no monies in its role as the tax collector does not alter the conclusion that the investors in each railway have received the same compensation per $100.00 of funds invested.

As we have emphasized several times, this Commission was not in a position to incorporate government policies into its cost calculations. However, we do believe that the Government should have before it a measurement of the consequences of various policy options. As mentioned earlier, the Government's decision to make funds available to the Canadian National at a rate below that justified by the risk involved was essentially a decision to subsidize. In order to demonstrate the effects of this decision, we have calculated the costs to Canadian National for transportation of statutory grain under the assumption that the railway recovered only its embedded cost of debt of 5.94 percent as determined by the Provinces. Effectively, this treated all CN capital supplied by the government the same, without regard to whether it was debt or equity. In this

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* For reasons discussed subsequently in this section, the part of this investment related to roadway property was actually stated in terms of investment in CP Rail.

sense it was used by the Commission as a surrogate for the embedded government interest rate on all capital supplied to Canadian National.

As a final alternative, we have computed the capital funds cost of transporting statutory grain by Canadian National at a capital funds rate of 20.80 percent under the assumption that the railway would pay full corporate income taxes on an equity component corresponding to that of CP Limited. The 20.80 percent capital funds rate would also be used under the assumption that, even if CN does not pay taxes, government policy requires that it receive the same amount per $100.00 of investment in its dual role of investor and tax collector from CN as the government and the private investors receive from CP Rail.

Capital Funds Cost for Government Hopper Cars

With the exception of the yardstick railway concept, the positions advocating the adoption of one capital funds rate for Canadian National over another, applied equally to a determination of an appropriate cost of funds rate to be applied to the Federal Government's investment in the Canadian Wheat Board hopper cars. Inasmuch as these cars were purchased with Federal funds and are owned by an agency of the Federal Government, it was contended by some that the interest rate on government long-term borrowing was the

appropriate capital funds rate and, by others, that the opportunity cost capital funds rate was the correct rate.

All parties did agree that the ownership costs, however determined, were costs to the Government and not costs to the railways. This Commission considered the capital cost associated with the Wheat Board hopper cars to be an appropriate part of the costs of transporting grain by rail--even though these costs were not borne by the railways. For the reasons cited in the preceding section, the capital funds rates of 11.31 percent, 8.9 percent,* and 20.8 percent were used by the Commission in its cost study. By the same reasoning used in our findings as to the appropriate capital funds rate for Canadian National, we concluded that the commercial rate excluding income taxes (11.31 percent) was more appropriate for determining the capital funds cost incurred by the government. The capital funds cost was determined by applying the capital funds rates to the average net book investment of these cars over their expected service life. Depreciation expense was based on the annual rate of 3.03 percent contained in the agreement between the railways and the Canadian Wheat Board.

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*The Government interest rate applicable at the time the cars were furnished to the railways. This is analogous to the 5.94 percent and represents the cost of general funds raised by the Government in this period.

GRAIN DEPENDENT LINES

The railways and the Provinces of Alberta, Manitoba, and Saskatchewan separated the grain gathering branch lines into those dependent and those not dependent on statutory grain traffic for their continued existence. The railways called the grain dependent lines "solely related lines" and the Provinces called them "substantially related lines." We found the term "grain dependent lines" to be a more apt description. This Commission adopted the general concept of isolating lines whose existence was dependent upon a specific traffic as a positive step towards specificity and precision in cost analysis.

The Provinces identified the grain dependent lines as being all Prairie Branch Lines on which the originated carloads of statutory grain were 60 percent or more of the total carloads originated and terminated. The Railways used four criteria which a line had to meet before it was classified as a grain dependent line. These criteria were:

- statutory grain tonnage originated must comprise 50 percent or more of the total tonnage originated and terminated;
- the line was not required for operations other than the carriage of statutory grain;
- there was no apparent potential for future development of non-statutory grain traffic originating or terminating on the line; and
- the total freight revenue received in the study year from non-statutory grain traffic

originating and terminating on the line did not exceed the cost of owning and maintaining the line during the study year.

With the exception of the use requirement, the Commission found the criteria used by the Railways to define the grain dependent lines to be more stringent and more in keeping with the concept and adopted it for this study. The Commission determined that the use criterion should be more restrictive and required that 60 percent or more of a line's total tonnage orignated and terminated had to be statutory grain. The Commission found the grain dependent lines in 1974 were all of the lines so designated by the Railways except the Big River, Inwood and Neepawa (part) subdivisions on CN which did not meet the 60 percent use requirement and CN's Herchmer subdivision which did not meet the operational requirements criterion. Further, in our view, this line did not meet the basic concept of the grain dependent line designation. The Herchmer subdivision's existence was dependent upon the port of Churchill and efforts to encourage the economic development of the North.

Appendix H is a listing of all of the CP Rail and Canadian National subdivisions, or parts thereof, which this Commission identified as grain dependent lines. This appendix shows that CP Rail had 3,772 total miles of grain dependent lines and that Canadian National had 3,355

miles in 1974. Subsidy claims were filed by the railways for virtually all of the identified lines. Most of the mileage was in the "B" category lines which are the subject of the Grain Handling and Transportation Commission Inquiry. A restructuring of the Prairie branch line network by the Grain Handling and Transportation Commission could eliminate certain of these lines and could cause lines which did not meet the volume criterion in 1974 to be added to a future grain lines list.

This Commission's acceptance of the grain dependent lines concept has a significant and substantial impact on the development of costs attributable to the carriage of statutory grain by rail. The identification of the lines and the fact that subsidy claims were filed for these lines in 1974* provided a data base for the development of the costs of owning and maintaining these lines on a specific cost basis.

The subsidy applications filed by the railways with the Canadian Transport Commission enabled the development of total costs incurred by the railways on these lines for each of the following cost components:

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*The Railways maintained subsidy claim data on those lines for which no subsidy claim was filed in 1974.

- Roadway Maintenance;
- Station Expenses;
- Property Taxes;
- Depreciation; and
- Capital Funds Cost.

These total cost elements can be separated into those variable with small increments of traffic, (i.e., variable with volume) and those variable with the line, (i.e., line-related). The cost approach used by the railways and the Provinces and adopted by this Commission was to determine the volume-related costs for direct shipment statutory grain traffic originating on the lines and for the total originating, terminating and overhead traffic (including direct shipment statutory grain) on the line. The volume-related cost for the total traffic was subtracted from the total costs to develop the line-related costs. Since, by definition, the existence of the line was dependent upon the existence of statutory grain traffic, the total line-related cost was attributed to statutory grain as was the statutory grain traffic volume-related cost.

The parties to the Inquiry did not dispute the use of specific costs for the grain dependent lines. There were several issues raised regarding the determination of the amount of the lines' specific costs that were applicable to the cost of transporting statutory grain by rail. Each of these issues is discussed below.

Classification of Line-Related Costs

The adoption of the grain dependent line concept assigns both the statutory grain volume-related costs and the total line-related costs to statutory grain traffic. This is contrary to the general concept used in most cost analyses where the study traffic is charged only with the volume-related costs. Usually a railway line is used by a variety of originating, terminating, and overhead traffics. In these circumstances, the line-related costs are common to all the traffic using the line and can be associated only with all of the traffic that uses the line and not with any particular segment.

Both the Provinces and the railways agreed that the line-related costs were properly associated with statutory grain traffic. They disagreed as to whether these costs were variable costs (railway position) or constant costs (the Provinces' position). The identification of the particular cost category of the line-related costs was immaterial in terms of the total dollars charged to statutory grain--the dollars were the same irrespective of cost category. However, we found this conceptual issue should be resolved as it may impinge on future determinations of grain transportation costs.

The reason line-related costs are usually treated as constant or residual costs is that the existence of the line cannot be associated with a particular traffic. This is not the case with the grain dependent lines for they can be and are associated with the total volume of statutory grain originating on the line. The regression experts (one of whom was the author of the definition of variable costs accepted by this Commission) that appeared before this Commission agreed that if the cost function is linear the restriction in the variable cost definition to quantitatively small volumes of traffic can be removed. Removal of this restriction permits the line-related costs to be properly classified as variable under the accepted definition. Given the peculiar circumstances of the grain dependent lines, this Commission found that both the volume-related and line-related costs were variable costs--albeit at two different conceptual levels of variability.

Asset Valuation and Depreciation

The grain dependent lines contain assets which generally are older than the average age of the same assets located throughout the railway system. The Provinces found that the age of the assets was such that the depreciation actually accrued on them (if taken on an individual basis) resulted in their being fully or nearly fully depreciated.

For this reason they attributed no depreciation expense to the grain dependent lines. For the investment base, they used the values reported to the CTC in the railways' subsidy applications. These values, they contended, were equal to the current net salvage value of the lines and represented the proper investment base for determining capital funds cost of a fully depreciated property. The Provinces contended this approach accurately reflected the aging characteristics of the lines and the true depreciation expense and capital funds cost actually incurred on them.

The Provinces and others, including the Manitoba Branch Lines Association, contended that some of the book assets on the grain dependent lines were not "used and useful." These inert assets, they asserted, did not contribute to the operation of the railway nor the transportation of statutory grain and should not be included in the asset base. A corollary of this issue was the assertion that some of the assets, though used and useful, were not associated with the transportation of statutory grain.*

The railways contended it was improper to relate the age characteristics of the assets on the grain dependent lines to their system average life expectancies. They

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*Some examples of these non-statutory grain related assets were stock pens, fertilizer storage sheds, and loading ramps.

applied system average net-to-gross ratios and system average depreciation rates to the gross book value of the assets to determine their net book value and depreciation expense. They contended this was proper because the group depreciation method of accounting anticipated that some assets in a particular group will become life expired before they reached the expected average service life of the group and others will be usable long after they reach this average age. Treating the older assets as fully depreciated on an age specific basis created an imbalance under the group depreciation system and failed to compensate the railways for assets retired before they reach the group average service life. The railways suggested that the groups of assets on the grain dependent lines may have a greater average life expectancy than do those of the system as a whole and, therefore, the application of system average net-to-gross ratios produced a reasonable estimate of their net book investment in the grain dependent lines.

The railways did not dispute the claim that some of the assets on grain dependent lines were not used or useful and that others were not required for the transportation of statutory grain. Their position on this matter was that if the asset was included in the property base it was charged to the line and, under the grain-related lines concept, it appropriately was charged to statutory grain.

The Commission's review of the property items included in the asset base of the grain dependent lines revealed that there were some assets which either were not required for the transportation of statutory grain or were not used or useful. The Commission did not accept the railway position on this matter. The acceptance of the grain-related concept required that only assets used in the transportation of statutory grain be included in the cost calculations. If the assets were inert and served no railway function, they should have been "written off" from the railway's property accounts. If the assets were required for functions other than grain transportation, they should have been isolated from the asset base and their depreciation and capital funds cost attributed to the traffic or function using the assets.

Time and readily available data did not permit us to eliminate such assets from the grain dependent lines asset base. However, we believed the original value of these inert or non-required assets, other than stations (discussed in the following section), was small and the overstatement was minimal. The Commission recommends that the Canadian Transport Commission, as part of its Branch Line Inventory Program, require the railways to "write off" all inert assets included in the inventory and segregate the others into those required for the general operation

of the line, those required solely for grain transportation, and those required solely for transportation of other commodities.

In developing the net asset value for tunnels, bridges, trestles, fences, and snowsheds on the grain dependent lines, Canadian National used CN system net-to-gross ratios rather than those of CP Rail. This was in contrast to the development of the net investment of all other road property where CP Rail net-to-gross ratios were used. As Canadian National's depreciation revenues were admittedly inadequate, the use of the CN net-to-gross ratio overstated the net asset value of these property items. In our cost study, we have used CP Rail's net-to-gross ratio for these assets and adjusted the CN costs accordingly.

The Commission found the Provinces approach to determination of depreciation expenses on the grain-related lines was not consistent with the railways' implementation of the group depreciation concept and, if generally applied, would result in an understatement of the depreciation reserve. More importantly, we found considerable merit and empirical support for the contention that the average life expectancy of the assets on the grain dependent lines was greater than that of the system assets. For this reason the Commission has not accepted the proposition that the

assets on the grain dependent lines were fully depreciated and concluded that some depreciation expense was incurred on these lines.

By the same reasoning, the Commission found that the railways' application of the system average depreciation rates to the gross investment on the grain dependent lines overstated the depreciation expense attributable to these lines. In this regard, we concur with the conclusion of the Canadian Transport Commission stated at page 352 of Reasons for Order No. R-6313 (see also page 394).

> However, as pointed out in the discussion of branch line abandonments, the group plan of charging and accumulating depreciation substantially overstates the rate at which depreciation actually occurs on most light-density branch lines....

Capital expenditures on the grain dependent lines have been so minimal that the current net salvage value of most of the lines was greater than their net book investment determined by use of system average net-to-gross ratios. This fact, confirmed by the railways, revealed that the net investment shown in the railways' subsidy application for most lines was not, as the Provinces assumed, current net salvage value. Rather, it was net book value based on the application of system average net-to-gross ratios to the original

book value of the assets on the lines.* Thus, the net investment base used by the Provinces and the railways was substantially the same.

The considerable evidence presented by the railways and others as to the actual age of the assets, the deferral of capital expenditures and the need for substantial rehabilitation of these lines led us to conclude that the expired life of the assets was greater than that represented by the system average net-to-gross ratios. Thus, we found that the application of the system average net-to-gross ratios to gross investment on the grain dependent lines resulted in an overstatement of the net investment and the capital funds cost attributed to these lines.

This Commission was convinced that the aging characteristics of the assets on the grain dependent lines were different from those aging characteristics of the assets on all lines in the system; and, that system net-to-gross ratios were not applicable to these lines because of the substantial and prolonged deferral of capital expenditures. The Commission also was convinced that the determination of a depreciation

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*Order R-6313 requires that the net investment in road property on lines under subsidy be based on current net salvage value or net book value determined by use of system net-to-gross ratios, whichever is lower.

rate reflecting the aging characteristics of the grain dependent lines and the development of the net-to-gross ratio specific to these lines would result in a reduction of the capital cost attributed to the lines by the railways.

If the Commission's convictions were correct, then it would follow that the appropriate average depreciation rates and average net-to-gross ratios for the other assets were higher than the present system averages. Thus, any reduction in the capital costs attributed to the grain dependent lines would be offset by an increase in the capital costs attributed to the other lines. Data, time and staff limitations prevented us from undertaking the studies necessary for the development of proper averages for both the grain dependent lines and the other lines. For this reason we have adopted the procedure used by the railways with full knowledge that our computed costs overstate the capital costs for the grain dependent lines and understate the capital costs for the other lines. While this concurrent overstatement and understatement are offsetting to some extent, we do not know whether the use of proper depreciation rates and net-to-gross ratios for both the grain dependent lines and other lines would increase or decrease the total capital costs we have attributed to statutory grain.

The Commission's acceptance of the grain dependent lines concept requires the production of cost data specific to those lines. The Commission recommends that separate asset groups and depreciation rates be created for the grain dependent lines. We further suggest that specificity in costing would be substantially improved by expanding this concept to provide for separate asset groups and depreciation rates for main lines and for other branch lines. The reason for recommending the creation of these new groups is that the branch lines and main lines have different service characteristics (most noticeably traffic density). As a result, physical assets on light density branch lines may provide useful service for more years than the same assets on a heavy density main line.

Stations

Changed billing practices of the railways, the introduction of the Block Shipping System and the decline of local freight services on railway branch lines has eliminated much of the need for local railway stations. Canadian National's attribution of $ 1.4 million of cost for the operation and maintenance of 75 stations was challenged by many parties on the grounds that the stations were not required for the safe and continued operation of the grain transportation system. This, they contended, was

supported by Canadian National's request to the Canadian Transport Commission to abandon all the stations on the grain dependent lines except 16 required for train dispatching and control.*

The Commission found that the stations on the grain dependent lines that were not required for dispatching and train control served no function attendant to the transportation of statutory grain by rail. For this reason we did not include the costs attributed to these stations in our cost determination. This conclusion notwithstanding, the Commission did not dispute Canadian National's contention that costs were incurred for these stations in year 1974 and they will be incurred in the future if the requested abandonments are not approved by the Canadian Transport Commission. The Commission recognized that, in the past, abandonment of branch line stations not required for railway operations has been opposed by some of the very parties whose representatives objected to the attribution of the station costs to statutory grain in this Inquiry.

The Commission recommends that if the Canadian Transport Commission does not permit the requested abandonment of any station on the grain dependent lines, it identify

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*Two of these stations (Neepawa and Churchill) are on lines which this Commission did not classify as grain dependent.

the specific railway functions requiring the continued operation of each such station and set forth a procedure for costing its continued operation. If a station's continued operation is required for reasons other than railway functions (e.g., loss of jobs or community tax base) then the cost of operating, maintaining and owning the station should be charged to the line and, hence, to grain as the railways have suggested.

Determination of Volume-Related Costs

The method used to calculate the volume-related costs for all traffic on the grain dependent lines impacts directly on the total costs attributed to statutory grain traffic. In their cost presentations, the railways used system average unit costs to determine the volume-related road maintenance expense, taxes, depreciation expense, and capital funds cost attributable to all traffic using the line.

The Provinces undertook a regression analysis which combined the observations for "labour" and "materials" and the data of CN and CP to develop roadway maintenance unit costs for the grain-related lines. This analysis indicated that the CP unit cost per gross ton-mile on grain-related lines was only about one-third that of CN but that the cost per train switching mile was not statistically different for the two.

This Commission favoured the specific approach of the Provinces, but was not in agreement with the procedure of combining the data for the two railways and for labour and material into a single data set. To determine the effect of the Provinces' procedure on the unit costs, the Commission undertook separate roadway maintenance regressions for CN labour, CN materials, CP labour, and CP materials. These regressions produced poor statistical tests and one negative unit cost which suggested that the approach of the Provinces, while desirable in terms of specificity, may be masking some data problems and may obscure cost differences between CN and CP.

Despite their lack of specificity, we found the most reliable estimate of volume-related roadway maintenance costs attributable to all traffic on the grain dependent lines was based on the application of system roadway maintenance unit costs of CN and CP to the respective output units of the traffic utilizing the lines.

Neither the Provinces nor CP Rail determined variable unit costs for road property investment for the grain related lines. The Commission undertook a regression analysis of the grain related lines investment and depreciation data but the results were not acceptable. For purposes of this study, we used the CP Rail unit costs for system gross

investment and depreciation and the CP Rail net-to-gross ratios as the best available estimate of the volume-related capital costs on these lines.

The various analyses conducted on the roadway maintenance and roadway property unit costs are described in detail in the Technical Appendix. The Commission is not satisfied with the specificity of the unit costs used in its study to determine the total volume-related costs for all traffic using the grain dependent lines. We recommend that future research be conducted by the railways and the Canadian Transport Commission on this matter.

Normalized Maintenance Expenses and Capital Costs

A source of costs which may not appear as expenditures in the accounting records of a railway is the difference between the normalized and the actual maintenance expenses and capital investment costs. It is possible to estimate the maintenance and capital expenditure required to perpetuate existing roadway and related assets at a specified operating standard. Where the actual maintenance and capital expenditures are less than required, the true capital and maintenance costs are not recorded in the financial records of the company and the lines are in a state of deferred maintenance.

No party to this Inquiry disputed the railways' statement that they had not expended the necessary dollars in 1974 and prior years to maintain the grain dependent lines at their original operating standards. Nor was there any disagreement with the railways' contention that the lines were now in a state of deferred maintenance and would need substantial rehabilitation to return them to their original operating standards.

Canadian National and CP Rail estimated the additional maintenance expenses and capital costs they would have incurred in 1974 if they had maintained their lines on an ongoing basis. The maintenance expense dollars were based on engineering estimates, and the capital costs were based on the difference between depreciation expenses calculated on a current cost of assets basis and the depreciation expense actually attributed to the line on an original cost of assets basis.

The Provinces agreed with the general concept of including normalized maintenance expense and capital expenditure as a cost, but contended it did not apply in this instance because the economic cost of deferral ultimately will be paid by someone other than the railways. The Provinces further contended that the railway engineering estimates were unreliable and that the total annual normalized

maintenance expense will be less in the future than it was in 1974. This is because the preponderance of the capital costs and maintenance expenses on branch lines are line-related and not volume-related and, therefore, they concluded that the anticipated rationalization of the branch line network would reduce the number of grain dependent lines and the total normalized maintenance and capital costs associated with them.

The accumulation of past annual maintenance and capital expenditure deferral was reflected in the rehabilitation cost estimates of the railways. We agreed with the Provinces that the railways, by their own admission, do not intend to expend the funds required for rehabilitation of the grain dependent lines--unless there is a substantial increase in the revenues received from statutory grain. This does not change the fact that the cost was incurred by both railways in 1974 and was borne by CP Rail shareholders in terms of deterioration of their assets, and by the Federal Government, as the owner of Canadian National, in terms of deterioration of Canadian National's assets. Whether these costs will be "picked up" in the future by the Federal Government or the railways is dependent upon many circumstances and was irrelevant to this Commission's considerations of costs under contemporary conditions.

Obviously if the branch line system is rationalized in the future, the line-related normalized maintenance expenses and capital expenditures in 1974 dollars should be less than those of the nonrationalized system that existed in 1974. However, this possibility was not relevant to the determination of costs under contemporary conditions and properly belongs in this Commission's evaluation of the impact on railway costs of changes in the system configuration under Term of Reference 3.6.

We have reviewed the estimates of the railway engineers and Loram International, the results of the Canadian Transport Commission's branch line inventory program, and other estimates of normal maintenance and capital costs for light density lines. We recognize that detailed engineering studies of each line would have produced more precise estimates than those presented to us but realize that such studies could not be made for the more than 7,000 miles of track in the grain dependent lines of both railways combined. The Commission concluded that the railway estimates were reasonable and valid and sufficiently precise for the purposes of this Inquiry. The Commission also found that the attribution of normalized maintenance expenses and capital expenditure for year 1974 to the grain dependent lines was proper for the estimation of costs for on-going railway systems.

While the railways' estimates of the 1974 normalized capital expenditures were accepted by this Commission, their development of the capital cost associated with these expenditures was not. The railways treated the capital expenditure as if it were an expense item and assigned the total expenditure to the grain dependent lines. We developed the additional capital cost (i.e., depreciation and capital funds cost) that would have resulted from including the difference between the 1974 normalized capital expenditure and the actual capital expenditure made on the lines in 1974* in the gross and net asset base of the grain dependent lines.

Rehabilitation Costs

In their initial presentation, the railways included in their 1974 costs an amount equal to one-tenth of the estimated costs required to rehabilitate the entire grain dependent line system to its original operating standards. CP Rail estimated the total rehabilitation cost would be $98.1 million in 1974 dollars or approximately $26,000 per mile of road. CP Rail proposed to amortize this expense over a 10 year period and charged $9.8 million to the 1974 costs of transporting statutory grain. Canadian National

*For this purpose we assumed that the actual capital expenditure was equal to the depreciation expense computed on the book cost of the assets in the grain dependent lines.

estimated a total rehabilitation of $171.4 million or approximately $48,000 per mile of road. CN also proposed to amortize this expense over a 10 year period and charged $17.1 million to the 1974 costs of transporting statutory grain.

All parties appearing before this Commission agreed that substantial rehabilitation and possibly a more costly upgrading program would be required to enable the branch lines to operate at reasonable standards. In their rebuttal presentation and summary statements the railways stated that the timing, scope, and cost of the rehabilitation program can not be determined with any certainty and that a decision as to who should bear the costs of rehabilitation can not and will not be made at this time. For these reasons they concluded that the calculation of the 1974 costs should not include an allowance for rehabilitation.

The Commission is in accord with the position of the railways and the parties that rehabilitation costs are not appropriately attributable to the carriage of statutory grain in year 1974. The Commission found that the rehabilitation costs were the cumulative result of the deferral of maintenance and capital expenditures on the grain dependent lines in years prior to 1974. The costs were borne by the

railway's owners in terms of deterioration of their assets in each of the years in which capital and maintenance expenditures were deferred. However, those costs were not attributable to year 1974.

FREIGHT CAR COSTS

Canadian National maintains its main shop car repair costs separately for 32 different car type repair groups and develops main shop repair unit costs for each. CP Rail maintains system average car repair costs and applies a system average unit cost to all car types. The Canadian National's unit costs reveal that there are significant differences in the unit costs of main shop repairs among the various car types. The unit costs for box cars are lower than those of most of the other car types, and, the unit costs for railway owned covered hoppers are higher. The railways contended, without supporting documentation, that the older box cars used in grain service have a higher than average car repair unit cost.

CP Rail's failure to identify the main shop repair differences among car types reduced the specificity and precision of the freight car repair costs they attributed to statutory grain. The Commission could not improve upon the lack of specificity of CP Rail's car repair unit costs for this study due to the absence of main shop repair data on a car type or repair group basis.

If, in future studies, the railways desire to pursue the contention of higher average repair costs for older cars, it is suggested that they maintain their car repair records by age groupings. The existence of a large fleet of railway box cars dedicated to the grain trade suggests that both the issues of age and specificity in freight car repair costs applicable to the transportation of grain could be resolved by the maintenance of separate main shop repair costs for the cars in the dedicated fleet.

During the course of the hearings, the Commissioner implied, and the railways agreed, that their treatment of the 1974 Federal Government's payment to them for repair of certain box cars failed to attribute the total payment as a credit against the costs incurred for repairing box cars used in the grain service. Upon reflection and review of the record, the Commissioner has concluded that he was wrong and that the railways treated the government payment properly. Given the railways' present method of computing freight car repair costs, the unit costs used in their studies were the same as the unit costs they would have calculated if the repairs paid for by the government had not been made.

The Commission found the railways' separation of freight car repair costs between that caused by car days

(time) and that caused by car miles to be inconsistent. CP Rail assigns 25 percent of its costs to time and 75% to mileage based on studies performed by the U.S. Interstate Commerce Commission.* Canadian National assigns about 85 percent of its main shop repairs** to time and 100 percent of its running repairs to mileage. Overall CN assigns about 50 percent of its repairs to time and about 50 percent to mileage. The Commission did not believe the difference between the two railways in the attribution of car repair costs to time and mileage significantly affected the costs of transporting grain. However, we found it difficult to accept that the causes of car repair costs on the two railways justify the significant difference in assignment to time and mileage.

CP Rail, Canadian National, and the Provinces all determined the gross investment and net investment in railway owned freight cars used in the carriage of statutory grain. CP Rail developed the average gross investment per car for 58 groups of box cars and 28 groups of covered hopper cars that were used in the carriage of statutory grain. The average gross investment for each group was weighted by the

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* The Interstate Commerce Commission studies presently assign 50 percent to time and 50 percent to mileage.

** Canadian National develops the time portion of main shop repairs through periodic special studies.

grain carloads carried in 1974 to develop an average gross investment per box car and an average gross investment per covered hopper car. Canadian National followed a similar procedure but used the inventory of cars in each group as the weighting factor. We found carloads of grain carried to be a better weighting factor for purposes of determining costs attributable to grain and have restated CN's average investment on this basis. Both CN and CP applied average depreciation rates and average net-to-gross ratios for all cars in the system to the gross investment to determine depreciation expenses and net investment attributable to the freight cars used in grain service.

The Provinces accepted the railways' methods for covered hopper cars. The Provinces determined that many of the box cars used to carry grain have exceeded their average service life (a fact not disputed by the railways) and concluded that they were fully depreciated. On this basis, the Provinces treated all cars over 31 years of age as having zero net investment and determined the actual gross and net investment for cars less than 31 years of age. These gross and net values (including those at zero) were then weighted by the use of the cars in the grain trade to develop average net and gross investment per car. The Provinces contended that this method was superior to that employed by

the railways as it reflected the specific aging characteristics of the cars used in the grain trade.

The railways contended that the cars used in grain service were the remaining cars of a group, some of which were removed from service prior to attaining the group average service life and that the use of these cars in grain service did not necessarily extend their expected lives over those experienced by cars carrying other commodities. In some instances, the lighter capacity railway lines of the Prairie network required the use of these older cars.

The railways argued that the average service life for all cars may be too short for the particular cars used in the grain trade. However, they maintained that if this was the fact then the system net-to-gross ratios for all freight cars may be appropriate for the grain cars and that depreciation expense--albeit at a lower annual rate--should continue to be charged on these cars.

This Commission found that depreciation expense and the net asset base attributed to freight cars by the railways to be superior to that proposed by the Provinces--given the current state of the group depreciation method used by railways. However, we believe this method obscures probable differences in the capital costs of different types of freight cars and

possibly obscures differences in capital costs of the same type of freight cars in different services--particularly cars which are substantially dedicated to a particular service.

Reasons for Order No. R-6313 required the railways to allocate 80 percent of freight car depreciation to car days and 20 percent to car miles as an interim measure and to conduct an indepth study of the causes of freight car deterioration. In their cost studies Canadian National used this 80-20 factor while CP Rail attributed 100 percent of the depreciation expense and capital funds cost to time. CP Rail's principal justification for assigning all of the costs to time was that the car fleet used to transport grain was essentially assigned to the service, and therefore, the use of the 100 percent time factor would not change the costs.

We agreed with CP Rail regarding those cars that essentially were in assigned service. However, a significant amount of grain was carried in cars not so assigned and, therefore the use of the 100 percent time factor could distort the cost study results. We found that the interim 80-20 factor apparently was selected arbitrarily and that the railways have not produced studies which provide a basis for development of a new allocation factor. Indeed, the railways indicated that the studies ordered by the

Canadian Transport Commission are not feasible and will not produce a factual basis for prorating freight car depreciation expense and capital funds cost between time and mileage. For reasons of consistency, we have rejected CP Rail's use of the 100 percent factor and have used the 80-20 basis in our cost study.

In accepting CP Rail's car repair unit costs and the CP and CN gross and net investment values for freight cars used in grain service, the Commission believes that some degree of specificity has been lost. However, we do not believe that this lack of specificity caused significant distortions in our development of total costs or that it had any major impact on the reliability of the study results.

The Commission found that the methodologies employed by each of the railways in the development of car costs, while in conformance with the Costing Manuals and the Cost Order, were not consistent with each other and that increased specificity in the development of freight car costs was both desirable and possible. The Commission strongly urges CP Rail to maintain separate main shop repair records and appropriate output units for cars substantially dedicated to the grain trade. Further, that CN and CP set these cars out as a separate group with its own depreciation rate in the railway property accounts.

The Commission recommends that the Canadian Transport Commission inquire into the adequacy of all aspects of freight car cost determination with an objective of prescribing methodologies that will result in a consistent approach on both railways and that will provide more specific freight car costs by car type and by car use. We believe that such an inquiry could eliminate most, if not all, of the freight car cost issues.

HOMOGENEITY OF RAILWAY UNIT COSTS

In their presentation to the Commission, the Provinces of Alberta, Manitoba, and Saskatchewan proposed three changes to the railways' costing procedures intended to increase cost specificity through the development of unit costs for homogeneous segments of the railway system.

East/West Costs

It has long been contended that railway operations and the facilities used in Eastern Canada and Western Canada were so different that it would be inappropriate to utilize system average unit costs for purposes of estimating the cost of transporting statutory grain. To test this hypothesis, the Provinces examined the geographical homogeneity of those unit costs developed by regression analysis.

To determine if different unit costs could be established for the western operations of Canadian National and the western operations of CP Rail, the Provinces' analysts performed a series of tests on 30 CN and 38 CP cost models developed by means of regression. Of these, three Canadian National and seven CP Rail models revealed statistically significant east-west differences. However, the east-west differences occurred for entirely different models on each of the two railways. The models with significant east-west differences on each railway were:

Canadian National

- Road Maintenance Superintendence--Labour
- Yard General Expenses--Labour
- Shop General Expenses--Material

CP Rail

- Signals Maintenance, Operation and Dispatching--Materials
- Maintenance of Shops and Enginehouses--Labour
- Maintenance of Shops and Enginehouses--Materials
- Equipment Maintenance Superintendence--Labour
- Maintenance of Shop and Power Plant Machinery--Materials
- Power Plant Machinery--Depreciation
- Power Plant Machinery--Gross Investment

The railways contended that the Provinces had not identified the factors which could logically explain the statistically demonstrated differences and that the differences could be observations of random statistical occurrences which had no pragmatic foundation. Further, operating, maintenance, and capital investment policies were uniform throughout the systems of each railway and a geographical segregation of costs was not meaningful. They concluded the evidence presented by the Provinces was not sufficient to show that costs in the east were significantly different from those in the west.

Analysis and review of the Provinces' material and that of the railways led the Commission to the finding that there were no demonstrated reasons for substantive differences between costs incurred in Eastern Canada and costs incurred in Western Canada. The Commission concluded that system average regression unit costs did not contain an east/west bias. We used the system average unit costs where appropriate in determining the cost of transporting grain by rail in Western Canada.

Main Line and Branch Line Costs

Roadway maintenance unit costs were developed by each railway for all of its system lines combined. CP Rail developed roadway investment unit costs for all of its system

lines combined, which costs were also used by Canadian National. Empirical evidence suggested that maintenance and investment characteristics of main lines were different from those of branch lines. The issue of whether average unit costs for all lines combined were adequate for determining the maintenance and ownership costs of main lines as opposed to branch lines was debated at length before this Commission.

The Provinces and others held that the light traffic densities and the operating and investment characteristics of the branch lines were significant cost causative factors. Accordingly, unit costs should be developed independently for main and branch lines. Further, these differences were probably magnified by the deferral of capital replacement and maintenance expenditures on the grain dependent lines. It was suggested that main lines, fully maintained branch lines, and branch lines with maintenance and capital investment deferrals each have their own maintenance and investment characteristics.

Neither railway keeps its roadway maintenance expenditures on a specific line basis. Canadian National does not have a sufficient disaggregation of its road property investment data to develop even system investment unit costs and CP Rail does not maintain its road property accounts on

a subdivision or specific line basis. Hence, it was not possible to develop either maintenance or investment unit costs directly for any of the three categories of lines.

As a part of the branch line subsidy program, the railways record maintenance and property investment data for the specific lines under subsidy. The Provinces' applied these data for lines in Western Canada to a regression model to develop roadway maintenance costs for light density lines. They contended these unit costs were better estimates of the cost of roadway maintenance on branch lines in Western Canada than were the system unit costs used by the railways.

The Provinces excluded these same data from the area observations in Western Canada to develop main line roadway maintenance unit costs using combined Canadian National and CP Rail observations. The combined data were used because of a lack of sufficient observations for either Canadian National or CP Rail in Western Canada and the expectation that main line unit costs for Canadian National were not dissimilar from those of CP Rail. The Provinces' analysis produced statistical results which were not significantly superior to those produced by the railways' procedure. However, the greater specificity inherent in the Provinces' approach made it more attractive for costing of statutory

grain traffic. They expressed the belief that more reliable estimates would have resulted from an independent analysis of maintenance costs on main lines and on branch lines for each railway if the appropriate data had been available.

In rebuttal, each railway developed system average roadway maintenance unit costs excluding all branch lines in Eastern and Western Canada with deferred maintenance. The Canadian National unit costs for the non-deferred maintenance lines were significantly different from, and statistically superior to, the unit costs for all lines combined. The unit costs and statistical results of the CP analysis excluding the deferred maintenance lines were only marginally different from those developed on a system basis. In their final cost estimates Canadian National used the unit costs for the non-deferred maintenance lines while CP Rail continued to use the unit costs for all system lines.

Neither the Provinces nor CP Rail developed roadway property gross investment or depreciation unit costs for the lines without deferred maintenance. The Commission did compute these unit costs through regression analysis. This analysis produced statistical results superior to CP Rail's regression analysis for all system lines.

The unit costs for roadway maintenance, depreciation, and property investment for lines without deferred maintenance were, in our view, superior to the system average unit costs for all lines on each railway and were used in our cost study for determining these costs on all lines except the grain dependent lines. However, these unit costs do not provide satisfactory explanations for all of the issues raised in this regard during the course of this Inquiry.

The issue of appropriate unit costs for maintenance, depreciation, and property investment on branch lines and main lines has been debated since the period preceeding the MacPherson Commission hearings. This Commission believes resolution of this issue is dependent upon the railways recording maintenance expenditures and property investment data on a subdivision or specific line basis and recommends that the railways tabulate the data on this basis commencing with the year 1977.

Unit Costs for Both Railways Combined

The concept of developing single unit costs for Canadian National and CP Rail, combined, for regulatory purposes has been proposed for some twenty-five years. The Provinces utilized this approach in estimating the maintenance costs of lines in Western Canada and advocated it for

the development of all unit costs. The statistical tests conducted by the Provinces in regression equations suggested that cost differences between the two railways were not significant. However, this does not lead to the conclusion that they were the same.*

This Commission concluded that CN and CP were not sufficiently similar to justify their combination in the development of unit costs. Though unit costs developed through such combination may be more statistically acceptable, they were not in accord with cost specificity. Further, the implementation of this Commission's recommendations for the development of more specific data will likely negate the statistical advantages of combining the railways for costing purposes.

CANADIAN NATIONAL ROAD PROPERTY INVESTMENT

Straight line depreciation accounting was adopted in 1956 by both Canadian National and CP Rail. Since that time, both railways have maintained similar sets of records for depreciation accruals although the depreciation rates used by them have varied slightly. One of the areas in which the railways differ is in the recording of gross

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*The statistical interpretation of a finding of no significant difference is discussed in detail in the Technical Appendix to this report.

investment and depreciation accruals for road property. Canadian National records these expenses at the system level and maintains only a single entry for each road property account. CP Rail maintains this information for some 430 property sections. As a result, Canadian National is unable to produce gross road property investment variable unit costs. In lieu thereof, Canadian National utilizes CP Rail's variable unit costs to allocate investment costs to the appropriate output units. In essence, this procedure assumes that Canadian National's variable gross investment per unit is the same as CP Rail's.

The same situation existed at the time of the MacPherson Royal Commission Inquiry and at the time of the Canadian Transport Commission's Cost Inquiry. The Canadian Transport Commission's reason for accepting CP Rail's road property unit costs for Canadian National was that it had no feasible alternative. The CTC recommended that Canadian National separate its road property among its then 18 accounting areas (now 16 accounting areas) and develop its own road property unit costs.*

Canadian National used CP Rail's road property gross investment unit costs in their cost estimates for this Inquiry. They reported that they had undertaken the development

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*Reasons for Order No. R-6313, page 350.

of a road property inventory for a sample of 31 subdivisions. The field work had been completed and the data were being compiled and tabulated and were expected to be ready for regression tests by mid-1976.

This Commission found the use of CP Rail's road property investment unit costs as a surrogate for those of Canadian National to be totally counter to the concept of specificity in cost development and totally contradictory to the railways' position that costs should not be constructed on the basis of the two railways combined because they were not homogeneous entities. The use of CP Rail's road property unit costs was also contradictory to the contention of the railways that the physical track and roadway structure of the two railways were different--a contention borne out by the differences in miles of branch lines operated and miles of branch lines with lightweight rail.

This Commission, like the Canadian Transport Commission, had no feasible alternative but to accept the use of CP Rail gross investment unit costs as estimates of Canadian National variable road property investment. We deplore this lack of specificity in our cost estimates and must admit that our estimates of road property depreciation expenses, capital funds cost, and property taxes for Canadian National on other than the grain dependent lines are

order of magnitude estimates. The Commission's queasiness in this area of costing is somewhat eased by its development of a gross investment equation for CP Rail which, by excluding the deferred maintenance lines, develops unit costs from a data base closer to a pure mainline base--an area where the investment of Canadian National and CP Rail should be more homogeneous.

This Commission can do no more than reiterate the recommendation of the Canadian Transport Commission that Canadian National develop its own variable gross investment unit costs. Until this is accomplished, the reliability of the road property capital cost attributed to Canadian National's carriage of statutory grain must be suspect.

During the 1968 Cost Inquiry hearings, Canadian National agreed that its depreciation reserves were inadequate and produced net book values which overstated the unexpired value of the assets employed. To prevent such an overstatement from being translated into costs which would be similarly overstated, the Canadian Transport Commission directed Canadian National to use the net-to-gross investment ratios of CP Rail and to develop a program which would provide acceptable current net-to-gross investment ratios for Canadian National.

There has been little change since 1968 and Canadian National's Costing Manual provides for the use of CP Rail net-to-gross ratios for the development of net investment in road property. This approach was followed by Canadian National in its submissions to this Commission except as noted in the section of this chapter on the grain dependent lines. As was the case with gross road property investment unit costs, this Commission had little choice but to accept the use of CP Rail net-to-gross ratios for the development of Canadian National net investment in road property. This was done with the same reservations on the reliability of the capital funds cost computed therefrom expressed earlier in this section and the reiteration of the same recommendation that Canadian National undertake to develop appropriate net-to-gross ratios for its own road property investment.

This Commission had problems in determining reliable capital costs attributable to the transportation of statutory grain by Canadian National. Much of the difficulty can be traced directly to the capitalization of Canadian National, the lack of detailed data on Canadian National's gross road property investment, and the lack of reliable estimates of Canadian National's net investment in road property. This Commission heard considerable testimony regarding the Government's intent to have Canadian National operated as a commercially viable enterprise and the efforts of Canadian

National's management to accomplish that goal. If indeed this is the objective, we strongly suggest that Canadian National develop an asset base that reflects the true gross and net values of the road property actually employed in providing the rail transportation service and that Canadian National and the Government establish a realistic capitalization and capital structure for Canadian National. The existing status of the Canadian National investment and capital structures is a hinderance to reliable cost ascertainment and effectively prevents any factual demonstration that Canadian National can be operated on a commercially viable basis.

FUEL COSTS

The present railway method of estimating fuel consumption created two issues before this Commission. The first related to the accuracy of the estimate itself and its usefulness for determining the fuel costs attributable to statutory grain traffic. The second related to the use of fuel consumption as the independent variable for estimating locomotive repair costs by horsepower category. Both of these issues had been raised before the Canadian Transport Commission in the Cost Order proceeding and were left unresolved pending further research.

Canadian National utilized a formula developed by W.J. Davis which relates fuel consumption to work performed to estimated fuel consumption in their initial submission to this Commission. This formula permits calculation of the work required (measured in pound miles) to move a railroad train a given distance considering the train weight and speed, number of axles and cross-section area of vehicles, and the grades traversed. Fuel consumption per pound mile is developed empirically and is combined with the Davis formula estimate to produce fuel consumption for the study traffic. This estimated consumption is then multiplied by the regional cost per gallon of fuel to produce the fuel costs attributable to the trains handling the study traffic.

After filing of their initial submission to this Commission, Canadian National indicated that the use of the Davis formula as perscribed in their costing manual created a substantial understatement of fuel consumption. A more recent study of fuel consumption conducted by CN yielded a consumption rate of 1.515 gallons per thousand gross ton-miles or 23 percent greater than the Davis formula estimates of 1.23 gallons per thousand gross ton-miles. The estimate of 1.515 gallons per thousand gross ton-miles was within 4 percent of CP Rail's estimated consumption rate. Canadian National based its final cost calculations on the consumption rate of 1.515 gallons per thousand gross ton-miles.

CP Rail does not utilize the Davis formula. At the conclusion of each train run, the engineer estimates the fuel consumption based on train tonnage, speed, distance, terrain, weather, and any other factors which he feels may have affected consumption on the run. While CP Rail believes this method to be reasonably accurate, the total of all such estimates is about 10 percent less than the actual fuel consumed in the system. To correct for the difference between actual and estimated fuel consumption, the engineers' estimates are adjusted by an appropriate ratio developed annually.

None of the methods used by the railways permits a separation of the estimate of total fuel consumed among the locomotive units used to power the train. While both railways contend that the mix of locomotive horsepower will have an impact on total fuel consumed, apparently neither the Davis formula nor the engineering estimates give consideration to this factor.

Each railway currently develops road locomotive repair unit costs by horsepower category on the basis of road locomotive unit-miles. At both the Canadian Transport Commission Cost Inquiry and this Inquiry, it was contended by various parties that road locomotive unit-miles did not reflect the locomotive work effort under differing conditions

and, therefore, did not accurately reflect the cause of locomotive repairs. The literature on this subject leads to the conclusion that the locomotive unit-mile may not be an appropriate measure of the cause of most locomotive maintenance. As fuel consumption tends to vary in relation to the work performed by the locomotives, it is suggested that this is a better measure of the cause of locomotive repair expense.

This Commission reviewed the procedures proposed by the parties and adopted the railway approaches for both estimating fuel consumption and for determining locomotive repair cost. However, the Commission finds that the Davis formula approach for determination of fuel consumption is preferable for future grain costing. The problem with the present formula appears to be the manner in which it is calibrated and its failure to consider certain factors that have an influence on fuel consumption.

The Commission also found that fuel consumption may well be a more precise explanatory variable for estimation of locomotive repairs--particularly for trains which must traverse steep grades as is required for carriage of grain to the Pacific Coast ports.

This Commission reasserts the recommendation of the Canadian Transport Commission on these matters as stated

in the Reasons for Order No. R-6313 dated August 5, 1969:

> The railways have indicated their intention to conduct further research into the Davis formula, and we agree that this should be carried out as soon as it is feasible to do so. (p. 365)
>
> Both railways should immediately begin accumulating the necessary statistics to test whether locomotive costs based on fuel consumption are more appropriate than present procedures. (p. 375)

In reasserting the recommendations of the Canadian Transport Commission, this Commission is cognizant of the fact that next to nothing has been done on these two issues during the 7 years since release of the Reasons for Order. It is hoped that this Commission's recommendations, along with the Canadian Transport Commission recommendation, will result in commencement of the necessary research and data collection to put to rest this continuing debate over the validity of fuel consumption estimates and the appropriate causative factor(s) for assignment of locomotive repair costs.

INSTITUTIONAL COSTS

A cost concept debated during the course of this Inquiry was the assignment of institutional costs to the transportation of grain. Institutional costs were defined as costs caused by structural rigidities which the railways

incur in, but are not required for, the provision of transportation service. Some examples of these rigidities are:

- labor union agreements requiring the continued use of a particular class of employee in particular circumstances; and
- government regulations affecting the handling of traffic between railways and the railways' failure to take advantage of interchange to reduce route of movement miles.

During the Technical Committee phase of this Inquiry, it was suggested that certain costs associated with the rail transportation of statutory grain were incurred because of institutional factors rather than because the cost causing activity was required for provision of the transportation service.

The railways contended these costs must be assigned to the grain traffic because they represented expenses they actually incurred in providing the transportation service. Other parties argued that these expenditures were for resource inputs that were not required to perform the transportation service and their inclusion overstated the true cost of transporting grain by rail. The Commission agreed with the concept that expenditures for resource inputs which were not required for efficient and safe performance of the transportation service should not be attributed to

the grain traffic and has structured its findings accordingly.*

Institutional Labour Costs

Prominent among the causes of institutional costs is the use of technologically redundant labour in the operation of the railway. With changes in technology, the need for certain classes of employees has either diminished or totally disappeared. The best known case of labour obsolescence is that of locomotive firemen. In this case, the railway labour unions reached a compromise agreement with the railways whereby the firemen's job is being eliminated through attrition of the employees. As the presence or absence of a fireman on a particular train is unrelated to changes in traffic volume, the railways treat the costs associated with firemen as system constant costs. In their submissions to this Commission, the Provinces and others identified two areas where they alleged that the cost causing labour activity was not required for carriage of grain traffic and the associated costs should be considered constant costs for the same reason as are the costs associated with the firemen.

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*For this reason, the Commission excluded Canadian National's branch line station costs for all stations, except those required for train operations, on the grain dependent lines even though such costs were incurred in 1974.

Road Crew Costs

A train is normally manned by a road crew which includes a conductor and two brakemen and an engine crew. The Provinces took the position that the use of advanced signalling systems has made the flagging function performed by the rear brakeman redundant and that the flagging was unnecessary on the grain gathering branch lines because they normally handle only one train per day. The Provinces contended that their position also was the position of railway management in its argument to the Honorable Emmett M. Hall, Arbitrator, Railways Arbitration, 1973. They further contended that the award of the Arbitrator* and the present practices of the Illinois Central Gulf Railroad** are indications that the second brakeman can be eliminated.

It was clear from the evidence presented to this Commission, that the management of both Canadian National and CP Rail believed that the second brakeman can be eliminated from many trains without impairing the maintenance of adequate safety or placing an undue burden on the reduced crew. On the other hand, it was apparent that the labour

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*The award of the Arbitrator is presently before the Federal Court of Canada.

**According to the Provinces, the Illinois Central Gulf operates a few trains with a two-man road crew and no caboose.

unions did not agree with the management position and generally have resisted any attempts to eliminate the second brakeman.

This Commission had neither the expertise nor the resources to determine whether the second brakeman was required, by other than union contract, as a labour input for the safe and efficient transportation of statutory grain under contemporary conditions. There was no doubt that the railways incurred the costs of the second brakeman and that such costs were variable with the number of trains operated. Therefore the costs of the second brakeman were variable with traffic volume to the same extent as the trains on which they were employed. In this respect, the costs incurred by the railways for the second brakeman were different from those incurred for the firemen whose cost incurrence does not vary with the number of trains operated. It is quite possible that the costs incurred for the second brakeman do, in fact, fall into the category of institutional costs. However, this Commission had no basis for making such a finding and has attributed these costs to the transportation of statutory grain in the same manner it has attributed the costs incurred by other members of the road crew.

Yard Crew Costs

A somewhat similar situation exists with respect to yard switching crews which normally consist of a foreman and two switchmen (ground crew), and an engineer. Many switching tracks are curved and the yard locomotive engineer cannot see the cars being coupled or uncoupled at the end of the train when he is moving a long cut of cars. While one switchman attends the couplers or switch near the train end, the foreman and/or other switchman is placed around the curve and passes along signals from the end switchman to the engineer. In recent years, citizen band radios or "walkie-talkie" devices have been used in railway operations. As visual contact is no longer essential to safe operation at many locations, the railways have contended that the second switchman's job function should be eliminated. Partial acceptance of this contention has been obtained from the railway unions and a number of yard engines now operate with two-man ground crews.

As of September 30, 1975, the Provinces determined that 94 percent of the Canadian National and 43 percent of the CP Rail yard crews working in Western Canada were considered by their respective railway managements to be reducible to two-man ground crews (i.e., the second switchman's job was not required). The Provinces contended that

the costs incurred for all of the crews considered by management to be reducible were institutional costs and should not be charged to grain service.

Our review of the situation reveals that 44 percent and 26 percent of the Canadian National and CP Rail yard crews respectively were actually working reduced as of September 30, 1975. Management and the unions agreed that an additional 33 percent of the CN crews and 10 percent of the CP crews could be reduced. The Commission agreed with the Provinces that these yard crews (77 percent of the total crews of CN and 36 percent of the total crews of CP) were not required for safe and efficient operations in 1974. We have not included the costs of these crews in our cost study.

There is no question that the managements of Canadian National and CP Rail believe that an additional 17 percent and 7 percent of their respective yard crews in Western Canada can be reduced to two-man crews. However, the fact that the unions have not agreed to such reductions indicates there may be some dispute over whether these crews are required for reasons of safety. As was the case with road crews, the Commission was not in a position to evaluate the need for these crews and has included the cost of these in its cost study.

Circuitous Routing

The Provinces contended that the railways did not always use the shortest available route from the primary elevators to the ports because they handled the grain traffic on a single line basis, i.e., there was no interchange of grain traffic between the two railways except at Vancouver and Thunder Bay where some traffic was interchanged before it was switched to the terminal elevators. The Provinces argued that the failure of the railways to interchange grain traffic and the costing of grain traffic on an actual route-of-movement basis, was not in compliance with the standard set forth in Section 278 (3)(d) of the Railway Act which provides:

> (3) In determining the variable cost of the carriage of goods for the purposes of this section, the Commission shall
>
> (d) if the goods concerned may move between points in Canada by alternative routes of two or more railway companies, compute the variable cost on the basis of the costs of the lowest cost rail route.

To illustrate the magnitude of the cost savings that could occur through interchange, the Provinces determined the car-mile and car-day reductions that would result through interchange from CN to CP at Calgary, and from CP to CN at Edmonton, Lloydminster, Prince Albert, Saskatoon, and Melfort. For 13 sample CN subdivisions, the Provinces

determined that a CN interchange to CP Rail at Calgary would have resulted in 1974 car-mile and car-day savings of 915,000 and 1,270 respectively.

The railways agreed with the Provinces that in some instances, the single line routing did result in a longer haul. They did not agree, however, that elimination of the longer haul necessarily would result in a net savings to the railways. This was because the additional switching required to interchange the cars and the additional car-days accrued in the interchange process may well produce greater costs than the savings due to the use of the shorter route. The Provinces agreed that this could be the result but did not believe it would be. Neither the Provinces nor the railways made any studies to determine if there would be a net cost saving through the interchange of traffic between the railways.

The Commission found the costing of grain on an actual route-of-movement basis was in compliance with section 278 (3)(d) of the Railway Act for two reasons. First, we believe the reference to alternative routes in Section 278 (3)(d) refers to instances where two or more carriers serve the same origin and have single line or interline routes to the same destination rather than instances where a single railway serves the origin and could move the traffic to

destination via a single line or, alternatively, via an interline route.

Second, and more important, Section (3)(d) refers to the computation of variable costs on the basis of the lowest cost route. The Commission agreed with the railways that the shortest route was not necessarily the lowest cost route. Indeed, our past experience has indicated that a shorter route-of-movement requiring one or more interchanges between railways is very often a higher cost route than is a longer single line route-of-movement.

We understand that one of the obstacles to the interchange of carloads of grain traffic between two railways was the determination of how the costs of interline shipments would be treated under the branch line subsidy program. We further understand that Canadian National, CP Rail, and the Canadian Transport Commission have now reached an agreement on this issue and that cars are now being interchanged from CN to CP at Calgary and from CP to CN at Edmonton. This can be considered an indication that, at least with respect to the Calgary-Edmonton cross-haul, there are some economies to the railways through interchange and that additional interchange of cars would create even greater cost reductions.

This Commission accepted the concept that if regulatory constraints or management inertia resulted in increased costs such costs should not be attributed to the transportation of statutory grain. However, we were not convinced that there were any real cost savings which could be achieved through the interchange of cars between CN and CP--even at Edmonton and Calgary--and believe that a detailed study would demonstrate that cost savings, if any, would be relatively small. We accepted the actual rail routings for our development of the costs of transporting statutory grain under contemporary conditions. The Commission will explore this issue further in its consideration of the impact upon railway costs of moving grain under different grain handling and transportation assumptions (Term of Reference 3.6) and will include these findings in Volume II of our report.

GRAIN CAR SWITCHING

Since the MacPherson Commission hearings, the development of the appropriate switching minutes for grain traffic has been at issue. This issue was brought before the Canadian Transport Commission in the Cost Inquiry. At page 388 of Reasons for Order No. R-6313, the CTC states as follows:

> The Committee believes that the railways have ignored this element [switching cut size] in switching costs for too long. Accordingly, the railways will be directed to institute the following studies immediately:

(1) A study to determine the average cut size used in the switching of grain cars at major grain-handling yards.

(2) A study to determine whether other broad classes of traffic experience consistent variations from the average cut size of all freight traffic moving through major yards and terminals.

(3) A study to determine the cost variations resulting from differences in car lot sizes in each of the switching elements.

Neither railway had performed the studies directed by the CTC prior to the commencement of this Inquiry. Both railways did undertake special switching studies of grain carrying cars to supplement the data normally used for costing general traffic and costing required by the Canadian Transport Commission. The studies were extensive and covered the major yards used by statutory grain traffic. Both were based primarily on the knowledge and judgment of operating personnel at the yards studied rather than a detailed recording of actual locomotive time spent on particular activities and detailed tracing of the locomotive movements throughout the yard--leading some to characterize the studies as "opinion polls of yardmasters."

This Commission did not agree with that characterization for either the studies conducted by Canadian National or by CP Rail. We concurred with the observation

that detailed time and activities studies (often referred to as on-the-ground studies) more readily lend themselves to objective analysis and, for that reason, were superior to the more subjective studies conducted for this Inquiry.

The major concern was with the studies of CP Rail and raised the same issue which caused the Canadian Transport Commission's findings and directive referred to above--namely, CP Rail's switching studies did not reflect the difference in cut size between grain cars and non-grain cars and, therefore, overstated the minutes, and hence, costs attributed to yard switching of grain cars. The Provinces found that the CN studies did differentiate between cut sizes of grain and non-grain cars. For CP Rail, the Provinces developed the relationship between the weighted average switching minutes for grain cars and the average switching minutes for all cars weighted by the grain cars from the CN studies. The Provinces used this relationship to adjust the grain traffic yard switching minutes determined by CP Rail. The effect of this adjustment was to reduce CP Rail's yard switching minutes for grain by seven percent.

CP Rail contended that their switching studies reflected the time required to switch grain traffic and gave full consideration to any differences in cut size that may have existed between grain traffic and all other traffic. They

pointed out that their yard operations and methods of handling grain cars were different from those of Canadian National. The operations and methods produced significantly smaller differences in cut size between grain cars and all other cars than did the yard operations and handling methods employed by Canadian National. Thus, they claimed it was inappropriate to apply Canadian National experience to their studies.

The Commission found that CP Rail's yard switching studies did not explicitly measure the differences in cut size between grain cars and non-grain cars and did not determine the cost variations resulting from these differences. In this respect, it is our opinion that CP Rail had not fulfilled the requirements of the Canadian Transport Commission directive. This finding notwithstanding, our review and analysis of all of the evidence presented by CP Rail and the underlying working papers thereto, led us to conclude that the CP Rail studies did reflect whatever differences may have existed in cut sizes of grain cars and other cars and, therefore, were appropriate for the determination of reasonable costs of yard switching of grain cars by CP Rail.

STUDY YEAR

As set out in the Introduction to this report, the interpretation of the Terms of Reference and their specifications of "contemporary conditions" raised the issue of the appropriate period of study for this Inquiry. The selection of the year that reflected contemporary conditions was deemed to be a technical matter that should be determined according to factors of timeliness, data availability, and relevance. The Commission could have selected any one of several years in the more recent past and could have produced estimates of costs under contemporary conditions based on that year. The year 1974 was chosen by this Commission as the study period.

While 1974 was representative of contemporary conditions, it did not exhibit all of the same characteristics as did, say, 1972, 1973, or 1975. During each of those years, the volume of statutory grain transported by rail was different, the relative percentages handled by CN and CP were different, the weather was different, the grain delivery and collection at primary elevators was different, the incidence of strikes and work stopages were different, and the volume of grain transported relative to the volume of other railway traffic movements was different. However, the choice of 1973 or 1975 rather than 1974 would

not have nullified nor eliminated these differences. The fact was that no one year embodied all of the characteristics of contemporary conditions to the same degree as another year.

The issue of the appropriate study year was raised at the first Technical Committee meeting. Ensuing discussion of this issue related to the choices of either 1973 or 1974 (or both) as appropriate base years for the analysis of contemporary conditions. The following factors were considered in discussions on this issue:

- use of trucks to transport grain to inland terminals;
- train weights west of Calgary;
- CP Rail use of "robot trains" west of Calgary;
- volume of statutory grain carried by rail;
- volume of all traffic carried by rail;
- volume of grain received at primary elevators;
- incidence of railway and terminal elevator labour strikes;
- weather conditions; and
- availability and use of government-supplied hopper cars.

The railway position was that data availability and accuracy dictated the use of the latest year (1974) for the study provided that its selection created no major

distortion of the cost results. They concluded that 1974 was not distorted in a way which was adverse to determination of reliable costs and that the costs of transporting statutory grain traffic would not be materially affected by differences in performance characteristics between 1973 and 1974. In support of this contention, CP Rail introduced an assessment of the effect of handling the 1973 grain volumes in 1974, concluding that the differences in volume, train weights, and car cycle would introduce a 4.4 percent reduction in the cost/revenue relationship derived from the 1974 CP Rail study.

The Prairie Provinces initially stated:

> This phase of the Commission's Inquiry is necessarily incomplete since, by direction, it is limited to the year 1974 in which a number of lines were out of service for a considerable period--truck operations being substituted--and in which CPR carried a perceptably lesser volume of grain traffic than in 1973...The differences in operating conditions between the two years are likely to have affected costs in ways and to an extent that cannot be determined without a study of that year. (Exhibit AMS-2, page 2)

They further stated:

> In the absence of such a study [year 1973], the suspicion will persist in the Prairies that, because of the abnormal conditions experienced

> in 1974, the Commission will have drawn its conclusions from atypical data. (Exhibit AMS-17, page 194)

The Commission found that the selection of year 1974 as being representative of contemporary conditions did not distort the cost study and, with the exception of the impact of inflation, the results derived therefrom were reliable estimates of the costs for any of the years 1972, 1973, or 1975. The Provinces, upon reflection, came to the same conclusion and in a letter, dated August 25, 1976, advised the Commission as follows:

> We are instructed to advise you that the Provinces of Alberta, Manitoba and Saskatchewan withdraw their request for a study of the Railways' cost of carrying statutory grain for the years 1973 and/or 1975.

All parties, therefore, have agreed that the year 1974 is representative of the contemporary conditions, under which statutory grain is transported by rail. The resolution of this issue should not lead the reader of this report to the erroneous conclusion that the cost findings of this Commission are applicable to prior or subsequent years without an adjustment for the impact of inflation.

TRANSIT TRAFFIC

Discussions with the railways and analysis of their data sources indicated that it would be extremely difficult to match the milling-in-transit (MIT) shipments inbound to a transit point with the subsequent outbound shipments from the transit point. The primary cause of the difficulty was the fact that the contents of one inward car were often shipped out from the transit point in two or more cars along with the contents of other inward grain shipments. Also, the designation of the inbound shipment(s) to be cancelled by outbound shipment(s) was at the shipper's discretion. Thus, the matching of inwards and outwards MIT shipments did not necessarily identify the "true" origin of the inwards commodity.

For these reasons, the fact that MIT traffic was less than four percent of all statutory grain traffic, and the fact that the portion of the railway service provided for MIT traffic that was covered by the statutory rate was virtually identical to the service provided on direct shipment traffic, this Commission concluded that a separate cost study of MIT traffic was not justified. To ensure that the total costs and revenues included the MIT traffic, the Commission directed that:

- the total inwards MIT cars, tons, and statutory revenues be identified by origin elevator and inwards transit point and the total outward cars, tons, and statutory revenue be identified by outwards origin, and statutory rate destination for each railway;

- the total costs of the portion of service provided MIT traffic covered by the statutory rate be estimated by applying the ratio of total cost to total revenue determined for direct shipment traffic to the MIT statutory rate revenue.

This procedure was accepted and adopted by all parties and has been followed by the Commission in the development of its Cost Study.

NORTHERN ALBERTA RAILWAYS

Northern Alberta Railway Company (NAR) is a Class II railway whose 930 miles of road are owned and operated jointly by Canadian National and CP Rail. In 1974, NAR originated 10,438 cars of direct shipment grain traffic or 3.2 percent of all direct shipment carloads of statutory grain and 715 carloads or 7.0 percent of the MIT traffic. Additionally, NAR transported overhead traffic for Canadian National between the CN-NAR junctions at Edmonton and Grande Prairie and the CN subdivisions of Athabasca and Manning. The NAR received a share of the total statutory revenue received by CN or CP on each car it transported. The NAR revenue proportion is based on a revenue-sharing

agreement with each railway. The total of this revenue was $1,278,308 in 1974.

Due to the relative size of the railway, to its relative significance in the totality of statutory grain transportation by rail, and to the lack of complete data, the railways and the Provinces adopted simplified costing approaches to produce the NAR's costs of transporting statutory grain.

The Canadian National performed the cost estimates for the NAR and basically adhered to the costing principles set down by the Canadian Transport Commission for other than Class I railways in Section 9 of Order No. R-6313:

- direct costing to the extent feasible; and
- empirical adaptation of factors employed by Class I railways, for other than direct cost assignment, where feasible.

Canadian National developed NAR unit costs by segregating the individual expense accounts into the account groups used by CN. They then applied the related CN variability percentages to the total expenses in each group to develop the total variable costs by group. These variable costs were then divided by the relevant causative factors selected from the NAR's operating statistics. The results

of this procedure, when aggregated, produced total variable costs, total output units, and unit costs for the following causative factors:

- train-miles;
- diesel unit-miles;
- car-miles;
- gross ton-miles;
- train switching-miles;
- yard switching-miles; and
- carloads.

These data were subsequently categorized as being more closely related to freight car-miles or gross ton-miles and a unit cost per car-mile or per gross ton-mile developed. The number of gross ton-miles and car-miles incurred by the NAR in the carriage of statutory grain was constructed from the traffic data.

Based on a usage criterion of grain originations equal to or greater than 50 percent of all carload originations and terminations, 311 miles of NAR lines were designated as grain dependent lines. The line-related costs were determined and converted to a unit cost per car-mile and per gross ton-mile for each grain dependent line.

The grain dependent and non-grain dependent unit costs were applied to the appropriate gross ton-miles and car-miles associated with each line type and the total costs for the NAR produced. CN also developed the cost adjustments to reflect a current value asset base and to include an allocation of constant costs.

The Provinces of Alberta, Manitoba, and Saskatchewan originally intended to pursue a similar line of cost development. They intended to use Canadian National unit costs for originated traffic interchanged to CN and for CN overhead traffic and CP Rail unit costs for originated traffic interchanged to CP.

For a variety of reasons, no service unit analysis was undertaken by the Provinces for NAR originated traffic delivered to Canadian National. Instead, the ratio of computed NAR variable costs to direct shipment revenues for traffic interchanged to CP Rail was used to impute the CN costs. NAR originations delivered to CP Rail and CN overhead traffic were costed in a fashion similar to that originally intended. The Provincial procedure made no allowance for line-related costs since their lack of station-by-station originating carload data prevented their identification of substantially grain-related lines.

In their rebuttal submission, the Provinces pointed out that traffic density, measured in gross ton-miles, on NAR was only one-third that of Canadian National and switching operations were about one-sixth the CN level. The results of these and other differences, they argued, were such that there were no apparent reasons for using Canadian National's percentage variability or any other CN cost characteristic for costing NAR traffic. The Provinces concluded that the result of applying Canadian National's variability precentages to NAR costs would be a substantial overstatement of NAR costs of transporting statutory grain.

We were in full agreement with the position of the Provinces and rejected the application of CN cost variability percentages to NAR costs for determining the costs of transporting grain. We also found the state of available NAR data to be so restrictive that costing as proposed by Canadian National and the Provinces was little more than a gross averaging and prorating process.

This Commission, similar to the parties that appeared before it, had neither the time nor the resources nor the historical foundation necessary for developing proper unit costs applicable to the NAR. Indeed, this was one of the first occasions in which this railway has been included in an overall public costing exercise. This lack of historical

precedent, lack of established procedures, and lack of comparable data bases rendered the costing of NAR on a scale relative to that of CN and CP impossible at this time.

These reasons, and the relatively small absolute dollars involved, and consequent potential for only minor cost misstatement, led us to conclude that the development of NAR costs on a similar basis to that described for MIT traffic would be appropriate. The costs displayed in the following chapter, for NAR, have been developed by applying the ratio of total direct shipment costs to total direct shipment revenues for Canadian National and CP Rail combined to the total NAR revenues. We recognize that this is only an interim solution and recommend that future costing of statutory grain either exclude NAR traffic or include the full participation of NAR with costs developed in relatively the same fashion and in the same detail as those of Canadian National and CP Rail. If the latter recommendation is followed, we further recommend that the Canadian Transport Commission undertake a review of the adequacy of the data submitted to them by Class II railways and undertake the research necessary to develop a reasonable costing methodology for these railways. In this regard, we found the Reasons for Order No. R-6313 and Order

No. R-6313 to be of no assistance in the development of variable costs for Class II railways.

TRAFFIC EXPENSE

Reasons for Order No. R-6313, at page 372, excludes traffic expense from the costing of grain traffic unless the railways can demonstrate an actual involvement of functions whose costs are entered as traffic expense. One of the reasons advanced for this exclusion was that it seemed odd for the railways to go out and solicit statutory grain traffic on which they were losing money. However, expenses charged to traffic also include tariff publication and other nonsolicitation activities. CP Rail undertook a special study of the labour and materials expenses related to the time of specific traffic personnel involved in matters related to statutory grain. The results of this study indicated that a total of $129,420 of traffic expense was chargeable to statutory grain. Canadian National made no such study and did not include any traffic expense in its cost estimates.

Based on the detailed analysis of number of weeks worked and pay rates for all Prairie personnel presented by CP Rail in support of its estimate, this Commission accepted the reasonableness of including this amount in its cost determination. The Commission has not included

any traffic expense estimates in its cost determination for Canadian National but would recommend inclusion of such costs if comparable supporting documentation could be provided.

ALLOCATION OF TRAIN COSTS

Current railway costing procedures develop many train costs (such as fuel, wages, and others) on the basis of train runs or other similar measures. The issue in the costing of a particular traffic is the appropriate method of allocating these expenses to the particular cars and commodities on the trains. The method employed by the railways in their presentation was to prorate the costs to each car on the basis of its pro rata share of the train's total gross ton-miles.

It has been argued that this procedure has the effect of allocating a disproportionate amount of the train costs to heavy loading commodities such as grain. The suggested alternative is to allocate train costs on the basis of car-miles, a method which removes the weight bias. CP Rail undertook a special analysis of the results obtained through each approach and found that the use of gross ton-miles resulted in costs which were five percent lower for statutory grain than those developed on a car-mile allocation basis.

We utilized a gross ton-mile allocation of train costs in our cost study. We believe that trains handling the major proportion of the grain cars are operated on a tonnage basis and, therefore, conclude that the gross ton-mile allocation is more appropriate for grain costing and recommends its continuance.

INSURANCE COSTS

The Provinces contended that Canadian National's annual liability insurance cost per dollar of revenue was substantially higher than that of CP Rail. While they did not dispute management's decision to insure themselves in this manner, they did contend that need for such insurance, whatever it may be, was not related to statutory grain and therefore the excess of Canadian National's insurance over that of CP Rail should not be charged to statutory grain.

The Commission's review of this issue revealed that, when proper consideration is given to both the insurance premium cost and the loss and damage claims paid directly by Canadian National and CP Rail, there was little difference in the total cost per dollar of revenue paid by each railway. On this basis, the Commission found no basis for adjusting the insurance costs of Canadian National downward as proposed by the Provinces.

STATISTICAL TESTS OF REGRESSION MODELS

The question of acceptance or rejection of railway regression results, based on statistical tests, was raised as an issue before this Commission. The Provinces contended that Canadian National regressions had very low correlation coefficients which, occasionally, were below an acceptable level of significance. The Provinces found 12 CN regression models with correlation coefficients of less than 0.50 and speculated that this lack of explanatory power of the independent variable might be due to one of the following causes:

- small number of observations in the regression model;
- Canadian National's role in government policy, resulting in lower efficiency and reduced covariance between cost and output.

To improve the correlation coefficients of the statistically poor CN regression models, the Provinces proposed two possible remedial measures:

- continued search for more meaningful measures of output,
- regression models using combined CN and CP data.

This Commission shared the concern of the parties over the reliance on unit costs obtained from regression

models with poor statistical test results. These railway regression models contained unacceptable unit cost coefficients (negative in one instance), statistically insignificant unit cost coefficients or low levels of explanatory powers. In some instances, the railways have adjusted for this by combining labour and material expenses; in others, they have utilized the coefficients of one regression to construct coefficients for the unacceptable ones; still, in others the railways found the a priori relationship sufficient reason to retain the poor results. While acceding to the necessity of utilizing some relationships for costing of statutory grain in which the statistical results were poor, this Commission nonetheless recommends that the railways continue to test alternative formulations of these relationships. While not utilizing the alternatives submitted by the Provinces for reasons specified elsewhere, we do recommend that the railways, particularly Canadian National, undertake such examinations and testing in an effort to improve the statistical quality of their unit costs.

CANADIAN NATIONAL CAR CYCLE

The Provinces' rebuttal submission, identified an inconsistency in Canadian National's determination of grain car cycle data. The issue arose over the following contradictory statements in Exhibit CN-2:

- The resulting cycles consisted of one-half of the prior-empty time, the full loaded time and one-half of the post-empty time of a carload trip. (Page 21)

- Car cycle = 1/2 (preceding empty transit and loading terminal time) + (loaded transit and unloading terminal time) + 1/2 (following empty transit and reloading terminal time). (Page 64)

The Provinces assumed that the data used by Canadian National and supplied to them for their use was based on the second of the two definitions--one to which the Provinces have continually objected throughout this Inquiry. The Provinces contended this caused them to rely upon a "gross and misconstructed estimate."

It was not certain what the impact of utilizing either definition might have on the costs of transporting grain by rail. However, the effect of the latter approach was to include only half of the time devoted to the loading of statutory grain and to include one-half of the time involved in reloading the car with the next commodity transported.

During the rebuttal hearings the Commissioner also raised this issue and asked CN to file a brief letter with copies to the parties designating which of these two methods they actually followed. The CN response to this indicated that the latter definition had been utilized in the costing, because of some problems with data reliability.

The Provincial response to this clarification reiterated the position stated on November 6, 1975, that they "can find no logic supporting the contention that car-cycle determinations computed from six unreliable components encompassing grain and non-grain elements are superior to determinations made from five unreliable components."

We agreed with the position of the Provinces and found that the former definition (at page 21 of Exhibit CN-2) was the proper definition for determination of car cycles. However, we were unable to conclude that CN's use of the second definition resulted in any systematic bias to the findings contained in this report. Accordingly, we have used the car cycle definition and data as supplied by Canadian National. For any future costing of statutory grain, we recommend that the alternative definition be utilized and that CN consider the matter of sufficient importance to correct for the reporting reliability of this data base.

FEDERAL GOVERNMENT COSTS

The Commission has interpreted its mandate to require the determination of all the costs required to sustain the operation of the contemporary railway system used for transportation of statutory grain irrespective of the party that

incurred such costs. As such, it was appropriate to determine the costs incurred by the Government of Canada for the provision of railway services or facilities that were directly identifable with the transportation of statutory grain traffic. The parties appearing before this Commission identified three cost elements incurred by the Government of Canada which they contended should be associated with the rail transportation of statutory grain in 1974. They were:

- 1974 branch line subsidy payments on grain dependent branch lines;
- 1974 car maintenance payment for rehabilitation and repair of railway-owned box cars to be used exclusively in the grain trade;
- the ownership costs associated with the hopper cars furnished to the railways by the Canadian Wheat Board.

The first of these cost elements was a revenue received by the railways which could be associated with the movement of statutory grain, the second was a sharing of expenses incurred by the railways, and the third element was a cost directly associated with the rail movement of statutory grain which was borne by the Federal Government.

Subsidy Payments

The 1974 branch line subsidy payments were made to the railways under the provisions of Sections 256 and 258

of the Railway Act. The Provinces contended, and the railways agreed, that the subsidy payments for those branch lines that have been identified as grain gathering lines should be considered as a credit to the line-related costs incurred by the railways on those lines. However, the railways further contended that these payments should be shown as a cost to the Government attributed to the rail transportation of statutory grain.

The Commission did not agree with either the railways or the Provinces. We found that the subsidy payment was a revenue received by the railways for the provision of rail service on certain lines and should be treated no differently than the revenue received by the railways from freight rates paid for the transportation of statutory grain. The dollars paid in freight rates to the railways for the transportation of statutory grain were just as much a cost to the shipper as were the dollars paid by the Government to the railways. We have treated the subsidy payment as revenues in our analysis.

✓ Canadian Wheat Board Hopper Cars

During year 1974, there were 2,000 Canadian Wheat Board steel hopper cars in grain service. These cars were purchased by the Federal Government and officially are owned by the Canadian Wheat Board which provides them to the

railways for exclusive use in grain service in western Canada. Under the terms of the agreement between the railways and the Wheat Board, the railways maintain the cars at their expense. An estimate of these maintenance expenses has been included in the car costs used by this Commission in its cost study. The railways did not incur any capital costs on these cars nor did they pay a per diem or mileage rental to the Canadian Wheat Board. The Commission found that capital costs were incurred on these cars and that such costs were appropriately attributed to the rail transportation of statutory grain. We have included depreciation expense at a rate of 3.03 percent on the gross investment in these cars in our cost study. For reasons presented in the capital costs section of this chapter we included a capital funds cost at capital funds rates of 8.90, 11.31, and 20.80 percent on the average net investment in the cars over their anticipated service lives.

Box Car Maintenance Payment

Unlike the branch line subsidy program which is a continuing program, the payment to the railways by the Federal Government for the rehabilitation of specific box cars which were to be used exclusively for the carriage of grain traffic was a one-time program. Under this

program, the Government has purchased a specific service from the railways, namely, the repair of freight cars, and then donated the repaired cars to the grain service. It is our understanding that the Government paid for one-half of the total repair costs on 1,000 CP Rail cars and on 1,400 Canadian National cars. We also understand that without these repairs the box cars could not have been used for the carriage of grain. In effect, the Government has put 500 CP Rail cars and 700 Canadian National cars in grain service.

The Commission found a significant similarity between the Government's purchase of covered hopper cars for exclusive use in grain service and their purchase of car repairs on box cars for exclusive use in grain service. As indicated earlier in this report, the Commission determined that CN and CP car repair unit costs did not contain any of the box car repair costs incurred by the Federal Government. In our study, we treated the repairs paid for by the Government as costs incurred by the Government for the transportation of statutory grain by rail. For purposes of our study, we have amortized the total cost incurred by the Government over a 5 year period--the railways' estimate of the remaining service life of these cars.

PORT MANN-VICTORIA FERRY COST

The Canadian National incurred a cost of $901,563 for moving grain to Victoria via the Port Mann-Victoria Ferry. While the propriety of the attribution of this cost to statutory grain traffic was not raised by the Commission or the parties during the Inquiry, upon reflection, the Commission had serious reservations about its inclusion. We did not question that the cost was incurred by Canadian National nor did we question the reliability of the magnitude of the cost. As indicated in Chapter II of this report (page 16, footnote *), Canadian National is not required to carry grain to Victoria at the statutory rate applicable to Vancouver but does so under a long standing gentlemen's agreement. We have concluded that the additional cost attributed to the Port Mann-Victoria Ferry is solely related to Canadian National's voluntary agreement to serve Victoria and therefore was not properly attributed to the cost of transporting statutory grain by rail. We have excluded this cost from our cost study.

COMMISSION COMMENT

AND

SUMMARY OF RECOMMENDATIONS

In this chapter we have described the issues brought before this Commission relative to the development of reliable costs of transporting grain by rail. Some of these issues, such as the determination of an appropriate cost of funds rate for CP Rail, do not lend themselves to permanent solutions because the answer is dependent upon the conditions existing at the time the cost study is made. Other issues, such as the use of current value of assets instead of original book value, while not new, have been intensified and taken on more significance due to contemporary conditions and probably should be explored to a greater extent than was possible in this Inquiry. However, most of the issues brought before this Commission did not fall into either category. The majority of the issues, such as the differences in switching costs due to differences in car cut size, have been raised and debated by the same parties (and in some instances the same persons) before the MacPherson Commission and before the Cost Inquiry.

In many cases, the positions of the parties have not changed since they were presented to the MacPherson Commission and the Canadian Transport Commission's Cost Inquiry.

More importantly, in this Inquiry the parties were not able to support their position or disprove the position of the opposing parties any better than they had in the past. Thus, while many, if not all, of these issues are subject to resolution on a reasonably permanent basis, they remain unresolved after 15 years.

In this regard, the Commission must conclude that the Canadian Transport Commission's Cost Inquiry fell far short of putting to rest the concerns of many about the reliability of the costs developed by the railways and accepted, if not formally approved, by the CTC. Of necessity, the Canadian Transport Commission proposed interim solutions to some of these issues and recommended future research by the railways in Reasons for Order No. R-6313.

A review of available decisions and reports of the Canadian Transport Commission led us to conclude that little progress has been made in railway costing since 1969--a view shared by the Provinces and others. In fact, when this Commission first met with the non-railway/non-CTC parties prior to the first Technical Committee meeting, they had virtually no knowledge of the status of the research recommended by the Canadian Transport Commission. One of the first requests this Commission made of the CTC and the railways was that they provide a report on the status of the

research recommended in Reasons for Order No. R-6313. Interestingly, the status report filed by the CTC was not entirely consistent with that filed by the railways. However, the status reports did reveal that some of the recommended research contained in Reasons for Order No. R-6313 had been undertaken and reported to the Canadian Transport Commission and, apparently, the issue had been resolved in one fashion or another. Regrettably, only a few of the Canadian Transport Commission's recommendations for future research fall into this category.

Chapter III and IV of this report have contained many recommendations by this Commission for futher costing research. For clarity, we have summarized these recommendations in Appendix I and have grouped them according to the party to which they are directed. This summary of recommendations should not be judged without reference to the particular context in which each recommendation was made. To assist the reader in this regard, the page number where each recommendation appears in its entirety is shown in Appendix I.

This Commission is concerned that its recommendations, like those of the Canadian Transport Commission, will become stultified within the pages of this report; and that current knowledge of the status of costing research and

changes to costing methodologies or concepts arising out of these recommendations, or those of the Canadian Transport Commission which are still outstanding, will not be known to parties other than the railways and the CTC. With this in mind, we recommend the procedures listed below.

- The CTC issue a report by no later than December 31, 1976 identifying the items in each railway's Costing Manual that it has approved, setting forth the reasons for withholding approval on each remaining item and the conditions upon which approval of each item is contingent (see Chapter III, page 40).

- The CTC issue status reports as required (but no less than one report per annum) detailing the research or other efforts undertaken relative to each unapproved section. Any change in the status of any item in the Costing Manual should be reported in the same fashion that Accounting Circulars are used to announce decisions affecting the Uniform Classification of Accounts.

- The CTC undertake a series of inquiries to deal with the issues still outstanding from the Cost Order Inquiry and the issues raised by this Commission which the CTC deems relevant to its responsibility for the reliability of costing for regulatory purposes.

- To ensure a full and complete inquiry on each of the issues, they should be grouped into general categories according to homogeneity of subject matter.

- By no later than January 31, 1977, the CTC publish for public review and comment a listing of the general categories, the specific issues to be covered in each, and the order in which the general categories will be examined.

- By no later than March 15, 1977, the CTC publish a preliminary schedule for the examination of each category and the procedures that will be followed for the Inquiry. The Inquiry for each general category should be held seriatim. If the procedures call for formal hearings, they should be preceded by one or more informal meetings of interested parties to clarify issues of data and methodological approaches and to ensure that the parties focus their efforts on the areas of disagreement. The objective of each Inquiry should be the resolution of the issues, and therefore, the Inquiry must not be conducted under any "burden of proof" standards that may be applicable to regular CTC proceedings.

- At the conclusion of each Inquiry on each general category, the CTC publish its findings on the matter at issue and set forth the basis for those findings. The decision of one Inquiry should be rendered prior to the commencement of the next Inquiry into another general category of issues.

In our view, implementation of these procedures will ensure improvements in the reliability of grain costing in particular and all costing for regulatory purposes in general. Perhaps more importantly, we believe implementation of these procedures will permit the non-railway parties to be informed of the current status of costing research, will eliminate some of the non-railway parties' concerns and doubts about the reliability of cost study results conducted under CTC approved concepts and methodologies, and will enable the CTC, the railways, and others to focus their attention on those issues which are truly unresolved.

CHAPTER V

COSTS OF TRANSPORTING STATUTORY GRAIN BY RAIL AND COMPARISONS TO REVENUES RECEIVED

As indicated in the Introductory Chapter to this report, both the railways and the Provinces submitted complete cost studies to this Commission. These studies set forth their respective estimates of the costs incurred by the railways for the transportation of statutory grain in 1974. The results of these studies are shown in Appendix J and are summarized in Table 7.

There is a significant difference between the costs as calculated by the two parties. However, a substantial part of this difference is directly related to differences between these two parties on major issues (i.e., capital funds cost, use of the current value asset rate base [inflation adjustment] inclusion of system constant costs and the inclusion of normalized roadway maintenance and capital expenditures as costs).

TABLE 7

Comparison of Year 1974 Costs Incurred in the Transportation of Statutory Grain by Rail Submitted to this Commission

Railway/Cost Element	Costs ($000,000) Per The Railways	Costs ($000,000) Per The Provinces
CP Rail		
Line-Related	$25.7	$12.1
Volume-Related	95.3	76.1
Maintenance Shortfall	8.8	0.0
Capital Shortfall	4.6	0.0
Inflation Adjustment	6.2	0.0
System Constant	15.8	0.0
Total CP Rail	$156.4	$88.2
Canadian National		
Line-Related	31.4	10.9
Volume-Related	99.4	73.8
Maintenance Shortfall	3.5	0.0
Capital Shortfall	4.5	0.0
Inflation Adjustment	5.7	0.0
System Constant	32.5	0.0
Total Canadian National	$177.0	$84.7
Total CP Rail and Canadian National	$333.4	$172.9
Northern Alberta Railways	4.9	2.2
Total Railway Costs	$338.3	$175.1
Federal Government Costs	6.3	--
Total Costs	$344.6	$175.1

THE COMMISSION COST STUDIES

The Commission's studies of transporting statutory grain by rail have incorporated all of the findings referred to in the previous chapters of this report. In developing our cost studies we began with the cost studies submitted by the railways and restated the individual cost elements to reflect our findings on the cost issues as set out in Chapter IV.

Our use of the cost studies submitted by the railways as a starting point should not be considered to detract from the cost studies submitted by the Provinces. The differences between the cost studies resulted from the different positions taken by each party on the issues before this Commission. As such, the cost studies of both parties are, in the Commission's view, outstanding examples of superior cost analysis efforts. As is obvious from our discussions in Chapter IV, this Commission agreed with the Provinces on some issues, with the railways on others, and in some instances did not agree with either party. Our use of the cost studies submitted by the railways as a starting point was one of convenience and not one of preference.

At the outset, it must be recognized that this Commission, though benefitting from access to one of the most detailed cost determinations ever conducted in Canada, could not produce the actual costs attendant to the transportation

of statutory grain by rail under contemporary conditions. In this regard we know we are not alone and share this position with regulatory agencies, other commissions, the railways, the Provinces of Alberta, Manitoba and Saskatchewan, and other parties to this Inquiry. The complexities of the railway transportation service, the joint and common use of railway facilities by various and sundry traffics, and the performance by the railways of a multitude of transportation and related services combine to make cost finding and the results therefrom, at best, reasonable estimates of the actual or true costs. To ascribe anything more to these computed costs is to delude oneself that he has achieved the unachievable. On the other hand, to reject such computed costs on the grounds that they are only estimates is to delude oneself that additional time and effort will achieve the unachievable.

This Commission believes it has produced an accurate and reliable estimate of the costs of transporting statutory grain by rail. This is not to suggest that the epitome of cost finding has been reached nor that the results cannot be improved upon. Rather, it is to state that the concepts employed are valid and that the results derived therefrom are reliable estimates of the actual costs and can be used in the decision-making process.

The Commission's findings as to the costs incurred by CP Rail and Canadian National in the carriage of direct shipment statutory grain are shown in Appendices K, L, M, and N. Using the procedures outlined in Chapter IV, we estimated the costs attributed to transit traffic carried by CP Rail and Canadian National, the costs attributed to the carriage of statutory grain by the Northern Alberta Railways, and the costs of rail transportation of statutory grain borne by the Federal Government. The development of these figures is shown on Appendix O. A summary of the Commission's estimates of the total costs incurred in the transportation of statutory grain by rail is shown on Table 8 (following page) For comparative purposes, this table is in the same format as Table 7 which shows the costs as determined by the railways and by the Provinces.

TABLE 8

Summary of Commission Determined Costs of Transporting Statutory Grain by Rail in Year 1974

Railway/Cost Element	Total Costs ($000,000)
CP Rail	
Line-Related	$22.8
Volume-Related	90.3*
Maintenance Shortfall	8.7
Capital Shortfall	0.7
Inflation Adjustment	0.0
System Constant	0.0
Total CP Rail	$122.5
Canadian National**	
Line-Related	$16.6
Volume-Related	83.7***
Maintenance Shortfall	4.0
Capital Shortfall	0.6
Inflation Adjustment	0.0
System Constant	0.0
Total Canadian National	$105.0
Total CP Rail and Canadian National	$227.5
Northern Alberta Railways	3.5
Total Railway Costs	$231.0
Federal Government	3.4
Total Costs	$234.4

*Includes $2.9 million of transit traffic costs.

**Costs shown are at a capital funds rate of 11.31 percent.

***Includes $1.8 million of transit traffic costs.

As shown above, this Commission found the total cost incurred by the railways in the transportation of statutory grain at the 1974 wage and price levels was $231.0 million with Canadian National's capital funds cost computed on a commercial basis excluding an allowance for income taxes.* Inclusion of an allowance for income taxes in the Canadian National capital funds rate increases the total cost incurred by Canadian National and the railways by $16.5 million. If the estimated government embedded interest rate of 5.94 percent is used as the capital funds rate for Canadian National, the total cost incurred by Canadian National and the railways is decreased by $9.0 million. Similarly, we found the total costs incurred by the government was $3.4 million in 1974 with the capital funds cost computed at the commercial rate excluding income taxes.** The government's cost would be increased by $2.3 million if the commercial capital funds rate including income taxes was used and would be decreased by $0.6 million if the 1974 government interest rate were used for this purpose. As we indicated in the Capital Cost section of Chapter IV, we believe that the selection

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*The Commission found that this was the appropriate basis for calculating the 1974 capital funds rate for Canadian National.

**The Commission found that this was the appropriate basis for calculating the 1974 capital funds rate for the Federal Government's investment in CWB hopper cars.

of a capital funds rate for both Canadian National and the Canadian Wheat Board hopper cars is, in final analysis, a public policy decision. In the remainder of this chapter, we will use the commercial capital funds rate without an allowance for income taxes of 11.31 percent for purposes of clarity and ease of presentation. The reader must recognize that the costs attributed to Canadian National and the Federal Government would be increased or decreased if a public policy decision was made to use a capital funds rate other than 11.31 percent.

To put the costs of transporting statutory grain by rail in more perspective, we have restated Table 8 on a per ton basis and per bushel basis assuming an average weight of 60 pounds per bushel. The results of this restatement are shown on Table 9. It should be noted that in constructing this table, we divided the costs incurred by the Federal Government by the total 1974 statutory grain tonnage. The resulting figure is the average cost incurred by the Federal Government for every ton of statutory grain transported in 1974 rather than the cost per ton to the government for the tons that actually moved in CWB hopper cars or in the box cars which were repaired with government funds.

TABLE 9

Commission Determined Total Cost Per Ton and Per Bushel For Transportation of Statutory Grain by Rail in Year 1974

Railway/Cost Element	Total Costs* Per Ton (Dollars)	Total Costs* Per Bushel (Cents)
CP Rail		
Line-Related	$2.12	6.36
Volume-Related	8.39	25.17
Maintenance Shortfall	.81	2.43
Capital Shortfall	.06	.18
Inflation Adjustment	.00	.00
System Constant	.00	.00
Total CP Rail	$11.38	34.14
Canadian National**		
Line-Related	$1.69	5.07
Volume-Related	8.52	25.56
Maintenance Shortfall	.41	1.23
Capital Shortfall	.06	.18
Inflation Adjustment	.00	.00
System Constant	.00	.00
Total Canadian National	$10.68	32.04
Total CP Rail and Canadian National	$11.05	33.15
Northern Alberta Railways	$5.07	15.21
Total Railway Costs	$11.22	33.66
Federal Government**	$.17	.51
Total Costs	$11.38	34.14

*Costs include transit traffic.

**Costs shown are at a capital funds rate of 11.31 percent.

REVENUE-COST COMPARISONS

At the outset of this Commission's Inquiry, there appeared to us to be two basic questions to be answered with regard to Term of Reference 3.2. They were:

- Are the railways sustaining a loss in the carriage of statutory grain as they contend? and
- If so, what is the amount of that loss?

As a result of the Inquiry process and the railways making a full disclosure of data to the Commission and the parties, the Commission believes the first question was answered affirmatively in the minds of most, if not all, of the representatives of the parties that participated in the Inquiry. Perhaps, the best support for this belief is the following statement of the transportation economist who appeared as a spokesman for the Provinces and who directed the development of their cost study:

> Mr. Commissioner, the word "perceived" as we use it at the bottom of page two refers to a time prior to the institution of this Commission and the Provinces have put forward numbers which lead inescapably to the conclusion that there is some shortfall of the revenues from the statutory rates. That being so, the perception has now become fact as far as the Provinces are concerned and the issue reduces itself to one of magnitudes. I hope that is responsive to your question. (Transcript Volume 30, page 5863)

Comparisons of the revenues received by the railways and the costs incurred in the transportation of statutory grain are difficult to display and must be interpreted carefully due to the involvement of the Federal Government in both the cost and the revenue side of the equation and the conceptual basis on which this Commission has determined the costs. As we are most concerned that our findings will not be misinterpreted, we have presented the cost-revenue comparisons in a series of tables starting with an overall comparison and then proceeded to comparisons of the revenues and costs attributed to each railway.

Appendix P shows that the total costs incurred by the railways attributed to the transportation of statutory grain in year 1974 exceeded the revenues received from the users of the service by $141.3 million under the Commission's determination of costs and revenues.* Including the costs incurred by the Federal Government, the excess of costs over revenues was $144.7 million. The costs incurred by the railways were 2.58 times the revenues received from the users of the service. The costs incurred by the railways and the Federal Government combined were 2.61 times the charges paid by the users of the service.

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*For comparative purposes, we have included the data as determined by the railways and the Provinces in this Appendix.

The railways' variable cost loss was reduced by 37 percent to $89.3 million by the subsidy payments they received on the grain dependent lines from the Federal Government under the branch line subsidy program.* Including the subsidy revenue, the railways costs were 1.63 times the total revenue received.

The overall relationship between costs incurred and revenues received is perhaps more clearly demonstrated in terms of total cost coverage. Table 10 shows that the total cost incurred by the railways for the transportation of statutory grain was paid for by the users, the government, and by the railways in amounts of $4.36, $2.52, and $4.34 per ton respectively. In terms of relative cost coverage, the Federal Government contributed 22.4 percent of the total cost incurred by the railways, the railways contributed 38.7 percent, and users of the service contributed 38.9 percent. In terms of coverage of the total cost incurred by the railways and the Federal Government, the Federal Government contributed 23.6 percent, the railways

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*In this regard, it should be noted that the concept of the grain dependent lines is not contingent upon the branch line subsidy program and, given the availability of data, this Commission would have attributed the same total costs to the transportation of statutory grain by rail in 1974 if the branch line subsidy program had not been in existence.

contributed 38.1 percent, and the users contributed 38.3 percent.

TABLE 10

Coverage of the Total Costs Incurred in The 1974 Transportation of Statutory Grain By Rail

Source of Cost Coverage	Amount of Cost Coverage		Percentage Distribution of Coverage
	Total Dollars (Millions)	Dollars Per Ton	
Total Railway Costs			
Users of the Service	$89.7	$4.36	38.9%
Federal Government	52.0	2.52	22.4
Railways	89.3	4.34	38.7
Total	$231.0	$11.22	100.0%
Total Railway and Federal Government Costs			
Users of the Service	$89.7	$4.36	38.3%
Federal Government	55.4	2.69	23.6
Railways	89.3	4.34	38.1
Total	$234.4	$11.39	100.0%

Appendix P shows the relationship of costs to revenues for each of the three railways that participated in the transportation of statutory grain in 1974. As shown thereon, the costs incurred by CP Rail exceeded the revenues received from the users by $76.3 million and the revenues received from the users and the Federal Government combined by $53.2 million. CP Rail's total costs were 2.65 times the revenues received from users of the service and 1.77 times the revenues received from the users and the Federal Government combined.

The costs incurred by Canadian National exceeded the revenues received from users of the service by $62.8 million and the revenues received from the users and the Federal Government combined by $34.3 million. Canadian National's costs were 2.49 times the revenues received from users of the service and 1.49 times the revenues received from the users and the Federal Government combined.

Since Canadian National and CP Rail each own 50 percent of the Northern Alberta Railways, its loss on the carriage of statutory grain is additive on a 50-50 basis to the losses incurred directly by Canadian National and CP Rail. Based on our rough estimate of costs incurred by NAR, Appendix P indicates that CN and CP each incurred an additional loss before receipt of subsidy payments of $1.1 million on statutory grain

traffic carried by the NAR. Including the subsidy payments, this additional loss was $0.9 million.

Table 11 shows the total coverage of the costs incurred by Canadian National and CP Rail including a 50 percent share each of the costs and revenues of the NAR. As shown thereon, the revenues received from the users of the service covered 37.7 percent of the total costs incurred by CP Rail. The Federal Government's, subsidy payments covered 18.8 percent of the total costs and the remaining $54.1 million or 43.5 percent was covered by CP Rail from revenues received for the transportation of other commodities. The revenues received from the users of the service covered 40.2 percent of the total costs incurred by Canadian National and the government subsidy payments accounted for 26.9 percent. The balance of the costs--$35.1 million--were covered by Canadian National from revenues received for the transportation of other commodities or by the Federal Government in the form of additional payments to CN.

TABLE 11

Coverage of the Total Rail Costs Incurred in The 1974 Transportation of Statutory Grain

Source of Cost Coverage	Amount of Cost Coverage*			Percentage Distribution of Coverage
	Total Cost (000,000)	Dollars Per Ton	Cents Per Bushel	
CP Rail Costs				
Users of the Service	$46.9	$4.36	13.1	37.7%
Federal Government	23.3	2.16	6.5	18.8
CP Rail	54.1	5.02	15.1	43.5
Total	$124.3	$11.54	34.6	100.0%
Canadian National Costs				
Users of the Service	$42.9	$4.37	13.1	40.2%
Federal Government	28.7	2.92	8.8	26.9
Canadian National	35.1	3.57	10.7	32.9
Total	$106.7	$10.86	32.6	100.0%

*NAR costs and revenues have been prorated 50 percent to CP Rail and 50 percent to Canadian National on the basis of ownership.

Our concern about possible misinterpretation of the revenue-cost comparisons is sufficiently strong that we believe it is of value to reiterate exactly what cost elements we have attributed to the railways for the transportation of statutory grain.

Our costs include all costs incurred by the railways that varied with the volume of statutory grain. These costs include the capital costs (depreciation expense and capital funds cost) which are variable with volume for all equipment and roadway property used by the railways in the transportation of statutory grain. With respect to the capital funds cost, we note that it is often referred to as profit with a connotation that it is the excess of revenues over costs. As we pointed out in the Capital Cost section of Chapter IV, the capital funds cost, in fact, is an expense that is borne by the railway in order to obtain funds in the debt and equity financial markets. While payment of the equity portion of the capital funds cost may be deferred, it ultimately must be incurred and, therefore, is no different than any other cost incurred by the railways. Thus, if we define profit as the excess of revenues over all costs, there is no profit allowance contained in the Commission's cost study.

In addition to the costs variable with volume, the Commission cost study includes all the line-related expenses and capital costs associated with the grain dependent lines. The study also includes the shortfall between the maintenance and capital expenditures on the grain dependent lines in 1974 and the normalized maintenance and capital costs. The inclusion of this shortfall effectively attributes to statutory grain the maintenance and capital costs, in 1974 dollars, that were required to maintain the grain dependent lines on an ongoing basis. These costs do not include any allowance for rehabilitation of the lines for the maintenance deferral that existed at the end of year 1973.

As the costs do not include any contribution to system constant costs, they can be said to represent the long-run revenue level, in 1974 dollars, at which the railways would "break even" on the carriage of statutory grain; i.e., statutory grain would be neither a contributor to or detractor from the viability of the railway enterprises. This statement inherently assumes that railway funds would not be used for rehabilitation of the grain dependent lines for maintenance deferrals accrued prior to January 1, 1974; that the Federal Government would replace the 2,000 CWB hopper cars in service in 1974 as they are subsequently retired; and that the Federal Government would continue to

periodically pay for some maintenance and rehabilitation of box cars used for the transportation of grain by rail.

It was brought to our attention during the course of the Inquiry that if the revenues received from the rates on statutory grain traffic were set equal to the variable costs of transporting the traffic as we have defined and calculated them, then the grain dependent lines could not be abandoned under the provisions of the Railway Act and Order No. R-6313. This statement is, of course, factually correct. However, it cannot be interpreted to mean that the revenues from statutory grain traffic would be greater than the "break even" costs for an ongoing system. Perhaps, more importantly, the correctness of this statement cannot be interpreted to mean the continued operation of all the grain dependent lines represents an economic use of the resource inputs required for such operation.

During the course of this Inquiry, the Commission has analyzed and reviewed the cost studies submitted by the railways and the Provinces, the underlying documentation to these studies, and material submitted by numerous other parties. We have carefully weighed numerous suggestions and contentions as to the cost elements that should and should not be attributed to the transportation of statutory grain by rail and decided upon the appropriateness of each. Finally, the

Commission has produced its own cost study which incorporated its decisions and findings on each of the issues raised during the course of the Inquiry. While not perfect in some respects, the Commission firmly believes that its cost study provides a reliable estimate of the costs of transporting statutory grain by rail and a reliable basis for comparisons of these costs to the revenues received by the railways for the provision of the transportation service.

Based on all of the material and evidence placed before us, we find that the revenues received by the railways for the transportation of statutory grain does not cover the costs incurred by the railways. We also find that excluding the subsidy payments received by the railways for continued operation of the grain dependent lines the revenue shortfall is substantial and ranges between 132.2 and 157.4 million dollars dependent upon the capital funds rate attributed to Canadian National. Including the subsidy payments the revenue shortfall ranges between 80.2 and 105.5 million dollars.

ALL OF WHICH I RESPECTIVELY SUBMIT FOR YOUR EXCELLENCY'S CONSIDERATION

Carl M. Swanlyph.
Commissioner

APPENDICES

APPENDIX A

P.C. 1975-873

CANADA

PRIVY COUNCIL

Certified to be a true copy of a Minute of a Meeting of the Committee of the Privy Council, approved by His Excellency the Governor General on the 18 April, 1975

The Committee of the Privy Council have had presented to them a report by the Minister responsible for the Canadian Wheat Board and the Minister of Transport indicating the need to establish reliable cost and revenue data pertaining to rail movement of grain in response to the requests of provincial governments and producer groups.

The Committee, therefore, on the recommendation of the Minister responsible for the Canadian Wheat Board and the Minister of Transport, advise that Mr. Carl M. Snavely of Washington, D.C., be appointed a Commissioner under Part I of the Inquiries Act to conduct an inquiry to determine the costs and revenues of grain traffic and the relationships of such costs and revenues.

The Committee further advise that

(1) The Commissioner, before the completion of the final report, submit such interim reports to the Minister of Transport and the Minister responsible for the Canadian Wheat Board as may be relevant to the Regional Branch Line Inquiry;

(2) The Commissioner be authorized to exercise all powers conferred on Commissioners by Parts I and III of the Inquiries Act;

(3) The officers and employees of the Departments of the Government of Canada concerned with rail movement of grain be required to render such assistance to the Commissioner as may be required for this inquiry; and

(4) The Commissioner receive such remuneration and reimbursement as may be determined by the Treasury Board.

Assistant Clerk of the Privy Council.

The Commission on the Costs of Transporting Grain by Rail

1. Purpose

One of the outstanding issues that requires resolution in the Western grain transportation problem is to establish revenue and reliable cost data pertaining to the rail movement of grain and grain products as defined in Section 271 and Section 414 of the Railway Act (hereinafter referred to as grain). In order to provide some independent answers to this problem Carl M. Snavely, Jr. has been appointed under Part I of the Inquiries Act to determine the costs and revenues of grain traffic and the relationships of such costs and revenues and report his findings to the Minister of Transport and the Minister responsible for the Canadian Wheat Board.

2. Powers of the Commission

The Inquiry Commission is empowered to conduct hearings, to summon witnesses, to receive submissions orally or in writing, and to assume all other powers applicable under Parts I and III of the Inquiries Act. The Commission shall make recommendations to the designated Ministers.

3. Terms of Reference

3.1 The general areas in which this Commission will work will be as set out below. In developing the areas of investigation there will be close consultation with the Hall Commission and work will be carried out in such a manner as to provide useful input to the work of the Hall Commission.

3.2 To identify the total costs and revenues to the railways of transporting grain under contemporary conditions.

3.3 To evaluate contemporary railway costing practices using Canadian Transport Commission Order R 6313 as a base; assess the adequacy of the order and the practices as a basis for costing of grain, and recommend changes if considered necessary.

3.4 To identify and review any other railway grain costing issues which are of concern to those affected and to recommend changes if required.

3.5 To develop a series of typical cost profiles for different categories of Prairie railway line used for transporting grain. These profiles to be sufficiently detailed, such that, interested parties will

be able to derive the order of magnitude of grain transportation costs for typical categories of line.

3.6 To assess the impact upon railway costs of moving grain under a series of different grain handling and transportation assumptions.

4. Recommendation Function

4.1 At the conclusion of the Inquiry, the Commissioner will report his findings and recommendations on the issues outlined in Section 3 above to the designated Ministers.

4.2 The Commissioner shall also issue such interim reports as may be required to the designated Ministers.

5. Organization

The Commission will consist of a Commissioner who will be assisted by consultants as required. The Canadian Transport Commission will provide one person to work with the Commissioner.

Members of the Technical Committee

Name	Representing
C.M. Snavely	Commissioner
F.J. Trotter	Commission Staff
V.M. Stechishin	Commission Staff
K.J. Cooksley	Alberta Wheat Pool
A.D. McLeod	Saskatchewan Wheat Pool
M.W. Menzies	Alberta & Saskatchewan Wheat Pools and Manitoba Pool Elevators
P.D. Earl	United Grain Growers
J.C. Doak, Q.C.	Manitoba Branch Lines Association
A. Moore	National Farmer's Union
W. Hamilton	Canadian Federation of Agriculture
L.C. Rayner	Canadian Grain Commission
D. Dever	Canada Grains Council
A. Wilson	Canada Grains Council
D. Harvey	Agriculture Canada
M. Tosh	Canadian Transport Commission
F. Nelson	Province of British Columbia
J. Telford, replaced by R. Johnson	Province of Alberta
J.W. Channon	Province of Alberta
W.H. Horner	Province of Saskatchewan

Members of the Technical Committee (continued)

Name	Representing
C. Kirkland	Province of Saskatchewan
D.A. Schaeffer, replaced by R. Wansbutter	Province of Manitoba
D. DeLisle	Province of Manitoba
R.L. Banks	Provinces of Alberta, Manitoba and Saskatchewan
D. Long, replaced by A. Sharp	Province of Ontario
J.K. Knox	CP Rail
R.O. Martinelli	CP Rail
F. Wallace	CP Rail
R.G. Pringle	Canadian National
V. Alalouf	Canadian National
G. Paquin, replaced by M. Grant, replaced by A. MacDonald	Canadian National
W.B. Saunders	CP Rail, Canadian National and Northern Alberta Railways

1974 Statutory Grain Carloads Terminated By Type of Shipment, Terminating Railway, and Statutory Rate Destination

Destination	Direct Shipment Carloads		
	CN Terminations	CP Terminations	Total
Armstrong & East	1,505	NA	1,505
Thunder Bay	100,214	111,564	211,778
Churchill	10,499	NA	10,499
Prince Rupert	12,224	NA	12,224
Vancouver	37,031	48,867	85,898
Victoria	4,631	NA	4,631
Total	166,104	160,431	326,535

Destination	MIT Shipment Carloads		
	CN Terminations	CP Terminations	Total
Armstrong & East	2,883	NA	2,883
Thunder Bay	500	4,151	4,651
Churchill	0	NA	0
Prince Rupert	5	NA	5
Vancouver	553	2,186	2,739
Victoria	0	NA	0
Total	3,941	6,337	10,278

1974 Statutory Grain Tonnage Terminated By Type of Shipment, Terminating Railway, and Statutory Rate Destination

Destination	Direct Shipment Tonnage (Tons in Thousands)		
	CN Terminations	CP Terminations	Total
Armstrong & East	101.7	NA	101.7
Thunder Bay	5,739.7	7,159.3	12,899.0
Churchill	564.2	NA	564.2
Prince Rupert	758.6	NA	758.6
Vancouver	2,179.3	3,301.1	5,480.4
Victoria	260.4	NA	260.4
Total	9,603.9	10,460.4	20,064.3

Destination	MIT Shipment Tonnage (Tons in Thousands)		
	CN Terminations	CP Termination	Total
Armstrong & East	152.7	NA	52.7
Thunder Bay	30.0	186.8	216.8
Churchill	0.0	NA	0.0
Prince Rupert	0.3	NA	.3
Vancouver	35.3	120.4	155.7
Victoria	0.0	NA	0.0
Total	218.3	307.2	525.5

NA: Not Applicable

CN - OUTPUT UNITS INCURRED
IN TRANSPORTATION OF DIRECT SHIPMENT STATUTORY GRAIN
YEAR 1974

Item	Output Units To						
	East Of Armstrong	Thunder Bay	Churchill	Prince Rupert	Vancouver	Victoria	Total
Car Miles for Caboose, Canadian Lines	31,550	2,173,944	259,733	459,204	909,462	122,383	3,956,276
Car Days							
- Box, Grain	6,369	814,820	110,272	115,086	387,707	60,031	1,494,285
- Box, 45 Ton Steel	1,739	748,286	119,344	107,197	337,285	54,286	1,368,137
- Box, 60 Ton Steel	5,062	279,473	40,147	35,131	130,854	18,568	509,235
- Box, Other	286	72,592	9,595	8,354	24,714	3,881	119,422
- Wheat Board Hopper (CNWX)	4,877	97,268		48,062	90,991		241,198
- Covered Hopper	571	15,831		8,988	17,864		43,254
- Total	18,904	2,028,270	279,358	322,818	989,415	136,766	3,775,531
Number of Units							
- Carload Billing	3,010	198,143	20,998	24,292	70,422	9,144	326,009
- Carloads, In Box Car	995	93,627	10,499	9,853	32,630	4,631	152,235
- Carloads, Total	1,505	100,214	10,499	12,224	37,031	4,631	166,104
- Grain Doors, Prairie	831	84,386	7,790	2,974	9,398	1,373	106,752
- Grain Doors, Mountain	164	9,241	2,709	6,879	23,232	3,258	45,483
Car Miles							
- All CN-Owned or Leased Cars	1,648,693	157,567,366	18,138,528	24,965,875	62,450,798	8,796,885	273,568,145
- Box, Grain	552,200	62,313,709	7,233,593	8,826,368	24,143,671	3,823,372	106,892,913
- Box, 45 Ton Steel	139,210	57,435,359	7,662,298	7,900,046	20,822,362	3,481,256	97,440,531
- Box, 60 Ton Steel	384,676	20,844,563	2,623,473	2,561,006	8,095,059	1,239,672	35,748,449
- Box, Other	22,225	5,556,184	619,166	628,931	1,559,719	252,586	8,638,811
- Wheat Board Hopper (CNWX)	485,714	10,162,061		4,444,742	6,595,402		21,687,919

CN - OUTPUT UNITS INCURRED
IN TRANSPORTATION OF DIRECT SHIPMENT STATUTORY GRAIN
YEAR 1974
(CONTINUED)

Item	Output Units To						
	East Of Armstrong	Thunder Bay	Churchill	Prince Rupert	Vancouver	Victoria	Total
- Covered Hopper	64,672	1,255,488		604,779	1,234,590		3,159,529
Crew Wages, Including Vacation and Non-productive Time ($)	57,629	4,378,107	544,952	881,354	1,792,554	242,594	7,897,190
Diesel Unit Miles							
- 800 to 1399 HP Rating	5,945	687,554	34,379	49,583	203,927	33,704	1,015,092
- 1400 to 2000 HP Rating	10,875	656,416	178,501	468,489	236,919	30,815	1,582,015
- Rated over 2000 HP	49,266	3,307,795	389,629	517,273	1,461,735	192,894	5,918,592
- Total	66,086	4,651,765	602,509	1,035,345	1,902,581	257,413	8,515,699
Gallons of Fuel -	187,324	12,800,796	1,393,297	2,247,981	5,460,118	707,287	22,796,803
Gross Ton Miles (000)	123,646	8,449,370	919,668	1,483,816	3,604,038	466,856	15,047,394
Net Ton Miles (000)	82,428	4,871,562	519,381	888,618	2,159,297	272,820	8,794,106
Train Miles, Freight	31,550	2,173,944	259,733	459,204	909,462	122,383	3,956,276
Net Tons	101,759	5,739,737	564,181	758,598	2,179,267	260,364	9,603,906
Train Switching Minutes	3,231	498,118	57,446	54,083	170,160	27,616	810,654
Yard Switching Minutes	27,929	3,388,789	152,709	332,232	1,640,983	458,103	6,000,745
Average Empty Ratio	35.2%	85.3%	87.7%	74.4%	70.2%	81.3%	
Average Car Cycle (Days)	12.56	20.24	26.61	26.41	26.72	29.53	
Average Loaded Haul (Miles)	810	849	921	1,171	991	1,048	

SOURCE: CN-14, Attachment I, pages 1-7.

CP - OUTPUT UNITS INCURRED
IN TRANSPORTATION OF DIRECT SHIPMENT STATUTORY GRAIN
YEAR 1974

Item	Output Units To Thunder Bay	Vancouver	Total
Carloads			
- Box	98,253	40,492	138,745
- CP Hopper	4,855	495	5,350
- Government Hopper	8,456	7,880	16,336
Total	111,564	48,867	160,431
Car Days			
- Box	2,029,839	1,205,880	3,235,719
- CP Hopper	82,873	17,480	100,353
- Government Hopper	171,603	171,535	343,138
Total	2,284,315	1,394,895	3,679,210
Loaded Car Miles			
- Box	81,295,313	37,419,670	118,714,983
- CP Hopper	3,994,125	560,602	4,554,727
- Government Hopper	6,996,566	7,113,130	14,109,696
Total	92,286,004	45,093,402	137,379,406
Empty Car Miles			
- Box	65,153,679	31,291,463	96,445,142
- CP Hopper	3,192,283	275,176	3,467,459
- Government Hopper	6,971,096	6,742,827	13,713,923
Total	75,317,058	38,309,466	113,626,524
Gross Ton Miles (000)	9,756,048	4,990,695	14,746,743
Net Ton Miles (000)	5,943,933	3,048,291	8,992,224
Yard Switching Minutes	3,200,848	2,027,771	5,228,619
Train Switching Minutes	445,609	178,428	624,037
Train Miles	1,865,827	1,072,090	2,937,917
Train Hours	83,804	50,092	133,896
Crew Wages ($)	3,877,883	2,294,256	6,172,139
Gallons of Fuel (train)			
- Prairie Region	13,709,645	802,695	14,512,340
- Pacific Region	702,304	8,150,851	8,853,155
Total	14,411,949	8,953,546	23,365,495
Diesel Unit Miles			
- 600 to 1,500 HP	83,592	17,795	101,387
- 1,500 to 2,000 HP	2,998,139	702,518	3,700,657
- 2,000 to 3,000 HP	1,399,857	420,917	1,820,774
- 3,000 plus HP	452,127	2,048,984	2,501,111
- Passenger	287	445	732
Carloads of Grain Requiring Grain Doors	95,520	37,202	132,722
Carloads of Grain	109,542	48,438	157,980
Carloads of Grain Products	2,022	429	2,451

SOURCE: CP-3-1

Revenues Received by the Railways Associated With the Carriage of Statutory Grain

Source	Revenues (Millions of Dollars)			
	CN	CP	NAR	Total
Freight Revenue				
Direct Shipment	$41.068	$44.577	$1.211	$ 86.855
Milling-In-Transit	.930	1.473	.068	2.470
Sub-total	$41.997	$46.051	$1.278	$ 89.326
Miscellaneous Revenue				
Grain Dependent Lines	$0.171	$.114	$ .012	$ 0.298
Other Revenue	0.052	.042	.000	0.094
Sub-total	$0.223	$.156	$ .012	$ 0.392
Government Payments				
Branch Line Subsidy	$28.473	$23.085	$ .366	$ 51.925
Total Revenue Received	$70.694	$69.292	$1.657	$141.643

Totals and sub-totals may not add due to rounding.

Comparison of 1974 After Tax Capital Funds Rates on Common Shareholder's Equity Estimated by the Railways, Provinces, and the Commission

Method of Estimation	After Tax Rate As Computed By		
	Railways	Provinces	Commission
Estimating Long-Term Growth			
- 10 Year Average Earnings	17.0	10.3-14.1	13.7
- 10 Year Weighted Average Earnings	19.0	13.1	--
- Dividends	17.8	10.7-12.2	17.8
- Retention Rate/Return	17.1	9.3-13.0	13.0
- Average Return-New Investment	17.4	12.9	13.5
Earnings Price Approximation			
- Comparable Risk Companies-Unadjusted	--	12.7	--
- Comparable Risk Companies-Adjusted for M/B	--	13.7	--
- Comparable Risk Companies Within 10% of M/B=1	--	14.0	14.0
- Comparable Risk Companies Within 20% of M/B=1	--	14.6	14.6
- CP Ltd. 1973/74 Average E/P	--	--	14.4
- CP Ltd. 1974 E/P	18.5	18.2	18.5
- CP Ltd. 1974 M/B in E/P Regression	--	--	14.5
- CP Ltd. 1974 E/P (Earnings Smoothed)	--	12.0	--
- CP Ltd. 1969-74 Average E/P	--	9.6	--
- CP Ltd. Adjusted for Regulated Divisions, E/P	17.6	--	--
Other CP Ltd. Relationships			
- CP Ltd. Average Premium Over Long-Term Government Bonds	--	11.0	--
- CP Ltd. Premium Over CP Bonds	16.0		
Earnings Book Approximation			
- Canadian Regulated Company Sample, 1974	--	--	15.6
- Comparable Risk Companies, 1973-74	17.4	--	--
- Comparable Risk Companies With M/B=1 Adjustment	--	14.6	14.6
- CP Ltd., 1974	--	10.0	--

Comparison of 1974 After Tax Capital Funds Rates on Common Shareholder's Equity Estimated by the Railways, Provinces, and the Commission

Method of Estimation	After Tax Rate As Computed By		
	Railways	Provinces	Commission
Other Regulatory Decisions			
- U.S. FCC Allowance Applied to CP Bonds	--	--	14.7
- Canadian 1974 Allowed Rates	17.0-18.0	14.5	14.5
Informed Judgement of Investment Dealer	15.0-20.0	--	--
Capital Asset Pricing Model	--	11.0	--
Comparable Industry			
- Solvent U.S. Railroads	--	4.1	--
- U.S. Investor-Owned Electric Utilities	--	10.9	--
- 6 Canadian Utilities, M/B=1.2162 in E/P Regression	--	--	13.4

CP RAIL

GRAIN DEPENDENT LINES - 1974

Subdivision	Between				Study Miles	Category	Miscellaneous Revenues $	% Statutory Grain of Originating & Terminating Traffic	CTC Certified Loss $
Alberta Central	Forth	(M0.0)	- Otway	(M58.0)	58.0	B	1,196	79.1	109,886
Alida	Lauder	(M0.0)	- Alida	(M54.5)	54.5	B	1,388	97.2	263,789
Altawan	Shaunavon	(M1.0)	- Manyberries	(M122.1)	121.1	A	846	88.7	638,784
Amulet	Mile 30.9		- Cardross	(M45.8)	14.9	B	635	98.1	146,626
Arborg	Mile 5.4		- Arborg	(M75.1)	69.7	B	1,662	76.1	167,815
Arcola	Schwitzer	(M0.0)	- Arcola	(M96.7)	96.7	B	3,618	92.6	454,239
Asquith	Urban	(M0.0)	- Baljennie	(M43.9)	43.9	B	618	96.6	201,345
Assiniboia	Mile 46.5		- Assiniboia	(M110.2)	63.7	B	1,674	89.4	196,520
Big Gully	Lloydminster	(M0.0)	- Hillmond	(M24.6)	24.6	B	372	96.3	155,197
Bromhead	Southall	(M0.0)	- Tribune	(M7.1)	7.1	B	435	98.6	80,249
Bromhead	Gladmar	(M73.3)	- Minton	(M79.1)	5.8	B	126	99.9	63,418
Bulyea	Neudorf	(M0.6)	- Bulyea	(M86.4)	85.8	A	1,727	97.5	880,226
Burstall	Pivot - Schuler Spur	(M0.0)	- Schuler	(M6.8)	6.8	B	267	85.6	47,467
Cardston	Raymond	(M7.7)	- Glenwood	(M74.1)	66.4	B	3,389	63.1	127,658
Carman	Kronsgart	(M31.8)	- Plum Coulee	(M39.4)	7.6	B	45	99.2	8,042
Cassils	Mile 10.0		- Scandia	(M23.4)	13.4	B	306	89.7	20,568
Colonsay	Euston	(M0.0)	- Colonsay	(M108.5)	108.5	B	2,002	96.7	696,967
Colony	Rockglen	(M0.0)	- Killdeer	(M25.0)	25.0	B	170	98.7	117,569
Coronation	Kerrobert	(M0.0)	- Coronation	(M116.5)	116.5	B	2,897	95.9	715,623
Crossfield	Collicut	(M0.0)	- Cremona	(M28.0)	28.0	B	1,428	62.3	86,029
Dunelm	Player	(M0.0)	- Simmie	(M25.2)	25.2	B	480	97.8	160,046

CP RAIL

GRAIN DEPENDENT LINES - 1974
(CONTINUED)

Subdivision	Between				Study Miles	Category	Miscellaneous Revenues $	% Statutory Grain of Originating & Terminating Traffic	CTC Certified Loss $
Fife Lake	Assiniboia	(M0.0)	- Big Beaver	(M79.6)	79.6	*	2,085	92.8	751,715
Furness	Epping	(M0.0)	- Paradise V.	(M19.5)	19.5	B	856	94.3	262,807
Glenboro		(M6.0)	- Souris	(M145.0)	139.0	A	6,449	88.0	222,666
Gretna	Altona	(M7.3)	- Gretna	(M14.1)	6.8	A	471	84.3	28,717
Hatton	Hatton	(M0.0)	- Golden Prairie	(M17.8)	17.8	B	600	100.0	81,833
Irricana	Bassano	(M0.0)	- Standard	(M36.9)	36.9	A	2,265	74.6	173,880
Kelfield	Brass	(M0.0)	- Kelfield	(M28.5)	28.5	B	289	95.2	252,810
Kerrobert	Outlook	(M0.0)	- Kerrobert	(M102.5)	102.5	A	4,789	94.6	1,292,863
Kisbey	Arcola	(M0.0)	- Weyburn	(M61.7)	61.7	B	651	95.6	336,919
Lac du Bonnet		(M6.0)	- Molson	(M43.6)	37.6	A	1,131	78.2	105,645
Lacombe	Coronation	(M0.0)	- Nevis	(M70.8)	84.4	A	1,723	61.2	262,632
	Including Cordel Spur								
Lenore	Forrest	(M0.0)	- Lenore	(M41.3)	41.3	B	857	94.1	144,339
Lomond	Lomond	(M0.0)	- Eltham	(M63.2)	63.2	B	3,188	95.9	367,616
Lyleton	Deloraine	(M0.0)	- Lyleton	(M37.5)	37.5	B	1,048	97.5	185,659
Macklin	Kerrobert	(M0.0)	- Macklin	(M46.4)	46.4	A	647	93.4	643,514
Matador	Gunnworth	(M0.0)	- Matador	(M43.1)	43.1	B	665	99.0	383,368
McMorran	Milden	(M0.0)	- McMorran	(M61.6)	61.6	B	920	98.1	408,601
Medstead	Healy	(M0.0)	- Panton	(M36.0)	36.0	C	67	61.0	61,930
Miniota	Brandon	(M0.0)	- Miniota	(M71.7)	75.3	B	2,091	89.6	330,840
	Including Rapid City Spur								
Napinka	La Riviere	(M1.3)	- Napinka	(M108.1)	106.8	A	5,546	87.9	884,877
Neudorf	Rocanville	(M53.2)	- Neudorf	(M126.2)	73.0	A	2,247	95.4	448,154
Notukeu	Notukeu	(M0.0)	- Val Marie	(M96.9)	96.9	A	1,735	94.1	897,138
Outlook	Moose Jaw	(M2.3)	- Outlook	(M120.2)	117.9	A	5,547	97.1	885,789

* Fife Lake Assiniboia (M0.0) - Coronach (M59.2) is a Category A line.
Coronach (M59.2) - Big Beaver (M79.6) is a Category B line.

CP RAIL

GRAIN DEPENDENT LINES - 1974
(CONTINUED)

Subdivision	Between				Study Miles	Category	Miscellaneous Revenues $	% Statutory Grain of Originating & Terminating Traffic	CTC Certified Loss $
Pennant	Wickett	(M0.0)	- Verlo	(M25.1)	25.1	B	864	87.6	175,919
Reford	Kerrobert	(M0.0)	- Wilkie	(M42.8)	42.8	B	1,237	96.3	334,623
Rosemary	Rosemary Including Gem Spur	(M0.0)	- Matzhiwin	(M4.9)	40.5	C	324	87.7	50,068
	Finnegan	(M29.8)	- East Coulee	(M53.6)		B			
Rosetown	Perdue	(M0.0)	- Marriott	(M30.7)	30.7	B	627	97.6	158,971
Russell	Binscarth	(M0.0)	- Inglis	(M23.9)	23.9	B	1,653	90.3	111,260
Shamrock	Old Wives	(M21.6)	- Hak	(M103.4)	81.8	B	1,471	94.6	471,415
Shaunavon	Assiniboia	(M0.0)	- Shaunavon	(M118.2)	118.2	A	3,341	97.1	1,338,856
Snowflake	Wood Bay	(M0.0)	- Snowflake	(M16.6)	16.6	B	602	99.7	60,528
Stewart Valley	Baird	(M0.0)	- Stewart V.	(M20.4)	20.4	B	374	87.9	118,370
Stirling	Manyberries	(M0.0)	- Stirling	(M84.0)	84.0	A	1,854	77.9	345,272
Strathmore	Gleichen	(M0.0)	- Langdon	(M33.6)	33.6	B	1,754	91.4	133,904
Suffield	Suffield	(M0.0)	- Lomond	(M83.9)	83.9	B	1,806	79.8	268,761
Tisdale	Goudie	(M0.0)	- Nipawin	(M131.7)	131.7	A	5,607	66.6	839,888
Tyvan	Stoughton	(M0.0)	- Regina	(M87.3)	87.3	B	3,797	88.5	619,087
Vanguard	Swift Current	(M2.0)	- Meyronne	(M76.3)	74.3	A	1,419	96.3	582,017
Varcoe	Wellwood	(M25.6)	- Varcoe	(M55.4)	29.8	B	989	96.8	95,271
Vegreville	Willingdon	(M0.0)	- Vegreville	(M24.6)	24.6	B	2,399	87.6	98,299
White Fox	Nipawin	(M0.0)	- Sharpe	(M73.4)	73.4	A	2,436	68.8	463,352
Willingdon	Josephburg Including Chemcell Spur	(M149.3)	-Lloydminster	(M0.0)	155.3	*	6,615	82.8	994,034
Winnipeg Beach	Gimli	(M58.0)	- Riverton	(M82.6)	24.6	A	228	75.5	90,920
Wishart	Foam Lake	(M0.0)	- Wishart	(M26.9)	26.9	B	1,107	97.6	223,451
Wood Mountain	Ogle	(M0.0)	- Mankota	(M64.9)	64.9	B	1,414	88.7	713,578
Woolford	Raley	(M0.0)	- Whisky Gap	(M21.0)	21.0	B	693	92.0	45,191
TOTAL					3,771.8		113,759	89.5	23,085,410

* Willingdon Lloydminster (M0.0) - Musidora (M80.8) is a Category B line.
Musidora (M80.8) - Josephburg (M149.3), including the Chemcell Spur is a Category A line.

CANADIAN NATIONAL

GRAIN DEPENDENT LINES - 1974

Line No.	Subdivision	Between				Study Miles	Category	Miscellaneous Revenues $	% Statutory Grain of Originating & Terminating Traffic	CTC Certified Loss
15	Acadia Valley	Cuthbert	(MO.00)	- Acadia Valley	(M24.31)	24.31	B	291	99.5	224,712
45	Amiens	Ordale	(MO.00)	- Belbutte	(M74.98)	74.98	B	1,703	92.5	463,705
65	Athabasca	Morin Jct.	(M20.20)	- Athabasca	(M93.10)	72.90	B	5,756	73.8	523,185
80	Avonlea	Benbough Jct.	(MO.00)	- Baldon	(M83.77)	83.77	B	1,374	97.1	741,075
100	Bengough	Brooking	(MO.00)	- Willow Bunch	(M71.45)	71.45	B	2,002	98.0	707,109
115	Blaine Lake	Crutwell	(MO.00)	- Shellbrook	(M29.37)	29.37	A	1.352	94.5	326,926
120	Blaine Lake	Parkside	(M29.37)	- Lilac	(M116.51)	87.14	B	3,789		1,210,785
130	Bodo	Sunny Glenn	(MO.00)	- Bodo	(M51.50)	51.50	B	832	98.9	687,275
135	Bolney	Bolney	(MO.00)	- Frenchman Butte	(M28.21)	28.21	B	550	97.4	205,872
155	Brooksby	Carrot River	(MO.00)	- Whittome	(M51.07)	51.07	A	3,281	81.2	525,819
195	Carberry	Petrel Jct.	(M13.03)	- Carberry Jct.	(M23.05)	10.02	B	0	--	0*
200	Carlton	Mennon	(MO.00)	- Carlton	(M35.93)	35.93	B	1,557	92.8	224,108
205	Carman	Oak Bluff	(MO.00)	- Roseisle	(M60.75)	60.75	B	4,654	88.3	841,015
		Notre Dame Jct.	(M70.33)	- Belmont	(M118.84)	48.51	B			
230	Central Butte	Archydal	(M39.18)	- Grainland	(M92.50)	53.32	B	1,114	99.4	438,574
250	Chelan	Dillabough	(MO.00)	- Bjorkdale	(M60.07)	60.07	B	2,008	92.7	521,205
265	Conquest	Chambers	(MO.00)	- Beechy	(M94.33)	94.33	B	3,209	97.4	920,335
275	Corning	Bemersyde	(MO.00)	- Handsworth	(M22.29)	22.29	B	325	97.6	192,476
310	Cromer	Brandon Piggyback	(M75.83)	- Kipling	(M128.62)	52.79	B	2,856	96.8	696,570
322	Cudworth	Rutan	(M17.40)	- Red Deer Hill	(M107.96)	90.56	B	3,003	95.3	832,345
335	Cut Knife	Cut Knife Jct.	(MO.00)	- Carruthers	(M26.84)	26.84	B	120	87.7	767
345	De May	De May	(MO.00)	- Dodds	(M24.92)	24.92	A	429	98.9	96,834
350	Dodsland	Argo	(MO.00)	- Hemaruka	(M154.11)	154.11	B	2,436	97.6	1,409,479
395	Elrose	Tichfield Jct.	(MO.00)	- Verendrye	(M120.65)	120.65	B	10,338	96.1	1,598,045
405	Endiang	Dowling	(MO.00)	- Sabine	(M62.18)	62.18	B	449	98.4	339,426
460	Glenavon	Dalzell	(MO.00)	- Dreghorn	(M91.84)	91.84	B	2,792	95.5	1,108,131
470	Goodwater	Goodwater	(MO.00)	- Colgate	(M26.84)	26.84	B	320	98.3	126,544
485	Gravelbourg	Claybank	(MO.00)	- Burnham Spur	(M118.92)	118.92	B	4,000	94.6	1,278,855
505	Haight	Inland	(M13.00)	- Inland	(M21.75)	8.75	B	163	100.0	39,135
510	Hartney	Sanatorium	(MO.00)	- West Jct. w/Cromer Subd.	(M82.86)	82.86	B	5,006	81.5	539,975
520	Hatherleigh	Scentgrass	(MO.00)	- Sandwith	(M31.56)	31.56	B	8,141	97.9	0
540	Kingman	Bardo	(MO.00)	- Kingman	(M13.0)	13.00	B	241	100.0	30,338
570	Lewvan	Minard	(MO.00)	- Rowatt	(M114.20)	114.20	B	2,747	99.5	0*
585	Main Centre	Kettlehut	(MO.00)	- Main Centre	(M48.64)	48.64	B	435	98.7	322,703
595	Mantario	Dankin	(MO.00)	- Sodium Sulphate	(M43.79)	43.79	B	3,133	74.3	644,169
615	Meskanaw	Thatch	(MO.00)	- Rak	(M89.45)	89.45	B	1,329	94.2	554,339
630	Miami	Smiths	(MO.00)	- Hubbell	(M62.08)	62.08	B	2,391	90.1	429,818
670	Neepawa	Helston	(MO.00)	- Helston	(M11.25)	11.25	B	80	96.6	36,979
685	Notre Dame	Notre Dame De Lourdes	(MO.00)	- Notre Dame De Lourdes	(M2.55)	2.55	B	231	90.1	33,820
700	Oakland	Oakland	(MO.00)	- Amaranth	(M53.38)	53.38	B	1,425	92.7	238,058

CANADIAN NATIONAL

GRAIN DEPENDENT LINES - 1974
(Continued)

Line No.	Subdivision	Between				Study Miles	Category	Miscellaneous Revenues $	% Statutory Grain of Originating & Terminating Traffic	CTC Certified Loss
730	Paddockwood	White Star	(M3.60)	- Paddockwood	(M23.85)	20.25	A	419	96.4	241,026
750	Pleasant Point	Edwin	(M10.70)	- Pleasant Pt.	(M51.70)	41.00		35,148	96.0	58,242
755	Porter	Lett	(M0.00)	- Cando	(M18.00)	18.00	B	620	98.5	112,401
760	Battleford	Battleford	(M0.09)	- Battleford	(M7.83)	7.74	B	720	96.8	217,436
765	Preeceville	Kenville	(M0.00)	- Stenen	(M65.34)	65.34	B	3,887	85.3	995,468
775	Preeceville	Lilian	(M67.36)	- Kelvington	(M113.58)	46.22	B	2,696		546,344
790	Rapid City	Mentmore	(M0.00)	- Beulah	(M74.40)	74.40	B	1,260	95.1	426,833
825	Rhein	Donwell	(M0.00)	- Stornoway	(M37.83)	37.83	B	1,183	92.8	308,084
830	Ridgeville	Ridgeville	(M60.87)	- Fredenstahl	(M70.00)	9.13	B	544	87.9	68,257
840	Riverhurst	Lawson	(M0.00)	- Riverhurst	(M18.02)	18.02	B	669	99.8	166,178
860	Robinhood	Keatley	(M0.00)	- Livelong	(M101.51)	101.51	B	2,414	95.2	645,929
880	Rossburn	Springhill	(M0.00)	- Russell	(M104.27)	104.27	B	3,256	90.4	785,014
920	St. Brieux	Lipsett	(M0.00)	- Moseley	(M52.20)	52.20	B	2,092	92.4	654,842
925	Ste. Rose	Ste. Rose	(M0.00)	- Rorketon	(M37.12)	37.12	B	761	82.3	162,151
940	Stettler	Ballast Pit	(M0.00)	- Warden	(M108.02)	108.02	B	5,690	90.8	1,304,716
1015	Tonkin	Endcliffe	(M0.00)	- Sturdee	(M75.20)	75.20	B	2,782	95.6	412,534
1025	Tonkin	Fonehill	(M75.20)	- Parkerview	(M112.06)	36.86	B	991		187,124
1035	Turtleford	Hamlin	(M0.00)	- St. Walburg	(M76.95)	76.95	B	3,764	94.9	937,260
1065	Wakopa	Glenora	(M0.00)	- Neelin	(M17.83)	17.83	B	287	99.1	86,730
1080	Wawanesa	Wawanesa	(M14.60)	- Rounthwaite	(M37.44)	22.84	B	702	82.1	182,162
1090	Weyburn	Airport Spur	(M0.00)	- Radville	(M38.24)	38.24	B	4,372	84.8	358,682
1095	White Bear	Witley	(M0.00)	- White Bear	(M34.30)	34.30	B	1,281	99.2	423,754
1115	Winnipegosis	Sifton Jct.	(M0.00)	- Winnipegosis	(M20.79)	20.79	B	1,208	79.0	81,565
	TOTAL					3,355.14		162,608	91.9	28,473,238

* Subsidy claims filed but no payment received.

Summary of Recommendations Contained in This Report

The recommendations which appeared throughout Chapters III and IV of this report are summarized on the following pages. They are according to the party addressed and are arranged to indicate our view of their priority--those appearing first on each list are designated as high priority. The number appearing at the right-hand side of each recommendation denotes the report page number where the recommendation was introduced. It is suggested that the reader refer to the context in which the recommendation was made, rather than relying solely on this summary. Also, the reader is reminded that our suggested program for implementing the research called for by these recommendations is found at the conclusion of Chapter IV.

PARTY/RECOMMENDATION	REPORT PAGE REFERENCE
Canadian Transport Commission	
• inquire into adequacy of Uniform Classification of Accounts as a basis for development of costs for regulatory purposes;	38
• jointly with railways, conduct future research into development of volume related roadway maintenance and roadway property unit costs for grain dependent lines; main lines and other branch lines;	123
• undertake a review of the adequacy of the data submitted to them by Class II railways and undertake the research necessary to develop a reasonable costing methodology;	176
• as a part of BLIP, require railways to "write-off" all inert assets and segregate the others into those required for general operations, those required solely for grain transportation, and those required solely for transportation of other commodities;	114
• if requested station abandonments are not permitted on grain dependent lines, identify the specific railway functions requiring the continued operation of the station;	121
• require railways to undertake whatever studies deemed appropriate to settle the variability issue on those costs which do not lend themselves to regression analysis;	60
• investigate assumptions of variability underlying railways procedures of translating costs derived on the basis of one output unit into costs based on another output unit;	59
• jointly with the railways, undertake detailed review and analysis of costs assigned on an indirect basis with a view to revisions in current procedures;	44

PARTY/RECOMMENDATION	REPORT PAGE REFERENCE
Canadian Transport Commission (Continued)	
• determine appropriate number of years to be utilized in the normalizing of expenditures and output units;	45
• determine nature and impact of productivity changes on the unit costs developed from normalized data; and	46
• inquire into issue of constant costs.	67
Canadian National and CP Rail	
• tabulate data on maintenance expenditures and property investment on a subdivision or specific line basis commencing with the year 1977;	142
• separate asset groups and depreciation rates be created for grain dependent lines, other branch lines, and main lines;	119
• conduct further research into Davis formula as method of determining fuel consumption;	152
• examine application of direct analysis to locomotive and freight car maintenance;	56
• segregate car repair and car investment and determime separate depreciation rates for cars substantially dedicated to the grain trade; and	130 to 136
• continue to test alternative formulations of regression relationships in an effort to improve statistical quality of unit costs;	181

PARTY/RECOMMENDATION	REPORT PAGE REFERENCE
Canadian National	
• rewrite Costing Manual in terms of accounting system on which costs are actually developed;	40
• develop an asset base that reflects the true gross and net values of the property actually employed in providing rail transportation service and develop realistic capitalization and capital structure for Canadian National; and	148
• correct for reporting reliability of car cycle data base, and utilize alternative definition of car cycle for future costing of statutory grain.	183
General	
• future costing of statutory grain either exclude NAR traffic flow or include the full participation of NAR as an equal participant, developing costs in the same fashion and from the same relative data detail as CN and CP;	176
• in railway costing, use regression analysis whenever the required input data can be accumulated on a cross-sectional basis;	60
• for grain costing, continue to use the gross ton-mile method of allocating train costs to specific traffics; and	179
• include CN traffic expense estimates in future cost determinations of statutory grain, if supporting documentation, comparable to that of CP Rail, can be provided by CN.	178

Comparison of Year 1974 Railway Costs of Transporting Statutory Grain Submitted to This Commission

Railway/Cost Element	Costs ($000,000) Per	
	Railways	Provinces
CP Rail		
Direct Shipment		
Line Related		
Operating	$ 5.4	$12.1
Depreciation	2.4	*
Capital Funds	16.9	*
Maintenance Shortfall	8.5	0.0
Capital Shortfall	4.4	0.0
Inflation Adjustment	(0.9)	0.0
Subtotal	$ 36.7	$12.1
Volume Related		
Operating	$ 62.2	$59.2
Depreciation	5.2	5.3
Capital Funds	24.9	9.2
Inflation Adjustment	5.6	0.0
Subtotal	$ 97.9	$73.7
System Constant Costs		
Constant Costs	$ 15.3	$ 0.0
Inflation Adjustment	1.3	0.0
Subtotal	$ 16.6	$ 0.0
TOTAL	$151.2	$85.8
Transit Shipments		
Line Related Expenditures	$ 1.0	**
Maintenance Shortfall	0.3	$ 0.0
Capital Shortfall	0.2	0.0
Volume Related Expenditure	3.0	2.4
Constant Costs	0.5	0.0
Inflation Adjustment	0.2	0.0
TOTAL	$ 5.2	$ 2.4
TOTAL CP RAIL	$156.4	$88.2

* Included in cost shown as Line Related - Operating.

** Included in cost shown as Transit Shipments - Volume Related.

Comparison of Year 1974 Railway Costs of Transporting Statutory Grain Submitted to This Commission

Railway/Cost Element	Costs ($000,000) Per	
	Railways	Provinces
Canadian National		
Direct Shipment		
Line Related		
Operating	$ 10.7	$ 10.9
Depreciation	2.1	*
Capital Funds	18.0	*
Maintenance Shortfall	3.4	0.0
Capital Shortfall	4.4	0.0
Inflation Adjustment	(1.0)	0.0
Subtotal	$ 37.6	$ 10.9
Volume Related		
Operating	$ 67.2	$ 59.9
Depreciation	4.8	5.5
Capital Funds	25.7	6.9
Inflation Adjustment	5.2	0.0
Subtotal	$102.9	$ 72.3
System Constant Costs		
Constant Costs	$ 31.9	$ 0.0
Inflation Adjustment	1.4	0.0
Subtotal	$ 33.3	$ 0.0
TOTAL	$173.8	$ 83.2
Transit Shipments		
Line Related Expenditures	$ 0.6	**
Maintenance Shortfall	0.1	$ 0.0
Capital Shortfall	0.1	0.0
Volume Related Expenditure	1.7	1.5
Constant Costs	0.6	0.0
Inflation Adjustment	0.1	0.0
TOTAL	$ 3.2	$ 1.5
TOTAL CANADIAN NATIONAL	$177.0	$ 84.7
TOTAL CP RAIL AND CANADIAN NATIONAL	$333.4	$172.9
NORTHERN ALBERTA RAILWAYS	4.9	2.2
TOTAL RAILWAYS	$338.3	$175.1

* Included in cost shown as Line Related - Operating.

** Included in cost shown as Transit Shipments - Volume Related.

CP Rail 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs			
Grain Dependent Lines			
Volume-Related			
Roadway Maintenance Expenditures	$ 0.226	$0.02	0.19%
Property Taxes	0.046	0.01	0.04
Overhead	0.108	0.01	0.09
Roadway Maintenance Shortfall*	0.501	0.05	0.42
Subtotal	0.881	0.09	0.74
Line-Related			
Roadway Maintenance Expenditures	$ 3.484	$0.33	2.91%
Stations	0.000	0.00	0.00
Property Taxes	0.444	0.04	0.37
Overhead	1.721	0.17	1.44
Roadway Maintenance Shortfall*	8.187	0.78	6.84
Subtotal	13.836	1.32	11.56
Total Grain Dependent Lines	$14.717	$1.41	12.30%
Other Lines and Above Rail Operations—Volume-Related			
Running Track and Roadway Property			
Roadway Maintenance	$ 2.835	$0.27	2.37%
Property Taxes	0.567	0.06	0.47
Overhead	1.274	0.12	1.07
Subtotal	4.676	0.45	3.91
Yards Track and Roadway Property			
Roadway Maintenance	$ 0.375	$0.03	0.31%
Property Taxes	0.077	0.01	0.06
Overhead	0.173	0.02	0.15
Subtotal	0.625	0.06	0.52

*Roadway Maintenance Shortfall is the difference between the 1974 roadway maintenance costs required to maintain the grain dependent lines on an ongoing basis (normalized maintenance) and the 1974 roadway maintenance expenditures.

CP Rail 1974 Variable Costs of Transporting Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent			
Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs (continued)			
Train Operations			
Locomotive Repairs & Servicing	$ 4.449	$0.42	3.72%
Locomotive Fuel	7.056	0.67	5.90
Crew Wages	6.172	0.59	5.16
Control, Dispatching & Communications	1.329	0.13	1.11
Caboose Repair & Servicing	0.122	0.01	0.10
Overhead	8.229	0.79	6.88
Subtotal	27.357	2.61	22.87
Yard Operations			
Locomotive Repairs & Servicing	$ 0.464	$0.04	0.39%
Locomotive Fuel	0.227	0.02	0.19
Crew Wages	0.646	0.06	0.54
Control Dispatching & Communications	0.318	0.03	0.27
Overhead*	3.842	0.37	3.21
Subtotal	5.497	0.52	4.60
Freight Car Operations			
Car Repair & Servicing	$10.723	$1.02	8.96%
Car Cleaning	0.500	0.05	0.42
Grain Doors	2.157	0.21	1.80
Communications	0.155	0.01	0.13
Overhead	5.297	0.51	4.43
Subtotal	18.832	1.80	15.74
Other Elements			
Carload Billing	$ 2.768	$0.27	2.31%
Loss and Damage	0.823	0.08	0.69
Communications	0.040	0.00	0.03
Overhead	1.261	0.12	1.06
Subtotal	4.892	0.47	4.09
Total Other Lines and Above Rail Operations	$61.879	$5.91	51.73%
Total Operating Costs	$76.596	$7.32	64.03%

*Includes payment to CNR of $0.276 million for switching at Thunder Bay and Vancouver.

CP Rail 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Depreciation Expense			
Grain Dependent Lines			
Volume-Related			
Book Depreciation	$ 0.100	$0.01	0.08%
Depreciation Shortfall*	0.002	0.00	0.00
Subtotal	0.102	0.01	0.08
Line-Related			
Book Depreciation	$ 2.525	$0.24	2.11%
Depreciation Shortfall*	0.059	0.01	0.05
Subtotal	2.584	0.25	2.16
Total Grain Dependent Lines	$ 2.686	$0.26	2.24%
Other Lines and Equipment-Book Depreciation			
Running Track and Roadway Property	$ 1.049	$0.10	0.88%
Yard Track and Roadway Property	0.231	0.02	0.19
Road Locomotives	1.238	0.12	1.04
Yard Locomotives	0.108	0.01	0.09
Cabooses	0.037	0.00	0.03
Freight Cars	1.715	0.16	1.43
Signals and Communications	0.223	0.02	0.19
Other Property	0.358	0.04	0.30
Total Other Lines and Equipment	$ 4.959	$0.47	4.15%
Total Depreciation Expense	$ 7.645	$0.73	6.39%
Capital Funds Cost			
Grain Dependent Lines			
Volume-Related			
Net Book Investment Basis	$ 0.582	$0.06	0.49%

*Depreciation Shortfall is the difference between the 1974 depreciation expense on gross book investment including the 1974 capital expenditure required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 book depreciation.

CP Rail 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Capital Funds Cost (continued)			
Capital Funds Shortfall*	0.026	0.00	0.02
Subtotal	0.608	0.06	0.51
Line-Related			
Net Book Investment Basis	$14.635	$1.40	12.23%
Capital Funds Shortfall*	0.611	0.06	0.51
Subtotal	15.246	1.46	12.74
Total Grain Dependent Lines	$15.854	$1.52	13.25%
Other Lines and Equipment-Net Book Investment Basis			
Running Track and Roadway Property	$ 6.996	$0.67	5.85%
Yard Track and Roadway Property	0.955	0.09	0.80
Road Locomotives	2.989	0.29	2.50
Yard Locomotives	0.108	0.01	0.09
Cabooses	0.125	0.01	0.10
Freight Cars	5.807	0.55	4.85
Signals and Communications	0.787	0.08	0.66
Other Property	1.768	0.17	1.48
Total Other Lines and Equipment	$19.535	$1.87	16.33%
Total Capital Funds Cost	$35.389	$3.39	29.58%
Total Variable Costs			
Grain Dependent Lines - Line-Related	$31.666	$3.03	26.47%
Grain Dependent Lines - Volume-Related	1.591	0.15	1.33
Subtotal	33.257	3.18	27.80
Other Lines, Train Operations, and Equipment - Volume-Related	$86.373	$8.26	72.20%
Total Variable Costs			
Line-Related	$31.666	$3.03	26.47%
Volume-Related	87.964	8.41	73.53
Total	$119.630	$11.44	100.00%

*Capital Funds Shortfall is the difference between the 1974 capital funds cost on net book investment including the 1974 capital expenditures required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 capital funds cost on net book investment.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs			
Grain Dependent Lines			
Volume-Related			
Roadway Maintenance Expenditures	$ 0.346	$0.04	0.29%
Property Taxes	0.056	0.01	0.05
Overhead	0.180	0.02	0.15
Roadway Maintenance Shortfall*	0.321	0.03	0.27
Subtotal	0.903	0.10	0.76
Line-Related			
Roadway Maintenance Expenditures	$ 4.190	$0.44	3.52%
Stations	0.249	0.02	0.21
Property Taxes	0.448	0.05	0.38
Overhead	2.801	0.29	2.35
Roadway Maintenance Shortfall*	3.648	0.38	3.06
Subtotal	11.336	1.18	9.52
Total Grain Dependent Lines	$12.239	$1.28	10.28%
Other Lines and Above Rail Operations—Volume-Related			
Running Track and Roadway Property			
Roadway Maintenance	$ 3.354	$0.35	2.82%
Property Taxes	0.947	0.10	0.80
Overhead	1.708	0.18	1.43
Subtotal	6.009	0.63	5.05
Yards Track and Roadway Property			
Roadway Maintenance	$ 0.733	$0.08	0.61%
Property Taxes	0.150	0.01	0.13
Overhead	0.378	0.04	0.32
Subtotal	1.261	0.13	1.06

*Roadway Maintenance Shortfall is the difference between the 1974 roadway maintenance costs required to maintain the grain dependent lines on an ongoing basis (normalized maintenance) and the 1974 roadway maintenance expenditures.

Canadian National 1974 Variable Costs of Transporting Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent			
Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs (continued)			
Train Operations			
Locomotive Repairs & Servicing	$ 3.379	$0.35	2.84%
Locomotive Fuel	7.061	0.74	5.93
Crew Wages	7.897	0.82	6.63
Control, Dispatching & Communications	1.245	0.13	1.05
Caboose Repair & Servicing	0.208	0.02	0.18
Overhead	10.858	1.13	9.12
Subtotal	30.648	3.19	25.75
Yard Operations			
Locomotive Repairs & Servicing	$ 0.311	$0.03	0.26%
Locomotive Fuel	0.249	0.03	0.21
Crew Wages	2.253	0.24	1.89
Control Dispatching & Communications	0.189	0.02	0.16
Overhead	3.684	0.38	3.10
Subtotal	6.686	0.70	5.62
Freight Car Operations			
Car Repair & Servicing	$ 7.296	$0.76	6.13%
Car Cleaning	0.073	0.01	0.06
Grain Doors	1.844	0.19	1.55
Communications	0.134	0.01	0.11
Overhead	8.750	0.91	7.35
Subtotal	18.097	1.88	15.20
Other Elements			
Carload Billing	$ 1.299	$0.14	1.09%
Loss and Damage	0.484	0.05	0.41
Communications	0.020	0.00	0.02
Overhead	0.626	0.06	0.52
Subtotal	2.429	0.25	2.04
Total Other Lines and Above Rail Operations	$65.130	$6.78	54.72%
Total Operating Costs	$77.369	$8.06	65.00%

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Depreciation Expenses			
Grain Dependent Lines			
Volume-Related			
Book Depreciation	$ 0.081	$0.01	0.07%
Depreciation Shortfall*	0.004	0.00	0.00
Subtotal	0.085	0.01	0.07
Line-Related			
Book Depreciation	$ 1.839	$0.19	1.55%
Depreciation Shortfall*	0.083	0.01	0.07
Subtotal	1.922	0.20	1.62
Total Grain Dependent Lines	$ 2.007	$0.21	1.69%
Other Lines and Equipment-Book Depreciation			
Running Track and Roadway Property	$ 0.990	$0.10	0.83%
Yard Track and Roadway Property	0.147	0.02	0.12
Road Locomotives	1.470	0.15	1.24
Yard Locomotives	0.153	0.02	0.13
Cabooses	0.071	0.01	0.06
Freight Cars	1.352	0.14	1.14
Signals and Communications	0.328	0.03	0.27
Other Property	0.216	0.02	0.18
Total Other Lines and Equipment	$ 4.727	$0.49	3.97%
Total Depreciation Expense	$ 6.734	$0.70	5.66%
Capital Funds Cost			
Grain Dependent Lines			
Volume-Related			
Net Book Investment Basis	$ 0.564	$0.06	0.47%

*Depreciation Shortfall is the difference between the 1974 depreciation expense on gross book investment including the 1974 capital expenditure required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 book depreciation.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 20.80 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Capital Funds Cost (continued)			
Capital Funds Shortfall*	0.057	0.01	0.05
Subtotal	0.621	0.07	0.52
Line-Related			
Net Book Investment Basis	$13.084	$1.36	10.99%
Capital Funds Shortfall*	.865	0.09	0.73
Subtotal	13.949	1.45	11.72
Total Grain Dependent Lines	$14.570	$1.52	12.24%
Other Lines and Equipment-Net Book Investment Basis			
Running Track and Roadway Property	$ 7.372	$0.77	6.19%
Yard Track and Roadway Property	1.096	0.11	0.92
Road Locomotives	3.570	0.37	3.00
Yard Locomotives	0.289	0.03	0.24
Cabooses	0.291	0.03	0.25
Freight Cars	5.552	0.58	4.67
Signals and Communications	0.811	0.09	0.68
Other Property	1.372	0.14	1.15
Total Other Lines and Equipment	$20.353	$2.12	17.10%
Total Capital Funds Cost	$34.923	$3.64	29.34%
Total Variable Costs			
Grain Dependent Lines - Line-Related	$27.207	$2.83	22.86%
Grain Dependent Lines - Volume-Related	1.609	0.17	1.35
Subtotal	28.816	3.00	24.21
Other Lines, Train Operations, and Equipment - Volume-Related	$90.210	$9.39	75.79%
Total Variable Costs			
Line-Related	$27.207	$2.83	22.86%
Volume-Related	91.819	9.56	77.14
Total	$119.026	$12.39	100.00%

*Capital Funds Shortfall is the difference between the 1974 capital funds cost on net book investment including the 1974 capital expenditures required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 capital funds cost on net book investment.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 11.31 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs			
Grain Dependent Lines			
Volume-Related			
Roadway Maintenance Expenditures	$ 0.346	$0.04	0.34%
Property Taxes	0.056	0.01	0.05
Overhead	0.180	0.02	0.18
Roadway Maintenance Shortfall*	0.321	0.03	0.31
Subtotal	0.903	0.10	0.88
Line-Related			
Roadway Maintenance Expenditures	$ 4.190	$0.44	4.06%
Stations	0.249	0.02	0.24
Property Taxes	0.448	0.05	0.43
Overhead	2.801	0.29	2.72
Roadway Maintenance Shortfall*	3.648	0.38	3.54
Subtotal	11.336	1.18	10.99
Total Grain Dependent Lines	$12.239	$1.28	11.87%
Other Lines and Above Rail Operations—Volume-Related			
Running Track and Roadway Property			
Roadway Maintenance	$ 3.354	$0.35	3.25%
Property Taxes	0.947	0.10	0.92
Overhead	1.708	0.18	1.66
Subtotal	6.009	0.63	5.83
Yards Track and Roadway Property			
Roadway Maintenance	$ 0.733	$0.08	0.71%
Property Taxes	0.150	0.01	0.14
Overhead	0.378	0.04	0.37
Subtotal	1.261	0.13	1.22

*Roadway Maintenance Shortfall is the difference between the 1974 roadway maintenance costs required to maintain the grain dependent lines on an ongoing basis (normalized maintenance) and the 1974 roadway maintenance expenditures.

Canadian National 1974 Variable Costs of Transporting Direct Shipment Statutory Grain at Capital Funds Rate of 11.31 Percent			
Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs (continued)			
Train Operations			
Locomotive Repairs & Servicing	$ 3.379	$0.35	3.27%
Locomotive Fuel	7.061	0.74	6.85
Crew Wages	7.897	0.82	7.66
Control, Dispatching & Communications	1.245	0.13	1.21
Caboose Repair & Servicing	0.208	0.02	0.20
Overhead	10.858	1.13	10.53
Subtotal	30.648	3.19	29.72
Yard Operations			
Locomotive Repairs & Servicing	$ 0.311	$0.03	0.30%
Locomotive Fuel	0.249	0.03	0.24
Crew Wages	2.253	0.24	2.19
Control Dispatching & Communications	0.189	0.02	0.18
Overhead	3.684	0.38	3.57
Subtotal	6.686	0.70	6.48
Freight Car Operations			
Car Repair & Servicing	$ 7.296	$0.76	7.08%
Car Cleaning	0.073	0.01	0.07
Grain Doors	1.844	0.19	1.79
Communications	0.134	0.01	0.13
Overhead	8.750	0.91	8.48
Subtotal	18.097	1.88	17.55
Other Elements			
Carload Billing	$ 1.299	$0.14	1.26%
Loss and Damage	0.484	0.05	0.47
Communications	0.020	0.00	0.02
Overhead	0.626	0.06	0.60
Subtotal	2.429	0.25	2.35
Total Other Lines and Above Rail Operations	$65.130	$6.78	63.15%
Total Operating Costs	$77.369	$8.06	75.02%

Canadian National 1974 Variable Costs of Transporting Direct Shipment Statutory Grain at Capital Funds Rate of 11.31 Percent			
Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Depreciation Expenses			
Grain Dependent Lines			
Volume-Related			
Book Depreciation	$ 0.081	$0.01	0.08%
Depreciation Shortfall*	0.004	0.00	0.00
Subtotal	0.085	0.01	0.08
Line-Related			
Book Depreciation	$ 1.839	$0.19	1.79%
Depreciation Shortfall*	0.083	0.01	0.08
Subtotal	1.922	0.20	1.87
Total Grain Dependent Lines	$ 2.007	$0.21	1.95%
Other Lines and Equipment-Book Depreciation			
Running Track and Roadway Property	$ 0.990	$0.10	0.96%
Yard Track and Roadway Property	0.147	0.02	0.14
Road Locomotives	1.470	0.15	1.42
Yard Locomotives	0.153	0.02	0.15
Cabooses	0.071	0.01	0.07
Freight Cars	1.352	0.14	1.31
Signals and Communications	0.328	0.03	0.32
Other Property	0.216	0.02	0.21
Total Other Lines and Equipment	$ 4.727	$0.49	4.58%
Total Depreciation Expense	$ 6.734	$0.70	6.53%
Capital Funds Cost			
Grain Dependent Lines			
Volume-Related			
Net Book Investment Basis	$ 0.307	$0.03	0.30%

*Depreciation Shortfall is the difference between the 1974 depreciation expense on gross book investment including the 1974 capital expenditure required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 book depreciation.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 11.31 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Capital Funds Cost (continued)			
Capital Funds Shortfall*	0.032	0.01	0.03
Subtotal	0.339	0.04	0.33
Line-Related			
Net Book Investment Basis	$ 7.115	$0.74	6.90%
Capital Funds Shortfall*	0.508	0.05	0.49
Subtotal	7.623	0.79	7.39
Total Grain Dependent Lines	$ 7.962	$0.83	7.72%
Other Lines and Equipment-Net Book Investment Basis			
Running Track and Roadway Property	$ 4.009	$0.42	3.89%
Yard Track and Roadway Property	0.596	0.06	0.58
Road Locomotives	1.941	0.20	1.88
Yard Locomotives	0.157	0.02	0.15
Cabooses	0.158	0.02	0.15
Freight Cars	3.019	0.31	2.93
Signals and Communications	0.441	0.04	0.43
Other Property	0.746	0.08	0.72
Total Other Lines and Equipment	$11.067	$1.15	10.73%
Total Capital Funds Cost	$19.029	$1.98	18.45%
Total Variable Costs			
Grain Dependent Lines - Line-Related	$20.881	$2.17	20.25%
Grain Dependent Lines - Volume-Related	1.327	0.14	1.28
Subtotal	22.208	2.31	21.53
Other Lines, Train Operations, and Equipment - Volume-Related	$80.924	$8.43	78.47%
Total Variable Costs			
Line-Related	$20.881	$2.17	20.25%
Volume-Related	82.251	8.57	79.75
Total	$103.132	$10.74	100.00%

*Capital Funds Shortfall is the difference between the 1974 capital funds cost on net book investment including the 1974 capital expenditures required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 capital funds cost on net book investment.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 5.94 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs			
Grain Dependent Lines			
Volume-Related			
Roadway Maintenance Expenditures	$ 0.346	$0.04	0.37%
Property Taxes	0.056	0.01	0.06
Overhead	0.180	0.02	0.19
Roadway Maintenance Shortfall*	0.321	0.03	0.34
Subtotal	0.903	0.10	0.96
Line-Related			
Roadway Maintenance Expenditures	$ 4.190	$0.44	4.45%
Stations	0.249	0.02	0.26
Property Taxes	0.448	0.05	0.48
Overhead	2.801	0.29	2.98
Roadway Maintenance Shortfall*	3.648	0.38	3.87
Subtotal	11.336	1.18	12.04
Total Grain Dependent Lines	$12.239	$1.28	13.00%
Other Lines and Above Rail Operations—Volume-Related			
Running Track and Roadway Property			
Roadway Maintenance	$ 3.354	$0.35	3.56%
Property Taxes	0.947	0.10	1.01
Overhead	1.708	0.18	1.81
Subtotal	6.009	0.63	6.38
Yards Track and Roadway Property			
Roadway Maintenance	$ 0.733	$0.08	0.78%
Property Taxes	0.150	0.01	0.16
Overhead	0.378	0.04	0.40
Subtotal	1.261	0.13	1.34

*Roadway Maintenance Shortfall is the difference between the 1974 roadway maintenance costs required to maintain the grain dependent lines on an ongoing basis (normalized maintenance) and the 1974 roadway maintenance expenditures.

Canadian National 1974 Variable Costs of Transporting Direct Shipment Statutory Grain at Capital Funds Rate of 5.94 Percent			
Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Operating Costs (continued)			
Train Operations			
Locomotive Repairs & Servicing	$ 3.379	$0.35	3.59%
Locomotive Fuel	7.061	0.74	7.50
Crew Wages	7.897	0.82	8.39
Control, Dispatching & Communications	1.245	0.13	1.32
Caboose Repair & Servicing	0.208	0.02	0.22
Overhead	10.858	1.13	11.54
Subtotal	30.648	3.19	32.56
Yard Operations			
Locomotive Repairs & Servicing	$ 0.311	$0.03	0.33%
Locomotive Fuel	0.249	0.03	0.27
Crew Wages	2.253	0.24	2.39
Control Dispatching & Communications	0.189	0.02	0.20
Overhead	3.684	0.38	3.91
Subtotal	6.686	0.70	7.10
Freight Car Operations			
Car Repair & Servicing	$ 7.296	$0.76	7.75%
Car Cleaning	0.073	0.01	0.08
Grain Doors	1.844	0.19	1.96
Communications	0.134	0.01	0.14
Overhead	8.750	0.91	9.30
Subtotal	18.097	1.88	19.23
Other Elements			
Carload Billing	$ 1.299	$0.14	1.38%
Loss and Damage	0.484	0.05	0.51
Communications	0.020	0.00	0.02
Overhead	0.626	0.06	0.67
Subtotal	2.429	0.25	2.58
Total Other Lines and Above Rail Operations	$65.130	$6.78	69.19%
Total Operating Costs	$77.369	$8.06	82.19%

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 5.94 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Depreciation Expenses			
Grain Dependent Lines			
Volume-Related			
Book Depreciation	$ 0.081	$0.01	0.09%
Depreciation Shortfall*	0.004	0.00	0.00
Subtotal	0.085	0.01	0.09
Line-Related			
Book Depreciation	$ 1.839	$0.19	1.95%
Depreciation Shortfall*	0.083	0.01	0.09
Subtotal	1.922	0.20	2.04
Total Grain Dependent Lines	$ 2.007	$0.21	2.13%
Other Lines and Equipment-Book Depreciation			
Running Track and Roadway Property	$ 0.990	$0.10	1.05%
Yard Track and Roadway Property	0.147	0.02	0.16
Road Locomotives	1.470	0.15	1.56
Yard Locomotives	0.153	0.02	0.16
Cabooses	0.071	0.01	0.07
Freight Cars	1.352	0.14	1.44
Signals and Communications	0.328	0.03	0.35
Other Property	0.216	0.02	0.23
Total Other Lines and Equipment	$ 4.727	$0.49	5.02%
Total Depreciation Expense	$ 6.734	$0.70	7.15%
Capital Funds Cost			
Grain Dependent Lines			
Volume-Related			
Net Book Investment Basis	$ 0.161	$0.02	0.17%

*Depreciation Shortfall is the difference between the 1974 depreciation expense on gross book investment including the 1974 capital expenditure required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 book depreciation.

Canadian National 1974 Variable Costs of Transporting
Direct Shipment Statutory Grain at Capital Funds Rate of 5.94 Percent

Cost Element (1)	Amount (Millions of Dollars) (2)	Dollars Per Ton (3)	Percentage Distribution (4)
Capital Funds Cost (continued)			
Capital Funds Shortfall*	0.019	0.00	0.02
Subtotal	0.180	0.02	0.19
Line-Related			
Net Book Investment Basis	$ 3.736	$0.39	3.97%
Capital Funds Shortfall*	0.304	0.03	0.32
Subtotal	4.040	0.42	4.29
Total Grain Dependent Lines	$ 4.220	$0.44	4.48%
Other Lines and Equipment-Net Book Investment Basis			
Running Track and Roadway Property	$ 2.105	$0.22	2.24%
Yard Track and Roadway Property	0.313	0.03	0.33
Road Locomotives	1.020	0.11	1.08
Yard Locomotives	0.083	0.01	0.09
Cabooses	0.083	0.01	0.09
Freight Cars	1.585	0.17	1.68
Signals and Communications	0.232	0.02	0.25
Other Property	0.392	0.04	0.42
Total Other Lines and Equipment	$ 5.813	$0.61	6.18%
Total Capital Funds Cost	$10.033	$1.05	10.66%
Total Variable Costs			
Grain Dependent Lines - Line-Related	$17.298	$1.80	18.38%
Grain Dependent Lines - Volume-Related	1.168	0.12	1.24
Subtotal	18.466	1.92	19.62
Other Lines, Train Operations, and Equipment - Volume-Related	$75.670	$7.98	80.38%
Total Variable Costs			
Line-Related	$17.298	$1.80	18.38%
Volume-Related	76.838	8.00	81.62
Total	$94.136	$9.80	100.00%

*Capital Funds Shortfall is the difference between the 1974 capital funds cost on net book investment including the 1974 capital expenditures required to maintain the grain dependent lines on an ongoing basis (normalized capital expenditures) and the 1974 capital funds cost on net book investment.

I. Development of Estimated Costs Attributable to 1974 Statutory Grain Transit Traffic (MIT)

Item (1)	Amounts in Millions of Dollars: Canadian National (2)	CP Rail (3)
1. Total Freight Revenues—Direct Shipment Traffic and Other Miscellaneous Revenues	$41.120	$44.619
2. Total Volume-Related Costs Direct Shipment Traffic	$82.251	$87.964
3. Ratio Costs to Revenues	2.000	1.971
4. Total Revenues Transit Traffic	$ 0.925	$ 1.473
5. Estimated Costs MIT Traffic	$ 1.850	$ 2.903

NOTE: The line-related costs attributable to transit traffic are included in the line-related costs shown in Appendices K and M.

II. Development of Estimated Costs Attributable to the Year 1974 Carriage of Statutory Grain Traffic by the Northern Alberta Railways

Item (1)	Amounts in Millions of Dollars: Canadian National (2)	CP Rail (3)	Total (4)
1. Total Freight and Miscellaneous Revenues	$ 42.220	$ 46.206	$ 88.426
2. Total Line and Volume-Related Costs*	$119.026	$119.630	$238.656
3. Ratio Costs to Revenues	-	-	2.699
4. Total Freight and Miscellaneous Revenues—Northern Alberta Railways	-	-	$ 1.291
5. Estimated Costs—Northern Alberta Railways			$ 3.484

*Source: Appendices K and L.

III.	Development of Costs Incurred by The Federal Government in the Year 1974 Transportation of Statutory Grain by Rail	
	Item (1)	Amount ($000,000) (2)
A.	Capital Costs—CWB Steel Hopper Cars	
	1. Total Investment in CWB Steel Hopper Cars	$45.076
	2. Depreciation at 3.03 Percent Per Year	1.366
	3. Salavage Value—30 Year Life (Total Investment x 9.10 Percent)	$ 4.102
	4. Average Net-to-Gross Ratio (.909 ÷ 2 plus .091)	0.5455
	5. Average Net Book Investment—30 Year Life	$24.589
	6. Cost of Funds At:	
	a. 20.80 Percent Capital Funds Rate	$ 5.115
	b. 11.31 Percent Capital Funds Rate	$ 2.781
	c. 8.90 Percent Capital Funds Rate	$ 2.188
B.	Box Car Repair Program	
	1. Total Amount Paid in 1974	$ 3.309
	2. Amortization Period—Years	5.0
	3. Average Cost Per Year	$ 0.662

Comparison of the Costs and Revenues
For the Transportation of Statutory Grain by Rail
in Year 1974

Item	Amount ($000,000) Per		
	The Commission	The Railways	The Provinces
Revenues Received From:			
Users of the Service			
CP Rail	$ 46.2	$ 46.2	$ 46.2
Canadian National	42.2	42.2	42.1
NAR	1.3	1.3	1.5
TOTAL	$ 89.7	$ 89.7	89.8
Branch Line Subsidy			
CP Rail	$ 23.1	$ 23.1	$ 21.8
Canadian National	28.5	28.3	32.3
NAR	0.4	0.0	0.0
TOTAL	$ 52.0	$ 51.4	$ 54.1
Total Revenues			
CP Rail	$ 69.3	$ 69.3	$ 68.0
Canadian National	70.7	70.5	74.4
NAR	1.7	1.3	1.5
Total	$141.7	$141.1	$143.9
Costs Incurred By:			
The Railways			
CP Rail	$122.5	$156.4	$ 88.2
Canadian National	105.0	177.0	84.7
NAR	3.5	4.9	2.2
Subtotal	$231.0	$338.3	$175.1
Federal Government	$ 3.4	$ 6.3	$ 0.0
TOTAL	$234.4	$344.6	$175.1

Comparison of the Costs and Revenues For the Transportation of Statutory Grain by Rail in Year 1974			
Item	Amount ($000,000) Per		
	The Commission	The Railways	The Provinces
Excess of Total Costs Over Revenues Received From the Users of the Service			
Railway Costs Only			
CP Rail			
Amount	$ 76.3	$110.2	$42.0
Ratio: Costs to Revenues	2.65	3.39	1.91
Canadian National			
Amount	$ 62.8	$134.8	$42.6
Ratio: Costs to Revenues	2.49	4.19	2.01
Northern Alberta Railways			
Amount	$ 2.2	$ 3.6	$ 0.7
Ratio: Costs to Revenues	2.69	3.77	1.47
Total Three Railways			
Amount	$141.3	$248.6	$85.3
Ratio: Costs to Revenues	2.58	3.77	1.95
Railway and Federal Government Costs			
Amount	$144.7	$254.9	$85.3
Ratio: Costs To Revenues	2.61	3.84	1.95

Comparison of the Costs and Revenues For the Transportation of Statutory Grain by Rail in Year 1974			
Item	Amount ($000,000) Per		
	The Commission	The Railways	The Provinces
Excess of Total Costs Over Revenues Received From the Users of the Service and The Federal Government			
Railway Costs Only			
CP Rail			
Amount	$53.2	$ 87.1	$20.2
Ratio: Costs to Revenues	1.77	2.26	1.30
Canadian National			
Amount	$34.3	$106.5	$10.3
Ratio: Costs to Revenues	1.49	2.51	1.14
Northern Alberta Railways			
Amount	$ 1.8	$ 3.6	$ 0.7
Ratio: Costs to Revenues	2.06	3.77	1.47
Total Three Railways			
Amount	$89.3	$197.2	$31.2
Ratio: Costs to Revenues	1.63	2.40	1.22
Railway and Federal Government Costs			
Amount	$92.7	$203.5	$31.2
Ratio: Costs to Revenues	1.65	2.44	1.22