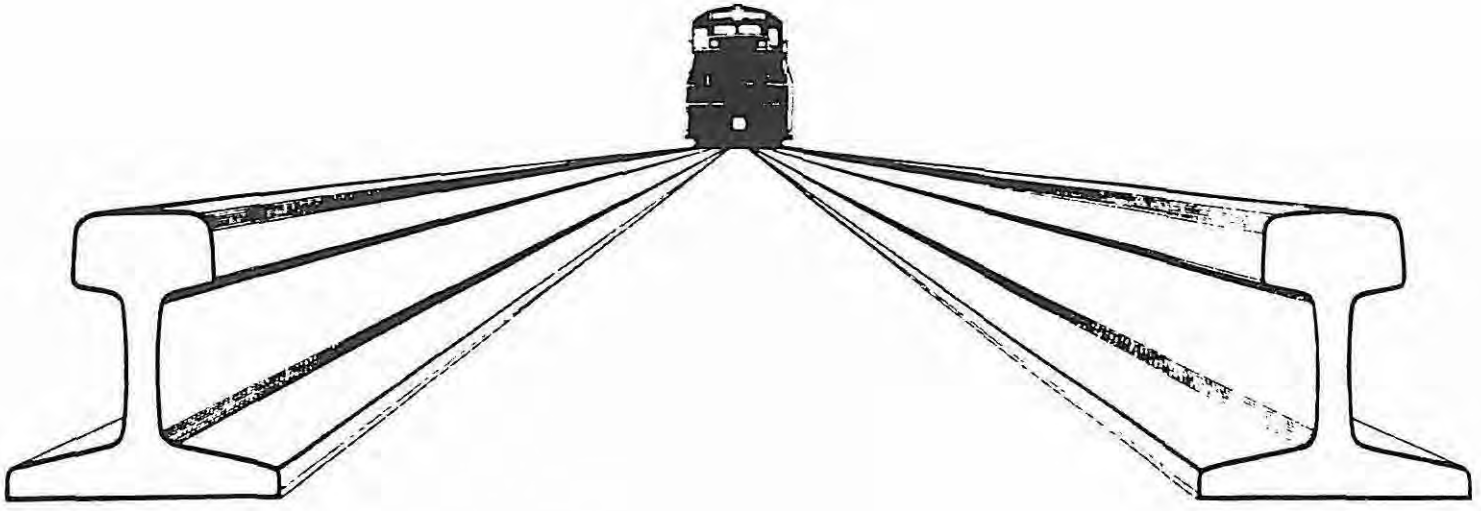
ALASKA STATE RAIL PLAN
1985



Prepared by the

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

Assisted by

Wilbur Smith and Associates

in association with
MORRISON-KNUDSEN ENGINEERS
CALISTA PROFESSIONAL SERVICES

AMENDED
DECEMBER 1990

U.S. Department
of Transportation
**Federal Railroad
Administration**

400 Seventh St., S.W.
Washington, D.C. 20590

Mr. Frank Turpin
Commissioner
Alaska Department of Transportation
and Public Facilities
Post Office Box 16900
Juneau, AK 99519-6900

Dear Mr. Turpin:

This is in response to the recently submitted amendment to the Alaska 1985 State Rail Plan Update.

I am pleased to approve the amendment which includes a benefit-cost analysis of the Garner Tunnel rehabilitation project.

Sincerely,

James T. McQueen
Associate Administrator for
Railroad Development

MAR 1991
RECEIVED
A.S.D. Directors
Office

RECEIVED
MAR 1 1991
DOT&PF
COMMISSIONER'S OFFICE

CERTIFICATION
266.17(e)

In accordance with the requirements of the provisions of section 5(a) of the Department of Transportation Act (49 U.S.C. 1650 et. seq.), I, Frank G. Turpin, serving as the Commissioner of the Alaska Department of Transportation and Public Facilities and as the Governor's duly authorized delegate this 11th day of February, 1991, do certify that the 1985 Alaska State Rail Plan as amended by the attached amendment, which adds the Garner Tunnel rehabilitation project to the list of projects eligible for public assistance, currently constitutes the Alaska State Rail Plan.

2/11/91
Date

Frank G. Turpin
Commissioner, DOT&PF

ALASKA STATE RAIL PLAN
1985

Prepared by the

ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES

Assisted by

Wilbur Smith and Associates

in association with
MORRISON-KNUDSEN ENGINEERS
CALISTA PROFESSIONAL SERVICES

Wilbur Smith and Associates

BANKERS TRUST TOWER
POST OFFICE BOX 92
COLUMBIA, SC 29202-0092
PHONE (803) 738-0580

CABLE WILSMITH
TELEX 57-3439

March 21, 1986

Mr. Stan McAlister
Alaska Department of Transportation
and Public Facilities
3132 Channel Drive, Room 300
Juneau, Alaska 99811

Dear Mr. McAlister:

It is with pleasure that we submit, for the State's use, the 1985 Alaska Rail Plan. This Plan addresses specific rail issues in Alaska and also contains information and analyses required by the Federal Railroad Administration, U.S. Department of Transportation.

We appreciate having had the opportunity to assist with the development of this Rail Plan, and trust that it will be useful to the railroad, the State, and Alaska's residents.

Sincerely,

WILBUR SMITH AND ASSOCIATES

Robert J. Zuelsdorf

Robert J. Zuelsdorf
Vice President

RJZ:kt

CONTENTS

		PAGE
I.	INTRODUCTION	
	A. Rail Plan Rationale	1-1
	B. Rail Plan Overview	1-4
II.	TRANSPORTATION AND RAIL TRANSPORTATION PLANNING IN ALASKA	2-1
	A. Transportation Systems Planning in Alaska	2-1
	B. Goals and Objectives	2-6
	C. Roles and Relationships	2-15
III.	ALASKA'S RAIL SYSTEM	3-1
	A. State Acquisition of the Alaska Railroad	3-2
	B. Profile of the Alaska Railroad	3-10
	C. Profile of the White Pass and Yukon Railway	3-36
IV.	RAILROAD PERFORMANCE INDICATORS	4-1
	A. Suggested Railroad Performance Indicators	4-2
	B. Current Railroad Submittals to Board	4-15
	C. Suggested ARR Performance Indicators	4-16
V.	RAIL LINE EXTENSION PROCESSES AND CRITERIA	5-1
	A. The Rail Line Extension Issue	5-1
	B. Existing and Previous Rail Extension Proposals	5-2
	C. Need for Extension Processes and Criteria	5-19
	D. Suggested Processes and Criteria	5-23
	E. Railroad Extension Concepts	5-38
VI.	RAIL INVESTMENT EVALUATION PROCEDURES	6-1
	A. Economic Evaluation Principles	6-1
	B. Rail Line Extension Evaluation Methodology	6-8
	C. Transport Cost and Efficiency Evaluation Methodology	6-15
	D. Abandonment Evaluation Methodology	6-18
VII.	PROGRAM OF PROJECTS FOR PUBLIC ASSISTANCE	7-1
	A. Criteria for State Rail Assistance	7-1
	B. Candidate Projects	7-5
	C. Suggested State Funding	7-14

TABLES

NUMBER	TITLE	PAGE
2-1	Items Required in a State Rail Plan	2-7
3-1	Maximum Grades on the ARR	3-12
3-2	ARR Maintenance of Way Accomplishments	3-15
3-3	ARR Diesel-Electric Locomotives	3-16
3-4	ARR Passenger Rolling Stock	3-17
3-5	ARR Freight Rolling Stock	3-18
3-6	ARR Freight Tonnage and Revenues by Commodity	3-21
3-7	ARR Passenger Volumes	3-28
3-8	ARR Traffic Density Trends	3-30
3-9	ARR Income and Expense Statement	3-32
3-10	ARR Capital and Major Maintenance Expenditures	3-33
3-11	Skagway to Whitehorse Traffic by Mode of Travel	3-47
3-12	Yukon Mineral Properties	3-49
4-1	ARR Traffic, Revenues and Expenses	4-4
4-2	ARR Statement of Income	4-5
4-3	Suggested ARR Performance Indicators	4-17
5-1	Suggested Phasing -- RR Extension Implementation Process	5-25
5-2	Suggested State Rail Extension Evaluation Process	5-32
5-3	Engineering Criteria Checklist	5-39
5-4	Financial Economic Criteria Checklist	5-40
5-5	Environmental Criteria Checklist	5-41
5-6	Social Criteria Checklist	5-42
6-1	Example Railroad Extension Economic Feasibility Calculation	6-14
6-2	Calculation of Operating Revenues and Costs	6-28
6-3	Energy Consumption Factors	6-33

FIGURES

NUMBER	TITLE	FOLLOWS PAGE
2-1	The Hierarchy of Transportation Plans	2-2
3-1	Map Depicting the Location of Alaska's Two Railroads	3-2
3-2	The Alaska Railroad	3-10
3-3	ARR Tonnage and Revenue Comparisons	3-20
3-4	ARR Traffic Density Chart	3-30
3-5	The White Pass and Yukon Railway	3-42
5-1	Example Railroad Extension Proposals	5-2
5-2	Generalized Status of Railroad Extension Proposals	5-28
5-3	Rail Line Extension Criteria Application by Process Phase	5-36
6-1	Method of Calculating Transport Efficiency Savings	6-16

I. INTRODUCTION

This document presents Alaska's 1985 State Rail Plan. The Rail Plan was prepared by the Alaska Department of Transportation and Public Facilities (DOT/PF). It complies with federal Rail Plan requirements; it reviews the current status of the State's two railroads -- the Alaska Railroad (ARR) and the White Pass and Yukon Railway (WP&Y); and, it reviews and analyses certain key rail issues of interest to the State.

The Rail Plan is of a public policy nature, intended to set the stage for State policies and programs relative to the rail mode, as administered by the DOT/PF.

A. Rail Plan Rationale

1. Rail Plan Purposes

This 1985 Alaska Rail Plan is intended to achieve two purposes. The first is to meet Federal Railroad Administration requirements relative to "State Rail Plans;" the second is to constitute the Alaska rail modal element of the State's transportation planning hierarchy, including a review of several Alaska-specific rail issues.

a. Federal Requirements

The 1985 Alaska Rail Plan has been prepared pursuant to Section 803 of the Railroad Revitalization and Regulatory Reform Act of 1976 (4R Act) and the Local Rail Service Assistance Act of 1978 (LRSA). These Acts direct that, as a prerequisite for eligibility to receive rail service assistance, a state shall establish "an adequate plan for rail services in such state as part of an overall planning process for all transportation services in such state, including a suitable process for

updating, revising and amending such plan, and that such state plan is administered or coordinated by a designated state agency and provides for the equitable distribution of resources."

Although Alaska could have developed a rail plan much earlier, such a plan was perceived as unnecessary since the dominant railroad, the Alaska Railroad, was owned and operated by the federal government. Now that ownership has been conveyed to the State of Alaska, the Rail Plan is needed to enable eligibility for LRSA funds.

b. State Needs

Equally important, the 1985 Alaska Rail Plan is intended to comprise the rail system plan, which complements the current other modal plans (highway, port, transit and aviation) being prepared by the DOT/PF. As a modal plan, the Rail Plan addresses key rail issues in Alaska, including:

* Rail line extension proposals
* Performance of the ARR under State ownership
* Rail planning and project funding needs
* Review of other Alaska needs and issues

2. Unique Alaska Circumstances

Of particular importance in the conduct of this Rail Plan is the recognition that Alaska, and the Alaska railroad situation, are unique. For example:

* The only railroad currently operating in the State (the ARR), is State owned and operated. There are no private railroads currently operating in Alaska.
* The only other railroad in the State (the WP&Y) is a private, Canadian railroad which ceased operations in 1982.
* The ARR does not connect (except via barge movements) with any other railroad. Interstate movements are true

intermodal movements, since the ARR is closely integrated with the various rail-barge operators.

* The general railroad philosophy in the State is not railroad retrenchment (line abandonments) but instead is to possibly expand railroad services and operations.
* Alaska is a vast State, most of which has no rail access. Rail is currently limited to the Fairbanks-Anchorage-Seward/Whittier "Railbelt," which contains the majority of the State's population.
* The vastness of Alaska, with its abundant natural resources, sparse community settlements, severe climatic extremes, and large native and federal land holdings, place unusual and challenging requirements on its transportation systems.

These and other unique circumstances cause this Rail Plan to be different from rail plans in other states. It certainly attains the federal requirements that pertain to the "Lower 48."; also, it focuses on Alaska's issues.

3. Rail Planning Program

The Alaska Department of Transportation and Public Facilities (DOT/PF) is the "designated Rail Planning agency" in Alaska. The DOT/PF carries out the rail planning function with headquarters staff in Juneau, supported by the DOT/PF regional staffs.

While the 1985 Alaska Rail Plan is the initial plan which meets federal requirements, it is but a part of the ongoing Alaska rail planning process. For example, the DOT/PF prepared a document entitled "Alaska Statewide Rail Systems Study" in 1980, which served to set the stage for the rail plan and which sought to clarify rail issues that then existed. More recently, the DOT/PF rail planning process focused on the process of transferring the ARR from federal ownership to State ownership, a process which was culminated on January 5, 1985. In the future the State will continue with its rail planning process, inclusive of other needed planning projects described later in this report.

B. Rail Plan Overview

1. Rail Plan Contents

This Alaska Rail Plan document is presented in seven sections, as follows:

Section I:	INTRODUCTION -- An overview of the Plan and its content.
Section II:	TRANSPORTATION AND RAIL TRANSPORTATION PLANNING IN ALASKA -- A description of the overall transportation planning process in Alaska, its goals and objectives, and current roles and relationships relative to the railroad mode.
Section III:	ALASKA'S RAIL SYSTEM -- A review of the process by which the ARR was transferred to the State, and a description of the Alaska Railroad and the White Pass and Yukon Railway.
Section IV:	RAILROAD PERFORMANCE INDICATORS -- A presentation of statistical measures by which ARR operations and services can be evaluated on a recurring basis.
Section V:	RAIL LINE EXTENSION PROCESSES AND CRITERIA -- A review of rail extension proposals in Alaska, and a suggested process by which such extensions might be considered.
Section VI:	RAIL INVESTMENT EVALUATION PROCEDURES -- Presentation of analytical procedures that can be used by the State to economically evaluate rail line extension proposals, transportation costs, and rail line abandonments.
Section VII:	PROGRAM OF PROJECTS FOR PUBLIC ASSISTANCE -- A review of rail planning and rail investment projects that might be considered for State funding.

II. TRANSPORTATION AND RAIL TRANSPORTATION PLANNING IN ALASKA

The manner by which Alaska's transportation system has been planned has evolved through the years to the point where it is now approached in a coordinated and somewhat comprehensive manner. The process is coordinated by the Alaska Department of Transportation and Public Facilities (DOT/PF) which has, by statute, jurisdictional responsibility over multimodal (aviation, railroad, port, highway and transit) systems planning.[1]

A. Transportation Systems Planning in Alaska

The DOT/PF maintains a rather continuous transportation planning process, inclusive of policy, modal, regional and subregional plans.

1. Systems and Policy Planning

a. Existing Systems Plan

In November 1982, the Alaska Department of Transportation and Public Facilities released its State Transportation Policy Plan and Needs Assessment.[2] This document (1) ties together on-going planning activities, (2) identifies current policy and major issues needing resolution in a statewide context, and (3) summarizes the present transportation system and its more significant assets and needs.

The Policy Plan document represents the product of a systematic, comprehensive, coordinated and continuing planning process to develop and implement state transportation policy covering the different modes. It was prepared by (1) analyzing the exist

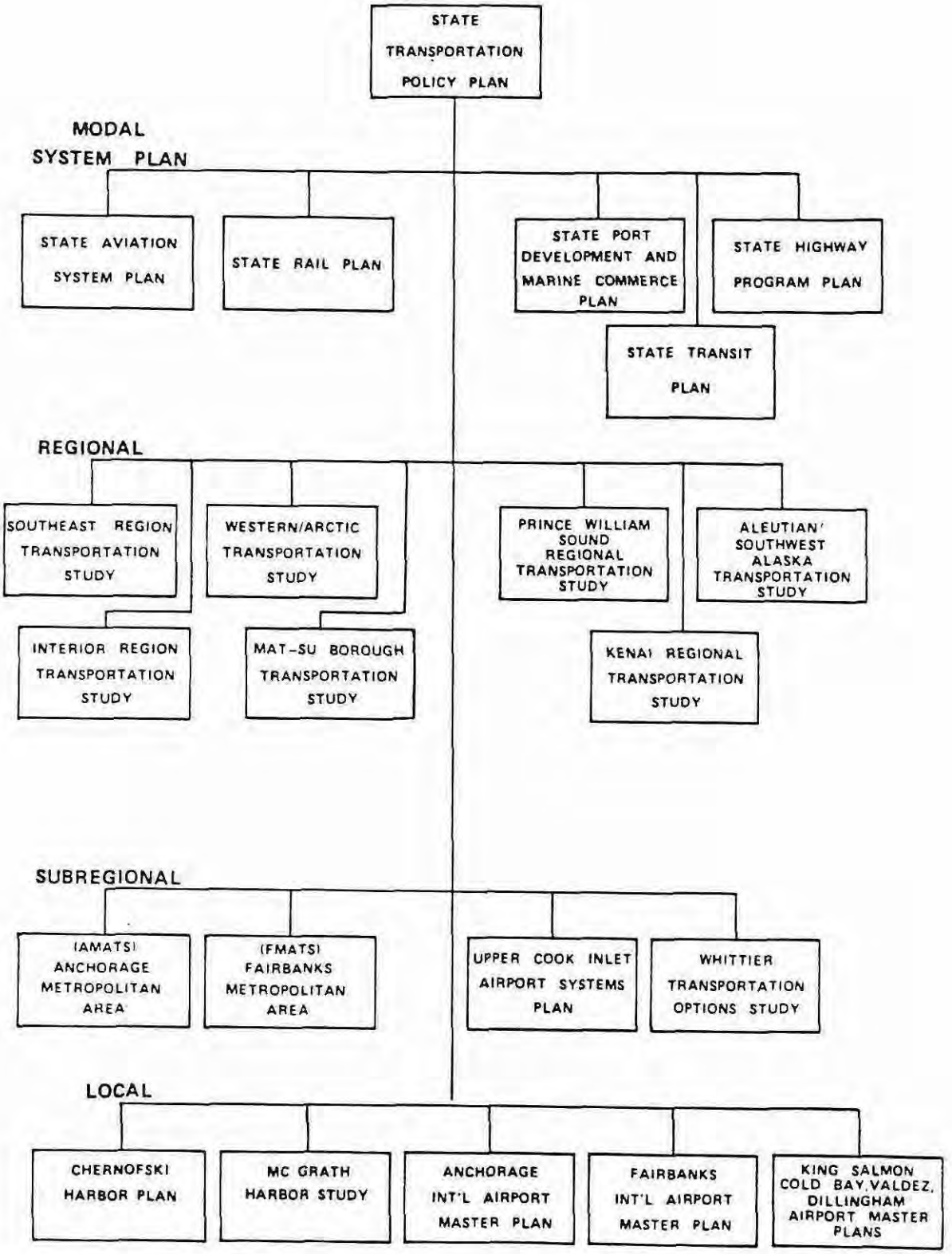
ing transportation system, (2) examining the underlying supply-demand relationships, (3) identifying related problems and issues, and (4) integrating regional, area, and local studies and plans. The resulting product was subjected to a review process which included presentations to government, user groups, and the general public and the opportunity to provide input and comment on the Plan. In addition to setting forth state transportation policies, the Plan described in some detail (1) the specific process used in developing the overall and component plans, (2) the state transportation system, (3) factors affecting the development of the transportation system, (4) statewide transportation issues, (5) the results of a needs assessment (a listing of potential projects), and (6) financial considerations.

b. Current Systems Plan Update

Since 1982, the DOT/PF has been continuing with the planning process, and has nearly completed the State Policy Plan, the Aviation System Plan, this Rail Plan, and several others.

2. Modal Plans

The Alaska Rail Plan is a modal plan within an hierarchy of transportation plans either previously developed or in progress by the Department and illustrated by Figure 2-1. Modal plans obviously focus on specific modes, but otherwise are statewide in character and contain the system analysis, supply and demand assessments, and problems and issues identification characteristic of the overall policy plan. Furthermore, modal system plans are intended to bridge the gap between the policy plan and the more detailed regional transportation plans.



THE HIERARCHY OF TRANSPORTATION PLANS
(STATE TRANSPORTATION PLAN)

SOURCE: STATE TRANSPORTATION POLICY PLAN
DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES
NOV. 1982

FIGURE 2-1

3. State Rail Planning

a. Designated State Rail Planning Agency

The Alaska Department of Transportation and Public Facilities is the designated state rail planning agency. The Department is also responsible for the State's railroad/highway grade crossing safety program.

b. Organization

Within the Department, the Headquarters Plans and Programs Division is responsible for rail planning. Assisting Division personnel is a Technical Committee comprised of senior planning personnel from the Department's Central and Northern regions and the ARRC. A Policy Committee, comprised of the two Regional Planning Managers, the Director of Headquarters Plans, Programs and Budget, and the Commissioner's Special Assistant for External Affairs, has also been established to review the draft plan and provide recommendations to the Commissioner concerning adoption of the resulting plan.

c. Public Participation

Both formal and informal processes have been established to ensure a full opportunity for public participation in the rail planning process. Copies of the draft Alaska Rail Plan were distributed to affected borough and local governments. The Alaska Railroad Corporation was given the opportunity to review the draft document. Copies of the draft plan were also circulated to the State Departments of Commerce and Economic Development; Natural Resources; and Environmental Conservation. A plan summary has been prepared and has been made available to native regional and village corporations, interest groups, and

the news media. Two public meetings were held in Anchorage and Fairbanks, to obtain public comment and input prior to development of the final 1985 Alaska Rail Plan.

d. Previous State Rail Planning in Alaska

In December 1980, Alaska completed the initial phase of its state rail planning program with the publication of the report: Alaska Statewide Rail Systems Study.[3] This report had two objectives:

* To conduct an analysis of Alaska's existing rail network with special emphasis on its historical development and operation, a literature search of relevant data and reports, and a description of the problems and opportunities of the railroads serving Alaska.

* To refine the continuous state rail planning process for the State of Alaska, including identifying the roles, responsibilities, and policies related to the rail planning process.

This work was followed in July 1981 with the publication of the report: An Assessment of the Alaska Railroad Ownership and Operational Alternatives.[4] Since that time, the State has been deeply involved in the transfer of the Alaska Railroad from federal to State ownership, the details of which are presented in Report Section III.

e. FRA Requirements for State Rail Plans

This Alaskan concept of the role and contents of a modal plan stands in contrast with the Federal requirements for a state rail plan. Although the resulting product is termed a state rail plan, the federal regulations are chiefly concerned with a subset of rail lines carrying less than three million gross tons per mile per year, i.e., the light density line and

its importance to the State and ultimate disposition in the event that the owning railroad concludes that the line is no longer economic to operate. This reflects the fact that most railroads in the lower 48 are privately owned and responsible for their own systems planning. In most other states, government becomes involved only when the potential abandonment of an existing line will cause social and economic impacts which are deemed unacceptable, and where government and industry agree to work out a financing arrangement whereby the net costs of continuing rail service or necessary physical improvements to the line is shared on an equitable basis.

Alaska is unique among the states in that (1) the sole operating railroad is government owned, and (2) rail line abandonments (except possibly the White Pass and Yukon Railway, service on which was discontinued two years ago) are unlikely in the foreseeable future, and thus not the underlying motivation for developing a state rail plan in the first instance. In Alaska, the desire is for extension and expansion of the transportation system to provide the infrastructure needed to unlock the mineral resources of the State, in which expansion of the rail mode has a role to play. Consequently, preparation of this modal plan provides an excellent opportunity for going beyond the Federal requirements and developing (1) a quantitative framework for evaluating the economics of system extension proposals and (2) measures and methods for maintaining railroad performance to be used by the Board in monitoring the Alaska Railroad, now State owned and operated by the Alaska Railroad Corporation (ARRC).

f. FRA Required Contents for a State Rail Plan

In developing the Alaska Rail Plan, Federal requirements have nevertheless been met. Table 2-1 presents a cross-index

depicting the items required under Title 49 CFR 266.15 and their location within this document.

B. Goals and Objectives

1. Basis for Rail Planning Goals and Objectives

Alaska's goals and objectives vis-a-vis planning and developing the State's rail system originate from the State Transportation Policy Plan and Needs Assessment report and two pieces of legislation: House Bill 256 (14th Legislature, First Session), which established an economic development policy for the State, and House Bill 512 (13th Legislature, Second Session), which established the Alaska Railroad Corporation.

a. DOT/PF Transportation Policy

As stated in the above referenced report, Alaska's transportation goal is to provide safe, reliable, convenient and efficient transportation that is socially, economically, and environmentally acceptable. Within this overall goal, the following policies have been identified:

(1) Create and maintain a State transportation policy plan that is coordinated with national policy and the policies of other states and supportive of local and regional transportation plans and programs.

(2) Support State, regional and local land use policies in planning, implementing and updating State transportation plans and programs.

(3) Cooperate with federal, state, regional and local agencies to establish a continuing process in which state,

Table 2-1
ITEMS REQUIRED IN A STATE RAIL PLAN[1]

REFERENCE	ITEM REQUIRED	LOCATION
266 15(c)(1)	Assistance Program Objectives	Page 2-14
266.15(c)(2)	Rail System Map	Figure 3-1
266.15(c)(2)(i)	Operating Carriers Map	Figures 3-2, 3-5
266.15(c)(2)(ii)	Freight Traffic Density Map	Figure 3-4
266.15(c)(3)(i)	Assistance Program Eligible Lines	Page 3-30
266.15(c)(3)(ii)	Abandonment Plans Map	(2)
266.15(c)(3)(iv)	Lines Pending Abandonment	(2)
266.15(c)(3)(vi)	Federal Fund Project List	(3)
266.15(c)(4)	Assistance Program Screening Criteria	Page 7-1
266.15(c)(5)	Benefit/Cost Methodology	Page 6-18
266.15(c)(8)	Application of B/C Methodology	(2)
266.15(c)(10)	Public Participation	Page 2-3
266.15(c)(11)	Planning Process	Page 2-1
266.15(c)(11A)	Energy Efficiency Promotion	Page 2-17
266.15(c)(12)	Program of Projects	Page 7-15
266.15(d)(2)(i)	Response to FRA Comments on Prev. Plan	(3)
266.15(d)(2)(ii)	Update of Planning Information	(3)
266.15(d)(2)(iii)	Subsidy Program Data Update	(4)
266.15(d)(2)(iv)	Update of Maps	(3)
266.15(d)(2)(v)	Analysis of New Projects	(5)
266.15(d)(2)(vi)	Changes in Agency Responsibility	(6)
266.15(d)(2)(vii)	Policy or Objective Revisions	(3)

(1) Title 49 CFR 266.15
(2) There are no rail lines in Alaska pending abandonment. Therefore no abandonment lines map is shown and the abandonment benefit/cost methodology is therefore not applied.
(3) This is the initial Alaska Rail Plan. Therefore, there is no response to FRA comments, no update of planning information, no update of maps, and no policy or objective revisions.
(4) There is no rail subsidy program in Alaska.
(5) There are no new projects analyzed in Alaska.
(6) The DOT/PF continues as the designated rail planning agency in Alaska

SOURCE: Wilbur Smith and Associates

regional, metropolitan and local transportation needs can be identified and evaluated, and used in transportation planning and decision making.

(4) Develop and implement strategies to efficiently and economically manage, maintain and improve the existing State transportation system.

(5) Support the development of transportation facilities and services that are consistent with economic, environmental, and social policies of the federal, state, and local governments.

(6) Emphasize energy conservation in transportation planning and in the design, construction, operation and maintenance of the transportation system.

(7) Provide for an effective implementation of current techniques and products by means of a comprehensive research effort to support planning and programming, design and construction, and maintenance operations.

(8) Provide for public involvement in transportation and development.

(9) Encourage private transportation carriers to continue to provide existing services and improve and expand passenger and freight services.

(10) Encourage coordination and integration of passenger and freight transportation systems and services provided by public agencies and private carriers.

(11) Promote and emphasize cooperation with local governments in maintaining and improving their transportation systems.

(12) Improve transportation safety through cooperation with other agencies and organizations.

(13) Encourage and assist in the development of special programs to provide increased personal mobility for transportation of disadvantaged persons.

(14) Develop financially feasible plans and programs that equitably allocate scarce financial and human resources for meeting identified passenger and freight needs.

Rail planning in Alaska supports the State's goals and the above policies.

b. State Economic Development Policy

In 1985, AS 44 was amended by adding Chapter 67. General State Policy:

"Sec. 44.67.010. Declaration of State Economic Development Policy

(a) To further the goals of a sound economy, stable employment, and a desirable quality of life, the legislature declares that the State has a commitment to foster the economy of Alaska through purposeful development of the State's abundant natural resources. It is the legislature's intent that this development:

(1) offer long-term benefits and increased employment

to Alaskans by strengthening and diversifying the State's economic base and encouraging new activities;

(2) provide opportunities for increased personal income or reduced living costs by creating activity in economic sectors;

(3) have a positive effect on the revenue needs and fiscal conditions of the State and local communities;

(4) be undertaken after consideration of the views of citizens impacted by the development.

(b) To take advantage of investment opportunities afforded by Alaska's abundant resources, the legislature finds that the State must undertake activities that serve as a catalyst to responsible economic development in the State for the benefit of its citizens. It is the policy of the State to

(1) develop and provide information to domestic and foreign investors to use in evaluating project feasibility;

(2) with cooperation from investors, identify constraints to economic development imposed by all levels of government and work with government agencies to solve problems created by those constraints;

(3) with cooperation from investors, identify constraints to economic development such as lack of transportation and energy systems necessary to support the extraction, production, and transport of resources to market, and implement capital improvement or other programs to resolve the deficiencies;

(4) provide a stable tax and regulatory climate that encourages expansion of the State's economic base;

(5) encourage "value-added" processing in the State;

(6) improve the State's comparative position by offering economic incentives that support the constitutional mandates for utilization, development, and conservation of natural resources."

HR 256 clearly supports the development of the State's transportation system in the context of encouraging economic development in the State.

c. Alaska Railroad Corporation Act

In 1984, AS 42 was amended by adding Chapter 40. Alaska Railroad Corporation. The following presents the legislative findings and purpose.

"(a) The legislature finds that

(1) it is the policy of the State to

(A) provide safe, economical, and efficient transportation to residents, businesses, visitors, and military installations in the State;

(B) foster and promote the long-term economic growth and development of the State;

(C) develop and implement plans for a transportation network;

(D) foster and promote the development of the State's land and natural resources;

(E) ensure that the Alaska Railroad does not use

direct appropriations to fund a particular freight operation if it can be demonstrated that the appropriation has placed privately owned and operated carriers in an unfair economic position.

(2) the Alaska Railroad is an essential part of the State transportation network that may, unless preserved by State action, cease to be a transportation option in Alaska;

(3) the federal government has offered to the State the option of taking over the Alaska Railroad to ensure its continued operation; and

(4) it is in the State's best interest to accept the railroad under the terms and conditions offered by the United States government.

(b) It is the purpose of this Act to

(1) create a viable economic entity with the powers and duties necessary to operate and manage the Alaska Railroad pending eventual transfer of the railroad to the private sector for its ownership or operation or both consistent with 45 USC 1201-1214 (Alaska Railroad Transfer Act of 1982);

(2) provide for the level of transportation service that best satisfies the needs of the people of the State consistent with the other findings and policies of this section;

(3) create a public corporation with the powers, duties, and functions needed to operate the Alaska Railroad and manage its rail, industrial, port and

other properties in the best interest of the people of the State by ensuring that the corporation will:

(A) be exclusively responsible for the management of the financial and legal obligations of the Alaska Railroad;

(B) operate the railroad as a common carrier subject to the jurisdiction of the United States Interstate Commerce Commission consistent with 45 USC 1207;

(C) have the ability to raise capital by issuing bonds upon approval of the legislature exempt from federal and State taxation and applying for federal money to which the State may be entitled or that may be available;

(D) carry out its responsibilities on a self-sustaining basis;

(E) provide the best possible combination of types and levels of safe, efficient, and economical transportation to meet the overall needs of the State, supported when necessary by State investment;

(F) provide for the prudent operation of the railroad according to sound business management practices; and

(G) preserve the integrity of the railroad utility corridor for transportation, communication, and transportation purposes.

(4) ensure that borrowing by the corporation does not directly or indirectly endanger the State's own borrowing capacity."

2. Rail Planning Goals and Objectives

Within the context of the overall State economic and transportation goals and policies, the State seeks the following relative to the rail mode.

a. Rail Plan Purposes

The State of Alaska presently does not have an FRA-approved State Rail Plan. The reason is that the ARR, until 1985, was federally owned and the State therefore needed no such plan. However, now that the State owns and operates the ARR, it is appropriate to have a federally approved rail plan. Therefore, the first goal of the Rail Plan is:

* To have a federally approved Rail Plan and evaluation methodologies in place, to thereby make the State eligible for federal funding assistance relative to eligible projects.

In addition, the State of Alaska has numerous issues that are somewhat unique to Alaska, and the State is in need of railroad evaluations that are not necessarily federally required. Therefore, the second goal of the Rail Plan is:

* To assess circumstances in Alaska that are current or potential issues in the State, regardless of whether such issues must be in a State Rail Plan.

In this way, the 1985 Alaska Rail Plan is tailored to the specific and rather unique conditions and circumstances in Alaska.

b. Rail Assistance Program Objectives

Alaska has not, to date, used Local Rail Service Assistance or other Section 803 federal funds relative to rail projects. Furthermore, funding levels and future expectations regarding such funding levels would indicate that the probability of significant funding being available to Alaska is very small. If so, Alaska applications for such funding to be used for project purposes, is unlikely.

Yet, such applications are conceivable. Therefore, the State has developed a set of rail assistance program objectives, to be recognized when considering the use of federal or State funds. These objectives are in the form of a set of criteria to be applied prior to the use of State or federal funds for rail mode purposes. The objectives find that State and/or federal funds should be used only when:

* The operating railroad cannot or will not undertake the investment with its own resources.
* The investment is for the benefit of the State and its residents rather than for the operating railroad.
* The investment is feasible, as established in the application of the State's benefit/cost methodology.
* The project does not contradict the State's overall economic and/or transportation goals, objectives and policies.
* The project attains or at least does not conflict with State environmental, social, safety and other objectives.
* The project has been suitably presented and reviewed in public session.
* The investment project cannot or will not be undertaken by the private sector.

C. Roles and Relationships

State roles in Alaska relative to the railroad mode are witnessing a period of transition, caused by the sale of the Alaska Railroad to the State of Alaska. The State now owns, operates, manages and otherwise controls the ARR. Involved in the performance of these roles is a series of State agencies, departments and entities. Some roles are clearly defined by agency, others are not, and others are evolving and changing.

1. DOT/PF Statutory Responsibilities

The Alaska Legislature formed the Alaska Department of Transportation and Public Facilities and, in so doing, awarded that Department certain powers and duties relative to transpor-

tation in general, and railroads in specific. The DOT/PF statutory responsibilities relative to the railroad mode include the following:[5]

"Section 44.42.020 Powers and duties. (a) The department (DOT/PF) shall:

(1) plan, design, construct and maintain <u>all state modes of transportation</u> and transportation facilities and all docks, floats, breakwaters, buildings and similar facilities;
(2) study existing transportation <u>modes</u> and facilities in the state to determine how they might be improved or whether they should continue to be maintained;
(3) study alternative means of improving <u>transportation</u> in the state with regard to the economic costs of each alternative and its environmental and social effects;
(4) develop a comprehensive, long-range <u>intermodal transportation plan</u> for the state;
(5) study <u>alternatives to existing modes</u> of transportation in urban areas and develop plans to improve urban transportation;
(6) cooperate and coordinate with and enter into agreements with federal, state and local government agencies and private organizations and persons in exercising its powers and duties;
(7) manage, operate, and maintain <u>state transportation facilities</u> and all docks, floats, breakwaters, and buildings, including all state highways, vessels, <u>railroads</u>, pipelines, airports, and aviation facilities;
(8) study <u>alternative means of transportation</u> in the state, considering the economic, social, and environmental impacts of each alternative;
(9) coordinate and develop <u>state and regional transportation systems</u>, considering deletions, additions, and the absence of alterations;
(10) develop facility program plans for <u>transportation</u> and state buildings, docks and breakwaters required to implement the duties set out in this section, including but not limited to (A) functional performance criteria; and (B) schedules for completion;
(11) supervise and maintain all state automotive and mechanical equipment, aircraft, and vessels, except vessels and aircraft used by the Department of Fish and Game or the Department of Public Safety;
(12) supervise aeronautics inside the state, under AS 02.10;

(13) complete and maintain a current inventory of public facilities, including a projection of the serviceability of the facilities and projections of replacements and additions to facilities needed to provide the level of services programmed by the various user agencies, for municipalities with populations of less than 12,000 and for unincorporated communities, and perform those duties on a cooperative basis with larger municipalities;

(14) adopt energy performance standards for public facilities of the state, the construction of which begins after July 1, 1980; the standards shall be based on thermal and lighting energy standards established by the American Society of Heating, Refrigeration and Air Conditioning Engineers as adapted for application in high latitude, cold climate environs:

(15) provide planning assistance, including but not limited to energy audits and related technical services, to school districts and regional educational attendance areas to develop and implement

(A) standards for the design, construction and operation of rural educational facilities, and

(B) energy conservation measures for rural educational facilities.

(b) The department may

(1) engage in experimental projects relating to available or future modes of transportation and any means of improving existing transportation facilities and service;

(2) exercise the power of eminent domain, including the declaration of taking..."

It would appear that the DOT/PF statutory responsibilities depict a DOT/PF with certain "all mode" responsibilities, including railroad. The focus, relative to railroads, is planning -- to study, to develop all-mode plans, to promote inter-modalism, to examine alternative transportation systems, etc. Clearly the DOT/PF is to have some measure of influence relative to each and every transportation mode.

The DOT/PF, represented by the Commissioner of the Department of Transportation and Public Facilities, also is to develop the "State Transportation Plan" and a "State Public Facilities Plan":

"Sec. 44.42.050. State transportation plan. (a) The commissioner shall develop annually a comprehensive, intermodal, long-range transportation plan for the state. In developing and revising the state plan, the commissioner shall consider means and costs of improving existing modes and facilities, state and federal subsidies, and the costs and benefits of new transportation modes and facilities. The commissioner shall also consider the recommendation of the Alaska Transportation Planning Council. The plan shall be submitted to the governor for review and approval and submitted by the governor to the legislature.

Sec. 44.42.055. State public facilities plan. (a) The commissioner shall develop and annually revise a statewide comprehensive facility procurement plan for public facilities of the state and its municipalities.

(b) In developing and annually revising the facility procurement plan, the commissioner shall

(1) request and receive on an annual basis from all state agencies a projection of the anticipated facility needs of the agency for the next annual capital improvement program;

(2) consult with officials and representatives of municipalities, the federal government, interested corporations and other organizations concerning public facility needs in the state;

(3) develop specific facility procurement plans for projects in each of the following categories:

(A) sewage transmission and treatment systems;

(B) water transmission and treatment systems;

(C) electrical generation and distribution systems;

(D) health care and social services facilities;

(E) educational facilities

(F) transportation facilities;

(G) public safety and justice facilities;

(H) recreational facilities;

(I) sanitation facilities; and

(J) cultural facilities;

(4) prepare recommendations to accommodate the various levels of service identified by state agencies and other parties with respect to the services described in (3) of this subsection, to include

(A) current and future facility needs;

(B) space standards and design guidelines for the appropriate facility types;

(C) maintenance and operations standards for the appropriate facility types;

(D) construction techniques and contracting methods;

(E) facility project budget requirements; and

(F) relative costs of identified alternatives (life cycle cost analysis) including but not limited to the installation and operation of energy systems that are not dependent on oil or gas for water heating, space heating and cooling requirements, and for the generation of electrical or mechanical power;

(5) identify common public facility needs among the various user agencies; and

(6) submit its findings, plans and recommendations to the governor and to the appropriate state agency to facilitate the development of agency capital improvement budget requests.

(c) In the preparation and revision of the facility procurement plan, the commissioner may

(1) develop and adopt regulations for use in carrying out the purpose of (b) of this section; regulations may not be adopted under this section unless approval is received from appropriate program agencies;

(2) make recommendations on the total capital improvement program to affected state agencies, local governments, and other interested parties and organizations, and to the divisions of budget and management and policy development and planning.

(d) In this section, "public facility"

(1) means a capital improvement within one of the categories described in (b) of this section that is constructed

(A) for subsequent occupancy or operation by the state, a public corporation of the state, the University of Alaska, a political subdivision, or a regional educational attendance area;

(B) by a political subdivision or any private party with the assistance of financial support provided by the state if funds appropriated or paid by way of a grant or loan in advance of construction of the facility, or any part of it, are 50 per cent or more of the estimated costs of construction of the facility;

(2) does not include projects constructed with the proceeds of one or nmore loans issued by a loan program administered by the Department of Commerce and Economic Development."

The DOT/PF, in response to statutory requirements, develops annually an all-mode (including rail) transportation improvement program. It also appears that the DOT/PF is to annually develop

a "State Public Facilities Plan" which apparently includes the rail mode of transportation. This is further strengthened by:

> "Sec. 44.42.900. Definitions. In this chapter, unless the context requires otherwise,
> (3) "transportation" or "transportation mode" includes, but is not limited to the following means of conveyance or travel, including their related or auxiliary structures, facilities or services: air, rail, water, highway and pipeline."

2. DOT/PF Roles Relative to the ARR and ARRC

Given that the ARR is now owned by the State, any roles that may have existed between the DOT/PF and the previously federally owned railroad are no longer relevant. Furthermore, the recency of State ownership causes the recognition that the DOT/PF roles relative to the ARRC are currently evolving, and likely will continue to be in a transition stage for some time.

a. Current Roles

Neverthless, certain DOT/PF roles do exist relative to the ARR, both officially and unofficially. These include the following:

* The DOT/PF Commissioner is a member of the ARRC Board of Directors. This being the case, the DOT/PF is involved in ARR decision making.
* DOT/PF staff served on the disbanded "transfer team." In this capacity, the DOT/PF was able to draw upon its expertise to assist with the transition process. While the transition to State ownership is complete, numerous issues remain, e.g., ARR personnel policies, ARR procurement, etc. wherein DOT/PF expertise can continue to be very helpful to the ARRC.
* The DOT/PF headquarters staff continues to assist the ARRC, as staff to one of the ARRC Board members.

* The DOT/PF is the governor's designated Rail Planning entity, for federal rail planning purposes. Therefore, the DOT/PF prepares the State Rail Plan, for example.
* The DOT/PF is responsible for the State's rail grade crossing program.
* The DOT/PF is responsible for the annual all-mode transportation plan which includes the rail mode.

As seen, the DOT/PF, therefore, continues to have railroad-oriented roles and responsibilities.

b. Possible Role Issues

Although the DOT/PF is seen to have some rail activity, it is suggested that several issues exist which complicate and somewhat constrain those roles and responsibilities.

Perhaps paramount among these issues is a general lack of perception of the DOT/PF roles among the various participants. This is partly because of the evolving nature of the roles, and the lack of definitive statements concerning precisely what those roles are. Complicating this issue are the somewhat contradictory statutes. For example, the DOT/PF is to plan all modes -- but in reality the ARR does its own planning; the DOT/PF is to work with all State agencies to prepare facilities budgets -- but the ARRC is exempt from the Executive Budget Act; the DOT/PF is responsible for the planning of all modes -- but the ARRC is organized within the auspices of the Alaska Department of Commerce and Economic Development, a placement which effectively ignores the DOT/PF statutes; and, the State desires a total transportation system that is well coordinated and is responsive to total State needs -- while the ARR process is somewhat autonomous to the overall process. While these differences and issues are not necessarily bad, they do introduce a degree of confusion and misunderstanding.

c. DOT/PF Railroad Role Suggestions

Based on this overview, it is suggested that more definitive DOT/PF roles relative to the ARR be established. This clarification process would include a general clearing up of the relevant DOT/PF and ARRC statutes to eliminate any contradictions and to seek mutual understanding. Generally the DOT/PF headquarters staff and the ARR staff have excellent working relationships, which allow them to work to the benefit of the State and the railroad. However, these relationships and the respective roles are informal and unofficial, certainly flexible, and should be made more official so that the DOT/PF and the railroad know what the DOT/PF responsibilities are, and are not.

It is suggested that the key DOT/PF responsibilities relative to the railroad should include two additional elements, at a minimum:

1. Statewide, Comprehensive Perspective - The ARR must view its plans, projects, services and operations from the perspective of its directive to be self-sustaining. The DOT/PF, as the State's representative, should be sufficiently involved to ensure that ARR activities are coordinated with and take on a wider, more statewide perspective and basis. When the effects, benefits or responsibilities are of a statewide nature, the DOT/PF should be the lead agency.

2. Rail Budgeting - While the ARR need not submit an annual budget to the Governor's office, it is suggested that any future ARR request for State financial assistance, if any, be coordinated with the DOT/PF since that agency is responsible for other public facilities budgets in Alaska.

3. DOT/PF Headquarters and Regional Roles Relative to Rail

The Alaska DOT/PF is organized into three regions (Southeast in Juneau, Central in Anchorage, and Northern in Fairbanks) plus

the headquarters staff. By statute, the DOT/PF decentralizes work activities to the regions as much as possible.

> "Sec. 44.42.040. Departmental organization. The commissioner shall establish regions within the state. The functions of the department within each region shall be performed, to the maximum extent feasible, through a regional office. Each regional office shall be directed by a regional transportation and public facilities director appointed by the commissioner."

While the extensiveness of perceived DOT/PF highway, aviation, port and transit work enables a great deal of work to be regionalized (there is a sufficient volume of such mode-specific work in each region to warrant full time region staff to deal with it), the DOT/PF has never viewed itself as having a major railroad role. As a result, there has not been an extensive development of railroad-oriented expertise in the DOT/PF regions. Thus, statewide rail issues and policy development are handled by headquarters staff in Juneau, while issues of local and/or regional concern are handled by regional staff implementing headquarters policy guidelines. Headquarters staff also provide interregional coordination on rail mode issues where necessary.

While the DOT/PF headquarters staff is concerned with such rail items as overall State multimodal policy, state rail plans, the ARR transition process, rail line extensions, and similar items, the regions also from time to time have some relationship to the rail mode. For example, the Northern Region is involved in a study concerning the relocation of a rail industrial park, or the Central Region has been peripherally involved in a study of access to the Beluga Coal Fields or a rail line across the proposed Knik Arm Bridge, and both regions are involved in the railroad grade crossing issue. However, such activity is limited

to the transportation interface between rail and other transportation modes and is typically a minor element. In other words, the regions' available rail expertise is focused on local and regional issues.

The means by which the regions become involved in rail activities is via increased local rail-oriented planning issues or via the budget process. However, the DOT/PF headquarters determines each Region's total budget and budgetary modal shares, and the Regions handle the detailed line items. Therefore, if rail items are to be included in the Regional budgets, modal funding allocations will initially be decided at the DOT/PF headquarters level.

REFERENCES

1. Alaska Statutes, Chapter 42. Department of Transportation and Public Facilities, Section 44.42.020 "Powers and Duties", page 121-122.

2. Alaska Department of Transportation and Public Facilities, State Transportation Policy Plan and Needs Assessment, November, 1982.

3. Alaska Department of Transportation and Public Facilities, Alaska Statewide Rail Systems Study, prepared by Bivens & Associates, Inc., December, 1980.

4. Alaska Railroad Ownership and Operational Alternatives, July, 1981.

5. Alaska Statutes, Chapter 42.

III. ALASKA'S RAIL SYSTEM

The vastness of Alaska, coupled with its abundant natural resources, sparse settlement, severe climatic extremes, and large native and State and federal government land holdings, place unusual and challenging requirements upon its transportation system. Seventy percent of the State's population of approximately 500,000 people are concentrated within an area known as the "Railbelt," which extends from Seward on the Kenai Peninsula north to Anchorage and then to Fairbanks in the interior. The general economy of Alaska reflects its large federal, state, and native land holdings, governmental employment, military importance, natural resources, construction, and tourism. Little manufacturing occurs within Alaska, and most industrial goods and consumer products must be imported from other states and foreign places. Agriculture is still in its infancy and the State is attempting to develop an agriculture industry.

There are two railroads in Alaska: the Alaska Railroad and the White Pass and Yukon Railway, both of which are depicted on Figure 3-1. Neither of these railroads interconnect with each other or with railroads in the "lower 48" except via rail barge service to/from Seattle and Prince Rupert, B.C. Until recently, the Alaska Railroad was owned and operated by the Federal Railroad Administration, U.S. Department of Transportation. It is now owned and operated by the Alaska Railroad Corporation, a public corporation of the State of Alaska. The Alaska Railroad operates freight and passenger services on 480.7 miles of mainline track extending from the deep-water ports of Seward and Whittier through Anchorage to Fairbanks. Additional active branch lines serve the Eielson Air Force Base, Anchorage and Fairbanks International Airports, and Palmer. An inactive branchline extends to the Suntrana coal fields.

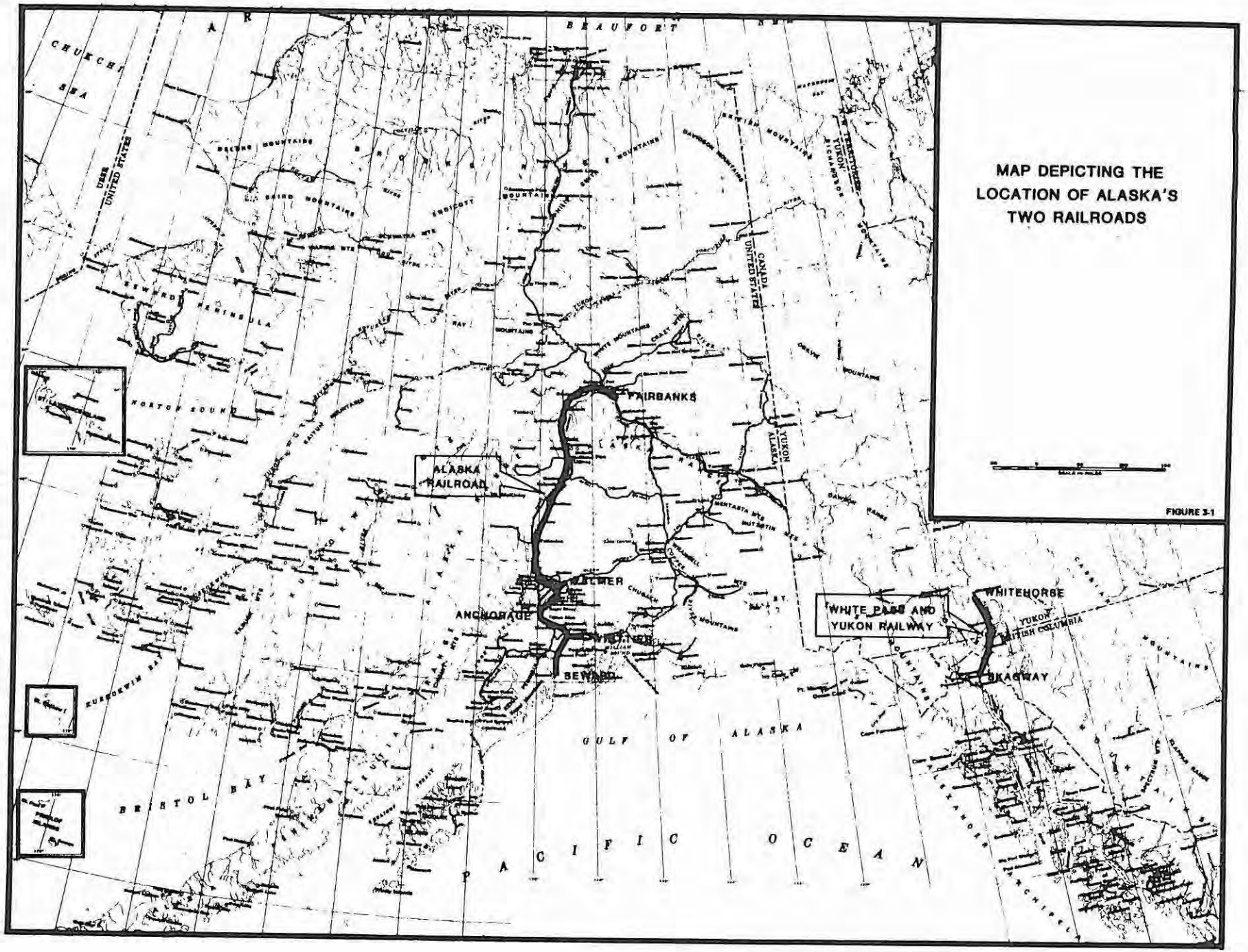
The second railroad is the White Pass and Yukon Railway, which until recently provided freight and passenger rail service from Skagway through British Columbia to Whitehorse in the Yukon Territory of Canada. This narrow gauge railroad was constructed during the "gold rush" period around the turn of the century. It is owned by Federal Industries Limited of Winnepeg, which halted service over the line in the fall of 1983 as a result of declining Canadian mineral concentrate traffic and accumulating deficits. Its future is uncertain.

The purpose of this Report Section is to describe the rail system in Alaska as it existed in mid-1985. As such, it updates and extends the description originally included in the Alaska Statewide Rail Systems Study report prepared in December 1980 for the Department of Transportation and Public Facilities.(1) It begins with a chronology of legislation and events surrounding the recent change in ownership of the Alaska Railroad and then concludes with updated profiles for the two railroads.

A. State Acquisition of the Alaska Railroad

1. Introduction

The Alaska Railroad (ARR) was authorized by an Act of Congress in 1914, and completed in 1923. With minor changes, the system has remained much the same over the intervening time period, although its role and source of traffic has changed significantly. Originally constructed to serve resource development activities in the interior, it moved defense-related materials during World War II. Thirty years later, it transported considerable portions of the materials needed to build the Trans Alaska Pipeline and to develop the Prudhoe Bay oil fields. More recently, it has supported the continuing development of the Anchorage area through sand and gravel shipments from the north,


MAP DEPICTING THE
LOCATION OF ALASKA'S
TWO RAILROADS
FIGURE 3-1
ALASKA RAILROAD
WHITE PASS AND YUKON RAILWAY
FAIRBANKS
PALMER
ANCHORAGE
WHITTIER
SEWARD
WHITEHORSE
SKAGWAY
BEAUFORT SEA
CHUKCHI SEA
GULF OF ALASKA
PACIFIC OCEAN
BRISTOL BAY
NORTON SOUND
SEWARD PENINSULA
UNITED STATES
CANADA
YUKON
ALASKA
BRITISH COLUMBIA

general freight shipments from ports in the south and, most recently, the carriage of export coal to the Port at Seward.

2. Transfer of the Alaska Railroad to the State

The enactment of the federal Alaska Railroad Transfer Act (ARTA) was the culmination of years of discussions between the Federal and State governments regarding the possible transfer of the Alaska Railroad to the State. Built originally to serve the transportation and development needs of the Territory of Alaska, Congress found that the Railroad was providing freight and passenger services that primarily benefited the residents and businesses of Alaska, and that continued Federal control and financial support was no longer necessary to accomplish these purposes. Congress also found the transfer of the Alaska Railroad to be consistent with the Federal interest in shifting to the states those activities more appropriate for state ownership and operation. Because of the critical role played by the railroad in the State's transportation system and economy, the State of Alaska had a direct interest in preserving the Alaska Railroad as an operating entity. These efforts culminated in Congressional passage of a bill in December 1982 authorizing the transfer of the ARR to the State of Alaska.

3. The Alaska Railroad Transfer Act (P.L. 97-468)

The Alaska Railroad Transfer Act of 1982 was signed into law by President Reagan on January 14, 1983. It authorized the transfer of the ARR to the State subject to several conditions, including the requirement to compensate the federal government for the fair market value of the rail properties involved. Other conditions included state commitments to continue railroad operations, provide employee protection for at least two years, and protect retirement benefits. The Act established an orderly

process for State consideration of the transfer offer. Key provisions included:

* Within six months from the date of enactment, an "Alaska Railroad Transfer Report" had to be prepared by the Governor and the U.S. Secretary of Transportation and be submitted to the Alaska State Legislature and the Congress. The purpose of this document was to provide a detailed description of the rail properties, assets, and liabilities of the railroad.(2)

* The Act required that the United States Railway Association (USRA) determine the fair market value of the Alaska Railroad within nine months of the date of enactment of ARTA. Subsequently, USRA's Board of Directors established the value of the Railroad to be $22.3 million.(3)

* The Act gave the State up to 12 months after delivery of the transfer report to decide whether to accept the offer and obtain certification by the Secretary of Transportation that it had agreed to all specified conditions. Actual transfer was to take place "as soon as practical" after this certification.

* In the event that the State declined acceptance of the railroad, or the State was unable to satisfy the transfer conditions within the specified time period, the Act then directed the U.S. Secretary of Transportation to dispose of the Railroad by other means. The Secretary was mandated to give preference to a buyer or transferee who would continue to operate rail services.

4. Initial Actions Taken by the State

Early in the process, the Governor established an Alaska Railroad Transfer Team to (1) represent the State in working with the U.S. Department of Transportation, USRA and others, and (2) advise whether the Railroad was important enough to the State to warrant acquisition, and if so, the best means for acquiring and managing the railroad. The Transfer Team presented its collective analysis and recommendations in a report which (1) examined ARTA's terms and conditions, (2) evaluated USRA's Valuation Report, (3) determined the liabilities and financial

exposure involved with the potential acquisition, and (4) benefits of the payment options offered.(4) The Transfer Team was instrumental in preparing the legislation required at the state level to take over the AAR (i.e., Alaska Railroad Acquisition Act, Alaska Railroad Corporation Act).(5)

On July 15, 1983, Governor Sheffield and U.S. Transportation Secretary Dole signed the Alaska Railroad Transfer Report prepared jointly by the U.S. Department of Transportation and the Transfer Team.(2) However, the report did not constitute an agreement between the two agencies to complete the transfer. On September 23, 1983, the United States Railway Association released its inventory and condition assessment of fixed facilities and equipment and analysis of operating expenses and capital requirements for the Railroad's continuing operation.(3)

On December 15, 1983, the Alaska Railroad Transfer Team completed and forwarded its comprehensive analysis of the major issues surrounding the acquisition of the Alaska Railroad to Governor Sheffield.(4) The resulting report was prepared in consultation with the State Departments of Transportation and Public Facilities, Administration, Law, and Natural Resources, and the Office of Management and Budget. The Transfer Team also used the services of private engineers, appraisers, and accountants, where appropriate, to review specific aspects of the ARR's assets, operations and finances.

In September 1983, the Department of Transportation and Public Facilities commissioned Sverdrup & Parcel and Associates, Inc. to assess the physical condition of the ARR. This assessment included the track structure, bridges, tunnels, docks, signals, communications, rolling stock, and motive power. Sverdrup delivered its condition assessment in February, 1984.(6)

The Transfer Team then turned its attention to the question of acquisition law, then an appropriate management entity to operate the ARR after purchase. This culminated in the preparation and passage by the Alaska Legislature of an Act entitled: "An Act Establishing the Alaska Railroad Corporation to Manage and Operate the Alaska Railroad" [the short title was the Alaska Railroad Corporation Act].(5) Governor Sheffield signed the legislation on July 5, 1984. On July 12, 1984, Governor Sheffield and U.S. Transportation Secretary Dole exchanged documents necessary to obtain certification, the last federal milestone prior to transfer. In so doing, the state agreed to:

* Operate the railroad as a rail carrier in intrastate and interstate commerce;
* Assume all rights, liabilities, and obligations of the Alaska Railroad on the date of transfer, with some limited exceptions regarding claims and causes of action;
* Protect employment and retirement benefits and to establish acceptable arrangements for continued employment during a two-year period following the date of transfer;
* Allow representatives of the Secretary of Transportation adequate access to railroad employees and records when needed in relation to the period of Federal ownership; and
* Compensate the United States at the value determined by the USRA.

The formal transfer occurred at Nenana on January 5, 1985 with the Governor and the Federal Railroad Administrator signing official transfer documents and exchanging a ceremonial $22.3 million check and a symbolic railroad gold switch key. Starting January 6, 1985, the ARR began operations under the Alaska Railroad Corporation (ARRC).

5. <u>Alaska Railroad Corporation Act</u>

The Act established a public corporation (i.e., the Alaska Railroad Corporation) within the Department of Commerce and Economic Development to operate the Alaska Railroad. The powers

of the corporation were vested in a seven-member Board of Directors. The Act empowers the Board to:

* Be responsible for the management of the financial and legal obligations of the Alaska Railroad;
* Operate the Alaska Railroad as a common carrier subject to the jurisdiction of the Interstate Commerce Commission;
* Generally manage the corporation on a self-sustaining basis;
* Provide for safe, efficient, and economical transportation to meet the overall needs of the State;
* Raise needed capital by issuing bonds upon approval by the Legislature while ensuring that the corporation does not directly or indirectly endanger the State's own borrowing capacity;
* Review state and other land disposal proposals to aid in planning for future development or expansion of transportation services;
* Ensure that the procurement procedures of the corporation meet accepted railroad industry standards; and
* Ensure that the accounting procedures of the corporation meet generally accepted accounting principles consistent with industry standards for comparable railroads.

The Act specifies that the Board appoint a chief executive officer who is responsible for managing the daily affairs and operations of the Corporation, including:

* Leasing and granting easements which do not constitute a transfer of the Corporation's entire interest in land;
* Establishing specific rates, tariffs, divisions, and contract rate agreements;
* Making routine changes in service levels;
* Establishing procurement and accounting procedures; and
* Performing procurement activities.

The Act further specifies that the Board is responsible for the review and approval of the following:

* Issuing bonds with approval by the Legislature;
* Mortgaging or pledging Corporation assets;
* Donating property or assets belonging to the Corporation;
* Acting as a surety or guarantor;
* Adopting a long-range capital improvement program;
* Adopting annual reports;

* Effecting general, comprehensive increases or decreases in rates;
* Expanding or reducing services in a major way;
* Expanding the main or branch lines including spur, industrial, team, switching, or side tracks, other than performing routine track alignment as necessary to maintain existing service levels;
* Selecting independent auditors and accountants;
* Entering into collective bargaining agreements;
* Adopting annual budgets;
* Beginning a capital project with an estimated completion cost of more than $500,000 or an estimated completion time of more than one year;
* Exchanging, donating, selling, or otherwise conveying its entire interest in land subject to approval by the Legislature; and
* Exercising the power of eminent domain. (Exercise of the power of eminent domain requires the prior approval of the Governor.)

In addition to the exercise of routine powers and duties, the Act also conveys to the Corporation the right to:

* Acquire personal property, rights, rights-of-way, franchises, easements, and other interests in land, taking title in the name of the Corporation;
* Hold, maintain, use, operate, improve, lease, exchange, donate, convey, encumber, or otherwise grant a security interest in, or authorize use or disposal of, land or personal property;
* Contract with and accept transfers, gifts, grants, or loans of funds or property from the United States and the State or its political subdivisions;
* Recommend to the Legislature and the Governor any tax, financing, or financial arrangement the Corporation considers appropriate for expansion or extension and operation of the Alaska Railroad;
* Apply to the State, the United States, and foreign countries or other proper agencies for the permits, licenses, rights-of-way, or approvals necessary to construct, maintain, and operate transportation and related services;
* Enter into contracts, leases, and other agreements with connecting carriers, shippers, and other persons concerning the services, activities, operations, property, and facilities of the corporation, including agreements that contain provisions to expand the railroad's traffic base;
* Plan for and undertake expansion of the railroad and railroad activities, including extension of the rail system, and contract with other modes of transportation service connecting to the rail system; and

* Undertake and provide for the acquisition, construction, maintenance, equipping, and operation of connecting, switching, terminal, or other railroads and railroad facilities;

The Legislature specifically retains for itself the right to approve:

* Raising capital through the issuance of tax-exempt bonds;
* Appropriations to be used to provide a particular service that is not otherwise self-sustaining, if a subsidy is required to maintain that service;
* Exchange, donate, sell, or otherwise convey its entire interest in land;
* Extend railroad lines other than for spur, industrial, team, switching, or side tracks; and
* Lease land for a period in excess of 35 years without a termination clause.

Acquisition of the Alaska Railroad is viewed by the State as a present necessity in order to retain rail service, and not as a long-term responsibility of the State to directly provide continuing rail service. The Act requires the Corporation to include in its annual report every five years an analysis of potential sale arrangements whereby the corporation may be transferred into private ownership. The Act requires that this analysis include documentation of at least three offers to sell the corporation initiated by the Corporation during the five year period.

The Act prohibits the state-owned railroad from applying for a right-of-way across, or exercise eminent domain in, the western (Kobuk River) unit of the Gates of the Artic National Preserve.

Upon receiving Legislative approval, the Corporation may issue bonds to provide funding to carry out its purposes. However, these bonds are not to be backed by the credit of the State or its subdivisions. Bonds and notes, and the interest and income from them, are exempt from Federal and State taxation except for inheritance, transfer, and estate taxes.

The Governor may provide for the sale or lease of the Alaska Railroad and dissolve the Corporation if it can be assured that the railroad will continue to operate after the sale or lease and the State will receive the amount of money it has spent in connection with the Alaska Railroad. Any sale, however, is subject to legislative approval.

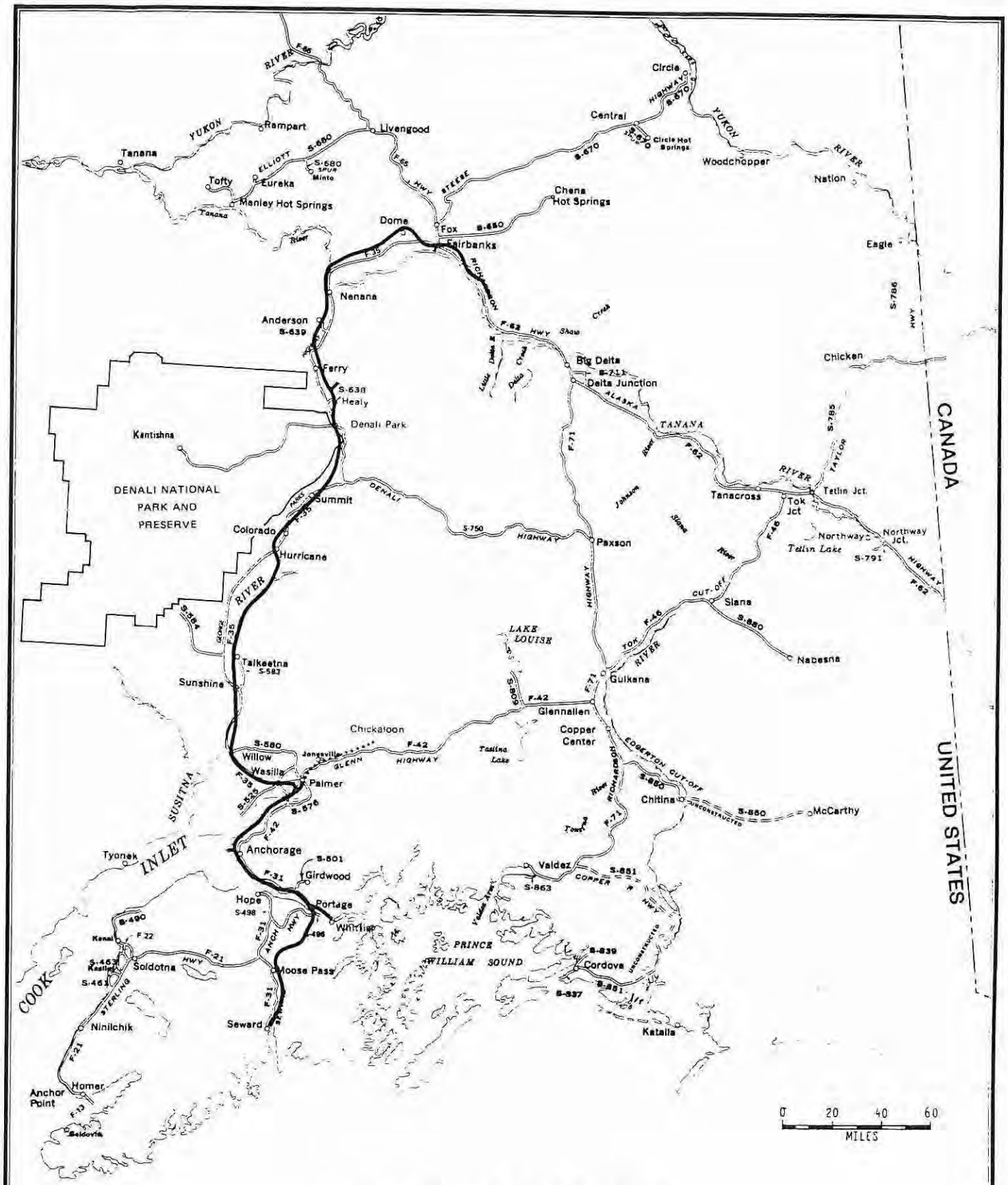
B. Profile of the Alaska Railroad

The following describes the Alaska Railroad as it exists in mid-1985.

1. The Physical Plant

a. Route Structure

The route structure of the Alaska Railroad has not changed in recent years; the railroad's single track mainline extends 480.7 miles from the ports of Seward and Whittier through Anchorage to Fairbanks. Passing sidings are spaced generally at 5 to 10 mile intervals, although sidings long enough to accommodate most freight trains are less frequent. Additionally, there are five branches having an aggregate length of 52.2 miles. These include the 28.0 mile spur from Fairbanks to the Eielson Air Force Base, (24.5 miles of which are owned by the ARR), the 10.0 mile spur from Ft. Wainwright to the Fairbanks International Airport, a 4.8 mile coal branch from Healy to Suntrana (the last 3.7 miles of this line are not presently being operated since relocation of the tipple to the mainline in 1983), the 6.7 mile branch from Matanuska to Palmer, and the 2.7 mile Anchorage International Airport spur. Additional trackage is used for passing sidings and serves on-line industries; resulting in a system comprised of 655 track miles operated. The ARR retained the former rail right-of-way extending eastward



THE ALASKA RAILROAD

Wilbur Smith and Associates

FIGURE 3-2

up the Matanuska Valley approximately 30 miles past Sutton, Eska, and Jonesville to Chickaloon. This right-of-way provides access to coal resources and thus would be an important asset if an opportunity develops in the future for exporting or otherwise utilizing coal from the Matanuska area. Figure 3-2 is a map showing the present route structure of the Alaska Railroad.

b. Operating Conditions and Constraints

The speeds at which trains operate depend upon (1) the severity of horizontal curvature, (2) ruling grades, (3) the presence of track signals, and (4) the level of maintenance of the track structure. The constraint imposed by gradient is illustrated in Table 3-1, which shows maximum grades in both directions along the ARR. As the controlling grade increases, the tonnage rating of a locomotive decreases. On the ARR, relatively flat gradients are encountered in the southbound direction between Anchorage and Portage and between Potter and Anchorage. Steep gradients are encountered between (1) Seward and Divide, where the ruling grade is 2.2 percent northbound, (2) Grandview and Spencer, where the ruling grade is 3.0 percent southbound, (3) Hurricane and Honolulu, where the ruling grade is 1.1 percent northbound and 1.5 percent southbound, and (4) Gold Creek and Hurricane and Honolulu and Summit where the ruling grade is 1.8 percent northbound. The lack of a blocked signal system places an upper speed limit of 49 mph on freight trains and 59 mph on passenger trains in areas not further constrained by the alignment. The ARR has very few slow orders resulting from deferred maintenance, but does have to impose restrictions due to frost heaves, slides, the necessity of installing shims, and on-going track and bridge work.

Economic considerations play a major role in railroad determination of the train speeds actually used and tonnage limits

Table 3-1

MAXIMUM GRADES ON THE ALASKA RAILROAD
1985

SEGMENT	MILEPOSTS		MAXIMUM GRADE IN PERCENT	
	From	To	South Bound	North Bound
Mail Line				
Seward-Divide	2.9	12.0	0.0	2.2
Divide-Primrose	12.0	18.4	2.3	1.7
Primrose-Hunter	18.4	40.0	1.2	1.1
Hunter-Grandview	40.0	44.9	0.0	2.0
Grandview-Spencer	44.9	55.8	3.0	0.0
Spencer-Portage	55.8	64.2	1.0	0.5
Whittier-Portage	0.0	12.4	0.5	0.6
Portage-Potter	64.2	100.6	0.5	0.7
Potter-Anchorage	100.6	114.3	0.8	1.0
Anchorage-Matanuska	114.3	150.7	0.5	1.0
Matanuska-Gold Creek	150.7	263.2	1.1	1.0
Gold Creek-Hurricane	263.2	281.4	0.0	1.8
Hurricane-Honolulu	281.4	288.7	1.5	1.1
Honolulu-Colorado	288.7	288.7	0.0	1.8
Colorado-Summit	288.7	312.5	0.8	1.0
Summit-Healy	312.5	358.7	1.1	0.9
Healy-Nenana	358.7	411.7	1.2	1.0
Nenana-Fairbanks	411.7	470.3	1.2	1.0
Branch Lines				
Matanuska-Palmer	0.0	6.7	0.0	1.4
Healy-Sutrana	0.0	4.8	2.0	1.0
Fairbanks-Eielson	0.0	28.0	1.0	0.5
Eielson Br.-Fairbanks I.A.	0.0	10.0	0.3	0.1
Anchorage Int'l Airport	0.0	2.7	0.4	0.0

SOURCE: Alaska Railroad Track Chart, Revised 1985 Alaska Railroad Timetable No. 118, effective May 12, 1985.

per carload. The rugged topography traversed by the ARR adds significantly to operating costs. Curves increase wheel resistance, which in turn increases fuel usage and rail and wheel wear. Grades likewise increase fuel usage and power requirements. To illustrate, a conventional 3,000 horsepower diesel-electric locomotive can haul a load of 4,560 tons from Portage to Potter, but only 730 tons from Spencer to Grandview on the mainline to Seward. A hypothetical 3,000 ton load, which would require a single 3,000 horsepower locomotive between Matanuska and Anchorage, would require five locomotives (or three if the train were "doubled" over the mountain pass) to reach Seward.

The ARR is able to handle virtually all traffic that can be handled by "lower 48" railroads without imposing weight and car size restrictions. Loads up to 11 feet wide and 15 feet 9 inches above the top of rail can be carried on all mainline tracks and the Whittier Branch. Taller loads can also be accomodated, but the maximum allowable width progressively decreases above 15 feet 9 inches. Between Portage and Whittier, the maximum height restriction of 19 feet 6 inches is decreased one foot between October 1 and April 15 because of tunnel icing conditions.

Maximum allowable tare weight and load is 263,000 lbs. on the mainline and Whittier Branch. Somewhat lower load limits of 220,000 and 240,000 lbs. are imposed on the Eielson and Suntrana branches. In 1985 the ARR placed two weigh-in-motion scales on the freight mainline in Anchorage, which give the Railroad the opportunity to weigh all traffic entering or leaving Anchorage. A certified weigh-in-motion scale is located within the Usibelli coal tipple near Healy. As indicated earlier, the Suntrana Branch is out of service and all coal loading, with the exception of a minor amount of domestic coal at mile one of the Suntana Branch, now occurs at the mainline tipple.

The railroad operates and maintains a number of yards to serve local industries, sort cars, and maintain its equipment. These vary appreciably depending on the purpose for which they are used. The yard at Seward serves the railroad-owned port facilities at that location and includes a number of car marshalling tracks, a small equipment maintenance facility, the dock facilities, and several tracks to local industries. Whittier is the interchange point for railcar service, and is designed to serve the two railroad-owned car-barge slips, the Whittier-Portage passenger-auto shuttle service, and the military dock and petroleum terminal. Anchorage has the ARR's major classification yard, locomotive and car maintenance shops, headquarters offices, some car storage facilities and serves the area's industrial community. The yards also serve a number of major and minor industries, including the Port of Anchorage, the International Airport, Elmendorf Air Force Base, and Fort Richardson. Healy has a small yard to serve the nearby Usibelli coal mine. The Healy yard and rail service will be retained, but the ARR has closed the local crew facilities. The Nenana yard serves the small river port operated by the city, the Yutana Barge Lines, Chevron and Nenana Fuel Service. Fairbanks has a small classification yard, limited locomotive and car shops, and trackage to serve such local rail users as Fort Wainwright, the Eielson Air Force Base, the Mapco oil refinery, Spenard Building Supply, the University of Alaska, Fairbanks Coal Bunkers, and several other local industrial and the TOFC yard at Fairbanks.

c. Track Structure

Table 3-2 shows major accomplishments of the maintenance of way and structures program in recent years.

Table 3-2

ALASKA RAILROAD MAINTENANCE-OF-WAY ACCOMPLISHMENTS
1980-1985

YEAR	CROSSTIE RENEWALS	RAIL REPLACE. (feet)	BALLAST PLACED (cubic yds.)	TRACK ALIGNED & SURFACED (miles)	BRIDGES UPGRADED
1980	19,500	n/a	62,300	142	12
1981	13,000	29,500	141,200	182	25
1982	26,000	26,900	139,000	181	67
1983	25,300	11,700	143,300	207	29
1984	25,700	49,100	143,000	211	50
1985	26,000	94,500	109,100	180	36
Total	135,500	211,700	737,900	1,134	

SOURCE: Alaska Railroad Annual Reports, 1980-1985

The majority of the rail on the main line and the Whittier Branch was relaid by the Federal Government with bolted 115 lb. RE rail during the period 1949-1954 as a consequence of heavy traffic volumes and deferred maintenance during World War II. Branch lines are constructed with a mixture of rail weights ranging from 70 to 115 lbs. A sampling of rail head wear measurements taken by USRA on both the mainline and branches indicated relatively light wear except on sharper curves where flange wear was detected. However, since that time (1983) the increase in traffic and the greater use of heavier cars has begun to wear the rail significantly, especially on curves between Matanuska and Anchorage. The ARR has begun the use of 78 foot rails and over 60 percent of the new rail laid in 1984 was premium alloy rail to help reduce wear on curves.

Tie renewals have not kept pace with emerging needs. The Sverdrup study noted that a large number of ties were installed on the ARR at about the same time the 115 lb. rail was laid, and are reaching the end of their useful life rather than having a uniform age distribution. Based on an estimated 1.95 million

crossties on the ARR, and the approximately 25,000 installed annually, the implied replacement cycle is far greater than the 30-40 years usually considered desirable.

d. Motive Power and Rolling Stock

At the end of 1985, ARR's locomotive fleet consisted of 51 diesel-electric locomotives, as listed on Table 3-3.

Table 3-3

ALASKA RAILROAD DIESEL-ELECTRIC LOCOMOTIVES
1985

TYPE	MFG.	HP	YEAR BUILT/REBUILT	NO OF UNITS
GP-40-2 (road)	EMD	3000	1975-1978	15
GP-40 (road)	EMD	3000	1967 rebuilt 1983	5
GP-40-2 (GP-35)	EMD	3000	1964 rebuilt 1980	1
GP-35 (road)	EMD	2500	1964	3
GP-49 (road)	EMD	2800	1983	4
GP-49 (road)	EMD	2800	1985	5
E-9 (passenger)	EMD	2400	1956 rebuilt 1974	2
GP-7 (road)	EMD	1600	1951 rebuilt 1977	9
FP-7 (passenger)	EMD	1500	1951	7
Total Locomotives				51

SOURCE: Alaska Railroad 1984 Annual Report, Table VII, updated to December, 1985.

ARR's passenger fleet at the end of 1985 consisted of 48 cars, as listed on Table 3-4. The ARR acquired 28 of the cars from the Union Pacific Railroad in 1971, and eight from the Southern Railway in 1980. Ten of the Union Pacific cars were converted to electric heat and power in 1982.

Table 3-4

ALASKA RAILROAD PASSENGER ROLLING STOCK
1985

CATEGORY	TOTAL SEATS	YEAR BUILT/REBUILT	NO OF UNITS
Coach/Dome Car	1,024	1950-1954 (5 in 1982)	20
Dome Chair Car	600	1948-1955 (1 in 1982)	9
Diner	96	1942-1959 (1 in 1982)	2
Lunch, Cafe-Lounge	135	1959 (1 in 1982)	3
Baggage Car		1961 (2 in 1982)	6
Power Car		1943-1951 (1 in 1975)	5
Recreation Car		1961	1
Rail Diesel Cars	96	1953 (2 in 1985)	2
Total Passenger Cars			48

SOURCE: Alaska Railroad 1984 Annual Report, Table VII, updated to December, 1985.

Given expanding passenger traffic volumes, additional passenger equipment will ultimately have to be modernized or replaced. The railroad has recently purchased two self-propelled passenger cars (RDC's sometimes called Budd cars) to use between Anchorage and Hurricane, and Anchorage and Fairbanks during winter months when patronage is low, and possibly on the Portage-Whittier route.

ARR's freight car fleet at the end of 1985 consisted of 1,493 cars comprised of the types listed on Table 3-5.

ARR's freight car fleet is considered to be an old fleet, with a growing number of cars prohibited in interchange due to their extended age. Since commodities in interline service are mainly inbound, the ARR interlines relatively few of its own cars with railroads located in the contiguous U.S. However, the cars which are most extensively used by the railroad in freight

Table 3-5

ALASKA RAILROAD FREIGHT ROLLING STOCK
1985

CATEGORY	CAPACITY (tons)	YEAR BUILT/REBUILT	NO OF UNITS
Commercial Service			
Box Cars	50-70	1943-1965	143
Flat Cars, Owned	50-70	1943-1985	435
Flat Cars, Leased	60-77		38
Gondolas	50-70	1943	275
Hoppers, Covered	100	1965-1970	19
Hoppers, Open Top	50-100	1952-1982	301
Refrigerator	65	1966	10
Tank Cars	10000-20000 gal.	1920-1974	85
Total			1,306
Non-Commercial Service			
Ballast Cars	70	1955	81
Air Dump Cars	28-40 yds	1934-1958	66
Caboose Cars		1943-1976	22
Power Cars		1943	7
Repeater Air Cars	50	1943	3
Locomotive Fuel Cars	10000 gal.	1923	6
Way Freight Cars	70	1943	2
Total			187
TOTAL			1,493

SOURCE: Alaska Railroad 1984 Annual Report, Table VII, updated to December, 1985.

service (e.g., open top hoppers for hauling coal, sand, and gravel and flat cars used for pipe transport and TOFC/COFC) are comparable in age and design with similar cars used by other railroads. Unlike railroads located in the "lower 48," the ARR does not enjoy convenient access to the nation's car fleet. In recent years, the ARR has been reducing the size of its fleet by retiring equipment no longer required for freight service, and adding specialized equipment as new business opportunities develop. An example of this are the articulated intermodal platform cars presently in service for use in expedited trailer service between Anchorage and Fairbanks and to serve roll-on roll-off traffic entering Alaska through the ports of Seward and Whittier.

With the ARR being directed to be operated on a self-sufficient basis rather than as a traditional governmental entity, it will be easier to acquire necessary equipment either through lease or purchase than it was under Federal ownership. The important point is that previous concern stemming from the age, lack or condition of rolling stock can now be resolved through actions taken by the Corporation.

2. The Freight Traffic Base

The ARR essentially provides a specialized transport service focusing on a small number of commodities moving between a limited set of origins and destinations. ARR's traffic logically divides into local and interline movements. Local movements (traffic that originates and terminates on the ARR) generate high tonnage, but relatively low levels of revenue per ton-mile. Interlined traffic is (1) carload traffic originating from Seattle or Prince Rupert and interchanged between the ARR and either Alaska Hydro-Train or the Canadian National Railway through the car-barge facility at Whittier and (2) trailer and

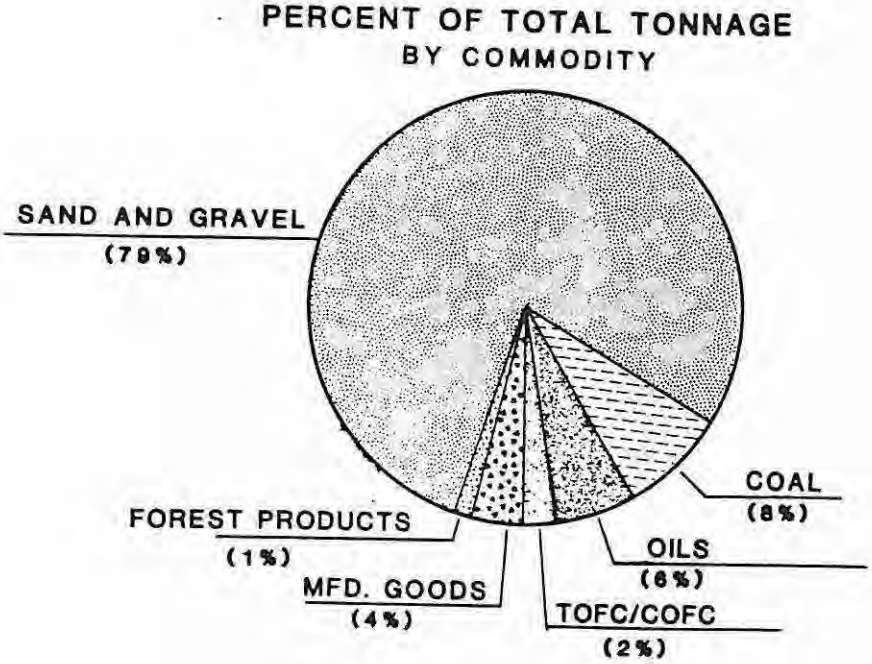
container movements through the ports of Whittier, Seward, and Anchorage that are forwarded by the railroad to interior destinations. Table 3-6 provides a summary of freight tonnage and associated revenues for the period 1980-1984, inclusive.

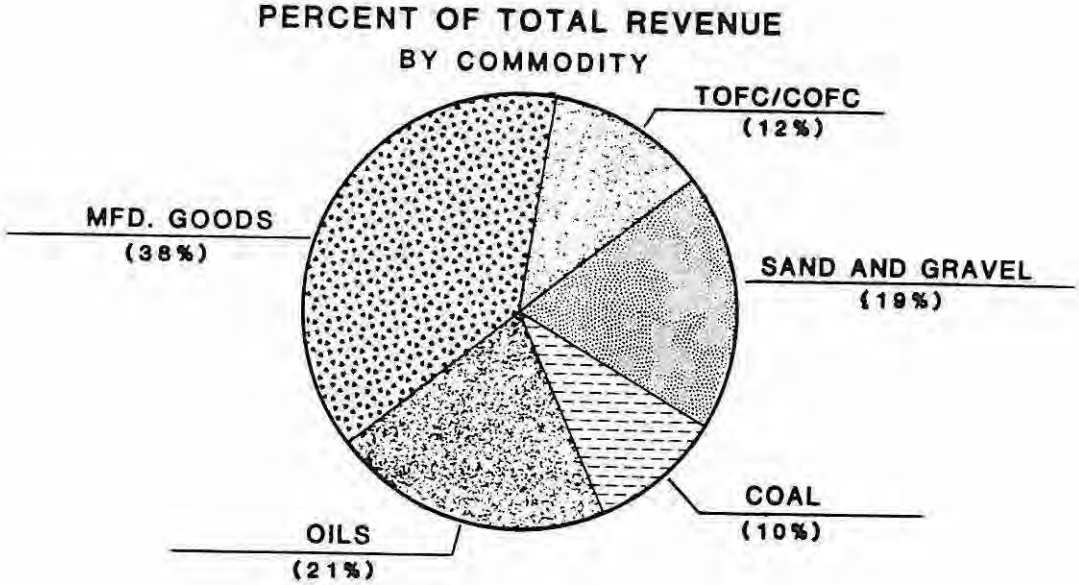
Figure 3-3 compares tonnage by commodity type with ARR revenue by commodity type, for 1984. Sand and gravel dominates the tonnage, but not the revenue. The following provides additional background on the major cargo categories.

a. Sand and Gravel

The seven large and 25 smaller pits in south-central Alaska produced 10.1 million tons of aggregate in 1984. The majority of this sand and gravel is shipped by unit train to Anchorage, as indicated in Table 3-6. Pits operated by Anchorage Sand and Gravel accounted for just under half of this total, followed by Alaska Gravel Sales, Big Lake Sand and Gravel, Stephen and Sons, and other companies. In addition to the rail hauls, approximately one million tons of aggregate were trucked from the Palmer and Eagle River areas to Anchorage, and 300,000 tons of aggregate were mined from the Pioneer pit in Anchorage.(12)

The rail movement of sand and gravel from Palmer to South Anchorage represents the single largest commodity movement on the ARR. This relatively short-haul movement has grown from virtually nothing in 1975 to 79 percent of the ARR's total tonnage in 1984. It reflects (1) the virtual termination of extraction activities in the Anchorage area and the necessity of utilizing deposits from outside the Borough to supply local needs, and (2) the high growth rates in residential, commercial and highway construction occuring since 1980. The ARR utilizes several 60-80 car unit trains which collectively make up to eight round trips per day during the summer months. In 1984,





TONNAGE AND REVENUE COMPARISIONS

ALASKA RAILROAD

1984

FIGURE 3-3

Table 3-6

ALASKA RAILROAD FREIGHT TONNAGE AND REVENUES BY MAJOR COMMODITY
1979-1985

	FREIGHT TONNAGE (000)						
MAJOR COMMODITY	1979	1980	1981	1982	1983	1984	1985(1)
Sand and Gravel	524	396	1797	2754	4398	6537	n/a
Coal	638	590	653	654	626	642	n/a
Petroleum, Oil, Lubricants	277	252	379	439	462	498	n/a
Manufacturers and Misc.	220	292	312	450	323	301	n/a
TOFC/COFC	55	92	113	122	98	212	n/a
Products of Forests	89	109	101	77	105	82	n/a
Products of Agriculture	7	10	8	7	7	n/a	n/a
Total Tonnage	1809	1741	3362	4503	6018	8272	n/a

	REVENUES ($000)						
MAJOR COMMODITY	1979	1980	1981	1982	1983	1984	1985(1)
Sand and Gravel	3207	556	2712	4556	6647	9430	7819
Coal	1009	3717	4637	5072	5007	5297	8078
Petroleum, Oil, Lubricants	6738	4691	6700	8376	9723	10287	9605
Manufacturers and Misc.	3877	8225	13631	22512	15704	18879	14022
TOFC/COFC	886	3054	4414	4915	3625	5860	5998
Products of Forests	2327	1253	1734	2301	2955	n/a	n/a
Products of Agriculture	114	168	181	145	126	n/a	n/a
Total Revenues	18158	21664	34009	47877	43787	49753	45522

(1) Eight months January through October, 1985

SOURCE: Alaska Railroad Annual Reports, 1980-1984

the sand and gravel shipments accounted for 19 percent of the ARR's total freight revenues.(7) Sand and gravel movements are closely related to the amount of construction in progress in the Anchorage area, which in 1985 decreased somewhat from the high levels of previous years.

b. Coal

Another important local movement is coal from the Usibelli Coal Mine near Healy to military power plants (Clear Air Force Station, Fort Wainwright, and the Eielson Air Force Base), the GVEA power plant at Healy, the Municipal Utilities System power plant at Fairbanks, and the University of Alaska at Fairbanks. This mine is the only major operating coal mine in Alaska, and produced 849,161 tons of subbituminous coal in 1984 from a drag-line-strip-mine operation in the Late Miocene Suntrana Formation.(12) Coal shipments accounted for eight percent of the ARR's total tonnage and 10 percent of its freight revenue.

In late 1984, Usibelli began exporting coal to KEPCO, a public utility in Korea, using facilities in Seward contracted by the State and Suneel Alaska Corporation. Under a contract which extends through 1992, the ARR expects to ship 660,000 tons in 1985 and 880,000 tons per year thereafter.

Thus, the near-term outlook for coal is good; stable rail movements of approximately 880,000 tons southbound and 600,000 short tons northbound are expected annually within the next several years. Longer term prospects depend upon further development of coal resources in the Railbelt area to serve export markets. Potential projects include (1) reinstituting coal mining in the Matanuska Valley and developing an export market for this high BTU coal and (2) the possible use of rail service to access coal resources in the Beluga and Yentna

leases. In connection with the former, Rocky Mountain Energy is presently conducting subsurface exploration on its State leases for its Wishbone Hill project. This work in being done coincidentally with the Matanuska Power Project, a proposed mine-mouth power plant that could produce 170 megawatts of electricity per year. Rail transport of coal from the latter fields is uncertain and potentially a distant possibility.

c. Petroleum, Oil, Lubricants

Another substantial local rail movement is that of petroleum products; in 1984, this movement accounted for six percent of ARR's tonnage and 21 percent of its freight revenues. The principal movement has been gasoline from refineries located at Nikiski (and delivered to Anchorage by pipeline) to Fairbanks. In recent years, the percentage of southbound jet and diesel products have been increasing. With completion of the expansion presently taking place at the North Pole Refinery near Fairbanks, the region will ship southbound movements of petroleum distillates (e.g., #1 and #2 fuel oils, asphalt) for distribution in the Anchorage area. Thus, the outlook for movements of petroleum products is very promising. MAPCO recently completed modifications to its track facilities at its Anchorage terminal in anticipation of increased shipments of asphalt, and is presently considering the acquisition of additional 20,000 gallon tank cars to handle the distillates. The net result is that northbound shipments of petroleum will reduce or cease, but southbound movements will increase to potentially double the petroleum products that perviously were moved northbound.

d. Manufacturers and Miscellaneous

This category includes local and interline rail carload movements of commodities such as cement from Anchorage to Fairbanks, iron and steel pipe and fittings either from Seward or Anchorage to Fairbanks for the the North Slope, machinery, and all types of consumer and industrial goods, such as building products, furniture, vehicles, and foodstuffs. In 1984, these commodities accounted for four percent of ARR's traffic base and 38 percent of its freight revenue. Consequently, it represents traffic which is very important to the ARR.

Interline carload service for cars with west coast origins is provided by Crowley Marine's Alaska Hydro-Train using rail and trailer barges between Union Pacific and Burlington Northern facilities at Seattle and the Port of Whittier under rates jointly published by Alaska Hydro-Train and the ARR. Similarly, Alaska Hydro-Train is included in through rates from "lower 48" railroad points to points on the AAR.

Interline carload service is also provided from Prince Rupert, B.C. to Whittier via the Canadian National Railway, which operates a tug-hauled barge service. CNR has basically the same through-rate tariff arrangements as Alaska Hydro-Train. The CNR typically handles cars from eastern, mid-western, and Canadian origins. It also handles hazardous materials shipments, which are prohibited from passage through Seattle.

Manufacturers and miscellaneous traffic has varied in recent years, partly in response to changes in the Alaskan economy. Over the long term, it will probably decline in volume as a consequence of the increasing use of trailers and containers through Whittier, Seward and Anchorage in place of carload movements.

e. Trailer-on-Flatcar and Container-on-Flatcar (TOFC/COFC)

Other components of interline traffic are (1) containership service between Seattle and Anchorage via Sea-Land, (2) roll-on, roll-off trailer ship service provided by Totem Ocean Trailer Express between Tacoma, WA and Anchorage, and (3) roll-on, roll-off trailer ocean-going barge service between Seattle and Whittier/Seward provided by Alaska Hydro-Train and Seaway Express, respectively. While such taffic generated less than three percent of the ARR's total tonnage, it accounted for nearly 12 percent of its freight revenues in 1984. Traffic destinations are primarily Anchorage and Fairbanks.

In May, 1985, the ARR instituted non-stop overnight trailer service between Anchorage and Fairbanks using articulated intermodal platform cars. The "Arctic Fox," which is a pair of all-piggyback trains having the capability of carrying 30 trailers apiece, leave Anchorage and Fairbanks at 8:30 and 6:45 PM, respectively, each evening except Sunday and are scheduled to arrive in Anchorage and Fairbanks at 5:15 and 7:00 AM, respectively, the following day. As of mid-1985, traffic on these trains had increased to the point that, on average, 86 percent of available capacity was being utilized. Expecting further increases in traffic, the ARR is considering adding similarly equipped trains to this service. The Arctic Fox basically serves local traffic which in the past would most likely have gone by highway between these two cities.

With a highway distance of 356 miles between Anchorage and Fairbanks, Arctic Fox piggyback service has already proven that it can provide door-to-door transit times comparable with motor carriers as well as maintain a high degree of service reliability, particularly in inclement weather. The service epitomized by the Arctic Fox represents the type of traffic having the

greatest growth potential in the near term for the ARR, particularly in terms of freight revenues.

f. Products of Forests

Even though Alaska has vast timber resources, some of which are accessible from the ARR, the state nevertheless imports nearly all of the dimension lumber and plywood used in the state from the Pacific Northwest and Canada. Lumber production costs are such that it is generally cheaper to import lumber than to utilize native timber. Furthermore, Alaska timber is usually inferior in quality. This in turn limits the market potential of local sawmills. Coupled with this is the fact that virtually all timber is located on Federal and State lands, and that governmental policies towards timber sales from these lands have not been such to guarantee a long-term supply of stumpage, even though sustainable yields are high. As a result, the local forest products industry can do little to make investments in state-of-the-art sawmills needed to create a viable sector capable of competing in the local, as well as foreign, markets. Thus, the short-term potential for a substantial increase in ARR lumber traffic beyond that induced by fluctuations in the economy and general level of construction activity is minimal.

Until 1981, the ARR benefited from a sizeable export log movement from Nenana through the Port of Seward. This traffic ended with the collapse of the Japanese housing market. Prospects for its resurrection are minimal at this time, although the potential remains.

g. Products of Agriculture

As can be seen, the movements of agricultural products by the ARR are small and relatively insignificant in terms of

freight tonnage and revenues. While increased agricultural development has been talked about for years in the Matanuska Valley, the Tanana Valley, and at Delta Junction, the amount of land in agricultural production, the feed grain orientation of the crops raised, the lack of export markets, and the generally depressed conditions in the national agriculture sector limit agriculture's potential as a railroad traffic base in the near term.

3. The Passenger Traffic Base

The passenger service provided by the ARR is unusual in that it is directed toward serving tourist and social needs rather than satisfying more traditional transport demands.

For a four month period between mid-May and mid-September, the railroad operates a daily passenger train in each direction between Anchorage and Fairbanks that is heavily used by tourists and others visiting Alaska. During the winter, this service is suspended, and in its place a once or twice weekly local service is provided, especially to homesteaders located east of the Susitna River between Talkeetna and Hurricane who do not have access to the Parks Highway. In early 1986 the ARR will be instituting winter service to the Talkeetna/Hurricane area with two rehabilitated self-propelled diesel passenger cars. This project will enable continued winter services at a lower cost to the railroad.

The ARR also operates the Whittier shuttle, which during the same four month summer period, provides once-a-day round trip service between Anchorage and Whittier and three to five round trips per day shuttle service between Portage and Whittier, which does not have highway access. As indicated earlier, Whittier is one of Alaska's principal ports, not only for

freight movements, but also as a port-of-call for cruise ships and the Alaska Marine Highway System. An extensive number of railbelt and locally-owned small craft are also based in Whittier. During the winter, shuttle service is limited to three round trips per week between Anchorage and Whittier plus the Portage-Whittier service. The shuttle accomodates automobiles, trucks, and buses on special quick-loading flatcars and carries passengers in coaches (passengers are allowed to remain in their vehicles) on the 35 minute trip through three and one half miles of tunnels between Portage and Whittier.

The ARR also runs a number of special trains each year which include (1) land extensions of cruise ship itineraries, (2) cross country ski trains, and (3) event-related trains (e.g., the State Fair at Palmer). The number of specials run each year have been increasing.

Table 3-7 provides a summary of patronage and associated revenues for the period 1980-1985, inclusive.

Table 3-7

ALASKA RAILROAD PASSENGER VOLUMES
1979-1985

SERVICE	TOTAL PASSENGERS (000)						
	1979	1980	1981	1982	1983	1984	1985 (1)
Anchorage-Denali-Fairbanks	61	54	54	61	62	78	82
Anchorage-Portage-Whittier	85	87	93	95	118	120	143
Special Trains	5	9	13	19	32	39	26
Total Passengers Handled	151	151	161	175	211	237	251
Total Revenue ($000)	1564	1549	1999	2627	3305	3877	3885 (1)

(1) Through October 31, 1985

SOURCE: Alaska Railroad Annual Reports, 1980-1984

Table 3-7 indicates an overall growth in patronage, which reflects the continuing promotional work being done by the Alaska Department of Commerce and Economic Development and the ARR to encourage tourist vacation travel to Alaska along with a sightseeing ride on the Alaska Railroad.

4. Traffic Density

Figure 3-4 presents the traffic density by direction for the ARR (expressed in gross ton-miles per mile per year) on the mainline and branches in 1984. Densities on the mainline segments between (1) Matanuska and South Anchorage and (2) Healy and Fairbanks are above three million gross ton-miles per mile per year due to the sand and gravel movements between Palmer and Anchorage and coal movements into the Fairbanks area. Although densities on the mainline segment between Healy and Matanuska are presently less than three million gross ton-miles per mile, they are expected to exceed this amount in 1985 as a result of unit coal train movements between Healy and Seward. Table 3-8 depicts traffic density by segment between 1979 and 1984 and reflects the considerable increase on some segments during the last three years.

5. The Financial Picture

This section focuses largely on the financial situation during the last six years of Federal ownership of the Alaska Railroad. It is still too early to determine how well the Alaska Railroad Corporation is doing financially, since it has been in operation for a period of less than one year.

Historically, the ARR has been a marginal enterprise. If it were not for Federal ownership, the railroad's importance to the military, and the railroad's ability to obtain governmental

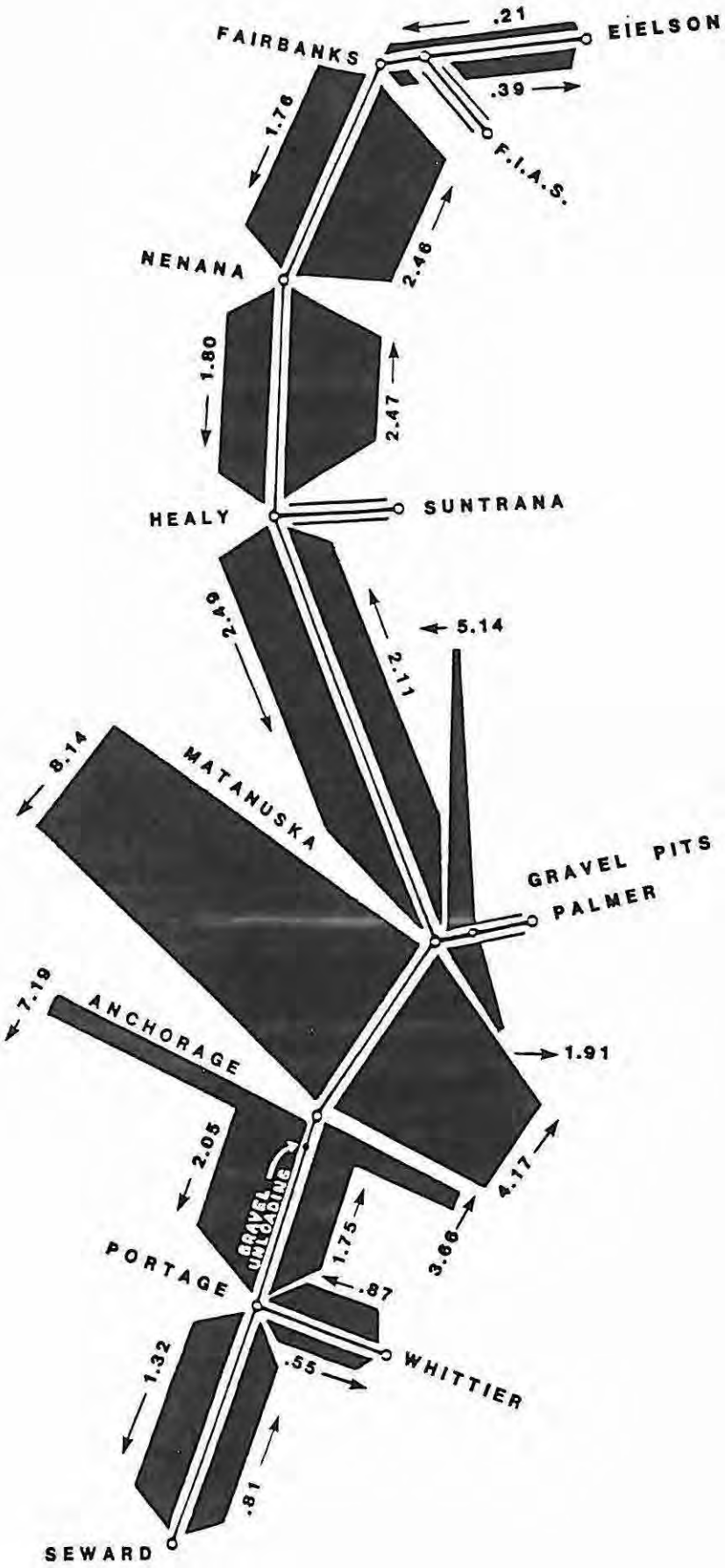
Table 3-8

ALASKA RAILROAD TRAFFIC DENSITY TRENDS
1979-1984

SEGMENT	MILEPOST	MILLION TON-MILES PER MILE PER YEAR					
		1979	1980	1981	1982	1983	1984
Seward-Portage	0.0-64.8	0.15	0.30	0.28	0.52	0.29	0.75
Whitter-Portage	0.0-12.4	0.89	0.88	1.01	1.20	1.21	1.29
Portage-Anchorage	64.8-114.3	0.99	1.87	1.82	2.50	1.79 9.19	2.41 11.95
Anchorage-Matanuska	114.3-150.7	3.88	2.68	5.88	7.90	10.57	13.90
Matanuska-Palmer	0.0-6.7	1.48	0.32	1.31	2.17	3.43	9.54
Matanuska-Healy	150.7-358.7	1.76	1.98	2.84	2.60	2.23	2.65
Healy-Suntrana	0.0-4.8	1.04	1.05	1.07	0.57	0.26	
Healy-Nenana	358.7-411.7	2.67	2.93	3.88	3.74	3.80	2.79
Nenana-Fairbanks	411.7-470.3	2.80	2.78	3.09	3.68	3.21	3.87
Fairbanks-Eielson	0.0-88.0	0.34	0.41	0.44	0.36	0.43	0.59

NOTE: Line segments with 0-3 MGTM are eligible for LRSA assistance.

SOURCE: Alaska Railroad



ALASKA RAILROAD
TRAFFIC DENSITY CHART
1985

LEGEND:
FIGURES REPRESENT MILLIONS OF GROSS TONS-MILES PER MILE

FIGURE 3-4

appropriations to use in meeting its capital needs, there is serious doubt that the railroad would have survived. In the past, its financial strengths and weaknesses have been tied to the boom-bust cycles typical of the Alaska economy.

Financially, the ARR did rather well during the building of the Alaska pipeline, but returned to a deficit operation during the late 1970s. Recently the ARR has done better by having a positive cash flow in its last four consecutive fiscal years. However, if extraordinary expense items (ARR transfer costs, deferred outlays, loss on inventories) are considered, then the ARR has increased its retained earnings in only two of its last six fiscal years. Table 3-9 presents an abbreviated income and expense statement for the ARR during the 1979-1984 period.

Table 3-10 shows the capital and major maintenance program expenditures made over this period. Funding of major maintenance expenditures was partly by appropriations and partly by retained earnings. As can be seen, the ARR depended heavily on governmental appropriations for capital improvements up until 1982. Although not shown, this dependence extends back as far as 1977.

By being owned by the federal government, the railroad enjoyed financial advantages not available to private enterprise. In addition, the Alaska Legislature in 1984 appropriated for the ARRC $4.9 million to be used for working capital and $6.0 million to be used for capital expenditures to complete projects which began under Federal ownership. Additionally, certain transfer-related costs including Whittier shuttle equipment to approximately $1 million were funded by the state of Alaska. By being fully owned, there was no outstanding indebtedness. Consequently, it did not have to pay dividends to stockholders. It

Table 3-9

ALASKA RAILROAD INCOME AND EXPENSE STATEMENT
FY 1979-1984

REVENUES/EXPENSES	($000) 1979	1980	1981	1982	1983	1984
Operating Revenues						
Freight	18,158	21,664	43,009	47,877	43,787	49,753
Passenger	1,564	1,549	1,999	2,627	3,305	3,877
Other (1)	3,378	3,524	4,774	4,941	5,305	4,286
Non-Operating Rev(2)	2,081	2,155	3,159	3,352	3,697	4,236
Total Revenues	25,181	28,892	43,941	58,797	56,094	62,152
Operating Expenses (includes depreciation)						
Maint of Way & Struc	5,235	5,109	6,307	8,554	11,128	12,745
Maint of Equipment	7,845	9,118	10,005	11,702	12,746	13,525
Transportation	11,821	13,146	16,072	18,685	19,555	22,112
Traffic Management	470	530	580	757	953	1,299
Incidental	1,937	2,456	2,855	4,152	2,718	2,826
General & Admin	3,977	4,021	4,539	5,128	5,893	7,448
Total Operating Exp	31,285	34,380	40,358	48,978	52,993	59,955
Non-Operating Exp(3)	204	344	273	258	277	363
Total Expenses	31,489	34,724	40,631	49,236	53,270	60,318
Net Profit (Loss)	(6,308)	(5,832)	3,310	9,561	2,824	1,834
Less Extraordinary Items (4)	(319)	(692)	(204)	(4,154)	(5,646)	(6,578)
Retained Earnings	(6,627)	(6,524)	3,106	5,407	(2,822)	(4,744)

(1) Other revenues are those that were neither freight or passenger (e.g., reimburseable services, sale of non-invested property; Whittier shuttle vehicle charges; reimbursements for real estate, utilities, and equipment; wharfage and handling charges; switching; equipment rentals; and mail)

(2) Non-operating revenues include miscellaneous rentals, interest earned, and other revenues.

(3) Non-operating expenses include buildings, depreciation, equipment, and other.

(4) Extraordinary items in 1984 included the loss on excess current inventories, deferred outlays, and costs associated with the transfer to the State.

SOURCE: Alaska Railroad Annual Reports, 1980-1984

Table 3-10

ALASKA RAILROAD CAPITAL AND MAJOR MAINTENANCE EXPENDITURES
1979-1984

	($ MILLIONS)					
	1979	1980	1981	1982	1983	1984
Buildings	0.1	0.2	1.8	1.5	3.3	1.5
Railbed, Track, & Other Fac.	2.2	3.3	4.5	4.3	3.0	3.7
Equipment	0.7	1.8	6.2 (1)	6.6	9.2	2.0
Other Projects	6.4 (2)	0.2	0.9	0.3	1.1	0.2
Total	9.4	5.5	13.4	12.7	16.6	7.4
Funded by:						
Appropriations	9.3	5.0	12.6	6.2	7.6 (3)	-
Railroad Earnings	0.1	0.5	0.8	6.5	9.0	7.4

(1) $4.24 million for the rehabilitation of ten passenger cars.
(2) $6.3 million for Seward and Whittier Dock Facilities.
(3) $1.0 million for Railroad Transfer evaluation.

SOURCE: Alaska Railroad 1984 Annual Report, Table V.

did not have to make a return on its investment in track structure, equipment, land, buildings, and the like. Finally, it always had the option of seeking Congressional appropriations for capital needs which could not be met out of retained earnings.

On January 5, 1985, Alaska formally acquired the ARR from the Federal Government for the "fair market value" of $22.271 million established by the USRA. In addition, the Alaska Legislature in 1984 appropriated for the Alaska Railroad Corporation $4.9 million to be used for working capital and $6.0 million to be used for initial capital expenditures. Thus, Alaska's investment in the ARR to date amounts to $33.2 million.

6. Overall Assessment

There is no question that the ARR does provide a vital service to Alaska. Its overall value can best be approximated by considering what additional costs would be incurred locally and to the state as a whole if the railroad ceased to exist.

a. Impact on the State Highway System

The Department's Division of Design and Construction, Central Region, has made a conceptual estimate of the impacts resulting from abandonment of rail service, which totals a capital expenditure of some $1.7 billion plus an annual expenditure of over $400 million, described as follows:

* If present sand and gravel movements between Palmer and South Anchorage were shifted from rail to highway, the impact of this traffic, along with current Anchorage to Fairbanks rail tonnage, would force immediate construction of six lanes to Eklutna, and four lanes to Palmer, at an approximate construction cost of $150 million (in 1983 dollars). Another $500,000 per year would be incurred in increased highway maintenance costs. This does

not include traffic congestion and public safety impacts from increased truck traffic on the Glenn and Parks Highways.

* To provide access for homesteaders living along the railroad north of Talkeetna, it would cost approximately $120 million to convert the existing railroad right-of- way into a 40 foot wide highway extending 37 miles to the Susitna River, and building a 1200 foot bridge. Extending this highway to Hurricane would cost an additional $57 million. Additional highway maintenance costs of $470,000 and $250,000 per year, respectively, would also be incurred.

* The cost of converting the existing Portage to Whittier line to a two-lane highway, including converting the railroad tunnels to highway use, would be approximately $75 million. Additional maintenance costs would be in excess of $500,000 per year.

b. Reduction in Tourist Traffic

The loss of rail passenger service, especially the daily trains to Denali National Park, would result in fewer tourists and fewer tourist dollars spent in the State. Further losses would occur through the multiplier effects of this income loss on service industry jobs and gross state product.

c. Loss of Present Export Traffic

The recently initiated coal export movement would be lost without rail service. Likewise, future opportunities for the export of hard rock minerals from the Railbelt area would be thwarted.

d. Higher Transport Costs

The costs of transporting bulk commodities (e.g., sand and gravel to Anchorage, coal to Fairbanks, petroleum products, cement, etc.) would increase due to the distances involved in loving these commodities by truck. Cost increases could extend

as well to merchandise traffic transported by motor carriers due to the loss of rail competition. This would increase living costs in the interior and building costs in the Anchorage area.

e. Greater Energy Consumption

Greater amounts of petroleum products would be consumed by the transportation sector substituting motor carrier movements for rail transport.

f. The ARR's Challenge

State government presently feels that the ARR should be operated on a self-sustaining basis. The challenge facing the Alaska Railroad Corporation (and ultimately the State) is threefold:

* To increase the ARR's traffic base. This requires high service levels and resourcefulness and flexibility in pricing to capture the traffic reasonably available to the ARR. It must be recognized that there is a finite amount of traffic potential in the Railbelt and the railroad must maintain a minimum breakeven level if it is to achieve its legislated mandate.
* To manage and operate the ARR as efficiently as possible, not only to avoid deficit operations, but to make the ARR financially attractive for purchase by private enterprise for continued operation as a rail carrier. The ARR's profit and loss picture is highly sensitive to changes in revenue, operations today are not appreciably above the break-even point, and further cost savings are important.
* To use the rail line to access mineral resources in proximity to its right-of-way when this is economically feasible.

C. Profile of the White Pass and Yukon Railway

The White Pass and Yukon Railroad (WP&Y) is owned by the White Pass and Yukon Corporation, Ltd., a holding company for a

number of subsidiary companies providing specialized water, highway, rail, and pipeline transportation. Three of these subsidiary companies comprise the Rail Division: 1. The British Yukon Railway Company, Limited; 2. The British Columbia-Yukon Railway Company Limited; and, 3. White Pass Transportation Inc., the railroad subsidiary of which is the Pacific and Artic Railway and Navigation Company. The WP&Y links Skagway, Alaska with Whitehorse, Yukon Territory, Canada.

1. WP&Y History

Built largely in response to the gold rush in Yukon Territory, the WP&Y was constructed in 1898-1900 as a three-foot, narrow-gauge line. Its original purpose was to haul passengers and freight into the interior. Constructed under speculative conditions, the original design standards were minimal so as to keep costs as low as possible. Its remote location coupled with its non-standard gauge have kept it apart from rail systems in the United States and Canada.

The WP&Y's history has been one of boom-bust cycles related to economic conditions in the Yukon. Recent history starts with October 1, 1942 when the WP&Y was taken over and operated by the U.S. Army to haul materials and equipment used in the construction of the Alaska Highway. The WP&Y was returned to civilian management on May 1, 1946 with its equipment worn out and its business at a low ebb. In 1951, a new Canadian company, the White Pass and Yukon Corporation, was formed to operate the WP&Y. The White Pass and Yukon Corporation, Ltd. is owned by Federal Industries Limited of Winnepeg, a public company whose stock is primarily held by several Winnepeg families. Through extensive use of containerization of all commodities (with the exception of petroleum products), the company provided an integrated transportation system between Vancouver, British Columbia

and interior Yukon. The company then proceded to upgrade the WP&Y during 1950's for a new role in hauling Canadian-produced zinc and lead concentrates from a centralized transfer point near Whitehorse to Skagway for further line-haul transport by water to smelters for further processing. The WP&Y also provided transportation for various other goods, including petroleum products, destined to Whitehorse and other Yukon points.

2. WP&Y Closure

The South Klondike Highway (Alaska Route 7, British Columbia Highway 4, Yukon Highway 3) between Skagway and Whitehorse was opened to through traffic during the summer of 1979 (although segments of the route had been completed earlier). Canadian Treasury Board funds used in constructing the Canadian portion of this highway were justified on the basis of: (1) facilitating local traffic, (2) encouraging tourism, and (3) providing a competitive means of shipping general freight between Skagway and Whitehorse. It was felt that the new highway would provide competition with the WP&Y for moving inbound passengers and general freight which it was hoped would lower personal transportation costs and consumer prices in Yukon. At no point was the South Klondike highway intended to become a facility for transporting ores to tidewater and, although not designed to carry such traffic, could do so based on its current condition.

In probable response to the anticipated opening of the South Klondike Highway, the corporation in 1977 sought governmental approval to close down the WP&Y, arguing that trucking the ore to tidewater would cost less. A 1979 Canadian Transport Commission (CTC) inquiry into the matter concluded that whether or not the road option was economic, opening the road would destroy the WP&Y to the long-term detriment of the Yukon and the mining sector. Instead, a program of recapitalization for the WP&Y based

on $6 million in Federal and Yukon Government interest free loans, legal requirements for freight rates on ore haul movements to be compensatory, improved railroad management, and anticipated volume increases from new mine development was chosen as the means of restoring the WP&Y's economic viability.(16) The WP&Y accepted the recommendations of the CTC Inquiry in good faith, and proceeded to improve the railroad by upgrading the physical plant, improving operating efficiency and on-time reliability and reducing employment.

Unanticipated events, combined with compromises in implementing CTC recommendations, did not solve the WP&Y's financial problems. In 1979, one of WP&Y's major shippers, Cassiar Asbestos, signed an agreement with a trucking firm to transport asbestos fibre, a commodity which heretofore had traditionally been transported by rail. Traffic volumes from new mine development and the northern gas pipeline proposal did not materialize. The final blow occurred in June 1982 when the WP&Y's principal shipper, the Cyprus Anvil Mining Corporation (CAMC), closed its open-pit lead-zinc-silver mine and mill near Faro, Yukon. Despite major increases in freight rates, the WP&Y had not become profitable and subsequently reported total operating losses exceeding $8.5 million during years 1980-1982. The closure of the CAMC mine forced the WP&Y to suspend its rail and most of its trucking operations in the Yukon. Rail operations were suspended on October 8, 1982 at the end of the 1982 tourist season.

In 1983, the Yukon Government requested that the CTC conduct an evaluation of territorial surface transportation in the short, medium, and long term to assist the Yukon in making economic and development decisions.(17) As part of a thorough investigation of transportation requirements, the inquiry undertook an in-depth comparative analysis of the cost of transporting CAMC concentrates by highway/rail or rail only via

the WP&Y, the South Klondike Highway, Haines Highway, and the Stewart Highway. It included highway capital and maintenance costs as well as motor carrier operating costs. In its draft report dated December 15, 1983, the Inquiry officers recommended that the WP&Y, in effect, be rail-banked while awaiting for the CAMC to resume operations and decide what mode of transportation to use for its concentrate shipments. If after resuming operations the CAMC chose not to use WP&Y rail services, or if CAMC did not resume operations within a two year period, the Inquiry officers further recommended that the Canadian Government should exempt the WP&Y from those provisions of the Canadian Railway Act which restrict WP&Y from abandoning its mainline railway.(17)

The panel also recommended against (1) making improvements to the South Klondike Highway or acceleration of improvements to other highways to accomodate CAMC ore trucks, (2) using public funds to purchase or lease the WP&Y, or subsidize the WP&Y for operation of a seasonal tourist train, and (3) extending further grants, loans, or subsidies to the WP&Y until the CAMC, WP&Y, and affected unionized employees of the WP&Y have "clearly demonstrated to the Government their conscientious and expeditious desire to co-operate among themselves, in their own self-interest, towards the resolution of a mutually acceptable and reasonable term agreement with respect to the transport of CAMC traffic by the WPY Railway with respect to the pricing of that transportation service and conditions related thereto - without Governmental financial intervention." If the latter was not possible (or until CAMC resumes shipments), the panel recommended that the Canadian Government and the State of Alaska compensate the WP&Y for certain unavoidable costs incurred in the complete shutdown of the WP&Y, with the compensation ending after two years if CAMC has no firm plans to utilize the WP&Y and there are no other major shippers willing or able to provide the traffic and revenue needed for the WP&Y to at least break-even.

Since the Inquiry, the status of the WP&Y has not changed. The State of Alaska did not participate in the previously proposed joint program for compensating the railroad for its unavoidable costs because the State felt that the WP&Y would likely not become self-sustaining and because the benefits of operation are more Canadian than Alaskan. The WP&Y has served Alaska primarily as an employer located in Skagway and, during summer months, as an attraction for tourists seeking a scenic ride, but not as a freight transportation service. The railroad does maintain at Skagway its shops and engine facilities; its general offices are located in Whitehorse.

3. The Physical Plant

The following describes the White Pass and Yukon Railway as it existed in mid-1985.

a. Route Structure

The White Pass and Yukon Railway owns, and operated up until the fall of 1982, 110.4 miles of mainline track between Skagway, Alaska and Whitehorse, Yukon Territory, Canada, of which 59.1 miles are in Yukon, 30.9 miles in British Columbia, and 20.4 miles in Alaska. The WP&Y has no branches.

From milepost 0.0 at Skagway to milepost 26.5, the line rises on an average grade of 3.5 percent to reach its summit east of the Alaska-British Columbia border. From milepost 26.5, the WP&Y descends on a 3.8 percent grade for one mile and then gradually descends for the next eight miles to a point just south of Lake Bennett. The railroad then follows the shore of Lake Bennett to Carcross at milepost 67.5. From Carcross, the WP&Y proceeds to Utah at milepost 105.5, which is the loading point for ore traffic containers. After leaving Utah, the WP&Y

descends on a 3.9 percent grade into Whitehorse. Figure 3-5 presents a map showing the route of the White Pass and Yukon Railway.

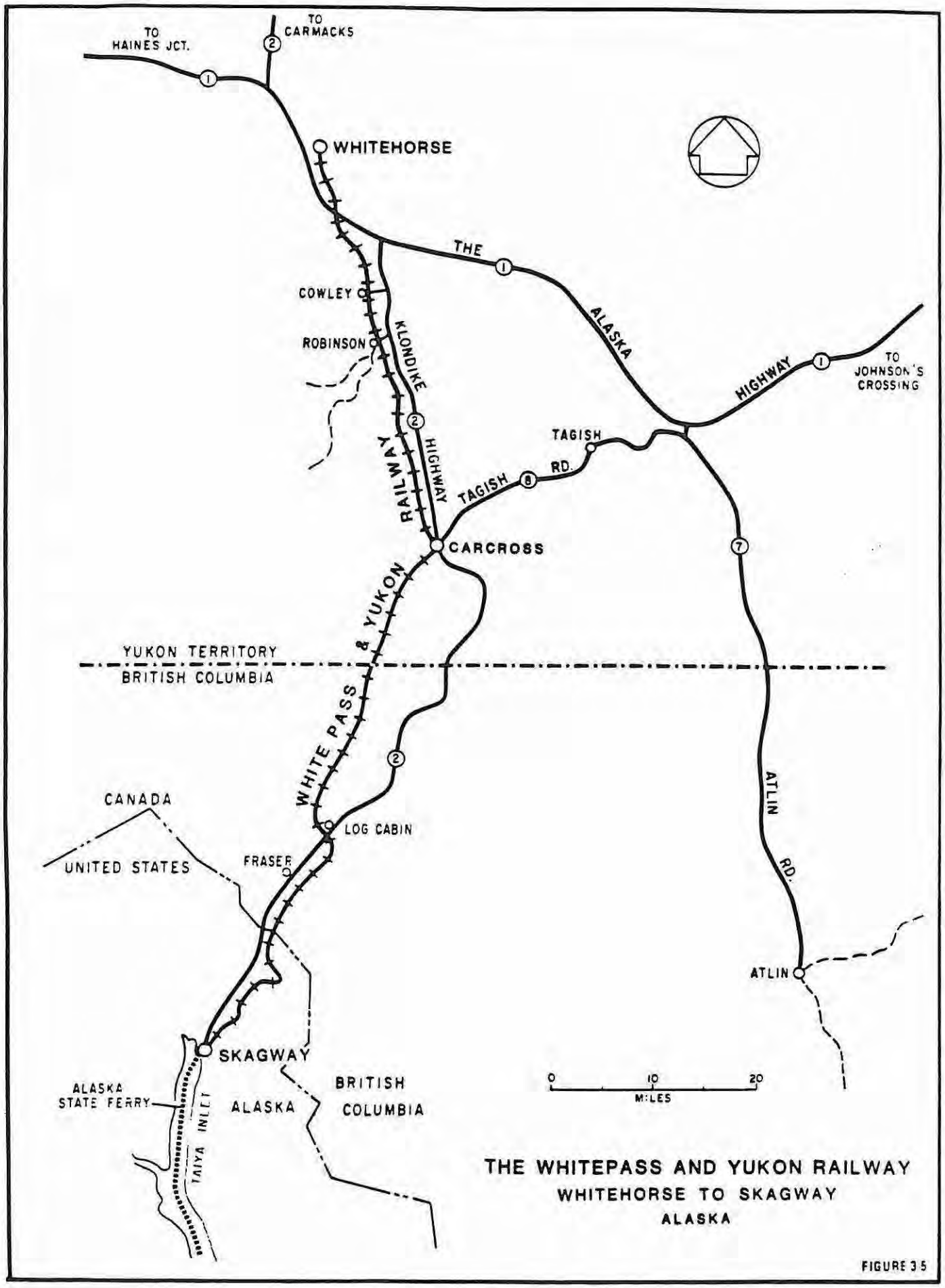
b. Operating Conditions and Constraints

The mountainous terrain in which the WP&Y is located coupled with the route's steep gradients and curvature, the severe weather conditions encountered during the winter, the limitations imposed on the maximum tonnages which can be hauled per carload as well as per trainload, until recently the existence of a full crew law in Alaska (for all except yard crews and switching) which is incorporated into the labor agreements with U.S. unions, and the narrow-gauge character of the line which makes supplies and equipment far more difficult and costly to obtain, result in an operation which inherently has been more costly than that of other railroads. Maximum speed is 25 miles per hour, with further speed restrictions at various locations.

c. Track Structure

The WP&Y has rail of varying weights. Over half of the line consists of the original 72 lb. rail. In 1977-1978, 100 lb. rail was installed between mileposts 42.0 and 56.5 and 97.0 and 104.0. There is also 65 and 85 lb. rail at some locations.

Because the WP&Y has been out of service for nearly three years, little or no maintenance has occurred since 1982. The WP&Y continues to patrol the line on a weekly basis and its tunnels and bridges are intact. However, there are three washouts and, if the railroad remains closed, brush will continue to grow, ties will deteriorate, and additional washouts will likely occur.



THE WHITEPASS AND YUKON RAILWAY
WHITEHORSE TO SKAGWAY
ALASKA

FIGURE 3.5

d. Motive Power and Rolling Stock

Motive power on the line consists of 23 diesel-electric locomotives of various ages, including 4 in Montreal that were not delivered due to service elimination.

Freight rolling stock consists almost exclusively of flatcars each capable of carrying one or more containers. The WP&Y has 306 flatcars and 37 tank cars. Passenger equipment consists of 34 coaches dating from when the WP&Y was originally constructed; some of these cars have since been modernized.

4. The Freight Traffic Base

In recent years, freight traffic on the WP&Y has consisted of three major commodities: general cargo and bulk petroleum products northbound from Skagway and lead and zinc concentrates southbound from Whitehorse. In 1981, the last full year of operations, 416,000 tons of mineral concentrates, 69,900 tons of other freight, and 44,500 tons of petroleum products moved over the WP&Y. Through its trucking subsidiary, the White Pass and Yukon Corporation provided a feeder service connecting the lead/zinc/copper mines with its receiving point at Utah spur. At one time, the WP&Y handled sizeable amounts of asbestos; this traffic was lost in the late 1970s-early 1980's due to competitive highway transportation to Stewart, British Columbia. The WP&Y has a very narrow traffic base, and its economic survival is (or was) tied to the fortunes of the three firms described as follows:

a. Cyprus Anvil Mining Corporation

CAMC has operated its open pit mine and mill located near Faro since 1970. It is one of the largest such mines in the

world, and produced about three percent of the world's production of lead and zinc and 13-15 percent of Canadian production. CAMC has extensive proven and potential ore reserves at its several Yukon deposits.

In early 1982, Hudson Bay Oil and Gas Limited acquired CAMC, and shortly thereafter HBOAG was acquired by Dome Petroleum. In June 1982, Dome closed down CAMC's mining operations at Faro for financial and productivity reasons. There are, however, actions intended to reactivate the mining operation; whether a reactivated mine would use the railroad is unknown at this time.

Prior to shutdown, CAMC determined that reductions in the cost of management, electricity, transportation, and labor were necessary. In addition, a recovery in world metal prices, particularly lead, is needed in order for the mine to resume operations. CAMC concluded that trucking from Faro to Skagway, or alternatively Haines, offered transport cost reductions beyond that possible using truck/rail via the WP&Y. (The truck and truck/rail distance to Skagway is virtually identical.) In addition to economic advantages, CAMC viewed truck as offering management control over freight charges through institution of a competitive bidding process and an ability to scale the size of trucking operations at any point in time to the needs of the firm and the market for mineral concentrates. It felt that operation over the South Klondike Highway with 134,500 lb. gross vehicle weight 7-axle, 70 foot truck-trailer combinations was technically feasible without major upgrading, did not create safety problems, and that additional costs were limited to keeping the road open during the winter. However, such large trucks are currently illegal in Alaska. CAMC did indicate that existing truck/rail was an acceptable method so long that costs were competitive with an all-truck alternative.

In 1981, CAMC concentrates represented 68 percent of WP&Y's total tonnage and 47 percent of its revenues. CAMC's other traffic, comprised of grinding media, chemicals, explosives, supplies, and fuel, represented 20 and 23 percent of the northbound tonnage and revenues, respectively.

The WP&Y, therefore, has been economically captive to the CAMC. There cannot be a viable rail operation without the traffic generated by the CAMC mine.

b. The United Keno Hill and the Whitehorse Copper Mines

The United Keno Hill Mine is a precious metals operation located at Elsa, Yukon; the Whitehorse Copper Mine is located near Whitehorse. Both of these mines also closed in 1982 (although the United Keno Hill Mine reopened in August 1983).

In 1981, these two mines accounted for five percent of the WP&Y's tonnage and three percent of the railroad's revenues.

c. Cassiar Asbestos' Brinco Mine

The Brinco Mine is located at Cassiar, British Columbia. In 1981, it accounted for five percent of the WP&Y's tonnage and one percent of its revenues. This level of traffic is far below the amount traditionally furnished to the WP&Y.

In 1979, Cassiar Asbestos signed a five year agreement with Arrow Transportation Services, Inc. to truck 80,000 tons of asbestos fibre annually from Cassiar to Stewart, British Columbia. (Cassiar is located 346 miles from WP&Y's railhead near Whitehorse and 326 miles from the Port of Stewart.) The stipulated rate was appreciably below that offered by the WP&Y. Although Arrow was not at first able to meet its tonnage commitments for

a variety of reasons, and rate escalations did occur bringing the rates approximately up to that which would have been charged by the WP&Y, the diversion of this traffic appears to be permanent. In the course of accomodating this traffic, the British Columbia government budgeted and spent over $100 million to upgrade Highway 37 to accomodate this movement.

5. The Passenger Traffic Base

The WP&Y typically carried around 40,000 passengers per year before the opening of the South Klondike Highway, and around 15,000 thereafter, as shown on Table 3-11. Most passengers were tourists using the railroad during the summer months.

A major Alaskan concern is the effect that cessation of WP&Y's rail passenger traffic has had on tourists visiting Skagway. Table 3-11 shows the number of persons traveling between Skagway and Whitehorse between 1975-1984 by mode. Only a portion of this traffic can be considered as being tourists, however. The table shows the impact that the South Klondike Highway has had on modal usage. Total crossings increased from 45,000 before the highway (1975-1978) to 64,000 afterwards (1979-1984). The percent using buses has increased from a negligible amount before the South Klondike Highway to approximately 25 percent afterwards. The percent of persons using rail has decreased from near total dominance of 95 percent before the highway to 25 percent afterwards (through 1981 only). The total number and the proportion of persons using rail or bus has been decreasing, as use of the private car increases. During this period, Skagway's proportion of persons entering the Yukon has remained approximately constant, at about 17 percent of the total. Thus, the opening of the South Klondike Highway has been the major factor in Skagway retaining its gateway share of transients (presumably a large portion of this is tourists).

Table 3-11

SKAGWAY TO WHITEHORSE TRAFFIC BY MODE OF TRAVEL
1975-1984

YEAR	NUMBER OF PERSONS (000) AND PERCENT OF TOTAL				PERCENT OF YUKON (1)
	Pers. Vehicle	Bus	Train	Total	
1975	2,300-5.6%	100-0.3%	38,600-94.1%	41,100	12.9
1976	2,700-5.9%	-0.1%	42,900-94.1%	45,500	14.8
1977	2,500-4.8%	100-0.1%	48,600-95.1%	51,100	17.0
1978	3,300-7.7%	100-0.3%	39,200-92.0%	42,700	11.8
1979	25,600-35.3%	15,700-21.6%	31,300-43.1%	72,600	20.0
1980	24,500-43.9%	15,400-27.5%	16,000-28.6%	55,900	16.4
1981	31,900-49.1%	16,100-24.8%	17,000-26.1%	65,100	16.8
1982	32,100-52.8%	13,600-22.4%	15,100-24.9%	60,800	16.7
1983			0-0.0%		
1984			0-0.0%		

(1) Percent of persons entering Yukon via Skagway.

SOURCE: Canadian Transport Commission, "An Inquiry into the Transport Requirements of Yukon," December 15, 1983. Tables 5.4 and 5.5.

In summary, the major factor affecting the WP&Y's passenger business was the opening of the South Klondike Highway. Although done with the intention of providing competition, it effectively killed the WP&Y's passenger business by diverting patronage to private vehicles which would otherwise have gone by rail. By using buses to transport tour groups between Skagway and Whitehorse, tour operators likewise contributed to the demise of WP&Y passenger use. Given the diversion of rail passengers to bus even when the WP&Y operated, the fears over the impact that the loss of WP&Y's tourist train might have on the magnitude of the tourist trade now seen unfounded. Skagway is a tourist attraction on its own besides functioning as an entry point into the Yukon. The WP&Y was a beneficial adjunct

to tours, but not a major factor in determining whether to stop off at Skagway in the first instance. The tour operators have simply substituted buses for WP&Y passenger service. The tour operators prefer using buses because of the greater scheduling control possible through integrated operations. Most tourists visiting Skagway and using bus or rail transport are utilizing a tour package and thus are not particularly sensitive to whether or not rail passenger service is provided on the WP&Y, although most would probably feel that their tour experience would be enhanced were WP&Y passenger service available between Skagway and Whitehorse.

6. Overall WP&Y Assessment

Although Alaska would like to see the White Pass and Yukon Railway resume operations from the standpoint of promoting tourism and creating jobs through Skagway, the economic rationale for the line more properly lies with meeting the freight transportation needs of Canadian extractive industries located in the Yukon and to a lesser extent in the northern portion of British Columbia.

Presently, the line is, in effect, rail-banked. A rail-banked line is one that is not operated but is also not officially abandoned. It could be brought back in operation as demand warrants. If it were to be brought back in operation, it would likely be due to improvements in world mineral prices. Should this occur and operations be resumed at mining properties which are presently shut down (perhaps along with the development of some of the mineral potentials listed in Table 3-12), then resumed operations over the WP&Y might make economic sense. The longer the rail line is shut down, however, the more difficult it will be to reopen, due to line deterioration and lack of maintenance. If rail operations do resume, they must be

Table 3-12

YUKON MINERAL PROPERTIES

MINERAL	PROPERTY	DEPOSIT SIZE (MM tonnes)	AVE. GRADE OF ORE (%)	ANNUAL MINING RATE (M tonnes)	ANNUAL CONCENTRATE (M tonnes)	MILES TO SKAGWAY	FIRST PROB. OPER. YEAR
Lead/Zinc	Jason	10+	14.0	666	125	464	1990+
	Tom	10+	14.0	666	125	464	1990+
	Howard's Pass	125	8.0	1000	186	595	1990+
	Goz	12	8.0	666	125	518	2000+
	Midway	4	10.0	300	40	272	1990+
	Mel	4	8.0	300	32	425	2000+
	Cyprus Anvil	87+	8.0	4000	383-520	353	1985
Copper	Minto	7	1.9	666	45	265	1989
	Casino	180	0.4	9100	133	308	2000
Molybdenum	Logtung	187	0.05	9100	18	231	1990+
	Red Mountain	180	0.17	9100	14	162	1990+
Tungsten	Canada Tungsten	4	1.5	400	20	567	1984
	Mac Tungsten	8	1.3	400	18	503	1989
	Dublin Gulch	4	1.0	400	16	415	1995+
	Risby	3	0.8	400	10	415	2000+

SOURCE: Canadian Transport Commission, "An Inquiry into the Transport Requirements of Yukon," December 15, 1983, Appendix 3.

conducted under long-term contractual arrangements (or the equivalent) by mine operators with the WP&Y. The WP&Y is highly dependent upon a handful of users, and its traffic base has to be broadened and secured against actions that would undermine its future viability. While the use of highway transport at times does appear to be more attractive to mine operators due to lower operating costs than truck/rail, such decisionmaking typically does not include any incremental highway capital and maintenance costs required to sustain such a decision, costs which are typically paid for by government, and may wind up costing more when all are evaluated as a total system. Highway expenditures by government needed to sustain trucking the output of a particular mine (expenditures beyond those required for access purposes) represent an indirect subsidization of that operation, and should be avoided if other modal alternatives, such as the WP&Y, are available and can reasonably be expected to remain available.

The long term picture is also important in considering the future of the WP&Y. The greatest tonnage potential seems to lie in lead/zinc concentrates, minerals for which there has been low market prices and an oversupply on world markets. Also, most of the lead/zinc deposits are located at appreciable distances from the WP&Y, and there may be more realistic transport routes available. Copper prices have also been low during recent years. The potential of molybdenum and tungsten is relatively limited, both because the market is small and the concentrate tonnages are low. Futhermore, the tungsten deposits are located at a considerable distance from the WP&Y. If the mineral has to move 300-400 miles to reach the WP&Y railhead at Utah Spur, transporting the mineral an additional 110 miles to Skagway and avoiding the mode change does make operational sense.

The WP&Y was built to provide passenger access to the Yukon interior. Today's needs are to transport minerals to supply the U.S. and Canada as well as to compete in international markets. It is too short a railroad and its route structure does not have the orientation required for domestic freight. It is not well located to serve future mining activities in the Yukon, which are dispersed over a wide area. Consequently, its future freight potential must be considered as being limited. If a sizeable mineral concentrate business were to develop in the future, it would seem more appropriate to serve this business by extending the British Columbia Railway line which presently terminates at Fort Nelson, British Columbia, northward to a centralized location in the southern portion of the Yukon, or by utilizing the Klondike Highway to maximize economies offered by marine access.

Action to restore freight service on the WP&Y must be initiated by the Canadian Federal and/or Provincial Governments and minerals producers, and include an appropriate financing package. Alaska cannot be placed in the position of being asked, in effect, to subsidize Canadian minerals producers. (It would appear that there is little hope for reinstituting passenger service due to the loss of the traffic base to other modes, although a 24 mile run from Skagway to Lake Bennet might be possible especially in the Summer.) Hence, the finding that WP&Y's present and future direct economic benefits to Alaska are insufficient to justify State expenditures on this line.

References

1. Alaska Department of Transportation and Public Facilities, Alaska Statewide Rail Systems Study, prepared by Bivens & Associates, December, 1980.
2. U.S. Department of Transportation and the State of Alaska, Alaska Railroad Transfer Report, July 14, 1983.
3. United States Railway Association, Valuation of the Alaska Railroad, prepared by Jackson R. Bell, Inc., September 23, 1983.
4. Alaska Railroad Transfer Team, Alaska Railroad Acquisition Assessment, December 15, 1983.
5. House Bill 512, "Alaska Railroad Corporation Act", May 23, 1984.
6. Sverdrup & Parcel and Associates, Inc., Alaska Railroad Condition Assessment, prepared for the Alaska Department of Transportation and Public Facilities, February 1984.
7. Alaska Railroad, Fiscal Year 19XX Annual Report, 1980, 1981, 1982, 1983, and 1984.
8. Alaska Railroad, "Time Table No. 118," May 12, 1985.
9. Alaska Department of Transportation and Public Facilities, Cook Inlet Transportation and Resource Development Plan: Phase 1, Data Collection and Inventory, prepared by Alaska Transportation Consultants, Inc. in association with Jon Isaacs and Associates and Tippetts-Abbett-McCarthy-Stratton, December, 1984.
10. Alaska Department of Transportation and Public Facilities, "Interior Transportation Study: Railroad Working Paper," prepared by Louis Berger and Associates, Inc. in association with Alaska Transportation Consultants, Inc., January, 1982.
11. Institute of Social and Economic Research, University of Alaska, "The Alaska Railroad: Overview and Operational Alternatives," February, 1982.
12. Alaska Department of Commerce and Economic Development and the Alaska Department of Natural Resources, Alaska's Mineral Industry - 1984, Special Report 38, 1985.
13. Alaska Miners Association, Inc., Future Mineral Freight Estimates: Interior Alaska, May, 1982.
14. Yukon Transportation Study, conducted for Transport Canada Artic Transportation Agency, October, 1978.
15. Canadian Pacific Consulting Services, Ltd., "A Technical Assessment of White Pass & Yukon's Marine, Rail, and Highway Operations," November, 1978.
16. Canadian Transport Commission, The Inquiry into the White Pass and Yukon Railway and Other Surface Transportation Services Into and Out of Yukon, 1979.
17. Canadian Transport Commission, An Inquiry into Transportation Requirements of Yukon, December 15, 1983.

IV. RAILROAD PERFORMANCE INDICATORS

On January 5, 1985 the Alaska Railroad (ARR) was sold by the U. S. Government to the State of Alaska. As owner, the State established the Alaska Railroad Corporation (ARRC) to operate the ARR. To manage the ARR, the State established a seven member Board of Directors which, by legislative intent, is responsible for the management of the financial and legal obligations of the ARR, the operation of the ARR, and other matters (see Report Section III.A.5 "Alaska Railroad Corporation Act" for a detailed listing of the Board of Directors' responsibilities).

To enable the Board of Directors to properly carry out its duties, it is requisite that the ARR provide the Board with timely and proper information upon which the Board can make its decisions and otherwise perform its responsibilities.

During the initial year of ARRC existence and operation, the ARR has provided the Board with timely financial and other information. Given the short time period within which the ARRC has had to do so many things to take over ARR operation, the ARR-provided information has been excellent. However, now that the Board has had some experience with its duties, it is appropriate to ask whether the Board needs other types of information, whether the information that is provided is provided in the best possible format, and whether the Board is able to understand the information that is provided by the ARR.

To assist, this Rail Plan has set forth a series of "Railroad Performance Indicators", whose intent is to display the types of information that railroad management typically would expect to have at its disposal. In this sense, "performance indicators" mean data that can be used to measure the efficiency

and financial performance of the ARR. Such statistical units or performance indicators should be developed regularly. By having these statistical units available on a current basis, operations can be monitored and trends can be recognized very early. Decisions regarding needed adjustments in operations and cost can then be made to reflect current circumstances.

Comparisons of performance indicators of an individual company with industry averages can be a useful tool in establishing norms and determining the reasonableness of the operation. However, in the case of the Alaska Railroad, the industry norms may not always be appropriate since the ARR operates with unique climate and market conditions, is a State owned railroad, and has other features that make it very different than most U.S. railroads. Nevertheless, even though not appropriate in every case, a comparison of performance indicator statistics with industry averages and with railroads of comparable size can assist in the timely evaluation and assessment of some operating and financial results.

A. Suggested Railroad Performance Indicators

Performance indicators can be placed in two general categories: (1) financial ratios and statistics used for broad overview by senior management and the Board of Directors, and (2) the detailed cost and production indicators used by department heads and middle management for monitoring the various activities.

1. Financial Data

Much of the statistical data needed for calculating financial ratios are normally found in the railroad's annual report.

Monthly or quarterly reports contain current data, both by month and year-to-date. Tables 3-9 and 4-1 illustrate the considerable data found in recent ARR annual reports. From this data many of the ratios and other performance indicators can be determined for measuring efficiency and profitability, without requiring the ARRC to generate significant amounts of additional data. Table 4-2 provides revenue and expenses for the ARR through October 31, 1985.

a. Net Income

The net income from railway operations forms the basis for calculating several of the other recommended performance indicators. Even though the ARR has shown a net profit in the recent past, this generally has been due to non-operating income, principally miscellaneous rental income.

b. Rate of Return

This represents the rate of return on net investment (ROI) and is the relationship of net railway operating income to net investment in transportation property. The U.S. railroad industry historically has had a low rate of return. For the period between 1975 and 1983, the ROI has varied from 1.20% to 4.13%. Under the new Depreciation Accounting System (DA) which allows for including the track structure in the depreciation base, beginning in 1983 the annual expenses for Class I railroads decreased and the profits increased. The actual cash flow does not change. Therefore as reported in the future, the ROI will increase for the U.S. railroad industry. The ARR converted to the Depreciation Accounting System in 1985. Since it is not a Class I carrier, it provides passenger service, is State owned and is not required to pay taxes, direct comparisons cannot be made in every instance.

Table 4-1

ALASKA RAILROAD TRAFFIC, REVENUES, AND EXPENSES

SUMMARY STATISTICS	FY 79	FY 80	FY 81	FY 82	FY 83	FY 84
Total Revenues ($ million)	25.20	28.90	43.90	58.80	56.10	62.15
Total Expenses ($ million)	31.50	34.70	40.60	49.23	53.27	60.32
Surplus (loss)						
Net Profit (after depreciation)	(3.20)	(2.30)	6.60	9.56	2.82	1.83
Cash Flow (before depreciation)	(6.30)	(5.80)	3.30	13.27	7.23	6.66
Capital & Major Maintenance Program	9.40	5.50	13.40	12.70	16.60	7.43
Freight Revenues ($ million)	18.20	21.70	34.00	47.88	43.79	49.75
Freight Tons (millions)	1.81	1.74	3.36	4.50	6.02	8.27
Freight Ton-Miles (millions)	257.00	271.00	407.00	479.14	546.52	700.88
Freight Revenue per Ton-Mile (cents)	7.10	8.00	8.40	10.01	8.01	7.10
Average Length of Haul (miles)	142.00	156.00	121.00	106.48	90.78	84.75
Freight Carloads Handled (thousand)	36.50	33.00	51.30	69.51	83.88	106.01
Revenue Train-Miles (thousand)	370.00	368.00	443.00	503.95	480.96	591.41
Passenger Revenue ($ million)	1.56	1.55	2.00	2.63	3.30	3.88
Passenger Miles (million)	13.80	11.80	13.63	15.07	15.27	15.59
Gross Ton-Miles (million)	878.00	925.00	1,182.00	1,446.53	1,417.81	1,781.71
Average Freight Load Per Car	49.6	52.7	65.5	64.7	71.8	78.0

SOURCE: Alaska Railroad Annual Reports, 1979-1984

Table 4-2

ARR STATEMENT OF INCOME
October 31, 1985
(000's)

	YEAR-TO-DATE 1985	YEAR-TO-DATE Budget
REVENUES		
Railroad	$49,965	$55,893
Other	9,222	7,500
Total	$59,187	$63,393
COST AND EXPENSES		
Railroad		
Transportation	$17,731	$22,280
Ways and Structures	11,188	11,022
Equipment	9,830	10,092
General and Administrative	11,343	7,169
Total Railroad	$50,092	$50,563
Other	$ 195	$ 3,718
Total Costs	$50,287	$54,282
Operating Surplus	8,900	9,112
Interest Expense	301	0
Corporate Expense	2,061	518
Net Surplus	$ 6,538	$ 7,594
Depreciation	1,064	4,000
Net Income	$ 5,474	$ 3,594

SOURCE: Alaska Railroad Corporation Financial Statements, October, 1985

When non-operating income is excluded, the ARR 1984 operating earnings reveal a ROI of 0.0, while the 1985 railway operations reflects a profit with a potential rate of return of 15%.

c. Current Ratio

The current ratio, or the ratio of current assets to current liabilities, is a measure of the ability of a company to meet its obligations in the short term. The current ratio of the ARR for the first 6 months of 1985 is 2.7. This is extremely good, since levels of 1.5 to 2.5 are considered good. Several large and profitable U.S. carriers have had current ratios varying between 0.64 and 2.23 during the period 1977 to 1981.

2. Operating Ratios

The operating ratio is used to measure overall efficiency. The operating ratio is determined by dividing railway operating expenses by railway operating revenues. The U.S. industry average in 1983 (the latest year available and not a banner year due to just emerging from the 1982 recession) was approximately 90%. By comparison, the ARR operating ratio for 1983-84 was 103.5%. The October, 1985 operating ratio, year-to-date, for ARR is approximately 100.3% without depreciation and 102.4% when depreciation is included.

The operating ratio is further broken down into the components that make up the total operating expense. These are the maintenance-of-way ratio, the maintenance-of-equipment ratio, the transportation ratio and the general and administration ratio.

Each ratio is obtained by dividing the individual department expense by the total operating revenue. Railroad officials strive to keep these ratios as low as possible and traditionally the ratios were compared month by month to the same month for the previous year. When revenues declined, expenses were cut to stay within the established ratio. However, in recent years the total operating ratio has been emphasized. It has been recognized by many railroad managements that an acceptable transportation department ratio can best be accomplished by providing the maintenance-of-way and maintenance-of-equipment (mechanical) departments with budgets sufficient to adequately maintain the plant and equipment needed to provide the transportation service. Of course, maintenance-of-way and maintenance-of-equipment expenditures for any given period are somewhat discretionary and during periods of declining revenues can be delayed (deferred). Significant or continued delays can adversely affect the quality of transportation service and present long-term profitability problems.

a. Maintenance-of-Way Indicators

The maintenance-of-way (MOW) ratio described earlier averaged about 18% for U.S. Class I railroads in 1981, but was approximately 15% in 1983. The ARR October 1985 year-to-date MOW ratio is 22.4%.

Other possibly more significant indicators than the MOW ratio are the average MOW cost per mile of railroad and average MOW cost per mile of track. The current year-to-date average MOW expenditure for the ARR is approximately $24,400 per mile of railroad and $19,700 per mile of track. The miles of railroad represents all main line tracks and miles of track represents all tracks, including passing tracks and yard tracks and sidings. An equality factor can be applied to branch lines,

passing tracks and yard tracks and sidings to arrive at an equated mileage. The cost of snow removal can also be deleted to make a more realistic evaluation of expenditures since this may constitute a higher percentage of the ARR cost. Because of the added cost of obtaining track materials and the higher wage rates in Alaska, dollar comparisons with Class I carriers alone may be misleading. All other things being equal, the ARR cost per mile would be higher by about 25% to 50%.

The number of MOW employees per mile of track also provides a measure of performance. The 1973 U.S. Class I railroad average was 0.4 MOW employees per track mile. The 1981 U.S. Class I average was 0.24 MOW employees per track mile. The average number of MOW employees per mile of track for the ARR in 1980, including temporary or part time, was 0.31. In 1985 the average is 0.27. The reduction and apparent improvement in efficiency is at least partly accounted for by the increased mechanization of many track work functions and the improvement in the mechanized track work equipment over the 10 year period both for the Class I railroads and the ARR.

b. Maintenance-of-Equipment Indicators

The maintenance-of-equipment (MOE) ratio is determined by dividing MOE expenses by the total operating revenues. For all U.S. Class I railroads in 1981, the MOE ratio was approximately 21% and about 23% in 1983. In 1981 the ARR MOE ratio was 22.7%. The ARR October 1985, year-to-date MOE ratio is 19.7%. A footnote in the June, 1985 Alaska Railroad Corporation Financial Statements indicates that this is due primarily to newer rail cars and locomotive fleet, requiring less maintenance.

Two MOE indicators that are reviewed annually are the average age of cars and the average age of locomotives. These should

be compared with the "rebuild or replace age" of 18 to 20 years for locomotives and the average freight car life of approximately 30 years. A younger fleet would imply larger, more efficient equipment types. An older fleet indicates less efficient fleet and potential high maintenance cost.

In addition to a review of the MOE ratio, the Board should consider a regular review of the bad-order ratio. The bad-order ratio is the unserviceable equipment as a percent of the total equipment on line and is the railroad industry measure of equipment condition. Equipment out of service due to needed repairs for more than 24 hours is reported on this list. This could be subdivided and reported as locomotives, revenue freight cars, non-revenue freight cars and passenger equipment. The bad order ratio is reviewed along with the MOE ratio. The comparison is made to determine if there may be potential problems in too little being spent on equipment repairs. As reported in a recent federal report, the U.S. average bad-order ratio for freight cars and locomotives varied from about 5.5% to 8.2% between 1972 and 1977. Ratios of 9% or above were considered high by that report. However, the U.S. Class I railroad locomotive bad-order ratio reported in the Harvard Business School Alaska Railroad Study, Spring 1982 was 10%. The ARR bad-order ratio for locomotives was 16% at that time. New equipment has been acquired by the ARR since that time, and some older equipment has been retired.

c. Transportation Ratios

The transportation ratio is determined by dividing the transportation expense by total operating revenues. In 1983 the U.S. Class I railroads transportation ratio was approximately 43%. In 1983 the ARR transportation ratio was about 42%. The June, 1985 year-to-date ARR transportation ratio is 35%.

The average freight carload in tons, the average freight train load, and the average number of cars per train are statistics that also provide measures of transportation efficiency.

In 1983 the average weight of a carload of freight for U.S. Class 1 railroads was 68.0 tons. By dividing the freight tons by freight carloads handled (Table 4-1), it can be determined that in 1983 the average carload weight on the ARR was 71.8 tons, and in 1984 this increased to 77.9 tons. From Table 3-6 this appears to be due to an increase in shipments of sand and gravel, unfortunately a low revenue commodity.

The average freight train load for U.S. Class 1 carriers was 2,432 tons in 1983. The division of freight ton-miles by revenue freight train-miles reveals an average freight train load for the ARR in 1984 of 1,629 tons.

The average number of cars per train is computed by dividing freight car-miles by freight train-miles. These statistics are missing from the current ARR reporting data. The average carloads per train can be determined by dividing the freight train load by the average carload weight. This produces an average of 15.8 carloads in 1983 and 15.2 carloads in 1984, approximately one- half the U.S. average of 30. The more restrictive grades, an increase in the number of larger cars, and a greater percentage of heavier commodities being handled such as sand and gravel and coal could account for the carload characteristics to date on the ARR.

d. General and Administrative (G&A) Ratio

The G&A ratio is determined by dividing G&A expenses by total operating revenues. The U.S. Class 1 railroads G&A average

was approximately 9.4% in 1983, the G&A ratio (including traffic or marketing costs) for the ARR in 1983 was about 14.5%. The year-to-date June 1985 G&A ratio for the ARR is 17%. The smaller revenue base of the ARR compared to all U.S. Class 1 railroads, combined with continuing administrative costs associated with the ARR transfer to State ownership, would cause the ARR ratio to be slightly higher.

3. Other Performance Data

Several other annual statistics can aid in evaluating overall performance.

a. Operating Revenue/Cost Per Employee

The U.S. Class 1 railroads operating revenue per employee in 1983 was about $83,000. The 1983 ARR average was $76,300, while the ARR year forecast for 1985 is about $112,000 per employee. The revenue per ton-mile for ARR in 1983 and 1984 was 8.01 and 7.10 cents while the U.S. Class 1 average in 1983 was 3.1 cents or less than half.

The average cost per employee for all U.S. Class 1 railroads in 1980 was $24,700 and the ARR average employee cost was $37,000. The 1983 estimated U.S. average was $32,125. The 1985 estimated ARR cost per employee is $64,900, which reflects the higher wage scale in Alaska.

The 1985 estimated total personnel salary and wages for the ARR of $35,700,000 is about 58% of total operating revenue. Railroads typically try to keep employee costs at 50% or less of operating revenues, so that sufficient funds can be available for materials needed for maintaining track and equipment and for capital improvements.

Total number of employees per mile of track is also a measure for comparing staffing. In 1983 the U.S. Class 1 average employees per mile of track was about 2.0. The 1985 ARR number of employees is about 1.0, which increases to approximately 1.3 when temporary employees are included.

b. Track Material

The data on the number of cross ties installed annually, and the miles of new rail layed, when considered over a period of several years, can serve as a guide to the long-term financial health of the railroad and to its policies. Under ideal conditions, a railroad's maintenance program will provide for meeting the normalized maintenance requirements. Normalized maintenance is defined as that which meets the average annual track material replacement requirement, and at a level that keeps the track at the desired standard. This is determined by dividing the total material units by the average life. Where cyclic work is performed, an allowance is made for all material items for the average annual requirement over the prescribed cycle time.

According to the 1984 Alaska Railroad Condition Assessment, there are approximately 1,950,000 cross ties on the ARR. Using a 40 year average life, which would be the upper limit of average tie life, it is found that at least 48,750 cross ties should be installed annually. As annual tonnage increases on some track segments, the longer cross tie life enjoyed in the past on the ARR can be expected to be reduced. The traffic density by segment shown previously on Table 3-8 reflects the significant increase between Matanuska and south of Anchorage where heavy gravel movements occur. This tonnage, coupled with the more numerous curves on this segment, will not permit a 40 year tie life in the future.

A detailed inspection of track and ties would provide a projection of the average annual requirements, but this task is beyond the scope of this project. Although there has been excellent tie life in the past, several factors suggest reduced tie life in the future. These factors are the increased annual tonnage on the segments of the main line with the sharpest curves, the increase in axle loading, and poorer quality timber today compared to that of 30 to 40 years ago. In some recent studies of the ARR, cross tie life of less than 40 years (30-35 years) has been suggested.

The ARR is currently installing about 25,000 cross ties per year (25,700 in 1984). Even with an average cross tie life of 40 years, installing 25,000 ties per year is only about one-half the number required. An increase in the number of cross ties installed annually will increase the current MOW expenditures and the related ratios outlined earlier.

Future expenditures for rail must also be increased over recent levels (49,100 linear feet, or 4.65 track miles in 1984). As shown in Table 4-1 the average freight load per car has increased from 49.6 tons in 1979 to 78.0 tons in 1984, thereby increasing the average axle load at the same time. The density, expressed as million gross ton-miles per mile per year (MGTM), has increased significantly between Anchorage and Matanuska, from 3.28 MGTM in 1979 to 13.90 MGTM in 1984. This four-fold increase in density over this segment of the ARR, with a very high percentage of curves, means that if this level of traffic continues, the rail must be replaced more frequently than in the past. Rail wear formulas can be used to calculate rail life using speed, density, curvature, and axle loads as in-put. Field-wear measurements can be made to monitor wear and validate calculated life. The results over a few years will give the long term rail replacement requirements for the various

track segments. It now appears that increased rail replacement and cross tie renewals in certain track segments, especially between Matanuska and Anchorage, are critical for the future viability of the railroad. The cost of more frequent track surfacing, ditching and bank widening required on the ARR due to severe weather, rugged terrain and unique subsoil conditions has been absorbed in the past at the sacrifice of rail and cross tie renewals. This has been possible with the relatively low tonnage, light axle loads and the fact that the majority of the railroad was rebuilt with new 115 lb. rail between 1949 and 1954 and that most of the cross ties have been installed since that time. However, with the heavier cars and increased density, provisions for increased expenditures for rail and cross ties should be included in future budgets.

c. Derailment and Accident Data

Reporting on the number of derailments and the cause of each can help identify problem areas. Derailment causes are classified as track, equipment, human error or other. Others include, for example: weather, acts of God, and hitting animals (moose). Between January 1, and August 8, 1985 there were 40 derailments, 15 (38%) track related, 4 (10%) equipment, 7 (17%) human error, and 14 (35%) other. The monitoring of derailments is normally a function of operating management due to the required interpretation of data furnished and needed corrective action. The various percentages do provide a guide as to where emphasis should be placed. However, if the number of derailments due to equipment failures or to track increase, a determination as to the adequacy of expenditures would be in order.

Industry safety records measure accidents or injuries per thousand man-hours of work (which is a function of the number of employees). The ARR has performed well in this area in the past

according to the 1984 Annual Report and received national recognition.

B. Current Railroad Submittals to Board

Currently the ARRC provides data to the Board of Directors for its review. Quarterly Financial Statement prepared for the Board consist of the following:

Summary
* 1985 Performance Analysis of revenue costs and expenses
* Project to Date Capital Performance Summary

Balance Sheet
* Supporting Notes
* Lease Disclosure Schedule
* Statement of Retained Earnings

Operating
* Graph of Actual vs Budget Income
* Statement of Income
* Revenues by Commodity, Passenger, Real Estate and Other
* Expense by Department

Capital
* Graph of Capital Expenditures, Budget vs Actual
* Project to Date Capital Performance Summary
* List of Capital Projects, Budget vs Actual

Appendix
* Graph - Monthly Bank Balance

Past Annual Reports have included, among other things, those items found in Tables 3-8, 3-9, and 4-1. In other words, the ARR does have a great deal of information available which, when presented in a comparable and continuing fashion, can be very useful to the Board of Directors.

C. Suggested ARR Performance Indicators

Based on this review of possible performance indicators and based on data that is known or believed to exist, it is recommended that the ARRC prepare a set of indicators that, over time, can be used to assess the railroad's performance. A computer program could be developed that would develop these items, at very little cost to anyone since the basic data already exists. The suggested indicators are presented on Table 4-3. It should be emphasized that the suggested indicators include not only financial indicators but also operational, utilization, safety and maintenance indicators. Once these data calculations are computerized, they should be made available to the ARRC Board of Directors and other ARRC management personnel on a continuing basis.

Table 4-3

SUGGESTED ARR PERFORMANCE INDICATORS

Performance Indicator	1984
*Railroad Miles	535.2
*Track Miles(1)	655.9
*Gross Revenues (Million)	$62.15
*Operating Revenues (Million)	$57.92
*Operating Expenses (Million)	$59.95
*Net Railway Operating Income (Million)	<$2.03>
*Net Other Income (Million)	$3.87
*Total Net Income (Million)	$1.84
*Depreciation (Million)	(2)
*Net Income After Depreciation (Million)	$1.84
*Net Investment Operating Property (Million)	$149.79
*Rate of Return	0.0
*Freight Revenues (Million)	$49.75
*Freight Tons (Million)	8.27
*Freight Tons-Miles (Million)	700.88
*Freight Revenue per Ton-Mile (Cents)	7.10
*Average Length of Haul (Miles)	84.75
*Freight Carloads Handled (Thousands)	106.01
*Passenger Revenues (Million)	3.88
*Passenger Expenses	N/A
*Gross Ton-Miles (Million)	1,781.71
Average Freight Load per Car	78.0
Density by Track Segment	(3)
*Operating Expenses (Thousand)	
*Maint.-of-Way & Structures	$12.75
*Maint.-of-Equipment	$13.53
*Transportation	$22.11
*General & Administrative	$11.57
*Operating Ratio	103.5%
*Maintenance-of-Way Ratio	22%
*Maintenance-Of-Equipment	23%
*Transportation Ratio	38%
*General & Administrative	20%
*Average Number of Employees	-
*Average Bad-Order Ratio	N/A
Average Freight Train Load	1185
Operating Revenue per Employee (Thousand)	N/A
Average Cost per Employee (Thousand)	N/A

Table 4-3

SUGGESTED ARR PERFORMANCE INDICATORS
(continued)

	1984
Average Number of Employees/per Mile of Track	N/A
Average Number of Maint.-of-Way Employee per Mile of Track	N/A
Cross Ties Installed	25,700
Track Miles (.5 X rail miles) of Rail Laid	4.65
Number of Derailments by Cause	
Track	N/A
Equipment	N/A
Human Error	N/A
Other	N/A

(1) Includes 3.8 miles on Suntrana Branch now out of service
(2) Depreciation shown with expenses in 1984
(3) Density by segment reported separately

Note: All of the performance indicators should be made available to department heads and middle management. Those designated by an asterisk * should be made available to the Board of Directors.

SOURCE: Wilbur Smith and Associates

GLOSSARY OF TERMS

Rate of Return - The rate of return on net investment (ROI) and is the relationship of net railway operating income to net investment in transporation property.

Current Ratio - The ratio of current assets to current liabilities, the measure of the ability of a company to meets its short term obligations.

Operating Ratio - The ratio of railway operating expenses to railway operating income.

Maintenance-of-Way Ratio - The ratio of maintenance-of-way and structures expense to railway operating income.

Maintenance-of-Equipment Ratio - The ratio of maintenance of equipment expense to railway operating income.

Transportation Ratio - The transportation expense divided by railway operating income.

General and Administrative Ratio - G&A expenses divided by railway operating income.

Bad-Order Ratio - The unserviceable equipment as a percent of the total equipment on line. Equipment is subdivided and reported as locomotive, revenue freight cars, non-revenue freight cars and passenger equipment.

Line Density - Expressed as million gross ton-miles per mile per year (MGTM).

Railroad Miles - As used here is route miles or main line miles as opposed to track miles which include all main tracks, passing tracks and yard tracks and sidings.

Normalized Maintenance - The average annual expenditure which meets the average annual track material replacement requirement and at a level that keeps the track at the desired standard or level of operation. This average annual expense includes actual expenses plus an allowance for those items worked on a longer cycle basis, such as, cross tie renewals, surfacing and lining, road crossing repairs, ditching and bridge maintenance.

V. RAIL LINE EXTENSION PROCESSES AND CRITERIA

The Alaska Railbelt, the area adjacent to the Alaska Railroad (ARR), covers only a very small portion of the State. The Railbelt contains the majority of the State's population, commerce, and industry. However, the greater expanses of Alaska not within the Railbelt contain most of the State's natural resources - the coal, zinc, lead, copper, petroleum, timber and other resources that need transportation infrastructure if they are to be developed.

Now that the State owns the ARR, it anticipates that an increasing number of proposals will be advanced to extend the railroad to access these resources. Some proposals may be for the extension of the ARR into new areas of the State; others may be for new rail lines which connect the mineral resources with a tidewater port, with no interconnection being provided with the ARR. If new proposals are forthcoming, they will be added to a number of extension proposals promoted over the years.

A. The Rail Line Extension Issue

When the Federal government owned and operated the ARR, there was little inclination to consider extending the railroad to access Alaska's natural resources. As a result, there was no need to establish a mechanism whereby extension proposals could be systematically put forth, studied, and decisions made. The result was that each extension was offered and considered on an individual basis, without any type of overall program and no agreed-to evaluation criteria. Consequently, public sector deliberations were on an individual, line item budget basis, if at all.

The purpose of this Report Section is to review the process, if any, by which rail extension projects are currently considered, and suggest an orderly process -- one based on procedures and criteria which should lead to prudent investment decisions in the future.

B. Existing and Previous Rail Extension Proposals

While only the Anchorage and Fairbanks airport spurs and the Whittier and Eielson Air Force Base extensions have been built since the basic line from Seward to Anchorage to Fairbanks was completed in 1923, a number of possible extensions have been discussed, contemplated, studied and debated. Some have been given considerable study, others have received scant consideration. There has been no comparable or comprehensive analysis of the various proposals, and most linger on, with neither a decision being made to proceed nor terminate consideration.

Seven basic extension options that have been considered over the years are depicted on Figure 5-1. This map presents the principal corridor selections, and includes many of their alternative alignments. The rail lines range from the very long to the rather short, and include:

1. Alaska-Canada Transcontinental Rail Link - some 297 miles of new railroad construction in Alaska, plus the additional mileage of the Canadian portion, to connect the Alaska Railroad with the Canadian and U.S. rail networks and potential mines in the "Delta Belt" and Slate Creek. The alignment study for this route has been completed and application has been made for right-of-way.

2. North Slope Extension - a new rail line to the north, possibly all the way to the Arctic Ocean oil fields, to serve those fields and to open the area to development.

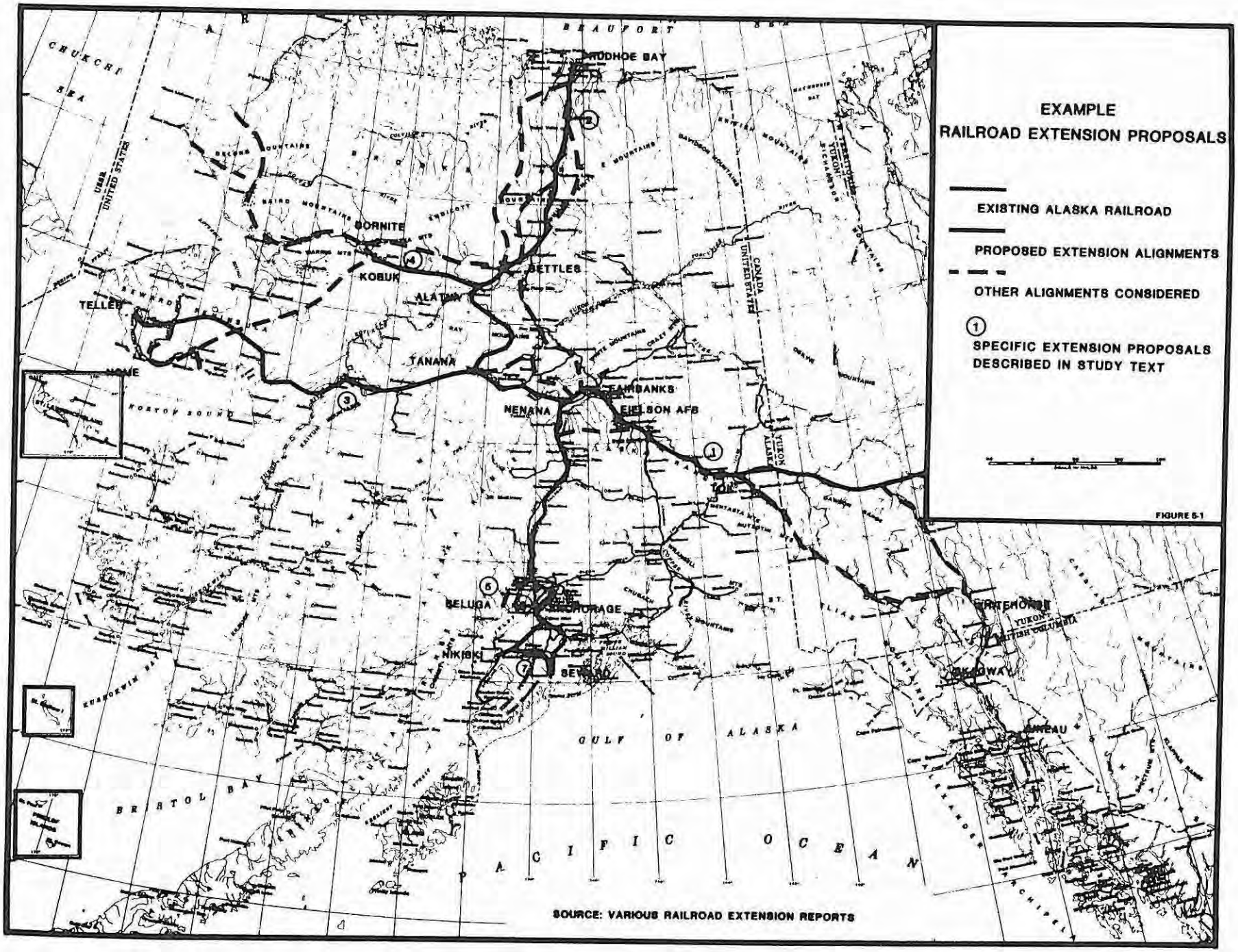


FIGURE 5-1

SOURCE: VARIOUS RAILROAD EXTENSION REPORTS

3. Extension West to Seward Peninsula - an 880 mile extension west through Tanana and on to a west coast port, intended to both open the area to resource development and to create a new shipping port.

4. Extension Northwest to Ambler District - a new line to penetrate a major potential ore mining area near Picnic Creek, Bornite, and Kobuk.

5. Beluga Coal Fields Rail Link - a rather short extension to the west of Anchorage that would penetrate a major to-be-developed coal field.

6. Knik Arm Crossing - The addition of a rail crossing to the planned highway crossing of Knik Arm, to create operating efficiencies for the Alaska Railroad.

7. Nikiski Extension - A new line from Seward or Moose Pass to the refinery/petroleum/industrial area near Nikiski and Kenai.

Other extension proposals have been advanced, but these seven reflect the major ones that have been proposed over the years. If an extension evaluation process and evaluation criteria are to be established, such techniques should be capable of evaluating all extension types -- hardrock mineral and petroleum resource penetration; efficiency extensions; access to ports; connections with other railroads and/or with other transportation systems; and regional access/development rail lines.

Following is a brief description of the major extension proposals including the studies that have been conducted relative to each and a review of the deliberation and consideration

process utilized in each study. This review is intended to explain the procedures that have been followed. The review should not be viewed in any way as an evaluation or an opinion regarding the feasibility of any specific rail line extension.

1. Alaska - Canada Transcontinental Rail Link

The Alaska Railroad does not physically connect with railroads in Canada or the "Lower 48" except by barge connections. There has long been interest in providing such a railroad connection; an interest that has heightened since the mid-1970's.

In 1942, a military alignment reconnaissance was made for a 1,417 mile railroad connecting Prince George, British Columbia, with Fairbanks to be known as the Trans-Canada, Alaska Railroad. The line, which was to be constructed for military purposes, was actually given the go-ahead in February, 1943 with construction beginning in May of that year. Meanwhile, military successes diminished the need for the line with the result that the project was placed on hold and has since not been reactivated.

In 1949, Congress sought negotiations with Canada for economic surveys. In 1957, the Alaska International Rail and Highway Commission was established and by law was required to make "a thorough and complete study of the economic and military advantages of additional highway and rail transportation facilities connecting the continental U.S. with Central Alaska". In 1977, the Alaska Legislature directed that the Alaska Railroad evaluate an extension to the Canadian Border. In 1981, the State legislature directed that an environmental study be conducted and that right-of-way be acquired or reserved. Earlier the State sponsored a conference dealing with an Alaskan Canadian rail connection and, more recently, several brief overview studies have been conducted (listed on the next page).

a. Previous Studies and Deliberation Procedures

A variety of studies have been made of the Alaska-Canada Corridor, with most being either brief and somewhat inexpensive or overview studies. There appears to be no definitive study analysis available. Those that are available are:

* Military Railroad Reconnaissance (U.S Army) -- 1942.
* "Alaska-Canada Transcontinental Rail Connection to Contiguous United States" (State of Alaska) -- 1977
* "Through Rail Route to Alaska" (Ward & Associates, Ltd.) -- 1977.
* "The Alaska Railroad Connection" (B.C. Railway) -- 1977.
* "Alaska Railroad Extension: Eielson to Canadian Border, Project X20089" (State of Alaska) -- 1979.
* "The Alaska Railroad" (Alaska Senate, Committee on Transportation) -- 1979.
* "Transportation Systems Planning for Alaska" (University of Alaska) -- 1979.
* "Feasibility Study, Proposed Extension of the Alaska Railroad from Eielson AFB to the Canadian Border" (Legislative Affairs Agency, State of Alaska) -- 1980.
* "Interior Alaska Transportation Study" (State of Alaska) -- 1982.
* "Alaska Railroad Extension: Eielson to the Canadian Border, Environmental Assessment" (State of Alaska) -- 1983.

The early 1942 military study comprised only a field evaluation of railroad alignments. It sought to depart from the existing Alaska Railroad at Rex, proceed to Tok, and to continue to Watson Lake, Canada. The more recent studies, however, have moved the point of connection with the Alaska Railroad to the Eielson Air Force Base and Fairbanks area rather than to the Rex area. This route would entail the construction of some 297 miles of track in Alaska, 568 miles in the Yukon, and about 100 miles in British Columbia. The 1977 "Alaska - Canada Transcontinental Report" presents an excellent non-quantified overview of the route and its pros and cons. "Project X20089" by the DOT/PF in 1979 summarizes a much more in-depth study of possible rail line alignments to the Canadian Border. That

alignment study by the DOT/PF was conducted at the request of the Tenth Alaska Legislature (House Bill 47 and 48), and the study used map study, photogrammetric mapping, ground control survey, and the like -- all intended to explore for the best alignment. There was no study of need, or economics, or impact -- at this point. As a result of this alignment study, it was concluded that right-ofway through public lands be reserved, and right-of-way through private lands be acquired. "The Alaska Railroad" report of 1979 apparently supported the view that a rail line should be built to connect with the Lower 48.

One of the first economic studies concerning whether such a rail link should be built was the University of Alaska's 1979 "Transportations System Planning for Alaska" study. That study explores the cargo traffic implications of the rail extension, inclusive of costs and cost comparisons with and without the rail link. That study indicates that cargo originating or terminating in Alaska would find it difficult to warrant the rail link. The 1980 study for the State Legislative Affairs Agency carries the analysis one step further in that it attempts to identify cargo that might be carried on the Transcontinental rail route. However, the cargo estimates are really assumptions rather than estimates. The next analysis "Interior Alaska Transportation Study" of 1982 conducted a comprehensive benefit-cost study of a variety of railroad extensions and found that an extension from Eielson to the Delta Belt (along the proposed transcontinental route) is the best of the various rail proposals in Alaska's Interior since there is some reason for the line and its costs are within reason. It also suggests that this extension is still infeasible at present. That study did not analyze the extension all the way to the Canadian Border. The study also tied the extension's economic benefits only to the immediate and known users or user types -- mining companies

and agriculture. The final study conducted relative to the transcontinental rail link is an environmental assessment conducted in 1985 by the Alaska DOT/PF. It is a good comprehensive review of the environmental issues and potential impacts, and it represents the first serious environmental review done relative to any of the currently envisaged rail line extensions.

b. Transcontinental Rail Link Extension Processes

The transcontinental issue is complex, given that two nations (the United States and Canada) are involved. It also appears that there has never been an in-depth study of the "who will benefit most" issue. Rather, there have only been limited scope and somewhat specialized studies, some of which merely rewrite what other studies previously discovered. Despite this lack of major study, or analytically detailed work, attempts to make decisions and to proceed have occurred. It would appear that the political process was in the lead, followed somewhat distantly by the study and professional investigation process. It appears that the transcontinental rail link was not subjected to unbiased in-depth study and was not assessed in accordance with objective evaluation criteria or procedures.

2. North Slope Extension

Beginning in the late 1960's, attention was focused on the North Slope oil, the methods of carrying it to market, and the transportation system needed to support the petroleum facilities. Several transportation facilities (the Alyeska pipeline, the pipeline service road, and Deadhorse Airport) were built to service Prudhoe Bay. No rail line has been built, and the discussion concerning the appropriateness of such a railroad has declined considerably since the pipeline's construction and operation.

a. Previous Studies and Deliberation Procedures

Several studies and groups have pursued a railroad extension to the north, with the following being the most notable:

* "Report of the NORTH Commission" (State of Alaska) -- 1970.
* "Alaska Transportation Corridor Study" (U.S. Department of Transportation) -- 1970.
* "Western and Arctic Alaska Transportation Study" (State of Alaska) -- 1981.

The earlier works sought to extend the Alaska Railroad to the north. The most recent transportation study plan for the region discounts rail as a non-viable mode to serve the region.

The NORTH Commission in 1970 recommended to the Governor that "... the federal government should extend the Alaska Railroad north over the Brooks Range to the oil and gas fields..." The Commission aggressively sought a railroad rather than a pipeline; however, the NORTH Commission's views on North Slope Transportation were not followed. Then, in 1970 - 1972, the "Alaska Transportation Corridor Study" was conducted. This in-depth study dealt with the engineering/alignment feasibility and options related to building a rail line directly to the north and on to the North Slope area. This study found that it is technically feasible to construct a railroad to the north since it is definitely feasible from the engineering standpoint. The line would represent 581 miles of new railroad and would cost well in excess of $1 billion to implement. The study found what it believes is the best rail alignment to the north, and suggests that "It is feasible, from an engineering standpoint, to construct and maintain both railroad and highway facilities."

Despite these pro-railroad extension entities, several examinations indicated that rail is not the best mode. The Alyeska

Pipeline Service Company decided that a service road was superior to a rail line for its purpose, and that construction cost savings did not justify a railroad. Furthermore, the 1982 Western and Arctic Alaska Transportation Study did not even consider a rail line to the north as a subject worth studying (it did study the rail option up to the Ambler District and to the west). In other words, it would appear that a rail line extension north to the Arctic region has been superceded by pipeline construction events. The specific rationale for such a rail extension no longer exists -- unless one considers the benefits of opening new lands for development, which studies to date do not seem willing to do. Instead, the benefits of rail in these previous investigations typically are assigned to the currently expected use (e.g., a mineral, or oil, or coal) and if that use is insufficient to pay for the rail, the mode is eliminated.

b. North Slope Extension Processes

The process of considering the northward rail extension appears to have been of a political consideration early in the process, and then to have been a private sector consideration (the pipeline companies) who apparently discarded rail very early in the process, and finally the conduct of a very detailed, very expensive government study. The detailed government study was not completed until it was too late (1970 - 72), and even that study dealt with physical items such as alignments and the like, rather than an alternatives analysis or a rail road-oriented economic development analysis. In other words, it would appear that the subject of a North Slope-oriented rail extension was never given serious study relative to need and appropriateness -- only an alignment study was done, and done too late to resolve any of the pipeline or pipeline construction issues.

3. Extension West to Seward Peninsula

An Alaska Railroad extension from the vicinity of Nenana west to the Seward Peninsula, to Nome and/or Teller, has long been a subject of study, although most recently it has not been a subject of current debate. Such an extension, which would require some 880 miles of new railroad construction and the crossing of the Yukon River, would be one means of enabling access to a west coast port; another method would be to build rail access to Tanana on the Yukon River.

a. Previous Studies and Deliberation Procedures

The early studies of this corridor were principally for military reasons, were concerned with the delivery of war material to the west coast (Teller) port, and only examined possible rail line alignments. There was little thought given to the rail extension's rationale (other than military), its economic impacts, or other Alaskan concerns.

Studies and consideration given to a rail extension to the Seward Peninsula include:

* "The Richardson Study" (U.S. Army) -- 1906
* "Reconnaissance for Railroad or Highway West from Fairbanks" (U.S. Army) -- 1942
* "Berryhill Report" (U.S. Army) -- 1943
* "Fairbanks to Nome Study" (State of Alaska) -- 1967
* "Western and Arctic Alaska Transportation Study" (State of Alaska) -- 1981

The Richardson Study of 1906 entitled "Reconnaissance and Survey for Land Routes from Fairbanks to Council City, Alaska" comprised an on-ground field survey of possible rail routes, as requested by Congress. The study found a route that could be built, but the rationale for such a route was never examined or

studied. The 1942 U.S. Army study entitled "Reconnaissance for Railroad or Highway West of Fairbanks" had a purpose in mind for the rail extension - to find a method of delivering war material to Siberia via a port to be built in the Norton Sound - Kotzebue Sound area. This survey was also merely an on- ground examination of alignments, supplemented with aerial reconnaissance, but without consideration of other types of "feasibility" criteria. The Berryhill Report of 1943 was another on-ground reconnaissance from Nenana to Nulato and to the Seward Peninsula.

The State of Alaska 1967 "Fairbanks to Nome Study" again suggested possible alignments, and was based on extensive use of USGS maps, aerial photography, and aerial reconnaissance. Once again, it comprised a study of alignments rather than a study of whether to build, or why to build, a rail extension. The 1981 "Western Arctic Alaska Transportation Study" analyzed the transportation needs of the western region only, but did not examine regional ties to the rest of Alaska and therefore did not consider a rail extension from the ARR. It did consider several intra-regional rail projects that would be mineral extraction oriented, but found them to be insufficient to warrant the construction of a new rail line. In this last study, feasibility was considered first, rather than first looking for possible alignments.

b. Seward Peninsula Extension Processes

Considerable expense has been invested in considering a rail extension to the Seward Peninsula. Nearly all has been expended on alignment studies - intended to answer the questions "can a rail line be built, and on what alignment?" It appears that there has never been a good examination of why such a rail extension should be built, what it might accomplish, how economically

or financially feasible it would be, how it might be funded, what cargo it would carry, or whether it might develop the area.

The reason for these deficiencies likely lies with the fact that the most serious consideration of the corridor was given many years ago, and principally by the Army for military reasons. It appears to be feasible, from the engineering perspective, to build such a line. There has been no attempt, however, to justify the extension on economic, financial, economic development, environmental or other bases. If a Seward Peninsula extension is to receive serious consideration currently, it would need a thorough feasibility study with less attention given to alignment and more attention given to whether it should be built.

4. Extension Northwest to Bornite, Kobuk, Ambler District

Unlike some rail extension proposals, an extension to the Bornite/Kobuk/Ambler District west of Bettles and Alatna would have a known purpose -- to transport the region's considerable copper, lead, and zinc ores and concentrates. Comprising the Bornite, Arctic, Sun and Smucker deposits, mineral extraction suffers from lack of transportation. Therefore, rail access is proposed and studied from time to time. Most proposals suggest a new rail line from Nenana to Tanana to Alatna and then on to either Kobuk or to Bornite via Bettles. The Alaska Railroad Corporation Act, Sec. 42.40.355 indicates that the railroad "... may not apply for a right-of-way across, or exercise eminent domain in, the Western (Kobuk River) unit of the Gates of the Arctic National Preserve..." This prohibition requires a southern route to the Ambler District unless the State were to be the applicant (the restriction applies only to the ARR).

a. Previous Studies and Deliberation Procedures

Since the discovery of these massive mineral deposits, a number of studies of a possible rail link have been undertaken.

* "Reconnaissance for Railroad or Highway West From Fairbanks (U.S. Army) -- 1942.
* "Extension of the Alaska Railroad, A Report to the North Commission" (State of Alaska) -- 1967.
* "Report of the NORTH Commission" (State of Alaska) -- 1970.
* "Alaska Transportation Corridor Study" (U.S. Department of Transportation) -- 1970.
* "Western and Arctic Alaska Transportation Study" (State of Alaska) -- 1981.
* "Interior Alaska Transportation Study" (State of Alaska) -- 1982.
* "Alaska Railroad Study" (Harvard Business School) -- 1982.

The subject of a rail extension to the Ambler minerals area was initially viewed in engineering terms (can a railroad be built, and at what cost?), although the most recent examinations also considered financial feasibility.

The 1967 extension study by EBS Management Consultants accepted the 1942 U.S. Army route, and then explained in comprehensive, but not analytically detailed, terms why the railroad should be built. The study reviewed the development possibilities, the ores and marketability of the ores of the Kobuk area, and examined railroad operation costs. The study is an excellent overview, but is not at all sufficient to enable prudent policy decision since detailed analysis work is not present in a comprehensive fashion. The study suggests a rail line extension from Dunbar to Alatna to Kobuk. The NORTH Commission in 1970 suggested that the construction of a railroad to the North Slope Oil Field through Alatna would "...provide an already- built transport route to Alatna, the natural point where a surface transport route should swing westward toward Kobuk...." In this sense, the NORTH Commission tied the 139 mile Alatna to Kobuk

extension to its proposed rail line to Prudhoe Bay. Also in 1970 was the "Alaska Transportation Corridor Study" by the Federal Highway Administration. This study explored routes to Kobuk and suggested the Nenana- Alatna-Kobuk route. This study comprised an exhaustive engineering study of alignments, construction issues and costs. It depicted construction feasibility from the engineering standpoint, but did not address whether such an extension should be considered or built.

Finally, the 1981 "Western and Arctic Alaska Transportation Study" addressed the economic/financial feasibility of a rail line into the Kobuk Valley/Ambler District area. It found that "None of the proposed scenarios regarding mineral transportation (by rail) and access routes have proven to be financially or environmentally viable." This study also looked at other options for transporting the minerals (modal as well as rail destination options). However, the study assumed all rail costs to be borne by the initial users (the minerals) in its conclusion. It also recommended that a detailed feasibility study be conducted (cost $686,000) to include socioeconomic, cultural and environmental impacts and, if the feasibility study results are positive, then a detailed survey of the selected alignment (cost $2.8 million). The most recent study, comprising a brief overview and opinion, is the 1982 Harvard Business School study which suggests that public investment in the Ambler rail extension will be necessary if it is to proceed, and encourages government to make that investment.

b. Ambler District Extension Processes

In the case of the Kobuk/Bornite area, the reason for a rail extension is known -- the carriage of minerals. Also, an alignment is established in a generalized sense. What has not

been established, however, is whether or not the extension is feasible in the economic/fiscal/environmental sense. While the world prices for the minerals remains depressed, it is likely that there will be no pressure to build the extension. However, if mineral prices climb, the rail extension could become a project worthy of detailed consideration.

However, the initial beneficiaries of the railroad would likely be only a few mining companies, which raises the issue of a proper role for the State of Alaska relative to resources based rail extension projects. Without question, much more exhaustive feasibility analysis is needed before any decision is made.

5. Beluga Coal Fields Rail Link

The Beluga Coal Fields west of Anchorage will require a means of moving coal from mine to tidewater, since market assessments indicate that the coal's major destination will be Asia and tidewater port access is therefore requisite. The coal mines and supporting facilities are currently in various stages of planning; no construction has taken place to date.

a. Previous Studies and Deliberation Procedures

The Beluga Coal Field is being developed by several private coal firms led by the Diamond Alaska Coal Company and Placer U.S. This group has undertaken a number of studies relative to specific development issues, among which was transportation. Several modal alternatives were considered including a coal haul road, a railroad, and conveyors. These studies found that conveyors were the superior mode to carry up to 12 million tons of coal per year. Rail transport was found to be more expensive than conveyor. This was based on constructing a bridge over the

Susitna River to connect the extension with the ARR, as well as making allowance for use of an existing tidewater port. In addition, it was concluded that a rail route would raise a number of environmental issues. The present plan is to move coal from the mines to a to-be-built coal port on Cook Inlet via an 11-mile conveyor.

b. Beluga Coal Link Extension Processes

The coal field development is being handled by the private sector, subject to requisite government permits and regulations. As such, the study of transport access and the transport (non-rail) decision was effectuated within the private sector based on cost effectiveness and environmental and other issues expected to surface as the process moved to the public sector review stage.

If rail had been the selected mode, it is likely that this would have been a private, single purpose railroad, not affiliated with the Alaska Railroad. If so, it is doubtful whether State government would have had any role other than the permit and regulatory process.

6. Knik Arm Crossing

A highway crossing of the Knik Arm has represented a possible major roadway project for quite a number of years. The project has always been envisaged as a highway, and rail has not been a key component in the studies or in the deliberation process.

a. Previous Studies and Deliberation Procedures

Since the crossing is intended to be a highway, the studies phase and consideration process are in the public sector -- the State, Federal government, and local jurisdictions. Quite a number of analyses have been done, such as the following:

* "Knik Arm Highway Crossing" (State of Alaska) -- 1972
* "Knik Arm Crossing: Survey Report" (State of Alaska) -- 1983
* "Knik Arm Crossing: Economic Feasibility" (State of Alaska) -- 1983
* "Knik Arm Crossing: Final Corridor Alternatives Analyses" (State of Alaska) -- 1984
* "Knik Arm Railroad Crossing Feasibility Study" (State of Alaska) -- 1984
* "Knik Arm Crossing: Draft EIS" (State of Alaska) -- 1984

All of the above, except for the "Railroad Crossing Feasibility Study" of July 1984, deal exclusively with highway matters. They are in great detail and follow standard Federal Highway Administration (FHWA) procedures. The rail analysis, on the other hand, comprises a brief overview of the economic feasibility of a new route which would reduce rail distances by 23 to 28 miles, thus reducing operating and maintenance costs plus serving potential mineral and other traffic. The study indicated that the rail crossing, whether on or separate from the highway bridge, was infeasible. The methods and criteria used to determine this conclusion are the same as that used for the road -- savings in car or train miles, car or train hours, etc. The principal economic benefit used in the rail analysis is that of the operating cost savings that might accrue to the ARR. Such savings were found to be meager when compared with the cost of building a separate railroad bridge or adding a railroad capability to the proposed highway bridge.

b. Knik Arm Rail Crossing Processes

The rail link across Knik Arm apparently never received much consideration. The analysis was done almost as an afterthought, and was conducted in a manner used on highway projects. The work was done entirely within the domain of the public sector, funded presumably with public highway funds. The process was to see if the rail could be added to the highway crossing, thereby presumably sharing costs. The study concluded with a resounding "no".

7. Nikiski Extension

This proposal would create a rail line between the Port of Seward and the petrochemical facilities at Nikiski on Cook Inlet via Moose Pass. This extension had some support a decade ago, but more recently has not been a subject of consideration.

a. Previous Studies and Deliberation Procedures

No studies were found that included the assessment of a Nikiski rail extension. It appears that this extension prospect was limited to talk and speculation, rather than analysis. The extension certainly had a rationale -- connect the Nikiski industrial area to a deep water port via a railroad. However, it apparently never got beyond the discussion phase.

b. Nikiski Extension Procedures

The Nikiski extension never reached the stage of entering into any set of procedures.

C. Need for Extension Processes and Criteria

Because no major rail extension has been constructed since the Alaska Railroad was built, (other than the Whittier and Eielson Air Force Base extensions built for military reasons and the extensions to the airports), and because none of the extension proposals made during the last 30 years has progressed much beyond the discussion stage, an established extension evaluation process does not exist. As a result, each extension proposal has been discussed; some have been considered by one entity, but not by other entities; and so on. With the transfer of railroad ownership to the State, an issue that has already arisen is what type of process and structure should be used by the State for considering extension proposals.

1. Observations Concerning Past and Current Extension Processes

The review of the seven rail line extension proposals found that none of the extensions have been implemented, and each is somewhat unique in that it has its own positive and negative features. Despite these variations, there are summary findings that should be useful in the consideration of extension assessment procedures and criteria.

(1) There are currently in Alaska no established and utilized processes or criteria that are used to consider extension proposals. Instead, each extension proposal is considered independently of the others, utilizing evaluation methods and promotional techniques that are unique to the specific proposition.

(2) While the ARRC might consider railroad extensions that are in the railroad's best interest, the railroad is not charged with the specific responsibility of considering extension proposals when such extensions are in the state's best interest. This responsibility, according to the legislature, lies with the DOT/PF.

(3) Very little attention has been given in the evaluation stage to the extension's economic/financial feasibility, economic development potential, or impact. Instead, the early consideration phases seem only oriented to alignment options and whether a rail line can be constructed in the engineering perspective. The studies tend to address whether a line can be built (alignment) rather than whether a line should be built (feasibility).

(4) There appears to have been no comprehensive, in-depth feasibility studies. Instead, single purpose studies are the norm which address alignments, or environment, or overview discussions. In the latter instance, many studies do little more than to repeat previously studied information, thereby shedding little new information. The studies that were reviewed are typically insufficient to enable a proper and final decision regarding any extension.

(5) When a study has considered the feasibility of an extension, the analysis has sought to determine whether the single known prospective user (a mine for example) will have sufficient volume to warrant rail line construction. When the single user is found to not have enough volume, the rail line is concluded to be infeasible. No weight is given to the possibility that the rail line will open terrain, could generate other traffic of currently unknown origins, and could be shared by many users (eventually). In fact, no extension has been investigated to determine whether there would be benefits of simply creating ground access to currently inaccessible regions of the State. Other than oil, it is doubtful that any single Alaskan natural resource is sufficiently valued by the market to be able to afford its own transportation (rail) system. Certainly none have been found to date with that capability. If this is true, then it would follow that there will never be any rail line extensions unless the perspective is revised to look beyond the single known user. Such a perspective and process are presented in Report Section VI.

(6) It would appear that public sector decisions have been hindered (or made impossible) by the lack of detailed and comprehensive feasibility analysis, lack of a specific review or consideration process, and a lack of evaluation criteria.

(7) Of the few investigations that have examined economic or financial feasibility, they have typically used different analysis methods and cannot therefore be readily

compared one with the other. Those that have examined feasibility are typically not true railroad studies, but instead are the more comprehensive studies sponsored by DOT/PF (all-mode, regional studies).

(8) There appears to be a tendency to conduct "railroad" studies rather than "alternatives analysis." If the purpose is to create access to a region, any of several modes should be considered. The recent regional studies of the DOT/PF somewhat overcome this problem.

(9) The reasons for building an extension vary considerably -- access to coal, or mineral ores, or agriculture, or a port, or for military reasons, or to provide operating efficiencies for the existing railroad. An evaluation process with appropriate criteria, to be useful, should be capable of equitably handling this diverse range of rail extension purposes.

(10) It would appear that some extension proposals linger in the public eye and in the governmental sector well after they have been discounted and are no longer candidates in the eyes of the private sector. Some of the studies seem oriented to the creation of a holding pattern, leading to no decision, just further delay without any action.

(11) There appears to be a tendency to avoid speculation. If the known potential user of the line cannot justify the line, it is not built. While this may be prudent in the short-term, it also avoids the opening of new lands and resources. It appears that no research has been conducted on any of the extensions relative to their potential role in enabling economic development. Without such evidence, there is uncertainty which apparently leads to the status quo, and ultimately to no decision.

(12) There are established State and Federal programs and funds that can be used to study and to then build highways and airports. As a result, construction occurs. In the case of the rail mode, there is no funding program for railroad construction and very little money except for planning. Therefore, if anything major is to be done by the State, in all probability it requires special legislative appropriations, general fund use or innovative financing techniques.

2. Rationale for Extension Process and Criteria

If the State were to adopt a process whereby extension proposals could be reviewed, and were to adopt criteria to assess them, such processes and criteria need not dilute the important roles played by the State Legislature, the DOT/PF, the Alaska Railroad Corporation, and others. Rather, such processes and criteria would only seek to structure the evaluation process. Such a structuring process could have the following example advantages.

* Extension proposers would have available to them an outline of the phases and items that must be considered before an extension can be built. Their understanding and perhaps their realism would thereby be enhanced.

* The proposers would know who to contact relative to the extension proposal, who would review the proposition, and who to contact for data, comparable studies, and the like. A more informed and more complete proposal could therefore be developed.

* A mechanism could be set up that would keep a file on every extension possibility, for the use of all relevant entitites.

* A mechanism could exist to ensure that all relevant parties are notified of the proposition. Such sharing of information should lead to greater debate and understanding.

* The key issues could be exposed early. This is especially important, since the key implementation issues could decide the ultimate fate of the expansion.

* The expediture of vast sums on detailed studies could be avoided by a sound approach earlier in the process.

* The legislature, DOT/PF and ARRC would have a structured approach, which should be more informative, less misleading, and more cost-effective.

* A set of analysis methodologies could be developed, so that extension studies are comparable and properly done.

These arguments in favor of a process would appear to be even more valid now that the State owns the railroad. Many people and groups feel that the railroad must extend to other corridors, for a multiplicity of reasons. If this thinking is translated into extension proposals, the State will be thankful for a process by which such proposals can be considered.

D. Suggested Process and Criteria

It is recommended that the State adopt a process which provides some structure and order to the rail extension evaluation process. Within this context, however, the State could adopt any of a variety of methods.

1. Railroad Extension Implementation Process

Before a possible State role or process can be established, it is requisite that the rail implementation process be understood. The overall process, from project identification through construction, is presented in Table 5-1. This table seeks to place the process into five distinct and sequential phases. Each phase is intended to achieve specific purposes, and the desire is to provide an orderly sequence to the overall process, to avoid needless expenditures on Phase III studies when the proposed extension is still in Phase I or II.

* Phase I: Project Identification - This phase is intended to be informational, to let various agencies and entities know that an extension may be in the formative stages, and to identify various aspects of the extension proposition. At this point, there is no thought of studies or other public expenditures.

* Phase II: Pre-Feasibility - This phase entails brief studies and analyses, intended to see if the extension warrants detailed review. At this stage, the work is still of a preliminary nature, with low expenditures involved.

The purpose is to see if the more expensive Phase III work should be done.

* Phase III: Feasibility - In the third phase, the detailed and more expensive studies are conducted. It is here that the extension becomes a serious contender, and it is here that the economic feasibility and other studies are done in sufficient detail to enable a decision whether to proceed with final design and implementation or not.

* Phase IV: Final Planning and Design - This phase comprises all those things that must be done between the time that a decision to proceed with construction is made and the actual start of construction. Final design of the extension is one example of this phase's work.

* Phase V: Implementation - Finally, the implementation phase (actual construction) occurs.

Table 5-1
A SUGGESTED PHASING OF THE
RAILROAD EXTENSION IMPLEMENTATION PROCESS

PHASE I: PROJECT IDENTIFICATION

Purpose: An introductory phase, to let relevant agencies and others know that a rail line extension is beginning to be considered.

1. Identification Of What Extension Is Being Considered.
   * General corridor
   * Purpose or function
   * Rationale
2. Identification Of Participants
   * Proposer
   * Major potential rail extension users
3. Extension's Expected Key Issues Or Problems, For Example:
   * Cost
   * Funding
   * Right-of-way
   * Environmental and social
   * Other
4. Extension's History, If Any
   * Previous proposals
   * Previous studies
5. Proposal's Current Status
6. Possible Or Expected Roles For Various Participants
   * State government
   * Local government
   * Private sector
   * Alaska railroad
7. Other Items Thought Worthy Of Review And Consideration

PHASE II: PRE-FEASIBILITY PHASE

Purpose: Conduct brief analysis to determine whether the extension concept makes sense, to see if it has sufficient attributes to merit consideration, but without conducting detailed and expensive studies.

1. Prospective Rail Utilization
   * Cargo types
   * Origins and destinations
   * Cargo volumes
   * Other potential or conceivable cargo
   * Passenger use, if any

Table 5-1
A SUGGESTED PHASING OF THE
RAILROAD EXTENSION IMPLEMENTATION PROCESS
(continued)

2. Conceptual Alternatives Analysis And Rationale
   * Rail
   * Road and truck
   * Other
3. General Alignment Studies
   * General corridor
   * Alignment options
   * Map studies
   * Aerial reconnaissance (optional)
4. Right-Of-Way Acquisition Issues
   * Purchase
   * Lease or easement
   * Key difficulties
5. Supporting Facility Needs
   * Rail facility
   * Other facilities
6. Preliminary Estimates Of
   * Capital costs
   * Cost Effectiveness
   * Economic development impact
   * Environmental issues
   * Social issues
   * Implementation issues
7. Campatibility With
   * State plans and programs
   * Regional and local plans
   * Rules, regulations, laws
8. Open Dialog With Relevant Agencies
9. Expectations From State Government
10. Public Participation Plan

PHASE III: FEASIBILITY PHASE

<u>Purpose</u>: Conduct sufficient detailed studies to enable a decision to implement or not to implement.

1. Final Alignment Study
   * Field Surveys
   * Specific final alignment mapping
2. Track Profiles
   * Gradients
   * Facilities

Table 5-1
A SUGGESTED PHASING OF THE
RAILROAD EXTENSION IMPLEMENTATION PROCESS
(continued)

3. Conceptual Design
   * Track work
   * Structures
4. Quantities Extimates
   * Earthworks
   * Other
5. Cost Estimate Refinements
6. Financial Feasibility
   * Railroad capital costs
   * Railroad operating costs
   * Railroad revenues
   * Life cycle evaluation
7. Economic Feasibility
   * Induced development
   * Job creation
   * Efficiency
   * Production
     Total costs
   * Discounted costs and benefits
8. Environmental Impacts
   * Assessment (EIA)
   * Statement (EIS)
9. Social Impacts
   * Beneficiaries identification
   * Impacted person's identification
   * Key groups impact
10. Public Participation
11. Financial Plan
    * Responsibilities
    * Funding sources
    * Cash flow
12. Relationship With Alaska Railroad
    * Operations
    * Responsibilities
13. Applications To Appropriate Public Agencies
14. Institutional And Management Plan
15. Decision Whether To Implement

PHASE IV: FINAL PLANNING AND DESIGN PHASE

Purpose: Design the rail extension and conduct all other work leading up to actual construction.

Table 5-1
A SUGGESTED PHASING OF THE
RAILROAD EXTENSION IMPLEMENTATION PROCESS
(continued)

1. Engineering Design
   * Railroad facilities
   * Support facilities
2. Final Cost Estimates
3. Engineering Specifications
4. Project Implementation Program
5. Final Financial Plan
6. Approval By Public Agencies
7. Construction Plan

PHASE V: IMPLEMENTATION PHASE

Purpose: Construct the rail extension.

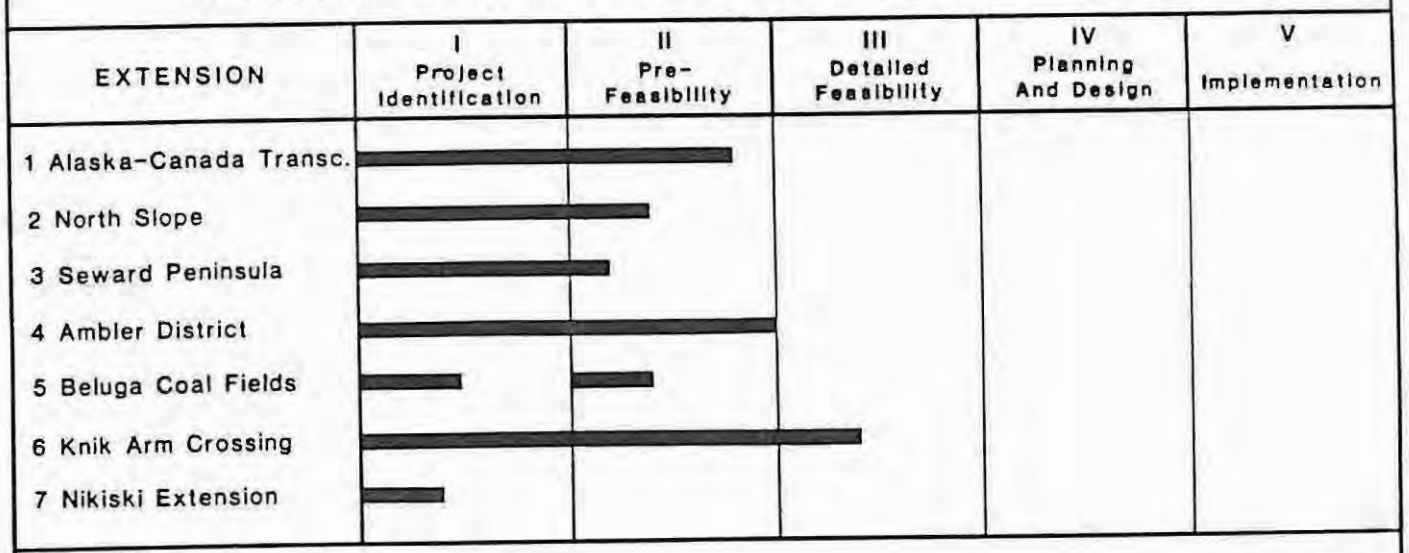
1. Right-Of-Way Acquisition
2. Bidding
3. Utility And Other Agreement
4. Construction
5. Construction Inspection

Source: Wilbur Smith and Associates

By dividing the process into these five phases, it is possible to visualize where each of the seven previous or current extension proposals are in the process. Figure 5-2 indicates that only the Knik Arm Crossing (rail component) entered Phase III: Detailed Feasibility, and this extension was found to be infeasible. The other proposals never went beyond the Pre-Feasibility Phase.

In other words, although several of the extension proposals have been around for many years, and despite a few studies, they really have not progressed very far.

GENERALIZED STATUS OF RAILROAD EXTENSION PROPOSALS



Source: Hellur Smith and Associates

FIGURE 5-2

2. State's Rail Extension Evaluation Process

Within the context of the Table 5-1 five phase implementation process, it is suggested that the State should have specific roles and functions relative to each phase. These roles and functions are identified on Table 5-2. Several significant points are made in Table 5-2, including the following:

a. Centralized State Review

It is recommended that the State's participation in the extension process be centralized and coordinated in one entity. While the creation of a new entity could be one means of establishing such a body, it is recommended that the DOT/PF already has the role due to its enabling legislation, its designation as the "official State rail planning agency" by the governor and the Federal Railroad Administration, its active and leadership role in the railroad transfer process, and the capabilities of its headquarters staff.

Because extension considerations must cover a wide range of interests and disciplines, it is also suggested that the DOT/PF utilize some type of advisory committee comprised of representatives of the ARR, various State agencies, and others. Such a Committee could meet only infrequently (only when an extension proposal is under active consideration by the DOT/PF) and will enable an orderly and informed approach to extension consideration and evaluation.

Such a centralized role by DOT/PF plus its advisory committee would not dilute the extension roles of the ARRC; rather, the ARRC would still determine by itself and for itself which extensions, if any, are in the railroad's best interests. The DOT/PF role would be different since it would determine which railroad extensions are in the State's best interests.

b. State Roles

Table 5-2 indicates, for several phases, that the DOT/PF should "...conduct, or guide, or review..." The reason for this range of roles is that rail extensions can be proposed by any of a number of interests, and for a variety of reasons. For example, if the extension is a State proposition, or with statewide significance, then the State should expect to actively conduct and/or fund much of the work. If a local proposition, the advise and review role might be more appropriate. If the extension is proposed by the private sector, then a more passive review role may be more appropriate. The proper State role, therefore, should be dictated by the extension proposition, rather than by some rigid quidelines.

c. Methodology Guidelines

It is also suggested that the DOT/PF rail extension group have overall methods and approaches to use when extension proposals are analyzed or reviewed. Such methods should be tailored to the specific phase of the proposal and should be utilized to avoid unnecessary or methodologically improper or misleading study. Report Section VI describes such evaluation methodologies: 1) A methodology to use when considering a rail line extension proposal, and 2) Methodologies to use when evaluating a State investment on the existing railroad.

3. Rail Extension Criteria

In addition to a rail line extension process and evaluation method, it is suggested that a set of criteria, or at least subject matter, be established. Any extension proposal should be expected to address the criteria at some point as it moves through the five-phase process. The generalized criteria, by

Table 5-2
A SUGGESTED STATE RAIL
EXTENSION EVALUATION PROCESS

ADMINISTRATIVE AFFAIRS PROCESS

Purpose: Centralize the rail extension review and consideration function within a single, designated, and knowledgeable body.

1. Agree that the DOT/PF is the proper entity
2. Form a rail extension Advisory Committee
   * Controls
   * Representative membership
3. Provide this Committee with specified but limited powers.
   * Powers of review and advice
   * Reporting requirements
4. Fund the extension review process
   * The DOT/PF function
   * The Advisory Committee function

PROJECT IDENTIFICATION PHASE

Purpose: To enable the DOT/PF and its Advisory Committee to be acquainted with all extension proposals, to know of their status, and to collect and disseminate information as needed.

1. Create and maintain a file on every extension proposal.
   * Obtain information from extension proposers
   * Create and keep current a file on each extension
2. Provide Advisory Committee members with relevant information.
   * Send information, as appropriate
   * Have meetings, as appropriate
3. Have information available for use by extension proposers, and others.
   * Copies of other extension studies
   * Sources of relevant information
   * Consultant list
   * Description of State's evaluation criteria
   * Description concerning the implementation process
4. Provide information to others.
   * Advise jurisdictions in the area of the extension
   * Notify others
5. Be prepared to respond to Legislator and other inquiries.
6. Budget funds for the Pre-Feasibility Phase

Table 5-2
A SUGGESTED STATE RAIL
EXTENSION EVALUATION PROCESS
(continued)

PRE-FEASIBILITY PHASE

Purpose: Conduct, or guide, or review the analysis and studies of this phase, in order to determine whether the extension proposal makes sense and whether or not it should proceed into the more detailed and expensive feasibility phase.

1. Prepare and have available an overall pre-feasibility analysis methodology.
   * Standard approach to economic effectiveness analysis
   * Lists of other items to be addressed in investigations
2. If State sponsored extension proposal, be prepared to conduct the necessary pre-feasibility phase studies and analyses.
3. If local government extension proposal, be prepared to conduct the studies, or to fund them, or to guide them and provide advice.
4. If private sector extension proposal, be prepared to provide study methodologies, to provide review and comment, and otherwise participate as warranted.
5. Assist local governments and other entities that might be affected by the proposed rail extension.
6. Budget funds for the Feasibility Phase

FEASIBILITY PHASE

Purpose: Conduct, or guide, or review the analysis and studies of this phase, in order to help determine whether the extension should be built.

1. Prepare and have available an overall feasibility analysis methodology.
   * Standard approach to economic benefit/cost analysis
   * Lists of other items to be addressed in detail
2. If State sponsored extension proposal, be prepared to conduct the necessary feasibility phase studies and analysis.
3. If local government extension proposal, be prepared to conduct the studies, or to fund them, or to guide them and provide advice.

Table 5-2
A SUGGESTED STATE RAIL
EXTENSION EVALUATION PROCESS
(continued)

4. If private sector extension proposal, be prepared to provide study methodologies, to provide review and comment, and otherwise participate as warranted.
5. Assist local governments and other entities that might be affected by the proposed rail extension.
6. Budget funds for the remaining phases
7. Apply for and/or acquire and/or preserve rights-of-way

FINAL PLANNING AND DESIGN PHASE AND IMPLEMENTATION PHASE

Purpose: Conduct, or guide, or review the design and implementation processes.

Source: Wilbur Smith and Associates

process phase, are depicted in Figure 5-3. As shown, most criteria are suitable for use in Phases II and III.

a. Engineering Criteria

Given Alaska's terrain, weather variations and high implementation costs, any rail line extension should meet engineering criteria that are specific to the State of Alaska. The criteria or items that should be addressed are listed in Table 5-3. Rather than specify criteria standards, it is suggested that the specific standards can be obtained from six relevant sources:

* "Manual of Recommended Practice of the American Railway Engineer's Association" (AREA).
* "Alaska Transportation Study," by Tudor-Kelly-Shannon, Interim Report #4, 1971,, "Criteria for Preliminary Design."
* Special Standards of the Alaska Railroad
* "Standard Guide Specification," U. S. Army Corps of Engineers
* "The Standard Specifications for Highway Bridges of the American Association of State Highway and Transportation Officials" (AASHTO).
* "The Standard Specifications for Highway Construction," State of Alaska.

A key point is that the engineering criteria apply only in the most generalized sense in Process Phases I and II. They should come into play in a serious way only in Phase III. -- after it is established that the rail extension makes sense, may be feasible and warrants the expenditure of sizeable funds relative to detailed study.

b. Financial and Economic Criteria

Prior to the application of engineering criteria is the need to establish and apply financial and economic criteria. The financial criteria should view the extension prospect from the

veiwpoint of the railroad -- and whether or not the project will pay for itself in the railroad cost and revenue sense. The economic criteria on the other hand, should view the extension from the perspective of the State or region as a whole, with emphasis on jobs, payroll, and induced economic activity. It is likely that an extension can be financially infeasible, but economically feasible.

Table 5-4 presents a checklist of suggested financial and economic criteria. Effectively, the financial issue is to estimate life cycle costs and revenues to see if the railroad will earn a profit. The economic issue is intended to ultimately lead to a quantified benefit/cost analysis, to show economic feasibility from the total State's economic perspective to see if the discounted B/C ratio is equal to or greater than 1.0, the internal rate of return is in excess of the real (excluding inflation) opportunity cost (4 or 5%), and the net present value is positive. Refer to Report Section VI for a more detailed description of the economic evaluation methodology.

c. Environmental Criteria

Any rail line extension should also meet State and federal requirements for Environmental Impact Statements/Assessments. Such detailed work, however, should await Process Phase III, since it is expensive and should only be done if the prospects are good relative to a feasible extension. Earlier in Phase II, however, the environmental items listed on Table 5-5 should be reviewed and considered in a general sense -- to see if there are any major environmental issues that might ultimately cause the extension proposal to prove impossible. Examples of such key elements are ice fields, Native lands, (d)(2) lands, and the like.

RAIL LINE EXTENSION CRITERIA APPLICATION BY PROCESS PHASE

APPLICABILITY BY PROCESS PHASE

	I. PROJECT IDENTIFICATION	II. Pre-FEASIBILITY	III. FEASIBILITY	IV. PLANNING AND DESIGN	V. IMPLEMENT
ENGINEERING ASPECTS:					
General Corridor	●				
Alignments		⊙	●		
Preliminary Design			●		
Final Design				●	
Operations		○	⊙	●	
FINANCIAL ASPECTS:					
Rail Line Use	○	⊙	●		
Railroad Revenue		○	●		
Railroad O&M Costs		○	●		
Capital Costs		⊙	●		
Financial Analysis		○	●		
Funding Analysis		○	⊙	●	
ECONOMIC ASPECTS:					
Cost Effectiveness	○	●			
Economic Costs		⊙	●		
Economic Benefits		⊙	●		
Feasibility Indicators		○	⊙	●	
ENVIRONMENTAL ASPECTS:					
Key Issues	○	⊙	●		
Land Impacts		⊙	●		
Environmental Impacts		○	●		
SOCIAL ASPECTS:					
Impacted Groups	○	⊙	●		
Lifestyle Implications		⊙	●		
Community Impacts		○	●	●	
Land Use Impacts		⊙	●		
Subsistence Impacts		○	●		
Public Review	○	⊙	●	●	

NOTE: "○" denotes some idea or concept of the answer
"⊙" denotes a preliminary, quantified estimate
"●" denotes best estimate based on detailed study

SOURCE: Wilbur Smith and Associates

FIGURE 5-3

d. Social Criteria

State and federal requirements for Environmental Impact Statements/Assessments and for right-of-way grants and permits establish a minimum set of social criteria and public notice procedures that any rail line extension should meet. Beneficial and adverse social impacts associated with a rail line extension cannot be assessed in detail until Process Phase III, i.e., until the economic and environmental impacts have been identified and analyzed. Communities and other social groups likely to be affected by a rail line extension, however, should be identified in Process Phase I and any applicable, current local land management and use plans should be reviewed in Process Phase II to anticipate major social issues or controversies that may be induced by the rail line extension proposal. The intent of the social analysis is to gauge the impact of any extension proposition on people, their lifestyles and their social conduct and well being. Table 5-6 presents social criteria that should be addressed prior to any rail line extension decision.

E. Railroad Extension Concepts

The following summarizes concepts which could govern in Alaska when railroad development is considered by the State outside of the Railbelt. They are drawn from some recent experiences in Canada and elsewhere in the U. S.

1. Characteristics of Recent Rail Extensions

During the last 30 years, only a handful of significant new railroads or extensions have been built in North America, and each was designed to haul coal or iron ore. These rail lines include: 1) the Quebec North Shore and Labrador (iron ore), 2) the Black Mesa and Lake Powell in Arizon (coal), 3) the Tumbler

Ridge in British Columbia (coal), 4) the Powder River Cutoff in Wyoming (coal), 5) the Lee Ranch Mine Spur in New Mexico (coal), 6) the Deserado Bonanza Western in Colorado (coal), 7) the Cartier Railway in Quebec, 8) and possibly a few others depending on one's definition of "significant" new rail lines. These railroads had the following elements in common:

* The line was based on hauling a dominant bulk commodity.
* The line was designed to carry a resource upon which the user was completely dependent (e.g., power plant designed to burn a specific coal) or a resource which was relatively insensitive to world market prices.
* The line often provided direct rail service between producing and consuming points by rail. (The iron ore line did involve a linehaul mode change between rail and water, and the Powder River line and others connected to the overall U.S. rail network.)
* In several instances the three principal components: (1) the resource (pit or mine), (2) the rail line itself, and (3) the receiver, were owned or controlled by the same corporate entity.
* Competing highway facilities are or were not available or the tonnage was such that highway was an ill-suited mode.
* A relatively long haul was involved.
* Substantial tonnage, well above the minimums required to sustain rail operations on a continuing basis, were reasonably certain.
* There was little or no need to interchange traffic with other railroads.

Against this, it is worthwhile to contrast the White Pass and Yukon Railway, a bulk minerals carrier over which service may never be restored. The WP&Y had the following elements:

* A very small shipper base.
* No corporate interlocking; each extractive industry could make its own transportation arrangements.
* No long term commitment either by shippers to use the service or the railroad to provide the service.
* A long linehaul distance involving two intermediate terminals: truck to rail and rail to water. Rail distance constituted a small portion of total linehaul distance.
* A railroad cost structure conducive to competition brought about in the first instance by labor (high salaries, contracts requiring excessive crew size) and the lack of economies of scale achievable with narrow guage equipment.

Table 5-3
ENGINEERING CRITERIA CHECKLIST
Rail Line Extension Proposals

ALIGNMENT ASPECTS:

General Corridor
* Termini of Line
* Topography
* Mapping

Alignments
* Rights-of-Way Lands
* Grades and Curvature
* Foundation and Materials
* Safety
* Service to Communities
* Environmental Issues
* Generalized Cost

DESIGN ASPECTS:

Geometrics
* Clearances
* Design Speed (Ruling and Other Grades)
* Vertical Alignment (Control Gradients, Compensation, Vertical Curves)
* Horizontal Alignment (Control, Circular Curves, Superelevation, Spiral Transition, Curves, Rights-of-Way Widths)

Structures
* Loading (Live, Impact, Wind, Temperature, Ice Forces, Earthquakes)
*Materials (AREA Manual)

Bridge & Trestle Foundations
* Pier Foundation
* Piles (Types, Ice Jacking, Bearing Capacity)

Earthworks
* Roadbed Standards
* Embankments
* Excavation
* Slope Protection
* Construction Season

Hydrology and Drainage
* Flood Frequency Design (Culverts, Bridge Spans)
* Peak Discharge
* Flood Clearances

Trackwork
* Ballast (Material, Dimensions)
* Ties (Materials, Dimensions, Spacing)
* Rail (Jointed or CWR, Weight)
* Fastenings, Anchors and Appurtenances
* Turnouts

RAILROAD OPERATIONS:

Service Levels
* Train Speeds
* Frequency
* Service Types

Utilization
* Tons
* Type
* Form
* Origin/Destination

Source: Wilbur Smith and Associates

Table 5-4
FINANCIAL/ECONOMIC CRITERIA CHECKLIST
Rail Line Extension Proposals

FINANCIAL FEASIBILITY ASPECTS:

Rail Line Use
* Cargo types
* Volumes
* Origin/destination
* Number of rail users
* Use alternatives
* Certainty of use
* Duration of use
* Line capacity needs
* Equipment capacity needs
* Use variations
* Induced demand

Railroad Revenue
* Rate expectations
* Annual revenues now
* Future annual revenues

Railroad O&M Costs
* Transportation
* Maintenance of way and structures
* Maintenance of equipment
* Traffic
* General overhead

Capital Costs
* Line construction
* R/W acquisition
* Equipment

Financial Evaluation
* Financial performance estimates
* Life cycle analysis
* Sensitivity analysis
* Funding analysis

ECONOMIC FEASIBILITY ASPECTS:

Cost Effectiveness
* Generalized capital cost
* Annualized cost per ton
* Annualized cost per car
* Induced jobs
* Ton value versus rail rate

Economic Costs
* Economic portion of capital costs
* Future capital costs

Direct Economic Benefits
* Railroad profit (loss)
* Railroad employment/payroll
* Railroad local purchases
* Induced jobs/payroll
* Induced purchases
* Induced local profits
* Induced tax base

Indirect Economic Benefits
* Basic impacts
* Non-basic impacts
* Economic multipliers

Feasibility Indicators
* Discounted benefit/cost
* Net present value
* Internal rate of return
* Distribution of benefits and costs

Impacts During Construction
* Displacements
* Economic Disturbances
* Jobs and payroll

Source: Wilbur Smith and Associates

Table 5-5
ENVIRONMENTAL CRITERIA CHECKLIST
Rail Line Extension Proposals

LAND IMPACTS:

Land Use
* Types (Towns, Farming, Mining, Timber, Other)
* Displacements
* Development Patterns
* Plans and Regulations

Terrain Types

Protected Properties
* Types (Parks, Recreation Areas, Wildlife & Waterfront areas, Historic Sites, Others)
* (d)(2) Lands

Land Ownership
* State (Potential, Tentatively Approved, Pending)
* Federal (BLM, U.S. Fish & Wildlife Service, Military, Other)
* Alaskan Native (Regional and Native Selected, Reservation)
* Private

Geologic and Hydrological
* Flooding (River, Glacier)
* Ice Fields
* Slides
* Faults

ENVIRONMENTAL IMPACTS:

Wildlife
* In Corridor, by Type
* Habitat (Prime, Important)
* Threatened or Endangered
* Subsistence Activities

Vegetation
* Plant Communities
* Threatened or Endangered

Water
* Water Quality (Turbidity, Sedimentation, Chemical Pollutants, Biodata)
* Groundwater and Wetlands
* Flooding

Air Quality
* Air Quality Classification
* Air Pollutant Emissions
* Conformity with State Plan

Noise and Vibration
* Impact Zone
* Attainment of Federal Noise Emission Standards for Railroads

Archeological, Historic, and Cultural Resources
* Sites
* Survey Needs

Scenic Aesthetic Resources

Source: Wilbur Smith and Associates

Table 5-6

SOCIAL CRITERIA CHECKLIST
Rail Line Extension Proposals

IMPACTED GROUPS:
* Identification
* Location
* Native Groups
* Individuals
* Nature of Impact

LIFESTYLE IMPLICATIONS:
* Family Roles
* Traditions Impacts
* Social Interaction
* Social Cohesiveness
* Goods, Services Availability
* Employment, Income

COMMUNITY IMPACTS:
* Accessibility, Isolation
* Right-of-Way Acquisition
* Disruption
* Community Identity

LAND USE IMPACTS:
* Existing Land Uses
* Land Use Plans
* Native Lands
* Higher Uses
* Access Impacts

SUBSISTENCE IMPACTS:
* Cash Economy
* Employment
* Habitat
* Wildlife
* Social Roles
* Family Roles

PUBLIC REVIEW:
* Proper Public Notice
* Groups Participating
* Locations of Review
* Extent of Participation
* Capacity to Participate

SOURCE: Wilbur Smith and Associates

2. Conditions Needed for Alaska Railroad Extension

Consequently, it would seem that the following conditions tend to favor rail extensions in Alaska, either within the Railbelt or outside.

* A bulk commodity where the loading and unloading operations can be automated so as to achieve sufficient tonnage volumes.
* A relatively long total rail haul, e.g.,200 miles, to enable it to be more cost effective than a road.
* A sizeable annual tonnage to be carried.
* Difficult terrain, costly construction conditions, and environmentally sensitive areas to be avoided to the extent possible.
* A railroad built to reasonably high standards so as to minimize operating and maintenance costs.
* Absence of competing, parallel highways. Fully allocated new construction railroad costs make rail quite expensive, with the result that new rail service cannot afford to give the shipper a choice among modes, unless the tonnage is extremely heavy and the length of haul is extremely long.
* Whenever possible, shippers should have a stake in the success of the railroad through investment. It would be risky for government to assume the full responsibility of putting up the capital for a railroad project, unless it controls the usage of the line.
* Railroad could be either privately operated by a for-profit organization or by a non-profit organization comprised of the shippers (e.g., the Alyeska Pipeline model).
* The Alaska Railroad should operate the line only if it interconnects, or if it can do so at less cost than a separate organization through shared administration and other centralized facilities.
* It is not necessary that a new railroad interconnect with the Alaska Railroad; a resource-to-port line will make more sense if the resulting length of the line is substantially reduced by not interconnecting. In other words, the lesser present cost (capital and operating) of (1) a separate line plus port facilities, versus (2) an interconnected line.
* Ideally there should be a guaranteed minimum level of traffic, or some revenue source that will permit operations to continue should traffic levels drop below a breakeven point. The mechanism for accomplishing this is unknown. In other words, shipper discontinuance of

extractive operations or choosing another mode must not destroy the viability of the line for other shippers nor impose operating or debt service costs upon government. (In actuality, this may be a very difficult condition to implement.)

* The State should not develop railroads on a speculative basis. There is no guarantee that development will follow railroad construction. The recent extension of the British Columbia Railway is an excellent example of not following this principle.
* Mineral deposts should be world class in size and ore content and quality; mining operations should use modern and efficient extraction and concentration processes; and the mines must be profitable and be price competitive on world markets at prevailing exchange rates and price levels.

3. Other Elements Relative to Railroad Extensions

Some additional thoughts relating to rail and highway development, including extensions:

* Railroads are very capital-intensive, long-term investments which, in this day and age, can be justified for new construction in only unique situations.
* A railroad requires threshhold traffic levels in order to sustain operations; they are extremely uneconomic at low output. Railroads are not very useful if low traffic forces a cessation of operations, whereas a highway will continue to function regardless of freight traffic levels.
* To be useful, the whole railroad facility must be provided. Highways lend themselves far more to incremental development.
* Highways are a more flexible, less risky investment. They do not have threshhold traffic levels.
* If an extension is contemplated into hardrock mineral areas, rail lines need not necessarily be connected to individual mines or pits, but rather could be connected by "collector" haul roads connecting these facilities with transfer facilities provided at centralized locations.
* The traditional method for paying for public highways may be inapplicable in development areas. In short, capital and maintenance costs are spread over the entire vehicle base in the state. A facility strictly used as a haul road should be paid for by the industry benefited by the facility. If it is also used by local traffic, the resource industry should pay the incremental cost of build-

ing and maintaining the highway to higher standards than would otherwise be required.

* The Alaska Railroad should not entertain extensions unless it can be proven that the revenues generated exceed on and off branch costs of the movement, and hence result in increased profitability for the system as a whole. If required to provide the service for economic or social reasons, the railroad should be reimbursed for its out-of-pocket costs.
* On the other hand, the framework for State decision making for an extension should take into account socio-economic benefits as well as those relating to transport costs and revenues. This framework is described in Report Section VI.

References

1. Alaska Department of Commerce and Economic Development, "Alaska - Canada Transcontinental Rail Connection to Contiguous United States", June, 1977.

2. Alaska Department of Transportation and Public Facilities, "Alaska Railroad Extension: Eielson to Canadian Border, Route Selection Project X 200089", July, 1979.

3. Senate Committee on Transportation, "The Alaska Railroad", December, 1979.

4. Institute of Social and Economic Research, University of Alaska, "Transportation Systems Planning for Alaska", November 30, 1979.

5. Alaska Legislative Affairs Agency, "Feasibility Study, Proposed Extension of the Alaska Railroad from Eielson AFB to the Canadian Border", by Larry Orsini Associates, Inc., December 10, 1980.

6. Alaska Department of Transportation and Public Facilities, "Interior Alaska Transportation STudy", by Louis Berger and Associates, Inc., 1982.

7. Alaska Department of Transportation and Public Facilities, "Alaska Railroad Extension, Eielson to the Canadian Border, Environmental Assessment", July, 1983.

8. The NORTH Commission, "Extension of the Alaska Railroad", by EBS Management Consultants, Inc., November, 1967.

9. Federal Highway Administration, "Alaska Transportation Corridor Study", by Tudor-Kelly-Shannon, April, 1972.

10. Alaska Department of Transportation and Public Facilities, "Western and Arctic Alaska Transportation Study", by Louis Berger and Associates, Inc., December, 1981.

11. U. S. Army, "Reconnaissance and Survey for a Land Route from Fairbanks to Council City, Alaska", the Richardson Report, 1906.

12. U. S. Army, "Reconnaissance for Railroad or Highway West from Fairbanks", 1942.

13. U. S. Army, "The Berryhill Report", 1943.

14. Alaska Department of Highways, "Fairbanks to Nome Study", 1967.

15. The NORTH Commission, "Report of the NORTH Commission", 1967.

16. The Harvard Business School, "Alaska Railroad Study", 1982.

17. Alaska Department of Highways, "Knik Arm Highway Crossing", by Howard, Needles, Tammen & Bergendoff, January, 1971.

18. Alaska Department of Transportation and Public Facilities, "Knik Arm Crossing", by EMPS - Sverdrup, 1983-84.

19. Alaska Transportation Consultants, Inc., "Knik Arm Railroad Crossing Feasibility Study", July, 1984.

VI. RAIL INVESTMENT EVALUATION PROCEDURES

As stated in Section V, it is recommended that Alaska adopt analytical methodologies that are suitable for evaluating rail line extension proposals and for evaluating other public sector investments relative to the rail mode. This Report Section describes these recommended methodologies.

A. Economic Evaluation Principles

It is recommended that Alaska utilize cost/benefit analysis when making its decision concerning the appropriateness of a major public investment relative to the rail mode. Such an approach, based on sound economic principles, provides a proper framework by which rational decisions can be made.

The economic principles and techniques described herein, however, are designed as quidelines only. There are some project types that lend themselves to such analysis; in other instances, the project types are not suitable for such analysis or time and data limitations might prevent these quidelines from being precisely applied. Since most major investments lend themselves to such analysis, such analysis is strongly recommended for major projects.

1. Economic Evaluation Concept

The suggested approach is to quantify the costs of implementing the project, to quantify the benefits expected to accrue from the project, and to compare the costs and benefits using standard economic evaluation procedures.

a. Frame of Reference

The principal thrust of rail line evaluation is to determine the extent of the impacts of various transportation options on all parties involved in a rail line issue. This includes the owning railroad, the users (shippers/receivers) of rail service, the communities through which the rail line passes, and the total State and its residents. In this sense the frame of reference is the total State, and all of its residents and entities.

b. Benefits and Costs

The costs are the economic costs (resource consumption) of building the rail project. Costs include land and equipment acquisition, labor and material, but do not include railroad operating costs since such costs are included in the benefit calculations (as either positive or negative benefits depending on whether the net costs are positive or negative). The costs are expressed in economic resource terms and are tabulated by expected year of outlay.

The rail project benefits comprise quantifiable economic gains due to project operation, including cost savings (operating cost savings), induced payroll, local expenditures on material and equipment, and, others. The benefits are also estimated by year of occurence, typically over a 20 to 50 year time period.

c. Benefit and Cost Comparisons

The cost and benefit streams are expressed, by year, over the project's anticipated operational lifespan. All are expressed at constant price levels (exclusive of future inflation). The costs and benefits are then compared using any of three indicators of economic feasibility, as follows:

* Discounted Benefit/Cost Ratio -- All future benefits and costs are discounted utilizing an appropriate discount rate. The total discounted benefits are then divided by the total discounted costs, and the resulting ratio is used to judge feasibility, e.g., if the ratio is greater than 1.0, the venture is deemed economically feasible.

* Net Present Value -- Using this indicator of feasibility, the future benefits and costs are discounted, and the total discounted costs are subtracted from the total discounted benefits. If the difference is a positive value, the venture is deemed economically feasible.

* Internal Rate of Return -- This indicator of feasibility compares the costs and benefits and finds that discount rate at which total discounted benefits equal total discounted costs. If the resultant discount rate exceeds the opportunity cost of capital, the venture is deemed economically feasible.

Typically any or all of the above indicators of feasibility can be used, with similar results. These indicators of economic feasibility can and should be used for any of the evaluations of major State investments in the rail mode -- as long as the project's economic benefits and costs can be properly quantified.

2. Economic Principles

To utilize the above methods, a variety of analysis principles must be adopted. Examples include the following.

a. Price Levels

All costs and benefits should be expressed at a common year's price levels, e.g., the current year. This means that future inflation is not included in the calculations.

b. Opportunity Cost

The opportunity cost concept should be used in any economic evaluation of possible State investment. It can be defined as

the value of an alternative foregone in order to achieve a particular objective. In other words, the value of a resource used in a rail line project is the maximum contribution that the resource would have made if it had been employed in the production of some other good or service. As an example, labor which would otherwise be unemployed might be used on a rehabilitation project. Since no projects or services have to be foregone to put this labor to work on the project, the opportunity cost of labor, in this particular situation, would be zero. This is an extremely important concept in the overall economic evaluation process.

c. Shadow Prices

"Shadow prices" are defined as the value of the contribution to the State's basic socioeconomic objectives made by any marginal change in the availability of commodities or factors of production. Shadow prices, rather than market prices, should be used anywhere in which distortions may be expected to persist; they are not the equilibrium prices that would prevail in a distortion-free economy. Where possible, shadow prices should be applied to cover the worth of social benefits or losses that are either unpriced by the market or are artificially priced. For example, the use of a shadow price for crew wages is important for evaluating the labor-savings impact of a rail line improvement. The applicable monetary wage may be associated with the process of collective bargaining and, therefore, not represent the true opportunity cost of the resource. Consequently, an adjustment to prevailing market prices may be required in some circumstances.

d. Discount Rate

One interpretation of an appropriate discount rate is an estimate of the average rate of return that is expected on private investments before taxes and excluding inflation. This interpretation is based on the concept that the alternative to the capital investment by government is to leave the capital in the private sector. Alternatively, if the alternative use for the funds is a different government project, then the discount rate should be the cost of State government borrowing.

In recognizing that nominal discount rates reflect both the effects of inflation and the true opportunity cost of money, and since all costs and benefits will be expressed in constant dollars (exclusive of inflation), it follows that only the real discount rate reflecting only opportunity cost will be used. A nominal discount rate equals real return e.g., 4%, plus inflation expectation, e.g., 7%, plus risk, e.g., 2% for a total of, e.g., 13%. When using constant price levels, the real (as opposed to the nominal) discount rate in this example is 6%. In Alaska, a real discount rate of 4% to 6% is suggested, given today's economic climate.

e. Project Life

Both the expected physical life and the possibility of technological obsolescence serve as upper limit parameters in estimating the life of a project. The critical determinant is the useful life of the project. Alternatively, some project analysis periods should be defined as the period over which demand for service and service provision are assured.

f. Salvage Value

Salvage value of materials and/or other items used in the assistance project remaining at the end of the project period becomes a benefit of having implemented the project. These values are estimated by computing the life of the project component for the conditions under which it will be utilized and determining the life remaining at the end of the project term.

g. Intangible Benefits and Costs

Project alternatives will sometimes have identifiable impacts that cannot be quantified but are still relevant to public investment decisions. Many projects may also have significant environmental or energy impacts that can be quantified, but cannot be incorporated in a standard measurement of economic feasibility. The general economic conditions which prevail in a community may also be an important consideration, e.g., if the project would change the lifestyle of the community's residents, this must be evaluated. State or local plans, goals, or policies that reflect the significance of intangible benefits and costs may also be relevant. Those factors which can be quantified, along with those which cannot, should be incorporated into a general discussion but not included in the formal benefit/cost assessment.

h. Distribution of Benefits

Finally, the distribution of benefits or disbenefits could also be considered. While benefits may accrue to the local community, (to the disbenefit of another Alaska community), they are not measures of economic efficiency from a State viewpoint and are not quantified in the analysis. Thus the distribution of benefits and disbenefits, who wins and who loses, is not

tabulated in a rigorous accounting approach, but are specified and listed by the groups of impacted parties.

3. Evaluation Methods by Project Type

The State of Alaska could invest in any of a variety of railroad ventures or projects. Some project types lend themselves quite well to the types of economic analysis described herein; others do not.

a. Project Types Suitable for Economic Evaluation

Three example project types that are well suited to economic evaluation are:

* Rail Line Extensions -- Any significant new rail line constuction should be subjected to a rigorous economic evaluation (see this Report Section C).
* Rail Efficiency Projects -- Any significant project that is intended to help railroad operations and reduce costs for the benefit of rail users and the State economy can be subjected to the economic evaluation process, but in a slightly different manner than the typical rail line extension project.
* Rail Line Abandonments -- The abandonment of a rail line or rail service has an economic evaluation methodology which has come to be a standard FRA-approved approach.

The principles used to assess each of the above project types are similar, although the details vary. A method for each is presented herein.

b. Project Types Not Suitable for Economic Evaluation

While economic evaluation methods are completely appropriate for some projects, there are some projects wherein the processes are less suitable. These include:

* Small projects wherein such detailed analysis is not warranted
* Safety-oriented projects
* Pure public policy projects
* Others wherein economic benefits cannot legitimately be quantified.

B. Rail Line Extension Evaluation Methodology

If the State were to seriously consider extending the railroad to presently unserved regions, it presumably will be doing so for one or both of the following reasons:

* Develop a natural resource area, and carry the commodity out on the new rail extension.
* Use rail to access new regions of Alaska, for developmental and possibly other purposes.

In each case the rationale would be economic development (of some type) and consequently the extension(s) are well suited to the application of economic evaluation, as long as the economic evaluation method is based on economic development principles.

1. Circumstances Involving State Investment in Extensions

Construction of a rail line in the United States by State government is a most unusual occurrence, since such funding and construction is perceived to be a proper function of the private sector. In Alaska, however, the Alaska Railroad is not private, and the private sector has not built such line extensions for a long time in Alaska.

a. When State Should Not Build an Extension

It is suggested herein that there are instances wherein the State should not fund and build a rail line extension. Situations where such a "no build" decision is proper include:

* Sometimes if a proposed rail line were to serve the interests of only one user, e.g., a natural resource developer, a state might not offer to build a rail line to serve that single user since, to do so, might give the appearance that the state would provide a "subsidy" to that single private firm. However, the State should consider such events on a case-by-case basis, since the State's residents might gain appreciably by a single user line, e.g., the "Red Dog" example, since the overall project might be of great economic advantage to the State.

* If the total development (mine, processing, transport, etc.) is capable of being financially feasible, it would appear that the private developer would build the rail line as part of the venture, without State assistance.

* If the products to be carried are of sufficient value and volume to pay rail rates sufficient to cover the railroad operating costs and debt recovery, the rail element is therefore feasible and the Alaska Railroad could undertake the extension project without State funding.

* If the overall project is not economically feasible.

b. When State Might Consider Building an Extension

If the above are perceived as valid practices, it then follows that the State of Alaska should become involved in funding and building rail line extensions when a series of other circumstances are present, including:

* There will be more than one rail user, so that the benefits are spread over numerous participating entities, and
* The rail line (construction and operation) will not be a self-liquidating venture and therefore needs outside capital assistance, and
* The total development will not occur unless outside (State) assistance is made available, and
* It is in the best interests of the State and its residents to make the necessary funding commitment to enable the project to be undertaken.

The last element is the crux of the issue -- "When is it in the State's best interest to commit resources to rail line extension development of this type?"

2. State Evaluation Perspective and Evaluation Concept

If State of Alaska funds are to be used to build a rail line extension, it should be because the State will be better off with the extension (and the expenditure) than without it. In this sense, the rail extension must satisfy the interests and objectives of the State.

a. The State Perspective

The evaluation process should take the perspective of the total State; effectively, the State should be viewed as an entity, (e.g., a company), and the project should be done only if the entity is better off with than without the project. When one project is undertaken using State funds, that means that another project is not undertaken or that money is taken from the individual residents and transferred to the project. This choice of what to do with public funds has consequences for employment, output, consumption, savings, earnings, income distribution, equity and a wealth of other factors.

b. Rail Extension Profitability

If the State were a private company, it could express its goal as profit maximization and then evaluate the project in terms of total profits. While the State is not a private company, it is suggested that the extensions should still be evaluated according to the profit criterion -- but that State profits should be defined to include all things that have benefit, rather than merely bottom line money. In this sense, State benefits could include, among others:

* Aggregate consumption (standard of living)
* Income distribution (equity)
* Employment (reduction of unemployment and under employment)

* Self-reliance (reduce State trade deficit)
* Increase in tax base
* Others

If any of these are improved, the State is perceived to "benefit." If these aggregate economic benefits equal or exceed the project's economic cost, the project is said to be feasible, from the State's perspective.

3. Social Benefit/Cost Analysis

If the State has already decided to penetrate an inaccessible area but the only decision is how (highway or rail), the evaluation is done on a least total cost basis. The total costs of building and operating the road are compared with the total costs of building and operating the railroad. If the decision is whether it is feasible to build a rail line only, and the purpose is to develop an area or a resource that otherwise could not be developed, then the economic development principles apply rather than the transport efficiency principles.

a. Cost and Benefit Perspective

Almost any rail extension project will include both public and private funds. For example, while public funds might be used to construct a rail line, private funds will likely be used to construct the coal mine, to provide the infrastructure necessary to mine the coal (electricity, housing, etc.), and to build other developments such as associated agricultural development.

For purposes of cost/benefit analysis, does the analyst include only the public costs, e.g., rail line construction, or all costs, e.g., the railroad, the mine, all infrastructure, etc? Either position is technically acceptable, as long as the

benefit calculations are tailored to the cost perspective definition. For example, if only the public railroad costs are included, it is then not acceptable to include the coal mine development as benefits. Therefore, to avoid having to distinquish between benefits attributable to the public sector investment and those attributable to the private sector, it is suggested that the analysis be as broad as possible -- to include all costs and all benefits (public and private). In this way, the analysis determines whether the total project (not just the railroad) is economically feasible, from the overall State perspective.

b. Economic Costs of Implementation

The costs include only the capital investment items, inclusive of land, labor and material. The cost side of the B/C equation does not include any type of operating costs or cost savings, since such items are included on the benefit side of the equation (as positive or negative benefits).

The capital costs are not simply the market prices paid. Instead, since it is an economic evaluation, the costs are calculated using three economic principles:

* Transfer Payments - The costs should only include those items that involve resource consumption. Costs of merely transferring monies from one place to another are not to be included, e.g., tax payments are merely a transfer from the private sector to the public sector and are therefore not included as a capital cost.

* Opportunity Costs - The cost is equal to the opportunity foregone, rather than the actual payment, e.g., the employment of a previously unemployed person has no economic cost.

* Shadow Prices - If any factors of implementation are artificially priced, the estimated shadow price should be used (the shadow price could be higher or lower than the market price).

All capital costs are depicted by the estimated year of occurrence, over the lifespan of the project.

c. Economic Benefits of Implementation

The economic benefits are equal to the value of goods and services produced, less the exported from Alaska costs of producing them. In the case of a rail extension that penetrates a new area thereby enabling development of a major coal mine and an agricultural area, the benefits equal the value of the coal and the agricultural products less their costs plus resultant Alaska tax receipts and Alaska resident income. Like the capital costs, the benefits side of the equation also reflects the opportunity cost and shadow price principles.

The economic benefits depict money that will exist in Alaska that would not exist if the project were not undertaken. For example, Alaskan corporations would have profits not otherwise available, the project will generate taxes for the State and its local jurisdictions, the project will provide jobs and generate personal income that otherwise would not exist, and so on.

d. Cost and Benefit Comparison

Once the costs and benefits are calculated, it is a simple process to compare them. An example B/C comparison is depicted on Table 6-1. This table depicts a hypothetical rail line extension that would serve a hypothetical new coal mine and agriculture area. The economic costs of building the hypothetical rail line are seen to be $460 million, spread over 4 years, and the mine's costs and the agricultural investment are similarly spread over their period of implementation. Recurring major investment costs (major rehabilitation) are also shown

TABLE 6-1
EXAMPLE RAILROAD EXTENSION
ECONOMIC FEASIBILITY CALCULATION
($ MILLIONS)
DISCOUNT 4.0%

	COSTS					BENEFITS					
YEAR	RR	MINE	AGR.	OTHER	TOTAL COST	PROFITS	TAXES	INCOME	OTHER	TOTAL BENEFIT	NET
1985	0.0	0.0	0.0	10.0	10.0	0.0	1.0	3.0	1.0	5.0	-5.0
1986	10.0	20.0	4.0	15.0	49.0	0.0	1.0	4.0	2.0	7.0	-42.0
1987	50.0	40.0	8.0	10.0	108.0	0.0	1.0	4.0	2.0	7.0	-101.0
1988	200.0	60.0	10.0	10.0	280.0	1.0	3.0	6.0	3.0	13.0	-267.0
1989	200.0	60.0	10.0	10.0	280.0	1.0	3.0	6.0	3.0	13.0	-267.0
1990	0.0	0.0	0.0	0.0	0.0	5.0	5.0	15.0	5.0	30.0	30.0
1991	0.0	0.0	0.0	0.0	0.0	5.0	5.0	15.0	5.0	30.0	30.0
1992	0.0	0.0	0.0	0.0	0.0	6.0	5.0	15.0	5.0	31.0	31.0
1993	0.0	0.0	0.0	0.0	0.0	6.0	5.0	15.0	5.0	31.0	31.0
1994	0.0	0.0	0.0	0.0	0.0	7.0	6.0	16.0	5.0	34.0	34.0
1995	0.0	0.0	0.0	0.0	0.0	7.0	6.0	16.0	5.0	34.0	34.0
1996	10.0	5.0	2.0	2.0	19.0	8.0	6.0	16.0	5.0	35.0	16.0
1997	0.0	0.0	0.0	0.0	0.0	8.0	6.0	16.0	5.0	35.0	35.0
1998	0.0	0.0	0.0	0.0	0.0	9.0	6.0	17.0	5.0	37.0	37.0
1999	0.0	0.0	0.0	0.0	0.0	9.0	7.0	17.0	5.0	38.0	38.0
2000	0.0	0.0	0.0	0.0	0.0	10.0	7.0	17.0	5.0	39.0	39.0
2001	0.0	0.0	0.0	0.0	0.0	10.0	7.0	17.0	5.0	39.0	39.0
2002	0.0	0.0	0.0	0.0	0.0	10.0	7.0	18.0	5.0	40.0	40.0
2003	10.0	5.0	2.0	2.0	19.0	11.0	7.0	18.0	5.0	41.0	22.0
2004	0.0	0.0	0.0	0.0	0.0	11.0	7.0	19.0	5.0	42.0	42.0
2005	0.0	0.0	0.0	0.0	0.0	11.0	8.0	19.0	5.0	43.0	43.0
2006	0.0	0.0	0.0	0.0	0.0	12.0	8.0	19.0	5.0	44.0	44.0
2007	0.0	0.0	0.0	0.0	0.0	12.0	8.0	19.0	5.0	44.0	44.0
2008	0.0	0.0	0.0	0.0	0.0	12.0	8.0	20.0	5.0	45.0	45.0
2009	0.0	0.0	0.0	0.0	0.0	13.0	8.0	20.0	5.0	46.0	46.0
2010	10.0	5.0	2.0	2.0	19.0	13.0	8.0	20.0	5.0	46.0	27.0
2011	0.0	0.0	0.0	0.0	0.0	14.0	8.0	20.0	5.0	47.0	47.0
2012	0.0	0.0	0.0	0.0	0.0	14.0	8.0	20.0	5.0	47.0	47.0
2013	0.0	0.0	0.0	0.0	0.0	14.0	8.0	20.0	5.0	47.0	47.0
2014	0.0	0.0	0.0	0.0	0.0	15.0	8.0	20.0	5.0	48.0	48.0
2015	-230.0	-90.0	-16.0	-27.0	-363.0	15.0	8.0	20.0	5.0	48.0	411.0
TOTAL	260.0	105.0	22.0	34.0	421.0	269.0	189.0	487.0	141.0	1086.0	665.0
PRESENT VALUE	348.9	140.7	26.8	45.8	562.2	130.0	98.5	257.5	78.3	564.3	2.2
BENEFIT/COST RATIO											1.00
INTERNAL RATE											4.02%

every 7 years. The project is shown to operate through the year 2015, with suitable salvage values taken in that year for remaining assets.

According to this hypothetical example, the total project has a B/C ratio of 1.0, a Net Present Value of $2.2 million, and a rate of return of 4.02%. According to these economic feasibility indicators, the project is just barely feasible.

e. Test of Financial Feasibility

While the overall project is deemed feasibile, one other major hurdle must be addressed. That is, the commercial viability of the various component parts. For example, is it certain that the coal can be sold at the assumed price? What risk is involved? Can the railroad cover its operating costs?

These issues are financial in nature rather than economic, but they are of equal importance since the economic benefits cannot occur unless the project operates. Therefore, a complete financial analysis is also required and, in fact, is included in the economic analysis in order to calculate the hypothetical example's "profit" benefits.

C. Transport Cost and Efficiency Evaluation Methodology

A second situation within which the State of Alaska might consider making a railroad investment (in addition to what the Alaska Railroad Corporation is investing) is if such an investment would reduce the railroad's costs and those cost savings would be passed on to the railroad's users who in turn would ship more, or employ more people, or stay in business. In this instance the null option (the "do nothing") is less efficient service and thus higher total costs.

A methodology which Alaska could use to evaluate such a prospective investment is as follows.

1. Efficiency Evaluation Methodology

The efficiency methodology will be used on projects in which rail service will exist in both the "project" case and the "null" or do nothing case. However, the costs of providing the rail service in the null are higher and therefore so are the rail rates charged. It is conceivable that the State might make an investment based on such an efficiency argument.

The methodology to be used recognizes three types of impacts which, when summed, equal total impact:

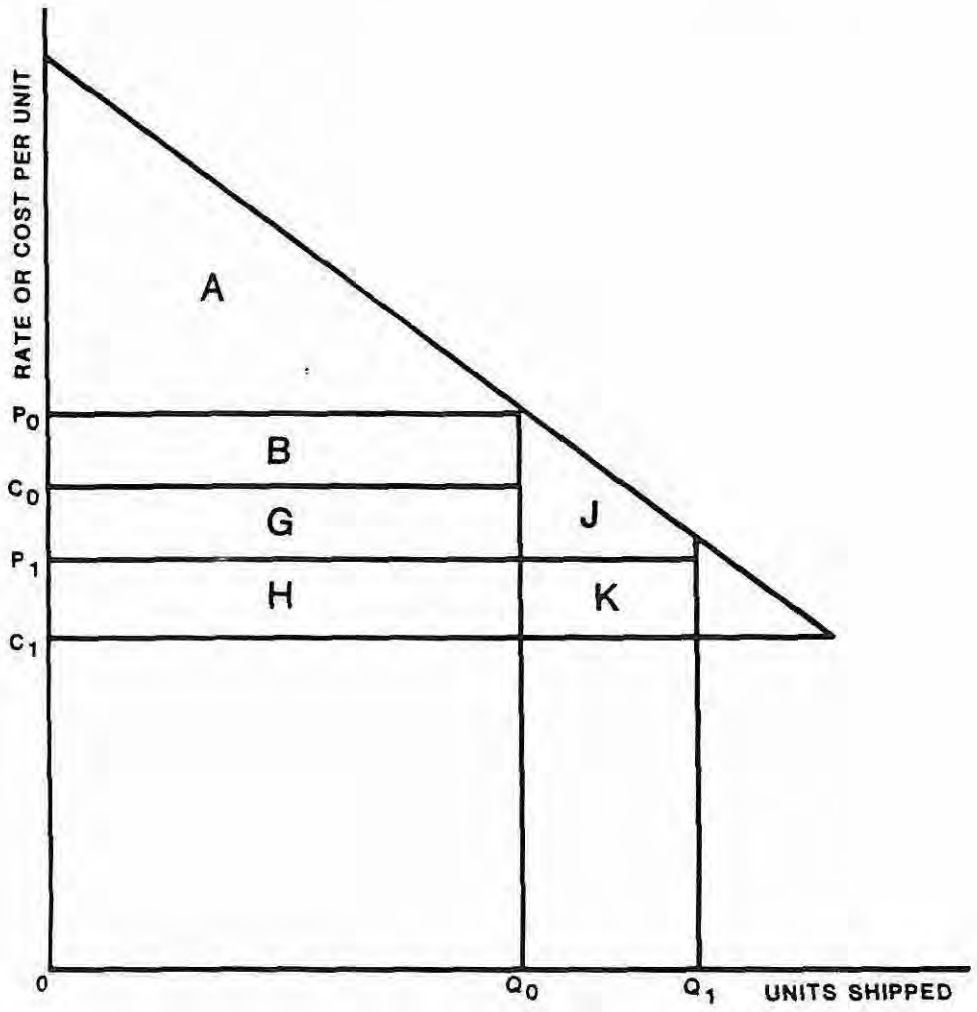
* Benefits from transport rate and cost changes
* Benefits from income gains
* Benefits from indirect income gains

a. Benefits from Transport Rate and Cost Changes

The economic benefit from a cost reduction on existing traffic equals the per ton cost relative to tons affected. The benefit from new traffic that is induced by the project to travel by rail equals the consumer surplus and producer surplus value.

The economic benefit calculation is best illustrated with the help of Figure 6-1 which depicts the transport cost formula and how that formula is calculated.

In some instances it may not be possible to determine whether a rail project will generate new traffic. In such instances both consumer and producer surplus will be zero, and the State likely should not invest in this circumstance. Since the bene-



$$(B_1 - B_0)_t = Q_0 (C_0 - C_1) + 1/2 (P_0 - P_1) (Q_1 - Q_0) + P_1 - C_1) (Q_1 - Q_0)$$

Where:

P = unit rate

C = unit cost

Q = units shipped

$(B_1 - B_0)_t$ = The gain in benefits from changed transport rates and costs of alternative 1 over alternative 0.

$Q_0 (C_0 - C_1)$ = Cost reduction on existing traffic (areas G + H). If data is available, cost reductions may be calculated for each shipper and commodity. However, in many instances only the total cost reduction on existing traffic will be available.

$1/2 (P_0 - P_1) (Q_1 - Q_0)$ = Consumer surplus on new traffic (area j)

$(P_1 - C_1) (Q_1 - Q_0)$ = Producer surplus on new traffic (area k)

SOURCE: Benefit-Cost guidelines, Rail Branch line continuation Assistance Program, U.S. Department of Transportation

METHOD OF CALCULATING TRANSPORT EFFICIENCY SAVINGS

FIGURE 6-1

fits of changed rates and costs will occur at different times during the planning horizon, an appropriate discount rate is used to convert all such benefits to a single present value.

b. Benefits from Direct Income Gains

If the rail investment (efficiency gain) is such that it enables or causes increased production and shipment, it also likely will cause increased employment. Employment in the methodology is measured as total income less opportunity cost. Total income comprises wages and fringe benefits on the part of the employee, profits on the part of the business, and local expenditures made by the business to the local businesses.

Such income gains are estimated for each relevant year at constant price levels.

c. Benefits from Indirect Income Gains

The direct income gains (local payroll, local expenditures, local profits) then induce additional employment and payroll and local expenditures in service and service-related industries that the community is able to support. This effect is known as the "multiplier," and should be assessed using Alaska-specific multipliers from the RIMS-II input/output model as developed by the U.S. Department of Commerce, Bureau of Economic Analysis.(4) The multiplier coefficients are applied by industry type, to the direct income gains.

d. Economic Analysis

The annual economic benefits (transport plus direct income gains plus indirect income gains) are then compared with the

capital costs and expressed in terms of the standard feasibility indicators -- NPV, B/C and IRR.

D. Abandonment Evaluation Methodology

Under the conventional Local Rail Service Assistance program rail planning process, most state projects deal with branchline abandonments. While ARR abandonments in Alaska could conceivably occur sometime in the future, there are currently no impending abandonments and abandonment of trackage is not currently envisaged on the ARR. On the other hand, the White Pass and Yukon Railway is no longer operating, and abandonment could occur on that railroad..

A methodology for evaluating abandonments is set forth as follows, to ensure FRA approval of the 1985 Rail Plan and to ensure that the State has an approved methodology for use if the need ever arises -- on the WP&Y and/or the ARR.

1. Abandonment Analytical Methodology

If the State of Alaska were to assess an abandonment issue, it would do so in an impartial manner in order to compare the relative economic benefits of line assistance with the relative cost of such assistance. The basic analytical tool would be benefit-cost analysis. However, other analyses would also include economic growth potential, environment, and energy implications. Benefits are either increases in the value of output or real reductions in economic cost. Costs are either program outlays or economic disbenefits associated with an assistance project.

Alaska's benefit-cost methodology is based on the methodologies developed in other State Rail Plans and as approved by the Federal Railroad Administration.

a. General Analytical Methods

A branchline abandonment would be evaluated in terms of benefits, costs, and other factors.

Benefits - If a line is abandoned, then the former rail users and the surrounding community can experience higher costs in order to move their product or to receive goods from elsewhere. Additionally, they can also experience employment, tax, personal income, and other effects. As used in this methodology, benefits are defined as those incremental impacts which could occur after abandonment but which could be prevented by the continuation of rail service. For lines in the 0-3 MGTM per mile group (0-5 MGTM at the discretion of the U.S. Secretary of Transportation) that could be considered for rehabilitation assistance, benefits are defined in terms of the improved service levels that would likely follow after rehabilitation as well as railroad operating savings and the benefits of abandonment avoidance (for those lines which would likely otherwise have been eventually abandoned).

It is especially important to define the perspective from which the analysis is made. For example, it might be argued that the abandonment of an unprofitable branch line could cause a shipper or receiver to close with a resultant loss of employment and personal income and increased driving distance for the shipper's customers or suppliers. From a local viewpoint, this closure has a large impact because the user might have been the only similar business for miles. From the state or national perspective, however, the loss in one community might be offset by increased railroad efficiency which could benefit many communities, or might cause the business to reopen in another community. The possible benefit to other communities is, of course, of little comfort to the town that has lost a business

because of a rail abandonment. Nevertheless, the viewpoint adopted for use in this analysis is that of the State. Where a transfer cost or cost-savings is made, e.g., between one community or another, the transfer is noted but is not included as a statewide cost or benefit unless there is a net difference.

Costs - Because rail lines in Alaska will not be abandoned unless they are unprofitable or otherwise in need of assistance, the cost utilized is the total amount of public or other funds necessary to preserve rail service or to mitigate the effects of rail abandonment. Such assistance could be applied to the lines in several ways:

* Annual Operating Subsidy - Direct funds could be offered to the railroad to keep the line open. These funds would likely equal an amount necessary to offset the difference between the revenues attributable to the line and the costs attributable to the line. The subsidy amount would include "normalized maintenance" (defined later), as well as necessary capital contributions. Operating subsidy, however, is short term in nature, does not represent a long term solution, and is an unlikely prospect in Alaska. Furthermore, operating subsidies are no longer eligible for FRA-administered LRSA funds.

* Rehabilitation - If the railroad is seeking abandonment because of the poor condition of the rail line, funds could be offered in an amount required to place the line into a stable physical condition so that long term operating efficiencies can be obtained. As discussed later, rehabilitation is considered to be a one-time major effort which is different from routine annual maintenance.

* New Construction - Sometimes service can be retained by constructing a connection track to another rail line, or impacts can be reduced by construction of a team track at a nearby location where one does not now exist. The assistance would be an amount required to build new rail facilities such as sidings or connection tracks.

* Substitute Service - To alleviate the adverse impacts of an abandonment, assistance could be offered to provide alternative means of transport in a manner less expensive than continuing rail service.

* Acquisition - Some states might find that the only solution is to acquire the rail line. This is not currently applicable to the ARR, however, since the Alaska Railroad is already state-owned, but could be applicable to the WP&Y.

Each of the above assistance types would be evaluated for the subject rail line(s) if an initial analysis indicated that such assistance might be appropriate or at least have a conceivable chance of success. Acquisition assistance would be evaluated based on approximate values of right-of-way and the net salvage value of the track and other facilities. This value would be considered as the starting point for negotiations if an outside party wanted to buy the line for operation by another carrier or for preservation for future use. To operate such a line by another carrier in most cases may also necessitate rehabilitation. Where operation by another carrier is contemplated, a preliminary estimate of that operator's profit and loss on the line would be made.

Benefit/Cost Ratio - The benefits and public costs of continued, restored, or improved rail service would be evaluated by dividing the present value of the benefits by the present value of the public costs. Benefits and costs utilized for this calculation would be the present value of the items discounted at 4 percent for a 15-year period or the service life of the alternative, whichever is less. The discount rate of 4 percent is deemed consistent with calculating benefits and costs in terms of constant dollars(1). This discount rate reflects the uninflated real cost of capital. Benefit/cost ratios that exceed 1.0 indicate that, from a public policy viewpoint, expenditure of public funds is justified because benefits exceed costs. Furthermore, the benefit/cost analysis allows for the comparison of alternative investments.

Other Analysis Criteria - A strict dependence upon benefit/cost analysis can sometimes overlook other important evaluation criteria. For example, a benefit/cost analysis based on historic traffic levels which have been distorted due to external factors such as weather or unusually low or high demand could lead to inappropriate conclusions. Environmental and energy factors are generally not included in the benefit/cost analysis. Likewise, the potential for area growth and the level of local interest in service preservation are issues which should be addressed. These other considerations would also be evaluated to the extent possible for the line.

Economic Growth and Traffic Potential - It is possible that the demand for rail service could grow as an area grows economically. This could take the form of increased traffic from existing users or the attraction of new users. Even though the demand for increased rail transportation on these branch lines is speculative, it nevertheless would be identified to the extent possible and evaluated accordingly. It would not be an analysis factor, however, unless there is clear evidence to warrant a prediction.

Environment - Since the railroad system has been in place for many years, it is likely that the environment has long since adapted to the presence of a rail line right-of-way. Consequently, the loss of rail service could have two environmental effects. First, the removal of the right-of-way could affect the plants and animals living along the line where typically the undergrowth and trees provide good cover. Second, the substitution of truck traffic for rail traffic could cause net decreases (usually marginal) in air quality along surrounding roads.

Energy - Another factor that would be considered is the total energy consumption changes that can occur after branch

line abandonment. Rail transportation is generally considered to be more energy efficient than trucks. For long distance movements by long trains carrying thousands of tons, this is true. Typical branch line operations, however, consist usually of just a few cars being carried at a time. Under these circumstances, train operations are generally not very fuel efficient. When a line is abandoned and trucks take over the transport function, the net change in fuel consumption can be positive or negative depending upon the differences in routing patterns and distances for track movements before and after abandonment.

Local Level of Interest - A final consideration in the evaluation of possible assistance to prevent abandonment, or to mitigate the adverse impacts of abandonment, would be the amount of interest that affected communities exhibit in service continuation. This interest would be ascertained via public involvement and through discussions with rail users and others and in the extensiveness of local willingness to make a financial commitment in the rail line.

6. Specific Analytical Techniques

The specific evaluation and analysis methodologies that would be applied to possible branch line abandonments are described as follows.

Location Characteristics - Each rail line would be located and identified on individual maps so that the relationships between the branch line and other transportation alternatives could be understood.

Status - Any rail lines considered for abandonment (currently there are none) would be described in terms of current status.

Issues - The issues concerning the line would be analyzed from three different viewpoints. First the railroad viewpoint would be analyzed. This information would come from written and oral information provided by the carrier, as well as this study's analysis. For example, a reason for potential abandonment might be that the line generates inadequate revenues to cover operating expenses. Other reasons might have to do with the physical condition of the line, which precludes profitable operations. Second, from the viewpoint of railroad shippers and receivers, the loss of rail service means that they lose direct access to an important mode of transportation. It can also mean that a business can close. Another viewpoint commonly expressed (elsewhere) is that poor rail service has led to a shift to greater truck use. These and other opinions of the rail users would be obtained from interviews and discussions with the rail users located along the subject rail line. Third, the viewpoint of the community would be expressed in terms of the potential effects of abandonment on growth and development.

Rail Line Inventory and Condition - One of the common reasons that branch lines are potentially subject to abandonment is that freight revenues have historically been inadequate to allow a level of annual maintenance sufficient to keep the lines operating efficiently or to allow for the replacement of obsolete rail which cannot handle modern loads. That is, reduced revenue can lead to deferred maintenance which in turn can cause revenues to be depressed even more as service efficiency deteriorates.

In keeping with Alaska's Rail Planning goals and objectives, the State will focus its possible assistance on long term solutions rather than courses of action that alleviate a problem situation for just a few years. Accordingly, inspections of the lines would be carried out in the field. In addition to the inspections, information would be obtained from railroad-

provided track charts and other data sources. The purpose of these inspections would be to inventory the line and to provide a basis for the estimate of costs necessary to rehabilitate the line to suitable standards which then could be sustained in the long term through normal annual maintenance procedures.

Information that would be obtained from the physical inventory and from technical documents would include:

* Rail - Weights in terms of pounds per yard; miles of each weight; rolling dates; physical condition.
* Ballast - Type and condition.
* Ties - Condition.
* Other Track Material - Type and condition of joints, tie plates, and anchors.
* Side Tracks - Location, length, type, and condition.
* Bridges/Drainage - Number, length, type, and condition.
* Road Crossings - Number, surface, type of protection, and condition.
* Railroad Buildings and Other Facilities - Number and type.
* Limitations on Operations - Timetable speed, maximum allowable gross weight, and special operating rules.

Transportation Service - Existing rail and highway facilities in the area of each line would also be documented. Railroad operating schedules would be described, and the location and road distance to alternative rail service (team track locations and loading/unloading facilities) to the extent that they might exist in Alaska, would be presented. Alternative truck service would be analyzed with respect to the type of freight traffic currently being carried by rail.

Rail Line Use - Detailed traffic statistics for the line would be provided by the railroad. These statistics would then be verified via discussions with the various users. These statistics would be summarized and discussed in terms of:

* Carloads - Number of origins and terminations by year and station.

* Tons - Total weight of origins and terminations, by year and station.
* Commodities - Type and number of carloads and tons by year and station.
* Freight Revenue - Amount by year and station.

From the above data certain comparative statistics would be calculated including ton-miles, carloads per week, carloads per mile, and revenue per mile.

Impacts of Abandonment - The impacts of abandonment in this proposed methodology would analyze the impacts of a possible abandonment or service elimination on three groups: the railroads, the shippers and receivers, and the surrounding community.

c. Railroad Impacts

From the railroad's viewpoint, the revenue and costs associated with the line are the line's most important characteristics. Because any line abandonment candidate would be generally unprofitable or marginal, the railroad can prevent additional losses by abandonment or service reduction. The railroad's profit or loss from operations would be calculated. Similarly, the railroad's "opportunity cost", as represented by the line's return on value, would be calculated. The calculation format is as depicted in Table 6-2. Following is a brief description of the cost and revenue data items contained in the table.

Revenues Attributable For:

1. Freight Originated and/or Terminated on Branch:
   The reported amount of gross freight revenue that the owning railroad derived from originating and terminating traffic. (Does not include revenue derived by other carriers participating in the haul such as barge lines or trucking companies).

2. Freight Traffic Interchanged:
The amount of revenue attributed to traffic which passes over the line but does not originate or terminate on the line (originates and terminates via another mode).

3. All Other Revenues and Income:
Demurrange revenue obtained by charging shippers and receivers for holding freight cars longer than allowed by tariff and miscellaneous revenues such as for switching, rents and leases, etc.

4. Total Revenues Attributable:
The sum of lines 1 through 3.

<u>Avoidable Costs For</u>:

5. On-Branch Costs:
The total costs attributable to operations on-branch. This is the sum of lines 5a through 5j.

5a. Maintenance of Way and Structures:
The annual costs necessary to keep a line at a particular operating standard. The railroad's provided actual expenditures for a single year is used if acceptable. While the actual expenditure as reported by the railroad is shown (if available), it should be realized that a cost of $5,000 to $6,500 per mile, depending on the traffic the line is subjected to and the number of structures on the line, is more representative of a normalized value. This cost provides insight into the deferral of maintenance on the line.

5b. Maintenance of Equipment:
The cost of equipment repair and depreciation.

5c. Transportation:
The cost of crews, fuel, supplies, crossing protection, derailment, and other.

5d. General Administrative:
Cost of general administration related to the line.

5e. Deadheading, Taxi, and Hotel:
The cost of train crew out-of-pocket costs.

5f. Overhead Movement:
On-branch costs attributable to traffic that is neither originating or terminating on the branch.

5g. Freight Car Costs:
Payment to other railroads for car use, and cost of owning railroad equipment utilization.

5h. Return of Investment - Locomotives:
The opportunity costs of using locomotives on the branch line.

5i. Revenue Taxes:
The tax payments due to revenue received from the line's traffic.

Table 6-2

CALCULATION OF OPERATING REVENUES AND COSTS
Station 1 to Station 2

		YEAR 1985
REVENUES ATTRIBUTABLE		
1. Freight Originated and/or Terminated on Branch		XXX
2. Freight Traffic Interchanged		XXX
3. All Other Revenues and Income		XXX
4. Total Revenues Attributable (Lines 1 through 3)		XXX
AVOIDABLE COSTS		
5. On-Branch Costs (Lines 5a through 5j)		XXX
a. Maintenance of Way and Structures	XXX	
b. Maintenance of Equipment - Locomotives	XXX	
c. Transportation	XXX	
d. General Administrative	XXX	
e. Deadheading, Taxi and Hotel	XXX	
f. Overhead Movement	XXX	
g. Freight Car Costs	XXX	
h. Return on Investment - Locomotives	XXX	
i. Revenue Taxes	XXX	
j. Property Taxes	XXX	
6. Off-Branch Costs		XXX
7. Total Avoidable Costs		XXX
8. Opportunity Costs (Line 8a times 8b)		XXX
a. Net Liquidation Value	XXX	
Land	XXX	
Materials	XXX	
b. Rate of Return	XX.X%	
9. Avoidable Loss From Operations (Line 7 Minus Line 4)		XXX
10. Total Economic Loss from Continued Operations (Lines 7 and 8 Minus Line 4)		XXX

5j. Property Taxes:
Local taxes on right-of-way and other properties (if any).

6. Off-Branch Costs:
The costs attributable to branch line traffic but which are incurred at a location not on the branch line. These costs include terminal, freight car mile, freight ton mile, and loss and damage costs.

7. Total Avoidable Costs:
The sum of lines 5 and 6.

8. Opportunity Costs:
The value of fixed assets on the line which would be used for other purposes if the line were abandoned. The product of lines 8a and 8b.

8a. Net Liquidation Value:
The value of the railroad property less the cost of removal. The amount includes net salvage value and the value of the right-of-way (owned in fee simple only).

8b. Rate of Return:
The value representing the carrier's cost of capital. This value varies yearly.

9. Avoidable Loss from Operations:
Line 7 minus Line 4.

10. Total Economic Loss From Continued Operations:
Lines 7 and 8 Minus Line 4.

Rail Line Rehabilitation Costs - In addition to the profit/loss and opportunity cost estimates, the cost of rehabilitating the line would be estimated where appropriate. Rehabilitation would be estimated in cases where the railroad indicates it is desirable for continuation of service or where an upgrading of the line could possibly produce savings in railroad operations that would contribute to the profitability of the line. Unit costs for materials and labor would be determined based upon information furnished by railroad and by suppliers.

d. Railroad User Impacts

In addition to the analysis of the line from the railroad's perspective, the line would be analyzed from the viewpoint of the rail shippers and/or receivers which utilize it. Available information regarding rail users would be obtained from the railroad company. This railroad-provided information would

include the names of stations utilized by all rail customers for at least the past three years. These customer lists would be verified, and later an interview would be held, either in person or by telephone. To aid in this analysis, certain information concerning each shipper/ receiver would be compiled on a standard interview form. Included on this form would be questions relating to:

* Nature and size of business;
* Rail facilities utilized;
* Commodities shipped and/or received by rail;
* Quantities of shipments;
* Origins and/or destinations;
* Proportion of rail usage to total transportation;
* Dependency upon rail transport;
* Alternatives to present rail service;
* Reaction to improved rail service; and
* Impacts should line be abandoned.

Through use of these standard questions, insights would be obtained regarding the potential effects on shippers and receivers of a possible loss of direct rail service and the relative need for improved service.

The situation of each identified rail user would be analyzed to determine the possible effects of a loss of rail service or the reaction to improved service caused by rehabilitation. Of primary concern would be the manner in which each rail user would adjust his operation to accommodate a change in rail service. Potential business closures or relocations would be identified as well as less drastic means of adjustment.

Rail Dependency - In some cases, the rail users would be found to be relatively dependent upon rail service because of the bulk nature of the commodities involved, distances to origins/ destinations or volume of the movements. For these reasons these commodities could not be hauled practically or

economically by another mode. Other rail users might be found to be less dependent upon rail because of smaller volumes, short distances to origins/destinations, or commodities that would lend themselves to transport by other modes. Impacts of rail abandonment on such users thus would tend to be less severe. Each business which uses rail would be assessed according to these criteria, and shippers with extreme rail dependency would be identified.

Employment Impacts - Of special interest in the shipper/receiver interviews is the determination of whether or not employment levels would be directly affected should rail service be withdrawn. In a study it is impossible to predict exactly what each shipper/receiver would do when faced with loss of rail service. Some observations, however, would be made. The most extreme case of direct employment impact would be if a business were forced to close. Less severe would be the case of a business which was forced to scale down operations or forego planned expansions. In other cases, it would be possible for direct employment levels to increase because of the necessity of adding extra personnel such as truck drivers. Possible impacts in this area would be obtained in the interviews, and a total impact would be determined for each line.

Transportation Costs - The principal assessment criterion of shipper/receiver impact is the cost change brought about by a change in service. For businesses which do not close or relocate, this cost change is generally related to transport and handling costs. Businesses that lose rail service in Alaska would have to use track or barge or conceivably air, all at considerably higher cost.

These costs would be totalled for each rail user and compared against an estimate of present railroad line transport costs. The cost of alternative transportation will naturally

vary according to the specific characteristics of the rail line traffic and the available alternatives.

e. Community Impact

A final viewpoint considered would be that of the area through which the line passes. Such impacts would include implications on job, payroll, fuel, economic development and the environment.

Employment - As discussed above, abandonments sometimes have direct employment consequences. That is, loss of rail service can result in employment changes directly to the rail users. Since these impacts also have direct impacts on the communities, the total loss or gain in employment would be reported for each branch line. Just as line abandonment affects employment, it also affects the total payroll of workers in a community. Through the rail user survey, potential job losses or gains would be identified along with the wage levels of the impacted jobs.

Fuel Usage - The final quantified impact is the change of fuel usage resulting from branch line abandonment. These impacts are quantitatively addressed in the above cost analysis, but are isolated here to explain the concerns of individuals and communities concerned with energy issues. These energy impacts are two-fold: a savings of rail fuel due to the cessation of train operations and an increase in truck fuel consumption due to additional truck trip requirements. Fuel changes would be estimated utilizing energy consumption factors such as those shown in Table 6-3.

Table 6-3

ENERGY CONSUMPTION FACTORS

TRANSPORTATION	CONSUMPTION RATE (Ton-Miles Per Gallon)
Rail - On-Branch	55
Rail - Off-Branch	270
Truck - Short Haul	65
Truck - Long Haul	55

SOURCE: Assessment of Environmental Impacts Associated with Railroad Abandonment Proposals, Interstate Commerce Commission, Office of Proceedings, October, 1976.

Environmental Impacts - Finally, observations would be made to determine whether or not the loss of rail service would have significant effects on the environment. Truck traffic, of course, would increase with rail abandonment but when compared with the average daily traffic the quantity is normally insignificant. Emission levels would thus change only marginally. Other effects would be associated with line dismantling operations, and it is doubtful that any long term environmental effects would ensure.

Economic Development - The potential for community economic development in terms of suitability of the area for industrial development would also be noted.

f. Benefit/Cost Analysis

The previously discussed factors would be quantified where possible and noted and described where not. Benefits and costs

are then calculated and tabulated. For analysis purposes, alternatives for preservation of rail service are developed and compared to a base case. The base case is the null or "do nothing" alternative. It would be assumed that the null alternative would result in the eventual abandonment of the rail line under scrutiny. Consideration of substitute service assistance is assessed and compared with other user alternatives for receipt or shipment of traffic.

Potential Alternatives - After the impacts of abandonment (or service reductions due to deferred maintenance) are assessed from the three viewpoints, public courses of action would be postulated. As listed earlier, alternatives might include individually or in combination: rehabilitation, new construction, substitute service, and acquisition (by or for a new operator).

Discount Rate - As previously stated, all costs and benefits would be discounted at a rate deemed representative of the opportunity cost of funds as opposed to current interest rates where a large portion of that rate reflects inflation. A rate of 3 to 5 percent would typically be utilized.

Project Life - The life of alternative projects would be established at 15 years. This term is deemed as a desireable goal from a State viewpoint in order to consider the project as a long term benefit. The State realizes that actual project life may, subject to negotiations, be of shorter duration and project life adjustments will be made accordingly at such time as negotiations have sufficiently progressed to indicate a change in terms.

g. Project Costs

The total cost of each alternative would be estimated. This cost represents the cost to construct and/or implement the pro-

ject. Where project investment, such as rehabilitation or new construction, may have value remaining at the end of the project life, this would be taken into account by consideration of the discounted salvage value of the investment at the end of the analysis period as a project benefit.

h. Benefits

Benefits or disbenefits arising from the continuation of rail service depend on the perspective taken in the analysis. The analysis from a State perspective requires the examination of total costs avoided or gains achieved in the process. This requires consideration of the impacts of the proposed action on all parties involved. The analysis is approached from a cost standpoint as a measure of the resources devoted to the alternatives under consideration. Resource allocation is determined on an economic cost basis rather than a rate paid basis, since transport rates charged do not always reflect true or actual costs.

Transportation Benefits - Changes in transportation required due to the elimination of rail service require a reallocation of resources from one mode to another. Also resources are used in the transfer between modes. For example, commodities that previously moved on the rail line will now either be moved completely by another mode or conceivably could move to a team track at another rail station and be transloaded and then moved by truck. These methods of transportation service are the most commonly anticipated results of rail abandonment. Where users are not sure of their alternative course of action, the use of an alternate rail point and transfer by truck would be the assumed course of action.

The cost of transloading and trucking will be determined from rail user surveys; or, if the user had not done an analysis, estimated by using commodity specific unit costs derived in An Economic Analysis of Upgrading Rail Branch Lines - A Study of 71 Lines in Iowa(2). The costs would be updated utilizing the Consumer Price Index for the appropriate periods of time, and would be tailored to represent Alaska-specific costs.

From the user's viewpoint, the continuation of rail service prevents these cost occurrances; but from the railroad's viewpoint the continuation of rail service results in a cost to them of providing the service on the line which is recorded as a disbenefit. To estimate these costs, unit costs will be developed for the line based on specific costs attributable to that line. Where traffic is anticipated to be retained at another point, the costs are reduced by the anticipated costs of providing service at the alternate point. For example, traffic delivered to an alternate team track still requires switching for set out and pick up and car costs are still incurred (although they could be less if the alternate team track receives more frequent service than the branch line).

For analysis purposes, the two transportation costs are compared and the net cost is used, i.e., the difference in the two costs are considered the cost impact. The costs incurred by the users is considered a benefit and the cost incurred by the railroad as a disbenefit.

Relocation Benefits - Users dependent on rail service may be required to either relocate their entire business or some portion of it in order to avail themselves of rail service where such service continues to exist in Alaska. These cases, expected to be rare in Alaska, would be ascertained in the rail user interviews and the costs of such actions are considered a benefit of rail service retention. In the case of substitute

service assistance, those costs considered as benefits of rail service continuation then become project costs. Another type of relocation benefit occurs if a business closes and the consumer has to travel to more distant points to make purchases. When this occurs, the expense of the additional travel is considered a benefit of rail service retention.

Employment Benefits - Unemployment resulting from a business closure is effective only until such time as the former employee(s) has obtained other employment. The average length of unemployment in Alaska for those workers receiving unemployment compensation would be determined. It is also assumed that the former employee is rehired within the State of Alaska (unless information is obtained to the contrary). The measure of the benefit then becomes the employment wages for the period. Unemployment compensation is considered a transfer cost from the State perspective and as such is not a benefit or disbenefit. From a local viewpoint however, the employment loss is reduced by unemployment compensation as the compensation results in a gain or reduction of loss in the local area.

Impacts on the retail sector also occur as a result of employment changes. These impacts, however, are only measured to the extent they influence profits. An estimate of this loss(3) is adopted as 60 percent of the wages due to unemployment (a measure of the percentage of wages that would have been spent in the retail sector times an assumed profit margin of 25 percent). These impacts are only considered from a local perspective.

i. Distribution of Benefits

In order to provide a clearer picture of the alternative actions, the distribution of benefits or disbenefits would be

shown for each analysis. This permits an overview of the impacts on each group involved in the potential action. It also provides another means of evaluating the proposed action without strict reliance on the benefit/cost analysis and as such may provide insights into alternative actions where one party may be disproportionately impacted as compared to others. In this manner, for example, local impacts not taken into account by the statewide accounting stance are revealed.

This analysis would comprise a table listing the affected groups and the resulting impacts on each. As such it is illustrative for comparison purposes only and not to be summed or arithmetically manipulated in any fashion. Impacts that cannot be quantified would also be shown in the distribution.

j. State Conclusions

At the end of the line's analysis, the State will present a statement concerning the State's conclusions of the appropriateness of each alternative considered in line analysis. These conclusions will be based on the benefit/cost and distribution analysis and on a comparison with State goals, policies and roles.

2. Application of the Abandonment Analytical Methodology

The above methodology is advanced for FRA review and approval. With FRA approval, Alaska will have an approved methodology to be able to use LRSA funds for rail abandonment prevention purposes, if it so desires.

However, as stated earlier, the Alaska Railroad currently has no planned rail line abandonments. Therefore, the above methodology has not been applied to any line in this Rail Plan.

It is set forth only to gain approval, for future use if needed. One potential use of the methodology, however, would be the White Pass and Yukon if formal abandonment proceedings are filed on that railroad in the future.

REFERENCES

(1) A Manual on User Benefits Analysis of Highway and Bus Transit Improvements, American Association of State Highway and Transportation Officials, Washington, D.C., 1977.

(2) Baumel, C. Phillip, John J. Miller, and Thomas P. Drinka, An Economic Analysis of Upgrading Branch Lines: A Study of 71 Lines in Iowa, Iowa State University of Science and Technology, prepared for the U.S. Department of Transportation, Federal Railroad Administration, March, 1976.

(3) Benefit-Cost Guidelines -- Rail Branch Line Continuation Assistance Program, Federal Railroad Administration, Washington, D.C., February, 1980.

(4) Regional Input-Output Modeling System, Regional Economic Analysis Division, Bureau of Economic Analysis, U. S. Department of Commerce, 1984.

(5) Economic Analysis of Projects, The World Bank, by Lyn Squire and Herman G. van der Tak, 1975.

(6) Guidelines for Project Evaluation, United Nations, 1972.

VII. PROGRAM OF PROJECTS FOR PUBLIC ASSISTANCE

The State of Alaska has not historically been called upon to fund railroad projects, since the ARR was federally owned and the WP&Y was essentially a private Canadian venture. Now that the WP&Y has ceased operations and the ARR is owned by the State, it is possible that the State should consider some types of railroad-oriented investment. Such investment could be oriented to the ARR or the WP&Y, or to new railroads or railroad extensions. This report section reviews projects and project types that might be considered for State investment. It concludes that State investment in ARR rail projects should be delayed at least until the ARRC has had more time to demonstrate its capacity to be self-sustaining. It does not rule out, however, State funding of planning nor does it rule out State-funded projects in the mid-term (within a few years). As explained herein, there are situations where State activity and funding would comprise a reasonable and legitimate State function.

A. Criteria for State Rail Assistance

It is the policy of the Alaska Railroad Corporation, and of the State of Alaska, that rail investments that are needed by the ARR, and that produce benefits for the railroad, be funded by the railroad. This implies that rail line maintenance or rehabilitation projects, or equipment acquisition, and similar projects that are for the benefit of the railroad are to be funded by the ARRC and not the State.

1. Rationale for State Funding

This does not imply, however, that the State has no funding role. Although the desire is to have a self-supporting ARR, legislation does permit the ARRC to request funds from the legislature relative to services or projects that are not self-supporting. Furthermore, investment projects may arise that are needed by the State, its residents or its regions that do not benefit the railroad as much as they benefit the State's residents. Examples would include safety projects, or new rail lines to open territory, or new rail passenger services, or similar investments that do not necessarily produce a profit or a cost savings for the railroad. These project types, if proven to be needed and justified, could be funded (or partly funded) with public sector funds (State, federal, local). Also, it is State policy to assist the ARRC with its start-up costs since the transfer to State ownership.

2. Criteria for State Funding

To assist in the Alaska funding deliberation process, it is suggested that the State utilize a project eligibility and appropriateness screening procedure. Such a procedure should be a quide, rather than a rigid and absolute determinant of eligibility, and should consist of criteria that can be used to determine whether specific investment needs should be funded in whole or in part by the State.

a. Rail Planning Criteria

The ARRC is of course concerned with the planning of its services, operations and capital investments. However, the perspective of that planning is oriented to the ARR as an

entity, rather than the State as a whole, and to only the rail mode. Recognizing this, the Governor designated the DOT/PF as the "official rail planning entity" in the State. This implies that the DOT/PF is responsible for the preparation of the State Rail Plan, and other overall rail planning activities.

It would follow, therefore, that the DOT/PF should fund needed and eligible rail-oriented planning projects. To be an eligible planning project, it is suggested that the proposed planning project have one or more of the following attributes:

* Comprise a multimodal planning project, wherein rail is only one of the modes involved; <u>or</u>
* Utilize federal Section 803 rail planning funds; <u>or</u>
* Constitute a planned project that would be undertaken primarily for the betterment of the State, its communities and its residents (rather than only done for the betterment of the railroad; <u>or</u>
* Involve a project that is clearly not self-sustaining from the railroad's viewpoint; <u>or</u>
* Involve planning that is done for social, or environmental, or economic development reasons; <u>or</u>
* Comprise a politically-inspired subject; <u>or</u>
* Comprise a subject that is traditionally within the planning sphere of the State and/or the DOT/PF.

By utilizing such criteria, it is readily seen that the Alaska DOT/PF should have a legitimate planning agenda which complements but does not supercede nor conflict with the planning processes of the ARR or other railroads.

b. Railroad Projects Criteria

Once the planning is complete, the State must decide whether the envisaged rail project warrants State monies, in whole or in part. A two part criteria process is suggested, relative to:

1) The <u>appropriateness</u> of project funding by the State.
2) The <u>feasibility</u> of project funding by the State.

The "appropriateness" element is designed to determine whether the project should be eligible for funding in whole or in part by the State, or whether it should be funded by the railroad or by other relevant participants. It is suggested that the following be used:

<u>The project should be funded by the railroad if</u>:

* The project itself is financially self-sustaining from the railroad's viewpoint; <u>or</u>
* The project is of a type to be viewed as a routine, railroad matter; <u>or</u>
* The project is to be undertaken because it is to be of direct benefit to the railroad only; <u>or</u>
* The railroad has the necessary capital, or can obtain the capital, needed to fund the project; <u>or</u>
* The project is a single mode (railroad) project.

<u>The project should be eligible for State funding, in whole or in part, if</u>:

* The project is not expected to be financially self-sustaining but instead is being done for other reasons; <u>or</u>
* The project's beneficiaries comprise a larger group than merely the railroad; <u>or</u>
* The project is being done for social, environmental or economic development reasons; <u>or</u>
* The project has multimodal impacts and benefits; <u>or</u>
* The project is intended to develop tourism, or to create employment, or to accomplish other State goals and objectives; <u>or</u>
* The project will be eligible for federal funds for which the State, but not the railroad, is eligible; or
* The project is intended to alleviate adverse economic, social or environmental impacts of a railroad action; or
* The railroad has proven that it does not have the capacity to undertake the project on its own.

Using the above criteria, it can be seen that the State might consider using State funds for such projects as: major rail line extensions, grade crossing and other safety purposes, rail passenger services of various types, specialized or experimental projects, and even some railroad rehabilitation projects.

However, merely because a project is deemed "eligible" for State funding based on the above criteria, does not imply that the State should necessarily fund it. Before such funding, the second level of criteria should be considered, dealing with feasibility.

The project should be considered as "feasible" for State funding if:

* The application of the tests of feasibility (as described in Report Section VI) find the project to be economically "feasible"; and
* The State has a suitable funding source for the project; and
* The project has a suitable level of active support by relevant participants; and
* The project has acceptable social, environmental and developmental impacts and implications.

To attain the above feasibility criteria, it is requisite that the project be suitably analyzed to ensure that it is in fact feasible.

B. Candidate Projects

Based on the above criteria and types of projects that might be suitable for some type of State or other public sector financial assistance, a number of specific investment projects were identified for consideration. These projects were identified via Consultant inspections, discussions with ARR personnel, and discussions with others. At this point the projects represent a "shopping list," for State review and consideration and to depict the type of projects wherein State funding might be appro-priate. The candidate projects are arrayed by possible funding source, so as to depict possible sources of funding. However, no detailed feasibility analysis was made of any of these project candidates.

1. FRA Funding Candidates

The Federal Railroad Administration administers the Local Rail Service Assistance (LRSA) Funds which can be used to preserve rail service, upgrade branch lines, etc. Two ARR projects appear eligible for such funding, both of which comprise rail line rehabilitation. Either or both of these projects are possible only if Congress funds the LRSA program in sufficient amounts to make a meaningful contribution to total project costs.

a. Eielson to Fairbanks Branch Line Rehabilitation.

In FY 1984 the Eielson-Fairbanks section of the ARR had a traffic density of 0.59 million gross ton-miles per mile, making it eligible for LRSA funding. Currently the MAPCO refinery at North Pole is being expanded. This expansion will generate additional traffic on this branch line, necessitating an upgrade in the condition of the track from the North Pole Refinery Spur to Fairbanks, a distance of 16.6 miles. Required will be the replacement of defective ties and worn rail, the addition of new ballast, and the possible grinding of the newly laid rail. An estimated cost of the project, based on a cost of $750,000 per track mile for furnishing and installing new track, is $12,500,000. The State could be involved in this project if it is decided that LRSA funds shall be used.

b. Whittier Portage Tunnel Track Rehabilitation

This 12.4 mile line from Whittier to Portage carries passengers and automobiles from the ferries and cruise ships docking at Whittier. In addition, the trains carry passengers to their private boats anchored in the small boat harbor at Whittier. The port also handles freight by trailers and freight cars from

Seattle and Prince Rupert. The 1984 density was 1.29 million gross ton-miles per mile, making it eligible for LRSA funding. There are two tunnels on this branch line: Portage Tunnel at 5,060 feet and Whittier Tunnel at 13,344 feet.

No significant track work has been performed in the tunnels since the line was constructed. The condition of the tracks within the two tunnels has deteriorated considerably and requires rehabilitation, removal of contaminated ballast and improved drainage. The work would consist of replacing the tunnel ties with new wood or concrete ties, replacing the existing rail with 78 ft. rails or continuous welded rail, and resurfacing the track. Using a price of $300/foot, the cost is estimated to be $5,521,200. Again the State would presumably be involved only if LRSA funds are to be used.

Note: the following section c was added as an amendment, December 1990.

c. Garner Tunnel Rehabilitation

The Garner Tunnel is a 500-foot long tunnel located in the Healy Canyon at mile 356.2 of the Alaska Railroad. An integral part of the Alaska Railroad Corporation (ARRC) mainline, all rail freight traffic between Anchorage and Fairbanks passes through this tunnel. In 1989 the line associated with the tunnel, the Matanuska to Healy segment, had a traffic density of 4.62 million gross ton-miles per mile, making it eligible for LRFA funding. Traffic density for 1990 is forecasted to be 4.85 million gross ton-miles per mile. Recent distress in the original timber lining, the preponderance of large-scale landslides throughout the Healy Canyon, and the significant erosion associated with the sharp outside bend of the Nenana River, prompted the ARRC to commission an engineering stability evaluation of the Garner Tunnel. In 1989 Golder Associates (report dated 2-19-90) performed an evaluation of the physical condition of the Garner Tunnel. The Golder report identified severe problems with the tunnel. The problems are categorized as follows:

- Rotting Timber Sets
- Loose Rock at North Portal
- Poor Drainage Control at North Portal

A new structure at the north portal is functioning well to date, except that seepage and subsequent winter icing has become a serious problem. The tunnel entrance is encased in ice and the drainage ditches have iced to the top of the rail. This seepage and icing problem is caused by the large rock falls diverting new water flows into the tunnel from the mountain above. Currently, the ARRC must frequently inspect the tunnel for ice conditions prior to each train movement through the tunnel. Rehabilitation would involve addressing the problems identified in the Golder report including replacement of timber sets, drainage system improvements, and insulation improvements to reduce icing and improve rock stability. A project evaluation by the ARRC engineering department estimates the costs to meet the most immediate needs to be $207,900. Long-term work would include monitoring to determine if overall slope movement is occurring and action to correct any problems revealed.

2. <u>FHWA Grade Crossing Funding Candidates</u>

a. Nenana Relocation Project

Currently the ARR mainline runs through the downtown area of Nenana, resulting in 6 grade crossings. It has been proposed that a bypass be constructed south of town and north of the airport. Although the existing alignment cannot be removed from the downtown and barge wharf area because of required local freight service, the number of trains passing through town would be greatly reduced if a bypass were built. The reduction in train traffic would alleviate the need for grade crossing signals and would reduce disruption to activities in Nenana. Eliminating the need for all main line trains to pass through Nenana would also improve train operating speeds and would reduce track maintenance costs due to the presence of a series of sharp curves through Nenana on the existing alignment. A new grade separation structure would be required to cross the Parks Highway, since the present line crosses under the highway at the approach span for the Parks Highway bridge over the Nenana River.

The cost of the relocation would presumably be at the expense of the ARR, but funds could be available for the grade separation from the FHWA Grade Crossing program. It is estimated that the cost of this track relocation project will be approximately $2.5 million, based on an order-of-magnitude estimate of $1.5 million per mile for roadbed and track construction including a new wye connection for a Nenana loop. The cost of the grade separation over the Parks Highway is estimated to cost an additional $1.5 to $2.0 million.

The State could be involved in this project's funding because the project will be of benefit to Nenana (in addition to the ARR) and because of the possible use of FHWA funds.

b. Crossing Gates at Signalized Crossings

For safety reasons, some of the existing ARR signalized crossings need crossing gates. Further site studies by the ARR and DOT/PF staff would indicate which locations are candidate crossings.

The State could be involved in these projects because of the intermodal nature of the projects, the safety elements, and the traditional State role in such projects.

3. <u>FHWA/FRA Corridor Crossing Funding</u>

In September 1985 a joint FHWA/FRA "Railroad Crossing Corridor Improvements" demonstration program was announced by the U. S. Secretary of Transportation. Under the program, the Department of Transportation's traditional railroad-highway safety initiatives, which concentrate on correcting safety problems at individual railroad-rail crossing sites, will be expanded to include wide-scale low-cost improvements at numerous crossings along many miles of railroad. The program will be to improve multiple crossing sites along rail corridors and to emphasize the use of relatively

simple, inexpensive safety improvements at low volume crossings where the installation of active warning devices and other high-cost safety features is not practicable. These low cost improvements include the installation of adequate signs and workings along the highway, clearing obstructions to make warning devices and approaching trains more visible to motorists, and upgrading the track crossing surface to prevent cars from stalling on the tracks. Alaska was one of the six states selected to participate in the demonstration project which began in October, 1985. The program does not involve new federal funding but will be a cooperative effort between the FHWA and FRA and those states which choose to participate in the program.

The task force formed by the Commissioner of the Alaska Department of Transportation and Public Facilities, and the President and Chief Executive Officer of the Alaska Railroad Corporation in October, 1985 has reached some preliminary conclusions concerning crossing safety improvements in Alaska. General recommendations of the task force include bringing all existing crossings up to basic industry and government approved safety standards; maintaining current crossing database information; actively supporting crossing safety education programs; and including local governments and developers, as well as all other interested agencies and parties, in the crossing planning process. Changes to existing crossings as well as design of new crossings will be evaluated by a diagnostic team consisting of representatives of Alaska DOT&PF, the ARRC, and, as appropriate, the FHWA, the agency responsible for road maintenance (if not ADOT&PF), the local borough government and law enforcement agencies. The task force, in its final report, will recommend adoption of crossing standards and policies for all railroad crossings in the Alaska Railroad corridor.

4. <u>State Funding Candidates</u>

The State might also consider the use of State monies for various railroad projects which the ARR would not normally undertake on its own. Examples include the following.

a. Passenger Station Rehabilitation

The State might consider a program intended to upgrade rail passenger stations on the ARR. The purpose would be tourism-oriented, and would therefore seem to fall within the areas of the State's responsibility. Such improvements would be oriented to passenger comfort and baggage handling, and could include improvements to the following example stations.

* Anchorage Station - General remodelling, with increased separation between ARR offices and passenger facilities.

* Fairbanks Station - The present station track is on the end of the main line in downtown Fairbanks. The track is essentially an industrial sidetrack, which also serves the local newspaper for newsprint unloading directly to the printing plant. The passenger train at the existing station location blocks Phillips Field Road, a major street. The State could consider relocating the station to a point just west of town nearer to the University and Airport. Such a relocation would release the station area for other development, would improve the passenger train schedule time, and courtesy cars from motels and hotels would operate as efficiently to the new site as downtown since the normal runs include the Airport. Further study is suggested, however, to determine associated costs and savings for this project.

* Denali Park Station - Remodelling of this facility, with improved baggage handling facilities, could reduce station dwell time and improve the passenger train schedule time at this major travel point on the railroad.

* Whittier Station - No facilities presently exist for the transfer of passengers from the ferries and cruise ships. There is a need to build a station, possibly near the existing tank farm and with bus shuttle service to the docks. It might also be possible that passengers for Anchorage to be loaded on buses at dockside and transported to Portage on the top of the flat cars presently provided by the ARR. This could eliminate the need for a major terminal station.

b. Additional Use of New Rail Passenger Equipment

Proposed changes have recently been approved for the change in type of equipment and operating schedule to be used for the 1985 winter schedule for passenger service between Anchorage and Fairbanks. Two rehabilitated self-propelled diesel passenger cars have been purchased to provide one round trip to Hurricane on Saturdays and Sundays, with a 4-month trial schedule of operations from Anchorage to Fairbanks on the 1st and 3rd Tuesdays of each month and returning on the following Wednesdays. After the 4-month Tuesday/Wednesday trial to Fairbanks, the schedule and patronage will be reviewed and a decision reached to continue or stop the service. If these vehicles are available during the summer, the State might fund their use elsewhere on the system.

c. Roll-on/Roll-off (RORO) Barge Service

The State could consider a demonstration project that would provide a rail/highway vehicle barge roll-on/ roll-off service to the West Kenai Peninsula near Nikiski. This system could eliminate trans-shipment costs by delivering and picking up materials in the original supplied vehicles. The system would utilize a steel docking grid onto which the barge would be docked at high-tide and upon which it would securely rest as the tide ebbed for unloading of rail cars on trucks at a permanently positioned ramp. This may offer a cost-effective answer to expanding the rail transportation infrastructure to meet the unique problems facing a major part of Alaska. Such experimental or demonstration projects could be viewed as a proper State role relative to railroad development.

d. Transportation Service to Girdwood

With the acceptance of Anchorage as the U.S. representative for the 1992 winter olympics, projects to provide transportation to the prime ski area of Alyeska need to be considered. This could include rail transportation and

passenger terminals. Given the nature of this possibility, funding would likely be a public undertaking, implying State roles and/or responsibility.

e. Nenana to Yukon River Extension

A near term major extension possibility for the ARR system would be to build an extension from Nenana to the Yukon River near Tanana. This extension would provide a connection to barge service on the Yukon River, as well as providing a beginning of a transportation system to serve the interior of Alaska. From previous studies performed (as discussed in Section V) it is estimated that the cost of this 120 mile extension would be some $420 million, based on an order-of-magnitude construction cost of $3.5 million per mile. If such an extension were to be built, it would have multimodal, State policy and economic development elements implying State participation. Furthermore, it is unlikely that the ARR could fund such a major project.

5. Alaska Railroad Funding

Currently the ARR must generate sufficient revenues to provide for most railroad capital improvements and expanded services. Many railroad projects, however, contribute to the overall benefit of the State as well as the railroad. In order that the maximum internal use can be made of railroad generated earnings, (e.g. rail and cross tie renewal) State assistance with capital funding for certain selected projects would relieve some of the cash demand on the railroad. In this sense, it might be appropriate for the State to participate, along with the railroad, in some projects.

a. Passing Sidings

The following additional passing sidings need to be constructed to provide for increased operating efficiency of the joint use passenger and freight tracks. Sidings should be considered at the following locations:

* Julius (M.P. 401.3)

* Eagle River (M.P. 126.6) - The ARR 1986 capital budget includes $394,000 for a 6,000 foot siding in the vicinity of M.P. 128 (the one location within this area where there is sufficient room on tangent track for siding). A siding in this area will undoubtedly be required if commuter service to Wasilla or Nancy Lake is initiated.

* Wasilla (M.P. 159.8) - Extend length from 3200' to 5000' to facilitate the passing of longer trains.

b. Alignment Change

In order to reduce operating and maintenance costs, the ARR has proposed alignment changes between approximately M.P. 120.6 and M.P. 122 and between M.P. 123.7 and 125.6. Within these areas, the existing alignment has several 10 degree curves which create considerable maintenance costs and operating problems, especially with the operation of heavy coal and sand/gravel unit trains through this area. The present timetable speed is a rather slow 35 mph, and realignment would permit higher train speeds and reduce the current high track maintenance cost at this location. In addition, existing curvature creates excessive rail wear and difficulty in maintaining track gauge. The cost of these projects is estimated to be approximately $5 million, based on a cost of $1.5 million per mile to construct roadbed and track. This might be an appropriate project type for State participation if the ARR is unable to undertake it.

6. <u>Other Funding</u>

a. Anchorage Airport to Wasilla or Nancy Lake Commuter Service

The Municipality of Anchorage is proposing to study the possibility of providing rail commuter service to the expanding community of Wasilla. This service would use the existing ARR trackage, which may have to be upgraded and signalization provided to furnish an attractive operating schedule which does not interfere with freight movements. Track realignments, including location between MP 120.6 and 122 discussed earlier, would be required to

permit adequate operating speeds to compete with other modes. This type of passenger service seldom is self-sustaining. If this proves to be the case, it would comprise a proper public sector funding possibility.

C. Suggested State Funding

Based on the State funding criteria and possible projects, as well as other Alaska activities and priorities, this 1985 Alaska State Rail Plan considered both planning and project funding activities over the near-term.

1. Recommended Rail Planning Activities

a. Immediate Rail Planning Needs

Given the recency of the transfer of the ARR to State ownership, it is difficult to anticipate with any degree of accuracy the planning needs which will have to be funded by State or LRSA funds. Two planning projects that are suggested at this time are:

* Rail Line Extension Evaluation - This Rail Plan (Section VI) developed an economic evaluation methodology that should be used to evaluate rail line extension proposals. That methodology, to date, has not been applied. To test the methodology, to clarify its many issues and to be most useful to the State, the State should fund one or more applications of that evaluation methodology. Candidate applications would be the TransCanada link or the extension to the Yukon River. A planning budget for FY1986 is $78,000 for this purpose, of which 80% would be funded by the FRA-administered LRSA program.

* Implementation of ARR Performance Indicators - This Rail Plan (Section IV) developed a series of statistical indicators that the ARRC should provide to its Board of Directors on a continuing basis. To implement the tabulation of these performance indicators, it will be necessary to computerize the process so that tabulation is inexpensive and comparable. To develop and implement the procedures, a planning budget of $42,000 is suggested for FY 1986, of which 80% would be funded by the LRSA program.

Both of the above should be eligible for FRA-administered LRSA funding, locally matched by State funds. Both of these planning projects should be considered in fiscal year 1986.

b. Mid-Term Rail Planning Needs

Beyond 1986, other rail planning projects, to be funded by the State, appear appropriate. These projects could include the following:

* Grade crossing protection planning.
* Planning of such rail passenger improvements or services as: station improvements, winter Olympics planning, and Anchorage rail commuter planning.
* Planning of such experimental projects as a roll-on/roll-off service at Nikiski.
* Other planning projects that will become apparent as the ARRC gains greater experience with the operation of the ARR.
* Impact analysis of any abandonment of the White Pass and Yukon Railway.

The costs of these mid-term rail planning projects are not estimated at this time.

2. Recommended Rail Projects Activities

Currently the ARR is attempting to abide by legislative intent, by maintaining a self-sustaining financial posture. Therefore, it would be premature for the State to thrust funding upon the ARR. Furthermore, no major capital investments were identified in the Rail Plan that will require State funding in the next several years. As a result, no State funded railroad projects are suggested at this time. However, the State should reserve the right to modify this conclusion at any time, so as to fund projects as the need arises — subject to each project's ability to be demonstrated to be both eligible for State funding and feasible for State funding.