

COMM-OPINION-ORDER, 20 FERC ¶61,321, **Alaskan Northwest Natural Gas Transportation Company, Docket No. CP80-435-000, Northwest Alaskan Pipeline Company, Docket No. CP78-123-000, et al.**, (Sep. 21, 1982)

Alaskan Northwest Natural Gas Transportation Company, Docket No. CP80-435-000, Northwest Alaskan Pipeline Company, Docket No. CP78-123-000, et al.

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**Alaskan Northwest Natural Gas Transportation Company, Docket No. CP80-435-000
Northwest Alaskan Pipeline Company, Docket No. CP78-123-000, et al.**

**Order Establishing Certification Cost Estimate and Center Point Values, and Resolving Other
Incentive Rate of Return Issues**

(Issued September 21, 1982)

**Before Commissioners: C. M. Butler III, Chairman; Georgiana Sheldon, J. David Hughes and
A. G. Sousa.**

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I. Background

The order adopted herein establishes the Certification Cost Estimate (CCE) and Center Point values for the Alaska pipeline segment of the Alaska Natural Gas Transportation System (ANGTS) and resolves other related Incentive Rate of Return (IROR) issues that are ripe for decision. The several CCE issues that are not currently ripe for decision (as discussed below) will be resolved in a supplemental order that will make appropriate adjustments to the CCE.

This proceeding arose from an application filed by Alaskan Northwest Natural Gas Transportation Company (Alaskan Northwest) on July 1, 1980, requesting a final certificate of public convenience and necessity to construct and operate the Alaska pipeline segment of the ANGTS (hereinafter referred to as the "July 1980 Application"). The application included a proposed Certification Cost and Schedule Estimate (CCSE) and a proposed Center Point for the IROR¹ of the Alaska pipeline segment.²

Recognizing the need to resolve outstanding IROR issues as they apply to the Alaska pipeline segment, the Commission, in a Notice and Order issued August 1, 1980 (45 F.R. 56132, August 22, 1980), instituted a special subproceeding to consider the CCE and Center Point values proposed by Alaskan Northwest and related IROR issues. The order instructed the Commission's Alaskan Delegate (John B. Adger, Jr.), in conjunction with the Director of the Division of Audit and Cost Analysis (Division Director) (J. Richard Berman) of the Office of the Federal Inspector (OFI), to convene a series of technical conferences to consider these matters. The Alaskan Delegate and the OFI Division Director were instructed to submit a report to the Commission at the conclusion of the technical conferences, and were authorized to submit interim reports as appropriate.³

On November 17, 1980, Alaskan Northwest filed an amendment to its application (hereinafter referred to as the "November 1980 Amendment")⁴ to reflect changes in Alaskan Northwest's CCE caused by routing changes mandated by the Grant of Right-of-Way proposed (and later issued) by the Department of the Interior. These routing changes involved the separation distance between the ANGTS and the Trans-Alaska (oil) Pipeline System (TAPS). Notice of the amendment was issued on November 28, 1980 (45 F.R. 80330, December 4, 1980).

The technical conferences were held in September, October, and November 1980, and in March 1981. The discussions at these conferences were conducted off-the-record, but at the conclusion of a particular discussion the Alaskan Delegate or his designee summarized the discussion for the record. Participants were allowed to add their own comments, summaries, or corrections to the record.

Pursuant to the August 1, 1980 order, the Alaskan Delegate and the Division Director submitted their final report to the Commission (hereinafter referred to as the "Adger/Berman Report"),⁵ and served copies on all parties. Appended to the report was a four volume report (hereinafter referred to as the "Williams Brothers Evaluation") prepared for the Alaskan Delegate and the OFI Division Director by the OFI's technical contractor, Williams Brothers Engineering Company.⁶ In an order issued August 21, 1981, the Commission invited the parties of record to

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submit written data, views, and comments, including reply comments, on the Adger/Berman Report and Williams Brothers Evaluation.⁷

Comments were filed by Alaskan Northwest ("Alaskan Northwest A/B Initial Comments"), the State of Alaska ("Alaska A/B Initial Comments"), Northern Border Pipeline Company ("Northern Border Comments"), and the Commission's Trial Staff ("Staff A/B Initial Comments"). Reply comments were filed by Alaskan Northwest ("Alaskan Northwest A/B Reply Comments"), the State of Alaska ("Alaska A/B Reply Comments"), and the Commission's Trial Staff ("Staff A/B Reply Comments").

In its Reply Comments (at 12), filed with the Commission on October 13, 1981, Alaskan Northwest indicated that it intended to file, in the next month, "revisions to the CCE" that would "provide the information necessary for the Commission to complete its review of the CCE and Center Point":

"On or about November 1, 1981, Alaskan Northwest will file revisions to the CCE reflecting the following: 1) schedule adjustment to 1986/1987 heating season; 2) Communications and Supervisory Control Systems costs; 3) elimination of the costs of Metering Station No. 1; 4) elimination of refrigeration system full load tests; 5) two compressor unit design at Station Nos. 2, 4, and 7; 6) adjustments to compressor and metering stations to reflect agreement with certain WBEC [Williams Brothers] recommendations; 7) new camps at certain existing and certain new locations; 8) adjustments to temporary facilities and services to reflect agreement with certain WBEC recommendations; 9) Rev. 3 pipeline alignment changes; 10) adjustments to pipeline to reflect agreement with certain WBEC recommendations; 11) Alyeska data acquisition; 12) third party monitoring and other related government cost adjustments; 13) affirmative action training programs; 14) highway repair costs; 15) qualified expenditures precertification cost adjustments; 16) FERC filing fees adjustment; 17) adjustments to project directorate to reflect agreement with certain WBEC recommendations; and, 18) tax language interpretation adjustments.

"These adjustments, plus Alaskan Northwest's Initial and Reply comments on the Final Report, will provide the information necessary for the Commission to complete its review of the CCE and Center Point."

On November 23, 1981, Alaskan Northwest filed a second amendment to its application (hereinafter referred to as the "November 1981 Amendment"), providing seven volumes of additional data on the above-enumerated subjects.

On December 9, 1981, the Commission issued in the above captioned dockets, a combined Notice of Amendment to Application and Order Establishing Procedures (46 F.R. 61698, December 18, 1981). The order reconvened the technical conferences in [Docket No. CP80-435](#), designated Barry M. Smoler (of the Commission's Office of the General Counsel) and J. Richard Berman (the OFI Division Director referred to above) to serve as presiding officers at the conferences, and instructed them to prepare a report to the Commission. The order also invited the parties of record to submit written data, views and comments, including reply comments, on the report as soon as it was issued.

The reconvened technical conferences were held on February 16 and 18, 1982. The February 18 conference was devoted to cost issues associated with highway repair, socioeconomic impacts, government monitoring, and the affirmative action training plan. All of the other issues were discussed at the February

16 conference.

The presiding officers determined that the issues discussed at the February 18 conference would take a considerably longer period of time to resolve than the issues discussed at the February 16 conference,⁸ but that the issues discussed at the February 16 conference spanned a much broader spectrum of the total CCE such that their earlier resolution would facilitate Commission determination of a vast majority of the CCE. Accordingly, the presiding officers decided to issue their report in two parts. Part I, containing their recommendations with respect to the issues discussed at the February 16 conference, was submitted to the Commission on April 16, 1982 (hereinafter referred to as the "Smoler/Berman Report"), accompanied by a memorandum to the Commission and a notice of the invitation for comment mandated in the above-referenced Commission order of December 9, 1981.⁹ Appended to the Smoler/Berman Report was a supplementary report prepared by Williams Brothers (hereinafter referred to as the "Williams Brothers Supplemental Evaluation").¹⁰

Copies of the Smoler/Berman Report and the accompanying notice of invitation for comment were served on all parties to the above-captioned dockets. Comments were filed by Alaskan Northwest ("Alaskan Northwest S/B Initial Comments"), Alyeska Pipeline Service Company ("Alyeska Comments"), and the Commission's Trial Staff ("Staff S/B

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Initial Comments"). Reply Comments were filed by Alaskan Northwest ("Alaskan Northwest S/B Reply Comments") and the Commission's Trial Staff ("Staff S/B Reply Comments").

II. Summary

The Adger/Berman Report, while recommending deferral of resolution of certain select elements of the CCE, concluded that "the filed design, as updated, is a valid basis upon which to set almost all of the CCE. The Commission can, and should, set this value in the most expeditious manner practicable."¹¹ The Smoler/Berman Report, while also recommending deferral of several elements of the CCE, recommended "that the Commission issue its order approving the CCE based on the Adger/Berman Report and this report, and the respective comments received on each. The limited number of deferred items could be resolved in a supplementary order at a later date; the vast majority of the CCE, however, is now ripe for decision."¹²

With one exception (the Alyeska data), the recommendations for deferral in the Smoler/Berman Report were, in effect, reiterations of recommendations for deferral in the Adger/Berman Report, while one major item deferred in the Adger/Berman Report (the communications system) has now been resolved in the Smoler/Berman Report. In light of the statutory mandate for expedition set forth in Section 9 of ANGTA, we will adopt the combined recommendation of the two reports that we establish the CCE at this time, subject, of course, to adjustment in subsequent orders as and when the deferred issues are resolved, and that we establish the value for the Center Point.

Alaskan Northwest has requested that the CCE be approved at \$8.53 billion, and that the Center Point be set at 1.267.¹³ The Adger/Berman Report recommended that the Commission approve \$6.73 billion of Alaskan Northwest's requested CCE and defer consideration of \$.9 billion associated with the management plan, communications system, affirmative action training programs, and socioeconomic impacts. That Report also made recommendations concerning certain design issues, proposed (for consideration by the Office of the Federal Inspector) guidelines for implementing the IROR design change process, recommended a labor cost adjustment index, and recommended approval of the cost formats put forward by Alaskan Northwest.

The Smoler/Berman Report recommended adding \$379 million to the CCE amount recommended in the Adger/Berman Report. The \$379 million includes \$103 million for the communications system, based on data submitted subsequent to issuance of the Adger/Berman Report. The Center Point was not an issue in the Smoler/Berman technical conferences. The Smoler/Berman Report recommended deferral of (1)

socioeconomic, government monitoring, highway repair, and training costs, all of which will be included in a supplementary report currently under preparation, and (2) Alyeska data acquisition costs, and noted that further technical conference proceedings might be necessary with respect to the cost of the management plan (recommended for deferral in the Adger/Berman Report) and of an additional schedule adjustment. The Smoler/Berman Report recommended that the record in the subproceeding be held open for additional technical conferences to resolve management plan costs (if deferred by the Commission) and additional schedule change costs (if filed by Alaskan Northwest).¹⁴

As indicated in Table 1 on the next page, we herein approve cost components of the CCE totalling \$6.93 billion, including \$1.01 billion for contingency associated with those components, and adopt the Adger/Berman Report's recommended Center Point of 1.2. We defer determination of the cost estimate for the Project Management component of the CCE pending the preparation by Alaskan Northwest of a detailed management plan (although we do resolve herein several significant sub-issues to facilitate ultimate resolution of the total). We defer determination of the cost of Alyeska data acquisition to permit assessment of any further agreements between Alaskan Northwest and the North Slope producers that could affect the amount requested. We defer consideration of the costs associated with socioeconomic and related issues pending receipt of the presiding officers' supplemental report and comments thereon. The total cost estimated by Alaskan Northwest for these deferred items is \$891 million. We also defer consideration of whatever amount, if any, might be appropriate for contingency for these items. In any event, the Center Point ratio will apply to the total CCE, including whatever costs the Commission may approve for addition to the CCE total approved herein when the deferred cost components are resolved.

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		Table I (Millions of 1980 \$)					
Components		CCE Currently		CCE Recommended		CCE	
Approved and		Requested by		by Adger/Berman			
Deferred in		Alaskan		and Smoler/Berman			
This Order		Northwest ^a		Reports ^b			
				Approve	Defer		
Approve	Defer						
Pipeline		\$4,251		\$3,693		\$3,694	
Compressor and Metering Stations		680		660		670	
Operations and Maintenance Facilities....		53		51		51	
Temporary Facilities and Services		1,095		962		967	
Communications and Supervisory Systems		103		103		103	
Project Directorate:							
Socioeconomic/Highway							
Monitoring/Training ^{c/.....}		260	54	\$ 206	0	\$ 260	
Other	1,170	535	579	435	631		
TOTAL BASE ESTIMATE	\$7,612	\$6,058	\$ 785	\$5,920	\$ 891		
Contingency	914	1,038		1,010			
TOTAL CCE	\$8,526	\$7,096		\$6,930			
Center Point Ratio	1.257	1.2		1.2			

a/Alaskan Northwest's July 1980 Application, as modified by its November 1980 and November 1981 Amendments and May 1982 comments.

^bThe combined effect of the recommendations of the Adger/Berman Report and the Smoler/Berman Report.

^cTraining refers to the affirmative action training program.

A word of caution and explanation is appropriate with respect to the significance of the \$6.93 billion figure approved herein for inclusion in the CCE. It should not be misconstrued or interpreted out of context. In particular, it does not purport to represent the total estimated cost of the Alaska pipeline segment of the ANGTS. First of all, as noted above, certain components of the CCE have been deferred for resolution in subsequent Commission orders. Secondly, the \$6.93 billion is stated in 1980 dollars (the year in which the estimate was prepared and filed by Alaskan Northwest), unadjusted for whatever inflation has occurred since that year or may occur prior to construction. Third, it does not include whatever cost adjustments (increases to the CCE) the Federal Inspector may authorize in conjunction with design changes prior to construction and in conjunction with scope changes after construction has commenced. Fourth, as noted above, the \$6.93 billion does not include the factor for the Center Point, which is a decimal ratio that is multiplied by the CCE after the CCE has been adjusted to include the above described increases. Finally, the \$6.93 billion does not include financing costs, which are reflected elsewhere in the IROR formula. All of these factors could significantly increase the total figure. Thus, although our determinations herein are important in establishing the rate of return formula for the Alaska pipeline segment of ANGTS, they do not purport to represent a "bottom line" estimate of the cost of that segment and should not be misconstrued as such.

We will keep the record open to receive additional filings on the Project Management cost component, as well as to receive the presiding officers' supplementary report(s) on the costs associated with the socioeconomic and related issues. The proposed design change guidelines are addressed to the Federal Inspector and fall within his jurisdiction; we merely note that the proposals are consistent with the requirements we established in [Order Nos. 31](#) and [31-B](#). Finally, we adopt Alaskan Northwest's cost estimate formats, and approve a labor cost adjustment index.

Our decision is based on consideration of Alaskan Northwest's application, as amended, the Adger/Berman and Smoler/Berman Reports to the Commission (including the Williams Brothers Evaluation and Supplemental Evaluation), the information provided by Alaskan Northwest and the other parties and participants during (or in conjunction with) the technical conferences, and the written data, views and comments

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received in response to the two orders inviting comment.

We turn to a discussion of the specific issues raised in the course of the subproceeding.

III. Status of the Alaska Pipeline Segment Design

In our August 1, 1980 order,¹⁵ we expressed some concern over design issues outstanding at the time the July 1980 Application was developed. This concern focussed primarily on our reluctance "to issue final orders having substantial ratemaking consequences based on design data that fail to consider design

alternatives known to the project sponsors at the time of issuance of the orders." Therefore, we asked that the remaining design issues be explored, in order to ascertain if it would be necessary to set alternative CCE values for alternative designs.

The Adger/Berman Report analyzed the design process and the status of the Alaskan Northwest design, and concluded that, for the most part, it was sufficiently advanced to form a basis upon which to establish a CCE. Alaskan Northwest, in its comments, has described its CCE as being "prepared at a 5 to 10 percent design . . ." at the time it was "frozen" for use in developing Alaskan Northwest's proposed CCE.¹⁶ This does not mean, however, that the design for the Alaska pipeline segment is insufficient to support a CCE decision.¹⁷ The Adger/Berman Report (at I-2) identifies the following stages of design development:

- (1) Development of general design concepts;
- (2) Development of preliminary design criteria;
- (3) Application of the preliminary design criteria to develop a preliminary design;
- (4) Testing of non-standard or unique designs;
- (5) Development of final design criteria; and
- (6) Application of final design criteria to develop the final design, including the plans and specifications by which the project is to be constructed.

The Adger/Berman Report concluded (at I-5) that Alaskan Northwest had completed the first three steps of this process, was well into steps (4) and (5), and had completed approximately five percent of step (6). Alaskan Northwest has not challenged this interpretation, and has given assurances that it does not contemplate extensive changes from the filed design.¹⁸ We concur with the Report's analysis of this issue and accept its conclusion that the design is sufficiently developed to support assignment of costs for almost all elements of the CCE.

IV. The Role of Williams Brothers in Reviewing the Certification Cost Estimate

In establishing the framework for setting the CCE and Center Point, [Order No. 31](#) required the target cost estimate to be based on expected costs.¹⁹ The target cost estimate, which includes both the CCE and the effects of the Center Point, is intended to represent the total anticipated project cost. In essence, the CCE represents the expected costs that can be reasonably foreseen and planned, while the Center Point represents the expected cost overrun attributable to abnormal events that might (or might not) occur.

As the Adger/Berman Report correctly observed, expected costs are by definition risk-neutral; the chance of cost overruns should be equal to the chance of underruns. The authors concluded that Alaskan Northwest's proposed CCE was in excess of a risk-neutral target cost estimate and should be reduced, and that Alaskan Northwest's proposed CCE exceeded the risk-neutral level primarily because of excess costs and errors in the base estimate and insufficient optimization of resources.²⁰

Alaskan Northwest's July 1980 Application was supported by 33 volumes of complex technical data; numerous additional volumes of data were filed as amendments. At the conferences, Alaskan Northwest had the assistance of a staff of several hundred engineers and other experts.²¹ To assist the authors of the reports in analyzing this plethora of material and in questioning Alaskan Northwest's staff, OFI engaged the services of Williams Brothers Engineering Company, a firm with considerable experience in arctic engineering and pipeline construction. Williams Brothers was to evaluate the Alaskan Northwest filings. The evaluation was to be in the nature of an audit rather than an attempt to create an independent cost estimate.²² These evaluations, which are appended to the respective reports, provide substantial basis for the reports' recommendation to adjust the CCE requested by Alaskan Northwest. (We note as well the excellent and comprehensive analysis of the filings performed by the Commission's Trial Staff, assisted by their own consultant, Purvin and Gertz, which contributed immeasurably in developing the record now

before us for decision.)

Alaskan Northwest responds to the reports by generally challenging the authors' reliance on Williams Brothers' judgments. In response to the Adger/Berman Report, Alaskan Northwest alleges that "the Report relies totally on and without variation from the . . .

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[Williams Brothers] audit" and ignores the opinions and explanations of Alaskan Northwest and its consultants. In response to the Smoler/Berman Report, Alaskan Northwest contends that the authors "rejected or ignored the applicant's presentation in favor of [Williams Brothers'] audit, even though there is no basis for substitution of [Williams Brothers'] judgement . . ." Alaskan Northwest also argues that the audit was close enough to corroborate Alaskan Northwest's estimate for IROR purposes. Finally, Alaskan Northwest argues that reliance on Williams Brothers is unjustified in that Williams Brothers had only a fraction of the resources available to Alaskan Northwest. Alaskan Northwest argues that the Adger/Berman Report must be evaluated by weighing Williams Brothers' experience and the information available to it against the experience and information available to Alaskan Northwest and its staff. These points are echoed also in Alaskan Northwest's comments on the Smoler/Berman Report.²³

Neither report was the result of blind reliance on Williams Brothers. The Williams Brothers evaluations were the end product of a number of drafts. The authors of both reports worked closely with Williams Brothers to be sure of the analysis and to order changes in the evaluations in some instances.²⁴ Even though the reports accept most of Williams Brothers' conclusions, it is apparent from the reports that those conclusions were adopted on the basis of independent consideration by their respective authors.

Alaskan Northwest's views were not ignored. On the contrary, the Williams Brothers Evaluation appended to the Adger/Berman Report, for instance, followed a long series of conferences in which Williams Brothers played an active role. At the technical conference in Tulsa in March of 1981, Alaskan Northwest had an opportunity to review and comment on a draft of that Evaluation as well as a draft of the Adger/Berman Report. A number of Williams Brothers' conclusions were changed as a result of that process.

Cost estimates are, in some measure, matters of judgment, and estimators will often disagree. Nevertheless, we cannot accept the view that the validity of the reports can only be judged by comparing the relative experience and information available to Williams Brothers and Alaskan Northwest. Meaningful evaluation of a cost estimate does not require the same level of technical resources as was required to produce the estimate. If it did, review of the cost estimate for a project this size would be effectively precluded.

Finally, we cannot accept Alaskan Northwest's contention, based on a statement in the Adger/Berman Report, that Alaskan Northwest's requested CCE and the Williams Brothers Evaluation were close enough to corroborate each other for purposes of setting the CCE. The cited remark must be viewed in context. In response to our concerns over outstanding design issues, the Adger/Berman Report concluded that the Williams Brothers Evaluation corroborated the Alaskan Northwest estimate for the purpose of "indicating a range of estimated cost within which the Alaska [pipeline] segment of the ANGTS can be expected to be built."²⁵ For IROR purposes, however, the difference between the requested CCE and that recommended in the Report is significant. As noted above, the IROR is based on the concept of a risk-neutral target cost, not a cost within which the project can be built. For purposes of the IROR, therefore, the reports do not corroborate the CCE requested by Alaskan Northwest.

Alaskan Northwest, as the applicant, has the burden of proof in this subproceeding to support its cost estimates. For a limited number of items in the CCE, the authors of the reports, assisted by their Williams Brothers consultants, found that Alaskan Northwest did not meet this burden. For the reasons indicated below, we accept and adopt most, but not all, of the reports' recommendations.

V. Specific Cost Issues

A. Pipeline

Alaskan Northwest's proposed total for the Pipeline portion of the CCE, as revised in its November 1981 Amendment and subsequent comments, is \$4.251 billion. This total has evolved throughout the proceeding as design changes were introduced and errors identified by Williams Brothers were corrected. The Adger/Berman Report recommended reductions of \$612 million in the then-filed \$4.275 billion total for Pipeline.²⁶ In its November 1981 Amendment, Alaskan Northwest corrected its estimate to reflect some of these items, as well as increasing its estimate to reflect the one-year slip in schedule and certain alignment changes. The Smoler/Berman Report recommended reducing the November 1981 schedule change and alignment change increases by \$518,000.²⁷

The total amount still being contested is \$557.9 million, as follows:

	Millions
General Optimization of Construction Plan	\$260.3
Civil Quantities Adjustment	124.9
Productivity Rate Adjustment	172.2
Alignment Changes	.2

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Schedule Change	.3
	\$557.9

Based on the record before us, we approve reductions totalling \$556.9 million, and approve a total of \$3.694 billion for inclusion in the CCE for Pipeline. The various adjustments are discussed separately below.

1. General Optimization of Construction Plan

Williams Brothers' evaluation of the July 1980 Application included an overall evaluation of the pipeline construction plan as filed--*i.e.*, Alaskan Northwest's productivity rate and material quantities were assumed to be correct.²⁸ This evaluation resulted in a recommended reduction of \$314.8 million, primarily attributable to adjustments in the size of crews and amount of equipment, the elimination of duplication of operations, and the correction of various perceived errors.²⁹

Alaskan Northwest subsequently agreed with \$55 million of the proposed reductions,³⁰ but has not specifically addressed any of the other recommended reductions except the reductions for contractors' overhead and profit and the benefits and burdens allowance (payroll adjustment), which are discussed elsewhere in this order. Alaskan Northwest's comments merely challenge generally all reductions and allege that Williams Brothers assumed that Alaskan Northwest did not optimize crews and equipment.³¹ The areas comprising the recommended reduction are discussed below.

a. Reductions in Crews and Equipment

The recommended reductions still contested in this area total \$139.0 million.

Alaskan Northwest states that its construction crews were designed to perform various assignments, and productivity rates were established for each crew. An hourly rate was applied against these numbers of workers and equipment that produced a cost of using equipment during the specified period. These rates assumed that 70 percent of the purchase price of the equipment would be recaptured through rental during its useful life on the project. According to Alaskan Northwest, this method of computation automatically optimizes total equipment required. When one operation is completed, the equipment will be moved to a new site within the spread. Alaskan Northwest notes that it cannot dictate movement of equipment between sections because each contractor controls his own spread, and further, that "[i]n the real world . . . computation of crews on usage time only results in automatic optimization within each segment."³²

It is far from clear that Alaskan Northwest's method of computation automatically optimizes crew and equipment use within a pipeline spread. There is no indication, for instance, that, in determining crew and equipment for each operation, Alaskan Northwest attempted to determine, with respect to other operations, which craftsmen and equipment could perform other tasks as well-- thus eliminating some workers and equipment from the total number. In some instances, of course, project location or schedule might require some idle time. But the point remains that there has not been sufficient optimization of resources.³³

The Adger/Berman Report and Williams Brothers Evaluation adequately explained the reasons for recommending reductions in this category. Except for its comments on Williams Brothers' calculation of the benefits and burdens allowance (payroll adjustment), Alaskan Northwest's arguments to the contrary are general rather than specific, and are not persuasive. We adopt the Report's recommendation on these issues, but for the reasons discussed *infra* (in section V.F.1. of this order, on Project Management), we will approve inclusion in the CCE of the \$736,000 in the benefits and burdens allowance questioned by Williams Brothers. Thus, the net reduction is \$138.3 million.

b. Overhead and Profit

(1) Execution Contractors

The CCE was based on an 18 percent execution contractors' markup. The Adger/Berman Report adopted Williams Brothers' judgment that 15 percent was adequate, primarily because substantial additional profit will be recovered through the salvage value of equipment. This resulted in a recommended reduction of \$105 million.³⁴ This same adjustment was applied to the alignment changes addressed in the Smoler/Berman Report.³⁵ The discussion herein is equally applicable to both reports.

Alaskan Northwest's proposed CCE was based on an assumption that contractors will recover 70 percent of the cost of new equipment through rental during its useful life on the project. This implies that 30 percent of the cost could be recovered through salvage when the equipment is sold at the end of the project.³⁶ Williams Brothers pointed out, however, that at auctions in the United States and Canada, such heavy duty equipment 2 to 2 1/2 years old and in top condition "brings approximately 60 percent of the original purchase price. Deescalated, this represents 40 to 45 percent of the original purchase price in original year dollars."³⁷

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Alaskan Northwest argues that salvage values are less for equipment used in Alaska because of the harsh conditions. Nevertheless, the CCE indicates that the estimate for spare parts is 40 percent higher to allow for freight and general conditions in Alaska. Indeed, the estimate for spare parts (excluding tires) amounts to 44 percent of rental rate for the equipment. We agree with the Williams Brothers Evaluation that this parts allowance, together with the allowance for repair and maintenance, ought to be sufficient to maintain the equipment in top condition.³⁸

Alaskan Northwest alleges that no contractor would accept a 15 percent rate for overhead and profit on a fixed price contract,³⁹ but no support for the allegation is offered. In Williams Brothers' judgment, the

construction plans and estimates should allow an efficient contractor to clear an 18 to 20 percent profit with a markup of 15 percent on the filed estimate.⁴⁰ In other words, execution contractors will look to total profits, not just profits shown in the CCE. If they can receive adequate profits through equipment rentals, they will bid on a lower projected overhead and profit rate. While not in the record, we take note of the fact that this approach is consistent with the guidelines used by the U.S. Army Corps of Engineers (COE) in negotiating profit on construction contracts.⁴¹

Alaskan Northwest also states that Williams Brothers has improperly assumed that execution contractors will recover 60 percent of the purchase price of the equipment through escalation.⁴² This is a misunderstanding of the Evaluation, which clearly states that its calculations are deescalated to original year dollars.⁴³

We accept and adopt the reductions recommended in the Adger/ Berman and Smoler/Berman reports and the Williams Brothers Evaluation and Supplemental Evaluation, for the reasons stated therein. Thus, the CCE proposed by Alaskan Northwest will be reduced by \$105,635,000.⁴⁴

(2) Subcontractors

The Adger/Berman Report adopted Williams Brothers' recommendation that subcontractors' overhead and profit should be reduced from 25 to 18 percent for double jointing, thin film epoxy coating, and pipe insulation.⁴⁵ This recommendation was applied by the Smoler/Berman Report in arriving at its recommendation on minor alignment changes.⁴⁶

Alaskan Northwest challenges the reductions, which are said to total \$15 million. (We note, however, that the reductions for all three items total \$15,726,000.) These include reductions for labor, equipment, buildings, and support costs, as well as subcontractors' overhead and profit. Alaskan Northwest fails to distinguish among these reductions, and fails to support its claim that a 25 percent markup would be justified.

We accept and adopt the recommendation of the reports and of the Williams Brothers evaluations that 18 percent is adequate for overhead and profit considering the scope and locations of the work and the size of the contracts.⁴⁷ The CCE proposed by Alaskan Northwest will be reduced accordingly.

2. Civil Quantities

Based on a Williams Brothers special analysis of quantities of material needed for trench excavation and backfill, the Adger/ Berman Report recommends reductions of \$125 million derived from excess costs and estimating errors.⁴⁸ Alaskan Northwest alleges that Williams Brothers' recommendations were based on "subjective judgmental differences . . . on the amount of over-excavation that will be experienced relative to the neat design trench cross section, on measurement of yards of material to be mined, hauled and placed in bedding and backfilling, and on estimated hauling losses."⁴⁹

The Williams Brothers Evaluation, which was aided by input from the State of Alaska,⁵⁰ contains a detailed analysis and explanation of those areas in which it found excess costs or estimating errors. The special analysis is summarized by Williams Brothers as follows:

Summary, Civil Quantities Special Evaluation

The special study of civil quantities has concluded that the CCE values for civil quantities are overstated for the following reasons:

The CCE value for hauling from the material sites to the right-of-way included material site losses.

Material site losses were applied to common backfill material, but 88 percent of the common backfill material comes from reusable ditch excavation material. In addition, the hauling costs (from material site to

the right-of-way) for these non-existent losses were also included in the CCE.

The ditch configuration, developed by NWA's cost estimators to determine excavation and backfill quantities in lieu of civil engineering quantities, was evaluated to be overestimated.

Backfill quantities, after deducting allowances for material site losses, right-of-way

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losses and shrinkage, were computed as bank cubic yards for the ditch configurations developed by NWA's cost estimators. The actual material placed in the ditch will not be compacted to bank density, even after natural settlement.

The ditch configuration developed by NWA's cost estimators increased the depth of the ditch by one foot, but left the pipe at the same elevation relative to the surface. This increased the depth of the more expensive select backfill (bedding material) by one foot more than the minimum design requirement.

The CCE backfill quantities included a mound, expressed in bank cubic yards. If the CCE quantity (as bank cubic yards for level backfill) were placed in the ditch, a significant mound would result.

The CCE contains a 17 percent allowance for crushing extra backfill to cover plant waste (this is in addition to material site losses and shrinkage) plus a buffer allowance in case of an overrun of the estimated amount of select backfill. The allowance for material site losses was evaluated to be adequate and the buffer allowance was evaluated to be a contingency factor. The 17 percent allowance was evaluated to be 5 percent, because some allowance for loss and waste during the crushing operation is reasonable.⁵¹

The Evaluation also found that ditch excavation volumes were apparently included for the five aerial river crossings. In addition, in developing the CCE, Alaskan Northwest estimated the size of the ditching crew based on the total material to be excavated, even though some excavation - *e.g.*, sloughage, tie-ins, river crossings and road crossings - are to be excavated by different crews.⁵²

Alaskan Northwest distinguishes between material quantities shown in its ditch design drawings and those that must be considered by cost estimators trying to anticipate the "real world." According to Alaskan Northwest, cost estimators must consider the over-excavation expected to result from such factors as ditch degradation; the extra width or depth required at tie-ins, sidebends, and various crossings; and the unavoidable over-excavation resulting from blasting. Alaskan Northwest contends that such factors are not taken into account by the design engineers. Alaskan Northwest argues that Williams Brothers compared its own ditch design drawings with those of Alaskan Northwest, and concluded that Alaskan Northwest's drawings contain excess allowances, even though it is agreed that quantities in excess of the design drawings will be needed to construct the pipeline.⁵³

The Williams Brothers Evaluation does not state that excavation and backfill quantities should be limited to amounts shown in the design drawings. It does challenge the methodology by which quantities in excess of the drawings were estimated as well as the results of that process. Thus, the Williams Brothers estimating drawings were not used to show that the Alaskan Northwest design drawings provided for excess material, but that the allowance for over-excavation was unduly generous.

We adopt the recommendation of the Adger/Berman Report on this issue for the reasons stated therein.

3. Productivity Adjustment

In preparing the estimate for the pipeline component of the filed CCE, Alaskan Northwest assumed that pipeline construction would proceed at an average rate of 40 joints of 80 foot pipe per day for non-insulated pipe and 35 joints per day for insulated pipe. The Adger/Berman Report concluded that this rate is too pessimistic and is not based on optimization of available resources. For instance, the Report observed that

even though some experts consider a welding speed of 14 inches per minute to be too fast, contractors typically find it advantageous to trade off the cost savings of a more rapid welding speed against the costs of repairing defective welds. The Report notes that such procedures were used on the Western Leg and Western Delivery System of the ANGTS and concludes that 48 joints per day is a realistic average. Based on the latter rate, the Report recommends a CCE reduction of \$172.2 million.⁵⁴

The Adger/Berman Report's conclusions are supported principally by the Williams Brothers Evaluation. Based on their own experience, Williams Brothers estimated that the pipeline lay-rate should be 45 to 50 joints per day and prepared a time and motion study that confirmed this estimate.⁵⁵ In their time and motion study, Williams Brothers estimated the time necessary for performing individual activities in the pipe laying operation under ideal working conditions. The resulting ideal production rates were then adjusted by efficiency factors established for each pipeline section for each month of construction. The efficiency factors adjusted the lay rate for "weather and other overall factors that would affect the productivity."⁵⁶ Using this method, Williams Brothers estimated average lay-rates of 47 joints per day for sections 1, 2, and 3 of the pipeline (excluding Atigun Pass), 49 joints per day for section 4, and 50 joints per day for sections 5 and 6.⁵⁷

In response, Alaskan Northwest challenges Williams Brothers' estimated lay rate; compares Williams Brothers' estimated lay

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rate with lay rates actually achieved on other projects; and attempts to refute the extent of savings possible if the Williams Brothers lay rate is achieved. We do not find Alaskan Northwest's arguments persuasive.

a. The Williams Brothers Evaluation

Alaskan Northwest challenges the validity of the Williams Brothers lay rate estimate primarily on the grounds that it assumed a welding speed that is too fast.⁵⁸ Citing letters from the Alaskan Welding Center and Exxon Production Research Company (EPR)⁵⁹ as corroborating their position, Alaskan Northwest argues that the optimum welding speed for 48-inch pipe is 8 to 12 inches per minute.⁶⁰ According to Alaskan Northwest, the 14 inches per minute assumed by Williams Brothers would result in an unacceptable percentage of defective welds.

Alaskan Northwest's assertion that a welding speed of 14 inches per minute would cause excessive weld repairs is undocumented and is not corroborated by the letters from EPR and the Alaskan Welding Center. As Williams Brothers observed, the letter from the Alaskan Welding Center was based on preliminary investigations and did not describe the tests they performed. Moreover, much of the Center's work involves certification of welders, who tend to reduce their rate during certification to assure a quality weld in an unfamiliar environment.⁶¹ The EPR letter is even less corroborative, for it acknowledges that average speeds of 14 inches per minute are "theoretically possible" and have "been permitted or even encouraged in the past."⁶²

Williams Brothers stated that its recommended welding speed is based on its real world experience that quality welds can be produced at this speed.⁶³ This judgment is born out by the productivity experienced in the "prebuild" of both Northern Border and the Western Leg. For example, installing the first 381 miles of pipe, the Northern Border welders achieved an overall average of 76.6 joints per day for 42--inch pipe. In order to achieve this rate, the Northern Border welders must have reached and exceeded a weld deposition rate of 14 inches per minute.⁶⁴

Alaskan Northwest denies that it is common practice to accept more repairs in exchange for a higher weld rate. They argue that such an attempt at optimization would cause special problems in Alaska, because locating and repairing defective welds would require either (1) leaving the ditch open in permafrost areas, where degradation occurs, or (2) making repairs in bell holes after the pipe is buried. Alaskan Northwest notes that defects involving cracks in root beads require cutting out an entire weld and inserting

a pup joint.⁶⁵

Even though more rapid welding speeds may be expected to result in a higher repair rate, the record does not show that a speed of 14 inches per minute would result in excessive repairs. Moreover, Alaskan Northwest's protestation that it is not efficient to accept a higher repair rate in order to achieve a more rapid welding speed is contradicted by a Department of Transportation/ OFI study of weld repair rates on the Western Leg and Western Delivery System. The study found that execution contractors on those systems were encountering and accepted weld repair rates in excess of 20 percent (in one instance as high as 38 percent). Relatively few of those welds (.97 to 3.4 percent) required repairs involving cutting out sections of pipe.⁶⁶ Since most of the weld defects studied were apparently the result of workmanship, it seems clear that the execution contractors had decided to accept the costs of the higher defect rate in exchange for the advantages of laying more pipe joints per day.

Alaskan Northwest's argument that a higher repair rate would require leaving the ditch open longer in permafrost areas is not persuasive and is of limited applicability considering the fact that only a limited amount of pipe will be laid in areas subject to permafrost degradation (either because of geological or climatic reasons). Once opened, the ditch must remain open while a number of operations are performed. A more rapid lay rate should, in itself, reduce the time a ditch is open. Even assuming that a higher repair rate necessitates leaving the ditch open for a longer period, this will not necessarily result in critical permafrost degradation. Furthermore, if this were a problem, we see no reason why it could not be met by expediting weld repairs in permafrost areas. In summary, the record contains evidence, which we find persuasive for the reasons stated, that an average welding speed of 14 inches per minute is practicable and efficient.⁶⁷

Alaskan Northwest also argues that Williams Brothers failed to include the time required for welders to change burned out rods and failed to consider that two welders working at the same position cannot strike their arcs simultaneously.⁶⁸ Williams Brothers explained that these work elements were included in the factor applied "for loss of efficiency in labor and equipment due to weather and other factors." Although it might have been more helpful to isolate these elements in the study, we note that the study was not an initial attempt to estimate lay rate, but was performed to test Williams Brothers'

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experienced-based judgment that a lay rate in the range of 45 to 50 joints per day is reasonable.⁶⁹ Finally, we note that Alaskan Northwest itself estimates a total of 42 seconds for these two elements, yet the Williams Brothers study contains 40 seconds for an operation, stripping the weld, that Alaskan Northwest does not intend to perform (albeit based on Alaskan Northwest's own estimate of what constitutes an efficient welding speed).⁷⁰ In sum, we do not see this as a meaningful defect in the Williams Brothers study, and in light of the rates experienced on other systems (discussed below), we find that a productivity rate of 48 joints per day should be reasonably obtainable.⁷¹

b. Comparison with Other Projects

(1) Trans-Alaskan Pipeline System (TAPS)

Alaskan Northwest argues that its estimate is optimistic compared to the actual rate obtained by the Alyeska Pipeline Service Company in constructing the Trans-Alaska (oil) Pipeline System (TAPS). In support, it appends to its comments a letter from Sohio Gas Pipeline Company purporting to compare the Alaskan Northwest estimate with the actual weld productivity on TAPS.⁷²

The Sohio letter contains an analysis of the man hours per foot required for line-up and weld activities for Alyeska compared to man hours per foot estimated by Alaskan Northwest for operations 606 (line up/hot pass), 607 (firing line) and 608 (weld repair). Sohio concludes that Alaskan Northwest's estimate is 12 percent too low. Alaskan Northwest argues that it should not be expected to achieve a higher lay rate than Alyeska.⁷³

We do not agree with Sohio's premise that a comparison of total man hours per weld is a valid method for comparing lay rates. We are convinced that it is the stringer bead (the initial weld) crew that sets the pace for the other welding crews in laying pipe. Other crews' man hours per weld are directly related to those required by the stringer bead crew. Thus, for example, one extra man hour required by the stringer bead crew may translate into several total man hours.⁷⁴ Even if a straight comparison of man hours per weld were valid, the Sohio analysis is flawed in that it compares Alyeska's actual experience with Alaskan Northwest's contingency free estimate.

In our view, any productivity estimate for this project should be optimistic compared to Alyeska. We would expect contractors to have benefitted from arctic experience on Alyeska. Moreover, the fixed price contracts proposed for this project should provide an incentive for performance that was not present in the cost-plus contracts under which Alyeska was constructed.⁷⁵

Sohio's arguments against this view are not persuasive. Sohio argues that if experience with arctic conditions could improve performance, Alyeska would have had a higher lay rate in its second year, but did not. Failure to improve in the second year could be the result of any number of factors, including lack of incentive through cost-plus contracts.⁷⁶

(2) Northern Border Pipeline Company

Northern Border's comments address the lay rate issue only. Installing high toughness heavy walled 42-inch pipe, Northern Border achieved an average lay rate of 76.6 joints per day on the first 387 miles. According to Northern Border, this is the equivalent of 40 joints per day for the Alaska segment when adjustments are made for the different pipe size, number of welders, and winter-summer construction.⁷⁷

In its Comments, Staff points out serious deficiencies in Northern Border's calculations.⁷⁸ We find Staff's analysis persuasive. Staff points out that Northern Border does not show the actual time required to lay down stringer bead. As we noted, *supra*, welders applying this bead set the pace for other welders and crews. We also agree with Staff that the number of additional welders required to weld one joint of 48-inch pipe cannot be determined by a simple ratio of pipe diameters. Other factors besides pipe diameter affect welding time - the time required to walk between two welds on a pipe joint and set-up time, for instance.

In a manner that we find convincing, Staff has demonstrated how the time and motion studies of both Williams Brothers and Alaskan Northwest can be adjusted for comparison with the Northern Border lay rate. Alaskan Northwest's time and motion figures indicate that it would take 9.5 minutes per joint to run the stringer bead on Northern Border's 42-inch pipe. This is the equivalent of 53.7 joints per day, considerably less than the rate actually achieved by Northern Border, even before any reduction for harsh weather or terrain, etc., or any allowance for contingency. The same method applied to the Williams Brothers study results in a rate of 71.8 joints per day, nearer the rate actually achieved yet still on the low side.⁷⁹

(3) The Western Leg and Western Delivery System

Alaskan Northwest argues that it is inappropriate for the Adger/Berman Report to compare the Alaskan Northwest estimate with

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lay rates obtained on the Western Leg and Western Delivery System because those projects used smaller diameter pipe and because weather, terrain, and soil were more favorable than in Alaska. These differences, however, are compensated for in the time/motion studies, which assume ideal conditions prior to application of an efficiency factor. The Williams Brothers lay rate, adjusted for 42-inch pipe constructed under ideal conditions, is 71.8 joints per day.⁸⁰ This corresponds with the low end of the 71 to 80 joints per day range experienced by the Western Leg and Western Delivery System.

(4) Foothills Pipe Lines

Even though Foothills has achieved a lay rate 46 percent greater than that estimated by Alaskan Northwest, Alaskan Northwest argues that the difference is attributable to smaller diameter pipe and better soil and weather conditions. According to Alaskan Northwest, the only significant comparison is between Alaskan Northwest's estimate and Foothills' preliminary lay rate estimate for the South Yukon part of its line. Alaskan Northwest states that when the Foothills preliminary estimate is adjusted to account for its joint lengths of 67.5 feet, its effective lay rate is 45 joints per day. The difference is said to be the result of less rugged terrain in the Yukon, Canadian labor practices, and the greater arctic experience of Canadian workers.⁸¹

Few of the details of the Foothills preliminary estimate appear in the record, and those that do raise questions. For instance, it is unclear whether the Foothills estimate includes factors for contingency. Moreover, Alaskan Northwest seems to accept the Foothills assumption that an increase in joint length will not increase the number of feet of pipe laid per day because certain unspecified operations, other than front end welding, cannot be scaled to progress faster.⁸² This unsupported assumption, which is incorporated into Alaskan Northwest's adjustment for different pipe lengths, is at odds with our belief that the pace for laying pipe will be set by the stringer bead crew.⁸³ This crew should be able to complete a 67.5 foot joint in the same time as an 80 foot joint. The only notable difference is that it will have to walk another 12.5 feet between joints. On balance, the Foothills preliminary estimate is not persuasive corroboration of Alaskan Northwest's.

c. Conclusions Regarding Productivity Rate

In summary, Alaskan Northwest would have us believe that, despite the experience gained on TAPS, despite the confinement of ANGTS construction to summer and shoulder months, and despite the experience gained on the prebuild of Northern Border and the Western Leg (*e.g.*, welding high toughness heavy walled pipe, exposure to Federal Inspector monitoring activities, etc.), productivity in Alaska will be roughly half that experienced in the lower 48 States. We do not find these arguments persuasive. The Williams Brothers analysis appears reasonable to us and is corroborated by actual experience. Accordingly, we will adopt the lay rate conclusions of the Adger/Berman Report.

d. Reductions in the CCE Attributable to a Higher Productivity Rate

The Adger/Berman Report accepted Williams Brothers' analysis that the recommended adjustment in the lay rate should result in a reduction of \$172.2 million in the CCE.⁸⁴ Alaskan Northwest argues that even if the Report's lay rate is accepted, the maximum reduction in the CCE should be \$16.87 million.⁸⁵

The Adger/Berman Report adopted the view, as put forth by Williams Brothers, that all pipe laying crews should advance at approximately the same rate, especially in arctic soils where the ditch may begin to thaw if left open too long. The ditching crew should not be far ahead of the welders, and the backfill crew should not be far behind. The Report, therefore, recommended reductions in the direct costs of all pipe laying crews and proportionate reductions in indirect costs.⁸⁶ Alaskan Northwest, however, maintains that only crews directly involved in the pipe laying operation would be affected, namely, stringing, welding, firing line, coating, and insulation.⁸⁷

We cannot agree with Alaskan Northwest's limited application of the increased lay rate. To us, the issue is whether the other crews proceed at the same rate as the stringer bead crew. To start, it must be clarified that the Adger/Berman Report's recommended lay rate adjustment reduces the number of days each crew will be working, as opposed to a reduction in crew size.⁸⁸ Alaskan Northwest recognizes that the lay rate is set by the stringer bead crew. In fact, it states that "[t]he other crews, such as ditching, hauling, and stringing were established to keep pace with the pipe gang and welding crews."⁸⁹ And Alaskan Northwest does not refute Williams Brothers' statement that "... most pipeline lay operations require specific crews *regardless* of the progress rate."⁹⁰ We note, for example, that Alaskan Northwest's estimate for Pipeline Survey (Operation 601) states that "[t]he full crew would start working two weeks prior to the Ditching

Operation, continue working during the entire pipeline construction and work two weeks after completion of the Testing

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Operation."⁹¹ Thus, if the period of pipeline construction is shortened, so must the period during which the survey crew would work. Similarly, a reduction in direct costs should be accompanied by a proportionate reduction in contractors' indirect costs (Operations 701-715, 723, and 731).

Based on the above, we accept and adopt the recommendation of the Adger/Berman Report. Total reductions attributable to lay rate productivity are \$172.2 million.

4. Alignment Changes

In addition to costs submitted in the November 1980 Amendment to reflect alignment changes resulting from the process of securing the Department of the Interior Grant of Right-of-Way, Alaskan Northwest also requested \$4,015,000 in its November 1981 Amendment.⁹² The \$4,015,000 is attributed to alignment changes made subsequent to 1980. This is characterized as the net of increases and/or decreases in mainline construction contracts, materials, subcontracts, and royalties.

Staff suggests that the November 1981 alignment change costs should be deferred for consideration by OFI during the design review process. Staff contends that the CCE should be based on the "frozen" design that formed the basis for the July 1980 Application, with only major adjustments in the interim considered in the Commission's CCE determination.⁹³

We disagree. For the reasons stated in the Smoler/Berman Report (at 30), the CCE should be based on the best estimate available in the record at the time the order is issued. The November 1981 alignment changes represent the best estimate currently available.

The Smoler/Berman Report, based on Williams Brothers' recommendations, suggests that all but \$187,000 of the requested increase be included in the CCE.⁹⁴ As discussed in part above, the proposed reductions are primarily attributable to the application of reductions recommended in the Adger/Berman Report. These include reductions in the costs of mainline construction contracts, materials, and subcontracts.⁹⁵

Citing its arguments in response to the Adger/Berman recommendations, Alaskan Northwest agrees with \$5,000 and disagrees with \$182,000 of the reductions proposed in the Smoler/ Berman Report.⁹⁶ We have accepted and adopted the Williams Brothers recommendations on these items elsewhere in the Pipeline component of the CCE, and will adopt them here as well.

The remaining \$10,000 is attributed to overstated transportation and handling costs for ditch insulation.⁹⁷ Alaskan Northwest, without further explanation, disagrees with this reduction.⁹⁸ We accept and adopt the Williams Brothers reduction recommended in the Smoler/Berman Report, for the reasons stated in the Williams Brothers Supplemental Evaluation.

5. Schedule Adjustment

In its November 1981 Amendment, Alaskan Northwest requested a schedule adjustment (from its original filing) for the Pipeline component of the CCE in the amount of \$25,874,000. For the reasons discussed *infra* (in section V.G. of this order, Schedule Adjustment), we adopt an adjustment of \$25,872,000, including \$329,000 for the benefits and burdens allowance (payroll adjustment).

B. Compressor and Metering Stations

Alaskan Northwest's requested total for Compressor and Metering Stations, as adjusted by the November

1981 Amendment and subsequent comments, is \$679.9 million.

The Adger/Berman Report recommended reductions of \$14.7 million, primarily in Project Management Contract (PMC) Direct Services, Outside Service Costs, and equipment prices. That Report also recommended reductions of another \$10.9 million for excess refrigeration capacity, unnecessary full load testing for compressors, and substitution of nickel alloy for stainless steel in flare stacks. The reductions total \$25.6 million.⁹⁹

Alaskan Northwest's November 1981 Amendment contained a \$10.2 million "reconciliation" reduction primarily for reduced refrigeration capacity. Further, the November 1981 Amendment contained a \$10.67 million reduction to reflect the incorporation of metering facilities into the gas conditioning facility, a \$25 million reduction attributable to the elimination of full load testing (as recommended by Williams Brothers), and the addition of \$33 million for the two compressor unit design. Finally, a \$1.4 million schedule adjustment was proposed.¹⁰⁰

The Smoler/Berman Report agreed with these proposals, with the exception of \$52,000 attributable to the schedule change and \$2.06 million of the cost of the two compressor design.¹⁰¹ In subsequent comments, Alaskan Northwest agreed to a further reduction of \$2.3 million.¹⁰² Alaskan Northwest still objects to the other recommended reductions.

The total amount remaining at issue is \$19.5 million, as follows:

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	Millions
1. Adger/Berman Reductions	\$14.700
2. Reductions Based on Special Studies	4.700
3. Deletion of Metering Station No. 1	.015
4. Two Compressor Unit Design	.017
5. Schedule Adjustment	.052
	<hr/>
	\$19.484

Based on the record before us, we approve reductions totalling \$10 million, and approve a total of \$669.9 million for inclusion in the CCE for Compressor and Metering Stations. The various adjustments are discussed separately below.

1. Reductions for Excess Cost Estimates

Of the total \$14.7 million reduction recommended by the Adger/ Berman Report for this category, \$8.3 million is for vendor shop inspection and the size of the technical engineering staff. Alaskan Northwest alleges that the reductions are arbitrary, but provides no further support for its allegation other than arguing that its estimators are more familiar with the project.¹⁰³ The Williams Brothers Evaluation, on the other hand, contained a reasonably detailed explanation of why the staffing levels for these activities were considered excessive. With respect to shop inspection, for instance, Williams Brothers pointed out that "[o]nly the major components will require a full time inspector, and most inspection will only be required during specific manufacturing and test phases." This activity can be supplemented by the shop inspection staff included in Project Directorate.¹⁰⁴ We accept the Williams Brothers analysis on this point.

Alaskan Northwest also challenges \$4.9 million in reductions for non-destructive engineering (NDE) tests on high pressure gas piping. The Williams Brothers Evaluation concluded that these costs duplicate costs included in the piping estimate. Williams Brothers concluded that the piping estimate includes both

labor and materials for x-ray.¹⁰⁵ Alaskan Northwest denies that the costs are duplicative. According to Alaskan Northwest, the \$4.9 million in this section is for labor and materials for x-ray and other NDE tests. The NDE costs under piping are for support services that the x-ray contractor will require, such as scaffolding for access to welds, and utilities needed by the contractor, such as water and electricity.¹⁰⁶

We accept Alaskan Northwest's explanation and will include the \$4.9 million in the CCE.

Also included in the \$14.7 million reduction is \$1,373,000 attributable to a disputed benefits and burdens allowance (payroll adjustment) calculation. For the reasons discussed *infra* (in section V.F.1. of this order, on Project Management), we will approve inclusion of the \$1,373,000 in the CCE.

2. Reductions Based on Special Studies

Flare stack metallurgy and performance testing of the compressors and refrigeration equipment were the subject of special studies by Williams Brothers. We agree with the Adger/ Berman Report's conclusion that the CCE should be reduced for these items because less expensive alternatives are available, particularly in light of the paucity of Alaskan Northwest's justification for the more expensive alternatives. We note, however, that if, as part of the design review process, the Federal Inspector should find additional testing or different stack metallurgy desirable, he would have authority to approve an appropriate design change for the stack or to approve or require additional testing. In such event, a commensurate adjustment to the CCE would be appropriate.

a. Compressor Testing

The CCE includes \$1.12 million for full load, full pressure performance testing of all seven mainline gas compressors. Alaskan Northwest argues that prudent management requires all seven units to be fully tested before shipment to Alaska, because these will be new units including some new designs.¹⁰⁷ Williams Brothers concluded that these units are not prototypes. The design and performance have been proven for similar size units. It may be that the same rotor system components have not been combined before, but any resulting difficulties should be revealed by the full load testing of two of these units.¹⁰⁸ We therefore approve the recommended reduction of \$800,000, subject to the above stated caveat that the Federal Inspector may restore part or all of that amount in the event that he later approves or requires such testing.

b. Refrigeration Testing

Originally, Alaskan Northwest estimated that full load performance testing would be required for all seven refrigeration systems, at a total cost of \$28 million. That estimate was subsequently reduced to \$3.1 million for testing components, computer simulation of system dynamics, additional engineer training, operator training, and additional start-up assistance. Alaskan Northwest argues that as much debugging as possible should be done before the units are shipped to Alaska, because these systems are novel in that they must be able to operate in two modes: refrigeration and free cooling.¹⁰⁹ In later comments, Alaskan

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Northwest still urges that \$3.1 million be included for alternative testing, contending (1) that Williams Brothers did not review all of the available data; (2) that such testing is "necessary"; (3) that similar testing is necessary for mainline compressors; and (4) that some of these costs have already been expended.¹¹⁰

It appears that Alaskan Northwest misread the Williams Brothers Evaluation. Williams Brothers never contended that this testing was unnecessary; rather, they found that the CCE "included sufficient allowances for component testing, engineering, training and start-up assistance."¹¹¹ Thus, Williams Brothers essentially concluded that these costs were included in the vendor bids used by Alaskan Northwest to develop its proposed CCE.

Alaskan Northwest initially provided no data or estimating basis to support the testing items listed.¹¹² In

its Comments, however, Alaskan Northwest now states that its request for quotations (RFQ) explicitly excludes these testing costs.¹¹³ On this basis, and in light of the other reasons set forth by Alaskan Northwest as enumerated above, we conclude that the \$3.1 million was not double-counted, and should be approved for inclusion in the CCE.

c. Flare Stack Metallurgy

Williams Brothers recommended nickel alloy steel instead of stainless steel, as a less expensive alternative design for the flare stacks at the compressor stations.¹¹⁴ Alaskan Northwest argues that Williams Brothers has failed to demonstrate that the design would be either feasible or less expensive,¹¹⁵ but Alaskan Northwest has not alleged either that nickel alloy would not be cheaper or that it would not be feasible. It is demonstrably cheaper. We will adopt the reduction of \$455,000, but on the understanding that the Federal Inspector has ample authority to approve a design change and appropriate CCE adjustment for flare stack metallurgy if he determines that use of nickel alloy steel would be appropriate.

3. Deletion of Metering Station No. 1

In its November 1981 Amendment, Alaskan Northwest proposed to delete \$10.67 million to reflect the incorporation of metering facilities into the Alaska Gas Conditioning Facility (AGCF). This reflects a complete deletion of the facilities from the November 1980 Amendment's proposed CCE, and the addition of new costs for the systems initially housed at Metering Station No. 1 and not transferred to the AGCF.¹¹⁶

The Smoler/Berman Report adopted Williams Brothers' proposed further reductions of \$50,000 for the metering station.¹¹⁷ In arriving at the \$50,000 reduction, Williams Brothers found some of Alaskan Northwest's reductions to be overestimated and others underestimated.¹¹⁸

Alaskan Northwest agrees with the Williams Brothers reductions, except for the \$15,000 reduction attributable to the benefits and burdens allowance (payroll adjustment).¹¹⁹ Staff does not challenge the Smoler/Berman Report's conclusions.¹²⁰

We will generally adopt the recommendations of the Smoler/ Berman Report and the Williams Brothers Supplemental Evaluation, for the reasons stated therein. However, in accordance with our resolution of the benefits and burdens issue (*see* discussion *infra* in section V.F.1. of this order, on Project Management), the total reduction will be \$35,000.

4. Two Compressor Unit Design

Alaskan Northwest, in its November 1981 Amendment, proposed an increase of \$33,054,000 attributable to redesign of Compressor Station Nos. 2, 4, and 7.¹²¹ The Smoler/Berman Report, based on the Williams Brothers Supplemental Evaluation, recommended a reduction of \$2,060,000 in the requested amount, based primarily on netting identified computational and methodological errors and omissions.¹²² Alaskan Northwest concedes that \$2,094,000 in freight costs was counted twice, and apparently agrees with most of the other Williams Brothers adjustments, both additions and reductions.¹²³ Remaining at issue is approximately \$17,000 of management costs derived by applying the reductions recommended in the Adger/Berman Report for the benefits and burdens allowance (payroll adjustment). We generally affirm and adopt the recommendations of the Smoler/Berman Report and the Williams Brothers Supplemental Evaluation, for the reasons stated therein, but, for the reasons discussed *infra* (in section V.F.1. of this order, on Project Management), we will approve inclusion in the CCE of the \$17,000 for the benefits and burdens allowance. Thus, the total reduction is \$2,043,000, for a net increase of \$31,011,000 attributable to redesign of the three compressor stations.

5. Schedule Adjustment

In its November 1981 Amendment, Alaskan Northwest requested a schedule adjustment (from its original filing) for the Compressor and Metering Stations component of the CCE in the amount of \$1,390,000. For

the reasons discussed *infra* (in section V.G. of

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this order, on Schedule Adjustment), we will adopt a schedule adjustment of \$1,391,000.

C. Operations and Maintenance Facilities

Alaskan Northwest's requested total for Operations and Maintenance Facilities, as adjusted by its November 1981 amendment, is \$53.5 million. The amount remaining at issue is \$2.5 million, as follows:

	Millions
1. Adger/Berman Reductions	\$2.500
2. Schedule Adjustment	.003
	<hr/>
	\$2.503

Based on the record before us, we approve reductions totalling \$2.24 million, and approve \$51.26 million for inclusion in the CCE for Operations and Maintenance Facilities. The adjustments are discussed separately below.

1. Adger/Berman Recommended Reductions

The Adger/Berman Report recommended reductions of \$2.5 million. Alaskan Northwest alleges that this recommendation is arbitrary. In particular, Alaskan Northwest criticizes recommended reductions of \$1.5 million in precommissioning costs based on an allegedly erroneous calculation of man hours by Williams Brothers.¹²⁴

The Williams Brothers calculations are not expressed as clearly as they might be, but upon examination they do not appear to be in error. Williams Brothers estimated that the work could be completed in 40 man years (480 man months) at 52 hours worked per week (225.3 hours per month), a total of 108,144 man hours.¹²⁵

Alaskan Northwest argues that the Williams Brothers estimate was initially based on an assumption of 13 crews of 12 men working for 4 months, or 624 man months. Alaskan Northwest fails to recognize that the latter scenario was also based on a 40 hour week (173.3 man hours per month). The difference in the final total is insignificant ($173.3 \times 624 = 108,139$ man hours).¹²⁶

Alaskan Northwest also argues that Williams Brothers erred in using a 52 hour work week when the construction work week is actually 70 hours. The CCE shows, however, that the estimating basis for a 70 hour week is 52 hours once vacation, holiday, and sick time are deducted.¹²⁷

The Adger/Berman Report's recommended reduction also included \$259,000 attributable to a disputed benefits and burdens allowance (payroll adjustment) calculation. For the reasons discussed *infra* (in section V.F.1. of this order, on Project Management) we will approve inclusion of the \$259,000 in the CCE.

With the above noted exception, we adopt the recommended reductions, for the reasons stated in the Adger/Berman Report and the Williams Brothers Evaluation. The net reduction is \$2.24 million.

2. Schedule Adjustment

Alaskan Northwest requested a schedule adjustment to the Operations and Maintenance Facilities component of the CCE in the amount of \$77,000, including \$3,000 attributable to the disputed benefits and burdens allowance (payroll adjustment). For the reasons discussed *infra* (in section V.G. of this order, on Schedule Adjustment), we will approve the requested adjustment of \$77,000.

D. Temporary Facilities and Services

Alaskan Northwest's requested CCE component for Temporary Facilities and Services, adjusted by its November 1981 Amendment and subsequent comments, totals \$1.095 billion, including \$622 million for the construction of pipeline and pump station camps.¹²⁸ The Adger/Berman Report recommended reducing Alaskan Northwest's original request (\$909 million) by a total of \$41 million.¹²⁹ The Smoler/Berman Report *inter alia* recommended adding \$81 million to reflect the revised estimate for camps; this constituted a recommended reduction of \$101 million in Alaskan Northwest's revised request (for an additional \$183 million) for camps.¹³⁰

The amount currently contested totals \$133.3 million, as follows:

	Millions
1. Craft Labor Productivity	\$ 23.6
2. Cost of Borrow Material/Haul	6.0
3. Foundation Cribbing	8.5
4. Camps Salvage Value	75.0
5. Other Adjustments	20.2

	\$133.3

Based on the record before us, we approve reductions totalling \$127.6 million, and approve \$967 million for inclusion in the CCE for Temporary Facilities and Services. The various adjustments are discussed separately below.

1. Craft Labor Productivity

Williams Brothers recommended a total reduction of \$23.6 million based upon its evaluation of the filed craft labor productivity factor for camps.¹³¹ Alaskan Northwest contends that Williams Brothers improperly used the U.S. Gulf Coast Man-Hour (USGCMH) productivity factor in its

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evaluation. According to Alaskan Northwest, those USGCMH figures should have been adjusted to reflect lower general productivity since 1961-1963 (when the figures were promulgated) and to reflect lower Alaskan productivity. Further, Alaskan Northwest contends that Williams Brothers' acceptance of the Alaskan Northwest productivity factor for compressor stations amounts to an admission that Alaskan Northwest productivity factors are proper.¹³²

We are not persuaded by Alaskan Northwest's comments. First, Williams Brothers only used the USGCMH factor for two of the tasks temporary facilities crews will perform. The rest of the tasks were

presented and evaluated based on Alaskan Northwest crew-hour estimates. In evaluating the use of the USGCMH factors, Williams Brothers compared the weather conditions in the Gulf Coast and Alaska. They concluded that an adjustment for Alaskan efficiency is not necessary in this case because much of the work in question is to be performed during the summer months and because much of the work scheduled for the early spring, late fall, and winter will be performed indoors. Furthermore, only 50 percent of the USGCMH-based estimates in the Williams Brothers evaluated estimate were subject to an Alaskan efficiency factor of 1.0.¹³³ We find Williams Brothers' reasoning persuasive for these particular crews.¹³⁴

We also note that Alaskan Northwest itself admits that the temporary facilities labor productivity should be higher than the compressor station productivity.¹³⁵ Reviewing the adjustments in the Williams Brothers Evaluation, we find them to be reasonable and well documented. Alaskan Northwest has provided no substantial justification for its disagreement. We will adopt the conclusion of the Williams Brothers evaluations, as recommended in the Adger/ Berman and Smoler/Berman reports, for the reasons stated therein.

2. Cost of Borrow Material/Haul

The Adger/Berman Report recommended a reduction in the cost of borrow material/haul of \$2.8 million as suggested by Williams Brothers. Similarly, the Smoler/Berman Report recommended an additional \$3.199 million reduction.¹³⁶ In both cases, Alaskan Northwest explains that the increased cost per yard for borrow material/haul in the Temporary Facilities and Services component of their proposed CCE - as opposed to the Pipeline component - is due to increased haul distances. This increased distance is due to the timing of temporary facilities construction; temporary facilities are built one year prior to actual pipeline construction and, thus, fewer gravel pits are operating.¹³⁷ We find Alaskan Northwest's responses to be persuasive. Accordingly, we will not adopt the proposed reductions.

3. Foundation Cribbing

The Adger/Berman Report recommended a Williams Brothers proposal to reduce the costs of concrete forming by \$1.7 million.¹³⁸ The Smoler/Berman Report recommended a similar reduction, which, after netting out the reduction previously made, results in an additional reduction of \$6.8 million.¹³⁹ Essentially, Williams Brothers determined that Alaskan Northwest's use of the *Means Building Construction Cost Data* index to increase cribbing labor costs for Alaskan productivity was in error because the index was intended to be used to address wage rates, as opposed to productivity.¹⁴⁰

Alaskan Northwest contends that Williams Brothers has misread *Means*, and that *Means* also includes productivity factors. Alaskan Northwest goes on to state: " That this is a productivity, rather than a wage and material factor, is also shown in the explanatory text of *Means*," citing the 1981 edition at 299.¹⁴¹

We are at a loss to understand Alaskan Northwest's position inasmuch as the cited page of *Means* states clearly:

"Tabulated on the previous pages are average construction cost indexes for 162 major U.S. and Canadian cities. Index figures for both material and installation are based on the 30 major city average of 100 and represent the cost relationship as of July 1, 1980. The factors for each division are computed from representative material and labor quantities for that division. The total index for each city is a weighted total of the components listed above it *but does not include relative productivity between trades or cities.*" (Emphasis added.)

This same statement (based on 1979 data) is contained in the 1980 edition of *Means*, which Williams Brothers used to prepare its evaluation. Further, Williams Brothers used another factor to adjust for Alaskan productivity,¹⁴² which Alaskan Northwest did not challenge in its comments. Thus, we are persuaded by the Williams Brothers analysis, and will adopt it as recommended in the reports.

4. Camps Salvage Value

The major portion of the temporary facilities reduction, \$75 million, is a reduction to the proposed increase for new camps.¹⁴³

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Alaskan Northwest included no salvage value for camps, arguing that the cost of storage, transportation, sales, and protection from vandalism would effectively negate any salvage value. Alaskan Northwest also contends that there will be no market for those camps in Alaska.¹⁴⁴

Williams Brothers proposed a \$95.8 million salvage value for the camps, basing its recommendation on a study prepared by ATCO for the predecessor to Alaskan Northwest, and on the fact that the July 1980 Application included \$95.8 million for purchasing eight year old Alyeska camps based on Alyeska's asking price. The ATCO study was prepared in 1978 and indicated that the value of three-year old camps (the approximate age of new camps at the end of construction) would be approximately \$98 million in 1978 dollars (\$119 million in 1980 dollars). Accordingly, Williams Brothers recommended that the purchase price that Alaskan Northwest had indicated was appropriate for the (older) Alyeska camps (*i.e.*, \$95.8 million) be deducted as salvage value for the (new) camps that Alaskan Northwest intends to construct.¹⁴⁵ The Smoler/ Berman Report reduced the recommended salvage value to \$75 million, based on the possibility that some of the camps might not be sold.¹⁴⁶ Staff agrees with this recommendation.¹⁴⁷

We recognize that estimating the precise value of the camps is a matter of judgment, and that there may be very limited demand for them. Nevertheless, we believe that the newly constructed camps will have at least some substantial salvage value. Accordingly, we will adopt the recommendation of the Smoler/Berman Report, for the reasons stated therein.¹⁴⁸

5. Other Adjustments

The Smoler/Berman Report recommended adoption of Williams Brothers' proposed reduction of the camp contractor catering subsistence expenses by \$8.018 million. This reduction was attributable to reduced working days resulting from increased productivity.¹⁴⁹ For the reasons stated above in the section on lay rate, we approve and adopt the reduction.

The Adger/Berman Report recommended adoption of a Williams Brothers proposed reduction of \$8.3 million for reprographics, communications, and expendables. Alaskan Northwest maintains that it has provided sufficient backup to justify these costs, including some actual costs.¹⁵⁰ These costs, however, are also found elsewhere in the estimate. Accordingly, we approve and adopt the reduction.

Williams Brothers proposed reductions of \$321,000 in allowable camp expenses and common camp facilities costs, which were attributable to the disputed benefits and burdens allowance (payroll adjustment) calculation. For the reasons discussed *infra* (in section V.F.1. of this order, on Project Management), we will approve inclusion of the \$321,000 in the CCE.

Williams Brothers proposed adding \$484,000 for kitchen/diners for the compressor station camps, to account for price escalation from the 1978 ATCO Report.¹⁵¹ Alaskan Northwest, however, states that this escalation was included in their November 1981 Amendment.¹⁵² Thus, we will not increase the CCE by this amount.

We also note that the Smoler/Berman Report recommended deletion of a total of \$4,149,000 attributable to Alaskan Northwest's proposed upgrading (in its November 1981 Amendment) of the sewage treatment equipment estimate.¹⁵³ Williams Brothers had questioned the need for higher quality equipment, but did not recommend deleting the incremental cost of using such equipment.¹⁵⁴ The Smoler/Berman Report recommended deleting the incremental cost for purposes of establishing the CCE, but noted that the Federal Inspector has ample authority to approve such costs as a design change, based on his analysis of sewage treatment requirements and equipment choices available to Alaskan Northwest. We will adopt the

recommendation of the Smoler/Berman Report, for the reasons stated therein.

Finally, Alaskan Northwest requested a schedule adjustment to the CCE component for Temporary Facilities and Services in the amount of \$13,226,000. For the reasons discussed *infra* (in section V.G. of this order, on Schedule Adjustment), we will approve an adjustment of \$13,097,000.

E. Communications and Supervisory Systems

The Adger/Berman Report (at IV-4) recommended deferral of consideration of the Communications and Supervisory Systems component of the CCE because Alaskan Northwest's estimate at that time was not based on a specific design. In its November 1981 Amendment, Alaskan Northwest submitted new cost data based on a specific design, requesting a total of \$103.4 million. The Smoler/Berman Report recommended approval of a CCE component based on the new data, but recommended a reduction of \$1.2 million comprised of three elements: (1)

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\$1,021,000 related to the communications component of Metering Station No. 1; (2) \$94,000 attributable to Project Management Contractor (PMC) overhead rates and certain other PMC costs; and (3) \$111,000 attributable to the disputed benefits and burdens (payroll adjustment) allowance.¹⁵⁵

Northwest Alaskan agrees with the first proposed reduction but disagrees with the second two proposed reductions.¹⁵⁶ However, except as related to the benefits and burdens allowance, we find their arguments unpersuasive.

We will adopt the recommendations of the Smoler/Berman Report, for the reasons stated therein, but adjusted for the benefits and burdens correction (discussed *infra* in section V.F.1. of this order, on Project Management). Thus, based on the record before us, we approve a total of \$102.3 million for inclusion in the CCE for Communications and Supervisory Systems.

F. Project Directorate

In its November 1980 Amendment, Alaskan Northwest requested approval of \$1.26 billion for Project Directorate. The Adger/Berman Report (at II-13) recommended that consideration should be deferred of costs estimated for project management (\$485 million) and for government monitoring and socioeconomic impacts (\$225 million). Of the remaining \$497 million, the Report recommended reductions of \$54 million, primarily for adjustments in insurance (\$28 million) and taxes (\$25 million).¹⁵⁷

In its November 1981 Amendment, Alaskan Northwest requested an additional \$202 million for Project Directorate costs. The Smoler/Berman Report (at 14) recommended deferral of \$553,000 in Project Management costs, as well as \$93.23 million in Alyeska data acquisition costs. As discussed below, the presiding officers in the reconvened technical conferences will issue a supplementary report on the costs associated with government monitoring, socioeconomic impact, highway repair, and affirmative action training.

The various elements of the Project Directorate component of the CCE are discussed separately below. We will resolve at this time all issues ripe for resolution given the posture of the record before us.

1. Project Management

The Williams Brothers Evaluation recommended a \$38.3 million reduction in the project management cost estimate, from \$485.1 million to \$446.8 million.¹⁵⁸ The Adger/Berman Report, however, recommended deferral of this portion of the CCE "until a detailed management plan has been submitted to and approved by the Federal Inspector." This recommendation was based on the Report's conclusion that the data submitted by Alaskan Northwest could best be characterized as "a basic management philosophy" and not

as "a detailed overall management plan" that could be evaluated.¹⁵⁹

The Adger/Berman Report noted that the design change guidelines proposed to the Federal Inspector would not construe changes in the management plan, by themselves, as changes in the design of the pipeline; thus, such changes would not qualify as "design changes" for purposes of CCE cost adjustment.¹⁶⁰ The Report also noted that the President's *Decision* (at 27) requires that "[p]rior to the issuance of [a] certificate, the successful applicants shall provide a detailed overall management plan, to be approved by the Federal Inspector, for the preconstruction and the construction phases of the transportation system project." Implicit in the Report is a consideration of fairness to Alaskan Northwest - if a CCE estimate is approved for management costs prior to Federal Inspector approval of the detailed management plan required by the President's *Decision*, and if the Federal Inspector requires levels of management in excess of those contemplated in the CCE, and if the CCE could not be adjusted accordingly during the design change process, Alaskan Northwest could be unfairly penalized.

Alaskan Northwest contends that there is no requirement in either the President's *Decision* or Order Nos. 31 and 31-B for deferring approval of a CCE value for management costs until after OFI approves a detailed management plan. In this regard, Alaskan Northwest cites a letter it received from OFI, dated June 6, 1980, stating that "[t]he overall management framework and principles established in the May 30 draft are acceptable and approved." The "May 30 draft" refers to a draft management plan submitted to OFI on May 30, 1980. Alaskan Northwest contends that the management plan is a "living document" that will evolve over time, and that the present estimate of management costs is reasonable given the current status of the project.¹⁶¹

Staff supports deferral of the management plan cost estimate, on grounds that a detailed overall management plan was not submitted. Staff notes that Northern Border submitted a detailed seven volume management plan prior to the setting of its CCE, and recommends that the Commission order Alaskan Northwest to file a detailed management plan.¹⁶²

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Alaskan Northwest responds by pointing out that Northern Border's management plan was approved by OFI subsequent to Commission approval of Northern Border's CCE, including the management plan cost component of that CCE. Alaskan Northwest also contends that its management plan is comparable in detail to Northern Border's.¹⁶³

The Commission's order of December 9, 1981 reconvening the technical conferences (at 2, n. 2), noted the recommendation of the Adger/Berman Report on this matter, and authorized the presiding officers at the reconvened conferences to consider any additional data that Alaskan Northwest might submit on this subject. The Smoler/Berman Report advised that no such additional data was submitted, and recommended keeping the record open to consider such data if the Commission adopts the recommendation of the Adger/Berman Report.¹⁶⁴

In its comments on the Smoler/Berman Report, Alaskan Northwest reiterates its position that the project management cost estimate is ripe for decision, stating that the level of detail in the management plan is comparable to the level of detail of the rest of the design of the pipeline on which the proposed CCE is based. Alaskan Northwest cites the ANGTS mandate for expedition, and stresses the importance of approving the most realistic estimate possible, *i.e.*, an estimate that includes project management costs.¹⁶⁵

The principal consideration in our decision is not the timing vis-a-vis each other of the respective OFI and Commission approvals, but the nature of the record before the Commission at the time it decides the issue. The record upon which the Commission based its decision regarding Northern Border's management cost estimate is not necessarily relevant in this case. The Northern Border pipeline involves relatively standard construction compared with the Alaskan pipeline segment, and, as stated by the Federal Inspector, procedures applicable to one segment are not necessarily applicable to the other.¹⁶⁶ Alaskan Northwest's management plan in its current form does not yet provide an adequate basis for a decision in view of the complexities of arctic construction. In this regard, we note that OFI's June 6, 1980 letter approved Alaskan

Northwest's overall management "framework and principles," not the "detailed" management plan. This is not inconsistent with the conclusions of the Adger/Berman Report. Thus, we will adopt the recommendation of that Report, for the reasons stated therein as summarized above, that consideration of the management cost component of the CCE be deferred until such time as Alaskan Northwest develops a detailed overall management plan and submits a cost estimate (or adjustments to its previous estimate) based on such a plan. We will also adopt the recommendation of the Smoler/Berman Report, to keep the record of the subproceeding open to receive whatever additional data Alaskan Northwest (and/or the Federal Inspector) may submit on this subject, and to consider it expeditiously in technical conferences pursuant to the procedures set forth in our order of December 9, 1981.

In an effort to simplify and expedite this process, we will at this time resolve certain sub-issues for which the record is complete. While these determinations do not enable us to approve a total CCE cost value for project management in the absence of a detailed overall management plan, they should facilitate development of that cost element total by eliminating certain areas of controversy in its construction and calculation. Also, as noted above in a number of previous sections of this order, resolution of the "benefits and burdens allowance" at this time also enables us to complete the calculation of a number of other CCE cost components.

a. Benefits and Burdens Allowance

A Benefits and Burdens (B&B) allowance is used to compute total payroll costs, and represents a factor covering payroll deductions for such costs as workman's compensation insurance and social security ("Burdens"), and vacation pay ("Benefits"). The total B&B allowance used by Fluor Engineers and Constructors, Inc. for computing payroll costs was 39 percent. Fluor is the Project Management Contractor (PMC) for the project, and in that capacity assisted Alaskan Northwest in preparing its proposed CCE.

The Williams Brothers Evaluation identified what they perceived to be a discrepancy in methodology between the B&B allowance for days off and the allowance for days off used in developing manpower loading estimates. Alaskan Northwest contends that no discrepancy exists in this area. We find Alaskan Northwest's arguments to be persuasive. The relevant facts and our own conclusion are presented below.

Alaskan Northwest's PMC contract with Fluor specifies a 39 percent B&B rate to be applied to Irvine labor costs; this rate includes a 16.1 percent allowance for days off, equating to 33.56 hours of work in a standard 40 hour work week. However, the PMC manpower estimates included in the CCE were based on a 36 hour standard work week. Williams Brothers, relying on the 33.56 hour work week,

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concluded that the CCE is overstated by a factor of 4.38 percent. (Williams Brothers used an evaluated labor multiplier of 2.598, which is 4.38 percent less than the CCE multiplier of 2.717.)¹⁶⁷

Alaskan Northwest states that PMC man-hours included in the CCE were developed based on job requirements, organization charts and job durations, and the man-hours required to accomplish specific tasks. These man-hours were then converted to equivalent people using a division of 36 hours per week. This factor was developed by the PMC through experience over many of its past projects and reflects the fact that many Irvine office personnel tend to defer vacations until they have completed their current project; thus, the vacation time off on an individual project will be less than the division average experience. The 39 percent rate, Alaskan Northwest argues, is a contractual rate designed to capture dollars as opposed to man-hours and reflects the fact that employees that have been with the company the longest generally receive higher than average pay and qualify for more time off for vacations and sick pay; thus it should not necessarily coincide with the man-power loading factor.¹⁶⁸

We find Alaskan Northwest's arguments to be persuasive and concur in the use of a 36 hour work factor for manpower loading and a 39 percent B&B factor for estimating payroll costs. While consideration of the Project Management cost component is being deferred, our decision in this matter does impact other

components of the CCE, as described in previous sections of this order.

b. Expendables Allowance

Alaskan Northwest's estimate for Irvine and Alaska "expendables" is based on a factor of one percent of base pay plus benefits and burdens. This factor was contained in the interim PMC contract between Alaskan Northwest and Fluor which was in existence in January 1980 when the estimate rates and bases were established.¹⁶⁹

Williams Brothers' evaluated estimate is based on an expendables rate of one percent of base pay only, the rate contained in the final PMC contract for services outside Alaska. The final contract was signed on January 26, 1981, and was made available during the technical conferences.

The rate (one percent of base pay only) used by Williams Brothers clearly provides the best estimate of expendables since it reflects the contractual rate upon which such expenses will be calculated. Alaskan Northwest offers no persuasive arguments for retaining the previous factor in light of the rate ultimately negotiated. Therefore, we concur in the Williams Brothers evaluated rate for use in calculating Irvine and Alaska expendables in the CCE.¹⁷⁰

c. Overhead Allowance

Alaskan Northwest's proposed CCE computes PMC overhead at 70 percent of all PMC labor costs. Williams Brothers notes that the final PMC contract specifies three separate overhead rates -70 percent, 60 percent and 18 percent for Irvine, Houston, and field locations, respectively.¹⁷¹

As with the expendables rate, we believe that the overhead rates ultimately negotiated provide the best basis for computing the CCE. Accordingly, we conclude that the three separate rates should be applied, as appropriate.

d. Schedule Adjustment

Alaskan Northwest, in its November 1981 Amendment, requested an addition to its proposed CCE of \$52,540,000 attributable to schedule adjustment for the Project Management component of the CCE.¹⁷² The Smoler/Berman Report, in recommending approval of \$92,914,000 as an addition to the CCE to reflect the one year schedule delay generally, included in that figure the schedule adjustment attributable to the Project Management component to the extent that Williams Brothers had recommended such approval.¹⁷³

The Smoler/Berman Report recommended approval of the schedule change cost adjustment for Project Management because the one year delay had already occurred and its cost consequences could be reasonably evaluated independent of the total Project Management cost which the Adger/Berman Report had deferred. (*See* section V.G. of this order, on Schedule Adjustment.) The issues of primary concern to the authors of the Adger/Berman Report, on the other hand, involved how the project would be managed during its construction phase.

Nevertheless, in view of our determination herein to defer consideration of the Project Management component generally, no useful purpose would be served by approving a one year schedule adjustment for an otherwise deferred cost component. Accordingly, we will defer consideration of the Project Management component in its entirety, including the schedule adjustment thereto. We prefer to consider Project Management in a comprehensive manner, when the record is complete. The record developed to date, of course, including our determinations in this order, will greatly assist that determination.

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2. Taxes

The Adger/Berman Report adopted the recommendation of the Williams Brothers Evaluation to include in the CCE \$207,056,000 for taxes.¹⁷⁴ In its November 1981 Amendment, Alaskan Northwest recomputed its tax estimate based on its revised cost estimate generally as well as recent changes in the State of Alaska *ad valorem* tax, the North Slope Borough sales and use tax, and the North Slope Borough property tax. Williams Brothers accepted the revised tax rates, but adjusted the total tax estimate in proportion to Williams Brothers' adjustments to the base cost estimate from which the tax calculation was derived,¹⁷⁵ in the same manner as that adjustment was made in Williams Brothers' original evaluation.¹⁷⁶ As so adjusted, and netting out the amount recommended in the Adger/Berman report, Williams Brothers recommended adding \$20,513,000 to the previously recommended figure. The Smoler/Berman Report (at 30 to 31) adopted this recommendation. Thus, the total recommended by the reports for taxes is \$227,569,000.

Alaskan Northwest contends, first of all, that the Williams Brothers adjustment of the tax estimate should be rejected to the extent that the Commission rejects the Williams Brothers adjustments to the base estimate. Secondly, Alaskan Northwest suggests that the Williams Brothers adjustment should be rejected as simplistic, because each element of the Work Breakdown Structure bears a different mix of tax burdens. Finally, Alaskan Northwest contends that it has no control over changes in tax legislation, including administrative interpretations of tax laws, and that such changes should be treated as design or scope changes.¹⁷⁷

Staff would reject the November 1981 Amendment's tax adjustment in its entirety, contending that it is related to the schedule change adjustment, which Staff would also reject.¹⁷⁸ Although not clear in its Comments, Staff would apparently consider tax adjustments in some manner in the design and schedule change process under Condition No. 9 of [Order No. 31-B](#), and/or the scope change process under Condition No. 10.

Alaskan Northwest's first point is valid. The ratio of the base estimate approved in this order excluding Project Directorate costs (\$5.485 billion) to the combined base estimate recommended in the two reports excluding Project Directorate costs (\$5.469 billion) is 1.0029. Applying that ratio to the cost element for taxes recommended in the reports (\$227,569,000) results in a cost element for taxes of \$228,229,000. We will approve that amount for inclusion in the CCE.¹⁷⁹

Alaskan Northwest's second point, as to the simplistic nature of using an overall ratio to calculate the tax adjustments, is also valid up to a point, but the ratio approach is preferable to either of its alternatives. The ratio approach generates a reasonable approximation of the correct estimate. Reconstruction of the tax estimate through recalculation of each of its elements would, to be sure, be more precise, but the effort required to perform such reconstructions (particularly with respect to design changes) would be grossly disproportionate to the very modest increase in accuracy that it might yield. Indeed, Alaskan Northwest itself has not offered any such recalculated estimate in any of its comments. The alternative suggested by Alaskan Northwest - rejecting the adjustment in its entirety - would clearly result in a much larger distortion; the ratio technique produces a much closer approximation of the correct estimate.

As discussed elsewhere in this order, the CCE approved herein is based on the most current information available to the Commission in the record before it, including known schedule changes that can be and have been evaluated, and tax rates currently in effect. Accordingly, we cannot accept Staff's proposal that we ignore the tax estimate refinements generated in the reconvened technical conferences and recommended in the Smoler/Berman Report.

We also reject Alaskan Northwest's suggestion that we modify [Order Nos. 31](#) and [31-B](#) to permit alteration of the CCE to reflect future changes in tax legislation. The basic purpose of the design change mechanism in [Order Nos. 31](#) and [31-B](#) is to provide an incentive to Alaskan Northwest to continually refine and improve its design without fear of reductions in its rate of return in the event that such design improvements result in cost increases.¹⁸⁰ The basic purpose of the scope change mechanism in [Order Nos. 31](#) and [31-B](#) is to protect Alaskan Northwest from potentially substantial rate of return impacts attributable to a very limited number of potentially drastic and costly events (*e.g.*, war and natural disasters) beyond its control.¹⁸¹ Neither of those purposes would be fostered by authorizing potentially endless recalculations of the tax cost element in the CCE every time there is a change in tax legislation or

interpretation. As we have stated before, the energies of the project sponsors and the Federal Inspector ought to be focused to the maximum extent possible on designing and constructing

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the pipeline, with the least possible diversion into administrative litigation of the rate of return formula.¹⁸²

We recognize that Alaskan Northwest has essentially no control over tax legislation. Nevertheless, the CCE is by its very name and nature an estimate. Recent developments at all levels of government, including the State of Alaska, indicate that tax rates (unlike time and death) are capable of moving down as well as up; thus, actual taxes paid might be either lower or higher than the estimate in the CCE. In any event, the generous factor for contingency in the estimate, as well as the Center Point, provide ample cushion for any unexpected increase in the overall tax burden.

3. Insurance

The Adger/Berman Report adopted the recommendation of the Williams Brothers Evaluation to include in the CCE \$84,482,000 for insurance.¹⁸³ In its November 1981 Amendment, Alaskan Northwest revised its insurance estimate by including new estimates for each category of insurance. Williams Brothers re-evaluated each category and determined that the rates it had recommended in its original Evaluation were still valid. Applying those rates to the revised data, the Williams Brothers Supplemental Evaluation recommended reducing by \$4,592,000 the amount recommended in the Adger/Berman Report,¹⁸⁴ such that the CCE would include \$79,890,000 for insurance. The Smoler/ Berman Report (at 31 to 32) adopted that recommendation.

Alaskan Northwest accepts some of the revisions in the Williams Brothers Supplemental Evaluation, but contends that the insurance rates Williams Brothers used were unsubstantiated. As adjusted, Alaskan Northwest's requested CCE element for insurance is \$114,730,000.¹⁸⁵

Staff generally agrees with the recommendation of the Smoler/ Berman Report.¹⁸⁶

Estimates of insurance costs are difficult to evaluate with confidence in the absence of binding offers for actual contracts. Rates can vary pursuant to the terms of coverage; quotations in the abstract for potential contracts several years in the future may lack reliability; and the appropriate balance to strike between quality of coverage and expense of coverage is ultimately a matter of individual judgment. Although not entirely clear from the record, it is our understanding that Alaskan Northwest and Williams Brothers each drew on their respective contacts in the insurance industry as well as their own experience, expertise and judgment, but that neither of them utilized systematic averaging of multiple bids. Recognizing the inherent imprecision in formulating an estimate for insurance costs, and having weighed and balanced the various considerations in the record before us, we will approve a cost estimate of \$100 million for insurance.

4. Precertification Costs

The Adger/Berman Report recommended inclusion in the CCE of \$130,300,000 for certification costs incurred prior to 1980, accepting Alaskan Northwest's estimate.¹⁸⁷ Similarly, the Smoler/Berman Report recommended inclusion of an additional \$23,829,000 in this category.¹⁸⁸

Both Alaskan Northwest and Staff have consistently advocated eventual substitution of actual expenses for estimated expenses for this item.¹⁸⁹ The Adger/Berman Report recommended use of the estimate without later substitution, in the interest of consistency. The Smoler/Berman Report suggested that substitution of actual costs in this instance would not be unreasonable in that the costs have already been incurred. Both reports were issued while the Commission's subproceeding on Alaskan Northwest's pre-1980 rate base was still pending. That subproceeding has now been concluded, through issuance on June 1, 1982 of an order approving Alaskan Northwest's pre-1980 costs for inclusion in its rate base.¹⁹⁰ That order renders the substitution issue moot - the costs approved in that order constitute the best estimate of the pre-

1980 certification costs.¹⁹¹

The Commission's June 1, 1982 order approves inclusion in Alaskan Northwest's rate base of \$89,982,160 for certification costs incurred prior to 1980. Accordingly, that figure (as appropriately rounded off) shall be included in the CCE.

5. Permits and Fees

The parties and the two reports generally agree that this category consists of an estimate of our Commission's fee plus \$470,000 for permits from other agencies. The Smoler/Berman Report (at 55 to 56) recommends calculating an estimate of the Commission's fee by applying the decimal formula in Section 159.2 of the Commission's regulations to the total of the base estimate (excluding the estimate of the fee) plus contingency (excluding contingency for the fee) plus the Center Point allowance.¹⁹² Applying that formula to the values approved in this order yields an estimate for the Commission's fee of \$16,170,000.¹⁹³ When combined with the \$470,000 for permits, the total is

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\$16,665,000. We shall approve inclusion of that amount in the CCE.¹⁹⁴

Both Alaskan Northwest and Staff advocate eventual substitution of actual expenses for the estimate.¹⁹⁵ For the reasons elaborated at length in the Adger/Berman Report with respect to other aspects of the CCE, however, we believe that the CCE should be based on estimated expenses without later substitution of actual expenses. Later substitution of actual expenses would reduce the incentive to hold down costs during construction.

We recognize the anomaly in the Commission preserving a rate of return incentive for Alaskan Northwest to resist payment of the Commission's own fee, but we see no basis for distinguishing the Commission's fee from fees or charges that might be levied or asserted by any other local, State or Federal agency. We also recognize Alaskan Northwest's position that there are severe limits on its ability to control the level of costs imposed on it by governmental agencies. Nevertheless, we believe that Alaskan Northwest ought to have such an incentive to negotiate the lowest possible cost for the project regardless of whether it is dealing with commercial concerns or governmental entities. Staff adds a further wrinkle by suggesting that the Commission approve in the CCE only that portion of the Commission's fee that has been paid to date, ignoring the portion of the fee to be paid in the future. We reject that approach, however, because it would be misleading and potentially unfair to Alaskan Northwest.

G. Schedule Adjustment

Alaskan Northwest, in its November 1981 Amendment, requested a \$106.3 million increase in the CCE due to a one year delay in start-up from November 1985 to November 1986.¹⁹⁶ Consideration of \$12.3 million of this amount, relating to increased third party monitoring costs, is being deferred pending receipt of the presiding officers' supplementary report. For the remaining \$94 million, the Smoler/Berman Report recommended deferring \$553,000, subject to resolution of the management plan issues, and eliminating \$573,000, resulting in a CCE adjustment of \$92.9 million.¹⁹⁷

Staff argues that any increased costs resulting from this schedule change should not be considered in this order. Staff contends that the CCE should be based on the "frozen" design and schedule from which the July 1980 Application was prepared, and that any schedule changes should be reviewed by OFI under the design and scope change mechanisms. Staff also argues that the \$106 million schedule adjustment is already covered by the Center Point allowance - particularly Alaskan Northwest's proposed Center Point event, "Delays Resulting from Third Party Interests" - and, for that reason, should not be allowed.¹⁹⁸

Alaskan Northwest contends that (1) the one year slip has already occurred and the subsequent rescheduling does not affect evaluation of the costs resulting from it; and (2) Alaskan Northwest's

November 1981 Amendment has already been thoroughly evaluated such that postponing a decision on it would result in needless duplication of effort. Alaskan Northwest also contends that the OFI Director of Audit and Cost Analysis (as co-author of the Adger/Berman Report) and OFI's consultant, Williams Brothers, have already determined that the schedule adjustment is not covered by the Center Point or by contingency.¹⁹⁹

We find Alaskan Northwest's arguments, and the analysis of the Smoler/Berman Report, to be persuasive. The one year slip and the subsequently announced slips are separable events with different cost consequences. The one year slip, which required some staffing adjustments, had almost run its course when the announcement of a delay to a 1989 completion date was made. The subsequent announcement was coupled with a major cutback in staffing and a redirection of Alaskan Northwest's efforts toward financing-related activities.²⁰⁰

On the other hand, the cost estimate for the one year delay and any estimate for subsequent delays are clearly related and need to be viewed together, as certain items may overlap. Such areas of potential overlap can easily be dealt with when the later schedule adjustments are evaluated.

In general, we find it preferable to dispose of all CCE issues that are ripe for decision. We therefore dispose of certain methodological issues, including a disputed methodology for computing Irvine labor costs,²⁰¹ and a dispute related to expenses which Williams Brothers identified as being duplicative and/or excessive.²⁰² For the reasons discussed *supra* (in section V.F.1.d. of this order), however, we will defer consideration of the schedule adjustment for the Project Management component of the CCE pending completion of the record on that cost component.

Thus, we adopt herein a total schedule adjustment of \$41.4 million, for the reasons stated in the Smoler/Berman Report and elsewhere herein. We note that this amount is

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already included in the various CCE components approved *supra* in other sections of this order, *i.e.*, in the respective sections of the order in which we have approved schedule adjustments to the various CCE components.

VI. Contingency

A. Normal Contingency

Alaskan Northwest proposed a factor for normal contingency calculated as 12 percent of the base estimate. The Williams Brothers Evaluation and the Adger/Berman Report deleted a calibration step in Alaskan Northwest's methodology, but for other reasons retained the same 12 percent contingency.²⁰³

In its Comments on the Adger/Berman Report, Alaskan Northwest challenges the determination of normal contingency on grounds that it is unrealistic in relation to the production rates and human productivity assumptions in the Report. Alaskan Northwest also objects to the shifting of certain risks from the Center Point to contingency.²⁰⁴ These, however, are really challenges to the determination of the base estimate and the Center Point, which issues are discussed elsewhere in this order. The comments on the Adger/Berman Report disclose no dispute (at that juncture) among the parties as to use of a 12 percent factor for normal contingency.

The matter of normal contingency arose again in the reconvened technical conferences. Alaskan Northwest, in its November 1981 Amendment, applied the same 12 percent contingency factor to the cost adjustments proposed therein, while Staff took sharp exception to continued use of that figure in light of the nature of the adjustments. The Smoler/Berman Report (at 32 to 35) recommended, "on both conceptual and practical grounds" (as elaborated therein) that the Commission apply a 12 percent contingency factor to the base estimate approved by the Commission, provided that the Commission excludes "built-in contingency"

in that base estimate.

In its Comments on the Smoler/Berman Report, Staff recommends a contingency factor of 9.3 percent for temporary facilities rather than 12 percent, contending that construction of new camps entails less cost estimating risk than renovation of old camps acquired from Alyeska. Alaskan Northwest disagrees, and supports the Report.²⁰⁵ Staff also recommends deletion of any factor for contingency with respect to any CCE item for which the Commission approves later substitution of actual costs for estimates in the CCE.²⁰⁶

Recognizing the inherent imprecision in estimating a factor for normal contingency, and based on the considerations articulated in the Smoler/Berman Report, we will adopt the combined recommendation of that Report and the Adger/Berman Report that normal contingency for CCE purposes be 12 percent of the base estimate.²⁰⁷ Staff also suggests that a factor for contingency for precertification costs and Alyeska data would be inappropriate in any event.²⁰⁸ We agree with Staff that contingency should not be applied to any portion of the base estimate that is derived from actual expenses.²⁰⁹ We will defer any consideration of normal contingency as applied to deferred elements of the base estimate; our determination of normal contingency herein applies only to that portion of the CCE that we are approving in this order.

In light of our decisions on the base estimate, as discussed above, the dollar figure for normal contingency must be recalculated. The base estimate approved above (*i.e.*, excluding deferred items as well as, for this calculation, precertification costs) is \$5.829 billion. Multiplying that figure by 12 percent yields a figure for normal contingency of \$699,480,000.

B. Assigned Contingency

In analyzing the Center Point allowance proposed by Alaskan Northwest, Williams Brothers recommended transferring \$311 million to a new category designated "assigned contingency." Williams Brothers reasoned that, inasmuch as some of the Center Point events identified by Alaskan Northwest were projected (by Alaskan Northwest) to have a 100 percent probability of occurrence, they could not properly be considered "abnormal risks" and should more properly be considered as part of contingency. The Adger/Berman Report adopted this approach, and recommended adding \$311 million to the CCE, in addition to the base estimate and normal contingency.²¹⁰

In its Comments on the Adger/Berman Report, Alaskan Northwest contends that these risks are "abnormal," and not properly included in "normal contingency," despite their 100 percent likelihood of occurrence, and that reclassification of these costs/risks into a new category "creates confusion and interjects cost impacts of abnormal events into the CCE." Accordingly, Alaskan Northwest contends that these risks and associated costs should remain in the Center Point and not be transferred to assigned contingency.²¹¹

Staff agrees with the Adger/Berman recommendation on assigned contingency as part of its general agreement with the Report;²¹² it is not explicitly discussed in Staff's Comments.

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Inclusion of the \$311 million for assigned contingency was an integral element of the Adger/Berman Report's recommendation with respect to the Center Point - the Report recommended a Center Point significantly lower than the one requested by Alaskan Northwest. Accordingly, in light of our decision to adopt the Adger/Berman Report's recommended Center Point, as discussed below, we will at the same time approve the \$311 million of assigned contingency for inclusion in the CCE.

C. Summary

The combined total for Contingency, premised on the components of the base estimate approved in this order, is \$1,010,480,000. The Commission will consider adjustments to the total for contingency, to reflect contingency attributable (if appropriate) to the deferred components of the base estimate, at such time as

those deferred components of the base estimate are ripe for decision.

VII. Deferred Issues

A. Project Management

For the reasons discussed above (in section V.F.1 of this order, on Project Management), we will defer at this time the determination of a total cost estimate value for the Project Management component of the CCE. We have included that discussion in section V.F.1. because of our determination in this order of several significant sub-issues within that cost category (the resolution of which has also enabled us to complete our consideration of other cost components within the CCE).

B. Socioeconomic and Related Issues

The Smoler/Berman Report recommended temporary deferral of a decision on the CCE costs associated with:

- (1) Socioeconomic impacts
- (2) Highway maintenance and repair
- (3) Federal and Alaska State government monitoring
- (4) Affirmative action plan training

The Report indicated that these four subjects comprise a comparatively small percentage of the total CCE, but involve complex issues of fact, law and policy.²¹³ Accordingly, the authors of that Report separated out those issues for consideration in a supplementary report which is currently under preparation and will be issued by the authors for comment pursuant to our order of December 9, 1981. Hearings were held in Alaska on these matters during the week subsequent to issuance of the Smoler/Berman Report, and additional data and memoranda of law were submitted to the presiding officers following those hearings.

The history of these matters is as follows. The Adger/Berman Report recommended deferral of highway repair and affirmative action training costs because Alaskan Northwest did not include an estimate of those costs in its July 1980 Application or November 1980 Amendment.²¹⁴ The Application did include cost data with respect to socioeconomic impact and government monitoring. The Adger/Berman Report recommended further Commission proceedings with respect to socioeconomic impact costs, as well as Alaska State monitoring costs, to develop a better record on relevant facts, law and policy. That Report recommended approval of a cost element for Federal government monitoring, subject to a caveat with respect to part of those costs.²¹⁵

In its November 1981 Amendment, Alaskan Northwest filed additional data on these four cost categories. At the technical conference on February 18, at the hearings in Alaska on April 20 and 21, and in memoranda to the presiding officers, the parties have explored those issues in detail.

Alaskan Northwest, in its comments on the Smoler/Berman Report,²¹⁶ does not disagree with deferral of costs associated with socioeconomic impact, highway repair, training, and Alaska State monitoring, but, citing the recommendation in the Adger/Berman Report, urges us to approve at this time the cost estimate for Federal government monitoring. No other party has commented on these subjects.

The discussion of government monitoring at the February 18, 1982 technical conference indicated that OFI and the State would seek to coordinate their respective monitoring activities, and that a State/Federal agreement on this subject was being negotiated.²¹⁷ These arrangements, as they emerge, could affect the cost estimate for Federal monitoring as well as for State monitoring. Given this nexus between State and Federal monitoring, the two should be considered contemporaneously with each other. Accordingly, we

will adopt the recommendation of the Smoler/Berman Report to defer consideration of all four issues pending receipt of the presiding officers' supplementary report and comments thereon.

C. Alyeska Data

During the technical conferences culminating in the Adger/ Berman Report, Alaskan Northwest referred to its then ongoing negotiations with Alyeska Pipeline Service Company for purchase of Alyeska's camps along the route of the pipeline and, in that

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context, mentioned Alaskan Northwest's desire to negotiate a comprehensive agreement with Alyeska covering acquisition of data as well as camps. Alaskan Northwest's July 1980 Application, however, included only the estimated cost of acquiring the camps; there was no estimate for Alyeska data. The Adger/Berman Report referred to the data issue in a footnote, recommending that Alaskan Northwest make an appropriate filing "as soon as possible" if it intended to include the cost of such data in the CCE.²¹⁸

In its November 1981 Amendment, Alaskan Northwest requested inclusion in the CCE of \$93.23 million for its license for design and geotechnical data from Alyeska and, at the reconvened technical conferences, disclosed the existence of contractual agreements that Alaskan Northwest had made with the Alyeska producers²¹⁹ in 1978 and 1979. The terms of the contract, and the propriety and manner of their inclusion in the CCE, were discussed at length at the reconvened technical conferences, in the Smoler/Berman Report (at 36 to 53), and in the comments on that Report.

The Smoler/Berman Report concluded that the contract was negotiated at arms-length, at a time when the producers were legally precluded from joining the Alaskan Northwest partnership. The Report also concluded that Alaskan Northwest had presented "very persuasive" reasons (described in the Report) for acquiring the data from Alyeska rather than developing it in-house.

The contract provides for a base purchase price for the data of \$55 million in 1979 dollars. The parties and the Report concluded that the \$55 million, if taken by itself, was reasonable. The principal controversy focused on a deferred payment factor that increases the base price at a compounded rate of approximately ten and one-half percent per year.²²⁰ That deferred payment factor is in addition to an inflation adjustment factor. The payment schedule provides that Alaskan Northwest is to pay for the data in prescribed percentage installments, respectively, upon acceptance of a final certificate, commencement of civil construction, commencement of pipeline construction, and completion of the project; to the extent that these events do not occur, Alaskan Northwest is relieved of its obligations to pay for the data.

The data itself has already been transferred to Alaskan Northwest, and has been and is being used to design the pipeline. Regardless of whether Alaskan Northwest ultimately pays for the data, Alaskan Northwest's license rights to the data are non-exclusive and non-transferable. Alaskan Northwest cannot transfer or sell the data to any other buyer; Alyeska can.

At the reconvened technical conferences, Staff took the position that the Commission should approve the \$55 million base price for inclusion in the CCE, but should exclude the deferred payment factor upon which the requested \$93.23 million was based. Staff also suggested the possibility that the producers should give the data to Alaskan Northwest as part of the producers' financial participation in the project, with the value of the data reflected in the producers' equity participation. Alaskan Northwest described the background and purpose of its contract with Alyeska to acquire the data, and contended that it was prudently entered into.

The positions of the parties,²²¹ and the facts developed at the technical conferences, are recorded in detail in the Smoler/Berman Report along with the authors' analysis of considerations they deemed relevant. The Report concluded that the Alyeska data licensing contract should be considered by the Commission in the context of whatever comprehensive agreement Alaskan Northwest negotiates with the

producers. The Report expressed grave reservations about the deferred payment factor, but noted the potential lack of identity between the Alyeska owners and the combination of producers (as yet undetermined) who might join the partnership. Accordingly, the Report concluded that the matter is premature at this time because important relevant facts are not yet known or might change, and recommended that the Commission defer consideration of this cost element pending Alaskan Northwest's negotiation of its full financial relationship with the producers.

In its Comments on the Smoler/Berman Report, Alaskan Northwest contends that there is no direct relationship between the Alyeska data contract and the ANGTS financing arrangements. Of the eight Alyeska producers, only three (Exxon, Arco and Sohio) are participating in the design and engineering of the Alaska segment of the ANGTS, and their debt and equity participation "in the final ANGTS financing plan will be totally independent of, and will bear no relationship to," the payments their affiliates would receive under the contract. Accordingly, Alaskan Northwest opposes deferral of the issue, and urges the Commission to approve the full \$93.23 million requested.²²²

Alyeska, in its comments, states that the Trans-Alaskan Pipeline System (TAPS) is owned in undivided interests by eight common carrier oil pipeline companies, seven of whose

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oil company parents own interests in the gas reserves in Prudhoe Bay. Alyeska is their agent in operating TAPS; the data is owned by the eight carriers. Although the recently enacted Waiver of Law, Pub. L. No. 97-93, now permits the Prudhoe Bay producers to participate in ownership of Alaskan Northwest, none have as yet acquired such an interest. Alyeska further states that the respective Uniform Systems of Accounts under the Interstate Commerce Act and the Natural Gas Act require both the TAPS carriers and Alaskan Northwest to record at cost all property they acquire. Finally, Alyeska contends that compelling some producers to contribute data rights to Alaskan Northwest would constitute an unlawful deprivation of their property without due process.

Staff also opposes deferral of a decision, but contends that the Commission should approve for the CCE only "up to \$55 million . . . at at this time until the sponsors and producers have reached agreement on the ownership and financing of the system."²²³ In reply, Alaskan Northwest reiterates its position.²²⁴

As Alaskan Northwest correctly observes in its Comments, the data licensing item is "[u]nlike the rest of the CCE" because it "is not an estimate. Rather, it is a mathematical calculation to determine the amount called for under the License Agreement . . . assuming the occurrence of certain events . . ." ²²⁵ For this reason, it is apparent to us that the Alyeska data licensing item in the proposed CCE bears strong implications for rate base determination that are not posed by other elements of the CCE.

We note that subsequent to the issuance of the Smoler/Berman Report, Alaskan Northwest has announced an additional two year slip in the projected schedule for the project, and has also indicated a considerable degree of uncertainty as to when its financing negotiations (including negotiations with the producers) will reach fruition.²²⁶ In this context, given the unique rate base implications inherent in approving a CCE cost element based on a contract that has already been signed and partially implemented, and in light of the unlimited scope over time of the deferred payment factor in the contract, approval of the data acquisition CCE cost element in the form requested by Alaskan Northwest could have the potential for radically inflating the rate base far beyond any level contemplated by the parties at the time they entered into their contract.²²⁷ Such an open-ended result would not be in the public interest, would be unlikely to foster just and reasonable rates for transporting the Alaskan gas, and might even serve to frustrate the project sponsors' own objectives of financing the project at a reasonable cost. Thus, deferring this item at this time would afford the parties an opportunity to reconsider their data licensing agreements in the full context of their broader financial negotiations. For these reasons, as well as the reasons stated in the Smoler/Berman Report, we will adopt the Report's recommendation to defer consideration of this CCE cost element pending negotiation of the financing plan for the ANGTS.

VIII. The Center Point Value

In the IROR mechanism, the Center Point serves as the target Cost Performance Ratio in structuring the IROR schedule. The Center Point value established is to represent "the best current estimate of the actual costs of the project, including any cost overruns relative to the Certification Cost Estimate approved by the Commission."²²⁸

A. Alaskan Northwest's Four Basket Methodology

In support of its requested CCE and Center Point values, Alaskan Northwest attempts to account for all possible risks of project cost overruns. To accomplish this, Alaskan Northwest attempted to identify as many costs and cost-increasing events as possible. These costs were then assigned to one of four categories or "baskets": (1) the base engineering estimate, (2) normal contingency, (3) abnormal events (which were classified as Center Point events), and (4) design and scope changes. This approach has been referred to as "the four basket methodology."

In developing its requested Center Point value, Alaskan Northwest used a team of estimators to establish high, low, and most likely cost consequences of each event classified as an abnormal occurrence. Based on these values, a probability distribution of possible costs was developed for each event. Alaskan Northwest then performed computer simulations using the individual probabilities to form an overall probability distribution for all the identified abnormal events. From this overall probability distribution, Alaskan Northwest extracted an expected value which became the proposed "allowance for abnormal events" of \$2.278 billion. As applied to the base estimate requested by Alaskan Northwest prior to its November 1981 Amendment, this Center Point allowance would yield a Center Point Cost Performance Ratio of 1.282.²²⁹

In its November 1981 Amendment, Alaskan Northwest requested certain additions and other adjustments to its proposed base

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estimate, but did not propose any alteration to its proposed Center Point allowance. When adjusted to reflect these changes in its requested base estimate, Alaskan Northwest's requested Center Point Cost Performance Ratio is 1.257.²³⁰ That is the Alaskan Northwest request currently before us for decision. It is based, however, on the proceedings that culminated in the Adger/Berman Report; the Smoler/Berman Report did not address Center Point issues.

B. The Report's Recommendations

1. Alaskan Northwest's Center Point Proposal

According to Alaskan Northwest, "the [Adger/Berman] Report essentially concedes that the Center Point analysis is in accordance with Orders 31 and 31-B."²³¹ We do not agree with this interpretation. The Adger/Berman Report concluded that the "four basket" approach was reasonable in theory only, and noted that its actual implementation would be difficult. Referring to Alaskan Northwest's specific implementation, the Report found that it "suffers from significant difficulties and, in some instances, conflicts with the intent and/or letter of the IROR orders." Elsewhere, the Report stated that Alaskan Northwest's analysis "is not dispositive of the Center Point issue" and that "[d]espite the appearance of precision, the results . . . are influenced considerably by problems of classification and interpretation and by subjective factors . . ." Despite these difficulties, the authors of the Report concluded that Alaskan Northwest's analysis could be a useful consideration, among others, in developing a Center Point.²³² Unlike Alaskan Northwest, we do not read this as a concession that the four basket methodology necessarily accords with Order Nos. 31 and 31-B. Even assuming that Alaskan Northwest's methodology for determining the Center Point is not inconsistent with the parameters set forth in Order Nos. 31 and 31-B, other approaches to the problem (including the one utilized by the authors of the Report) are also consistent with Order Nos. 31 and 31-B, and may better accomplish the objectives of those Orders.

Alaskan Northwest's estimators identified 36 possible events that they considered abnormal and classified these as Center Point events. The Adger/Berman Report expressed general concern that an expected cost overrun allowed for by approving a Center Point value would not necessarily be the result of one of those events. Furthermore, it seemed likely that other estimators might well identify an entirely different set of possible abnormal occurrences or approach the Center Point analysis in an entirely different manner.²³³

The Adger/Berman Report also identified a number of specific problems in Alaskan Northwest's analysis. Notably, most of the events defined in Alaskan Northwest's list of abnormal occurrences were assigned a 100 percent probability of occurrence.²³⁴ In many instances these events represented cost overruns that should have been considered, either totally or partially, as contingency events, because they represent estimating uncertainties rather than truly abnormal occurrences. They were not classified as contingency events by Alaskan Northwest, however, because the sponsors adopted a relatively narrow definition of normal contingency.²³⁵ Accordingly, in order to use Alaskan Northwest's approach as one of the factors in developing a Center Point, the Report adopted the Williams Brothers recommendation that the cost consequences of these events be reclassified under the heading "assigned contingency." By itself, this approach would have reduced the Center Point to 1.235.²³⁶

Six of the events that Alaskan Northwest included in its list of Center Point events are intended to allow for changes in markets for various services and materials.²³⁷ The Adger/Berman Report noted that the IROR inflation adjustment mechanism²³⁸ is intended to protect the sponsors against inflation and that such cost increases therefore do not belong in the Center Point classification. Nevertheless, in using Alaskan Northwest's approach as a guide, the authors of the Report retained 25 percent of the cost consequences of these events in the analysis on the theory that some of the consequences of these events would be the result of something other than pricing - such as lack of availability at any price and the problems of inadequate substitutes.²³⁹

Alaskan Northwest argues that allowances for these events are intended to cover cost increases from unexpected competition rather than inflation.²⁴⁰ This response is not persuasive. Increased competition for limited resources, with its attendant increase in price, is but one of a number of possible causes of inflation. The IROR mechanism already adjusts for inflation.²⁴¹ It would be inappropriate to provide additional compensation for the individual factors that cause inflation.

Another major difficulty identified by the Adger/Berman Report is the subjectivity of the costs and probabilities assigned to each event. The estimated cost consequences of events are necessarily affected by assumptions (or lack of them) concerning such factors as the ability of management to contain the cost consequences of unanticipated events and the

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efficacy of using a single agency, the Office of the Federal Inspector, to mitigate problems of government approvals and monitoring. The Report (at III-21) also observed that different analysts would be likely to make different predictions concerning "such items as probable conditions in capital markets, world markets for transportation services, foreign exchange rates, insurance rates, and intentional work slowdowns . . ." Moreover, even though Alaskan Northwest's estimators may have experience estimating costs for pipeline projects, the IROR mechanism is an unfamiliar classification scheme that could affect the validity of the estimates.

Despite the above shortcomings, the authors of the Adger/ Berman Report considered the Alaskan Northwest analysis to be useful as one of several considerations in determining the Center Point value. This is consistent with [Order No. 31](#). Although the sponsors have advanced their list of abnormal events as the sole consideration in their Center Point proposal,²⁴² [Order No. 31](#) requires only that Alaskan Northwest's analysis of abnormal events be analyzed as *part* of the submission concerning potential cost overruns; the order does not contemplate that such events will be the sole factor considered.²⁴³

Using Alaskan Northwest's list of events as a guide, Staff, Williams Brothers, and the authors of the Report each performed their own analysis of the cost consequences of those events. The results yielded a range of Center Point values from 1.104 to 1.235, after adjustment for assigned contingency as discussed above.²⁴⁴

2. Other Relevant Factors

Besides its consideration of Alaskan Northwest's analysis of abnormal events, the Adger/Berman Report also based its Center Point Recommendation on (1) cost growth experienced on other major projects, as described in published sources, (2) cost growth experienced on this project to date, (3) the availability of opportunities for reducing cost overruns, and (4) a comparison with TAPS. Based on these factors, the Report concluded that additional cost growth should be considerably less than the 30 percent anticipated in the President's *Decision* and that the Center Point should therefore be considerably less than 1.3.

a. Experience with Other Projects

The authors of the Report examined published reports for other major projects²⁴⁵ and found that cost overruns are chiefly attributable to five factors:

- (1) lack of an adequate design prior to construction;
- (2) design and scope changes prior to and during construction;
- (3) inadequate time for project planning;
- (4) escalation in the prices of key inputs; and
- (5) ineffective management.

The Report discussed each of these factors separately and explained why they should not be significant here. For instance, lack of an adequate design should not affect this project, since the President's *Decision* requires Federal Inspector approval of a relatively advanced design before construction begins. Likewise, design and scope change prior to and during construction should be of limited significance, because Alaskan Northwest is protected by Condition No. 9 of [Order No. 31-B](#), which allows increases in the base engineering estimate for design changes prior to final design. After final design, there are usually far fewer cost increases resulting from design changes. And, as the Report indicated, arctic construction experience gained from TAPS should also limit cost growth attributable to design changes.²⁴⁶ Inadequate planning should not be a factor since this project has been in planning since 1968. And escalation in prices of key inputs will be offset by an adjustment for inflation prior to determining the Cost Performance Ratio. Obviously, no Center Point allowance should be based on an assumption of ineffective management.

b. Cost Growth to Date

The Adger/Berman Report pointed out that substantial interim cost growth has already occurred as a result of refinements in the basic design. It follows that future growth should be limited by the greater reliability of design resulting from such refinements.

In response to the Report, Alaskan Northwest argues that significant cost growth can occur after final design and challenges as fallacious "the contention that the design and scope change mechanisms can be used to adjust the target costs for the project to reflect any such cost growth . . ." ²⁴⁷ The Report, however, did not say that design and scope changes can be used to adjust for "any such cost growth." Obviously such changes are limited. The point is that growth already occurring should have reduced the likelihood of future growth.

c. Opportunities for Limiting Overruns

As the Adger/Berman Report correctly observed, the risk neutral target cost of the

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IROR assumes reasonably effective management. In addition, a body of construction experience is available from TAPS and other arctic projects. These sources should provide Alaskan Northwest with additional opportunities to reduce cost overruns.

d. Comparison with TAPS

The Adger/Berman Report's recommendation was based in part on consideration of a GAO analysis of the TAPS project that showed estimated costs increasing 23 percent from a 1975 estimate, when design was 90 percent complete, to a 1977 estimate compiled after six months of operation.²⁴⁸ Reducing these overruns by a 12 percent contingency yields an overrun of 11 percent. The Report took the view that cost overruns for the Alaska segment should be less than for TAPS and concluded that comparison with the oil pipeline suggested a Center Point between 1.1 and 1.2.

Alaskan Northwest argues that it is indefensible to compare TAPS at 90 percent design completion with the Alaskan segment at a 5 to 10 percent stage of design completion. As discussed below, however (*see* section III of this order, on Status of the Alaska Pipeline Segment Design), the design for the Alaskan pipeline segment is considerably more advanced than 5 to 10 percent. Indeed, OFI's Director of Engineering stated that the design was sufficiently advanced that a cost increase of no more than 10 or 15 percent is expected as a result of development of final design.²⁴⁹ We are well aware that there are significant differences in the construction techniques and operating modes of TAPS and the ANGTS. TAPS, for instance, is an above-ground pipeline transporting a heated liquid, whereas the ANGTS is a below-ground pipeline transporting a chilled, compressed gas. Nevertheless, in our view the comparison with TAPS, as one of many factors considered by the authors, and as a test they used to validate the conclusions they reached based on the full range of matters they considered, is justified.

C. Conclusion

We approve and adopt a Center Point value of 1.2, for the reasons stated in the Adger/Berman Report as discussed above.

IX. The Design Change Process

In Condition No. 9 in [Order No. 31](#), as modified in [Order No. 31-B](#), the Commission authorized adjustments to the CCE to reflect design and schedule changes approved by the Federal Inspector in his approval of the final design.

At the technical conferences, the parties had occasion to discuss at length the potential application of Condition No. 9 to discrete potential design changes that might arise in the future. In an effort to preserve the benefit of those discussions for future use when design change issues are presented to the Federal Inspector for decision, the authors of the Adger/Berman Report took several steps to record the views of the parties as well as their own recommendations. First, they included in their Report several sections discussing specific potential design change issues and recommended IROR treatment of those issues.²⁵⁰ Secondly, they included in the Report (as Attachment E) "Proposed General Guidelines for Reviewing Design Changes for Implementing the Incentive Rate of Return for the Alaskan Leg." The proposed guidelines were recommended to the Federal Inspector "for his consideration and possible use in administering the design change process."²⁵¹ Despite the fact that all of these recommendations were addressed to the Federal Inspector, and not to the Commission, they have generated extensive discussion in the comments received.

Alaskan Northwest stresses the Commission's determination in Order Nos. 31 and 31-B to adopt a liberal design change policy to encourage Alaskan Northwest to refine and improve their design. Alaskan Northwest then asserts that various provisions in the proposed design change guidelines, such as offsetting of cost increases against related cost decreases, and consideration of whether costs of requested design changes are already included elsewhere in the CCE (*e.g.*, elsewhere in the base estimate, in the factor for normal contingency or in the Center Point), are inconsistent with a liberal design change policy. Alaskan Northwest also disagrees with the design change treatment recommended by the Report for particular potential design changes, such as camps, refrigeration and the Yukon Bridge. Alaskan Northwest alleges that the Report erred in attributing unlimited discretion to the Federal Inspector and erred as well in "usurping" his authority.²⁵²

In response, Staff strongly supports the proposed design change guidelines, and addresses Alaskan Northwest's points in detail. Quoting the Commission's Order of April 28, 1980 (at 100, n.121),²⁵³ Staff stresses the Commission's concern with preserving the integrity of the design change process, and alleges that "the liberal design change policy once contemplated by the Commission has been compromised by the lack of firmness in the requested CCE." Staff asserts particular

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cost saving alternatives that, in its view, should have been developed as part of the proposed CCE, and supports use of discretion in netting out related design changes and in considering whether particular design change costs have been accounted for elsewhere in the CCE. Staff disagrees with recommendations in the Report regarding proposed design change treatment of camps, the Yukon River crossing, and changes in pipeline mode.²⁵⁴

The proposed design change guidelines were addressed to the Federal Inspector. All arguments for or against those guidelines should be addressed to him, in the event that he decides to pursue the Report's recommendation to consider adopting them. Pursuant to Reorganization Plan No. 1 of 1979, the Federal Inspector has ample authority to issue design change guidelines as a means of implementing and enforcing Condition No. 9 in Order No. 31-B. The Commission hereby reaffirms that Condition No. 9 establishes a liberal design change policy, as a broad general principle to encourage refinement of the design. Application of that broad principle in the context of specific facts will undoubtedly pose difficult decisions for the Federal Inspector to make. Guidelines could facilitate an orderly decision-making process if the Federal Inspector, in his discretion, wishes to adopt some. The particular guidelines proposed in the Adger/Berman Report represent a rational attempt to grapple with difficult issues based on the extensive deliberations at the technical conferences. Those particular guidelines are consistent with Order Nos. 31 and 31-B (including the liberal design change principle enunciated therein, as well as other relevant principles of the overall incentive scheme); many other possible formulations of guidelines would be equally consistent with those Orders, as a rational implementation of Condition No. 9. The Federal Inspector, with the engineering expertise of his office as well as the experience of the design change process for Northern Border, is in the best position to determine what guidelines, if any, would be most appropriate to assist him in resolving the close questions that will inevitably arise.

The recommendations in the Adger/Berman Report with respect to IROR treatment of particular potential design changes is purely advisory, and that advice is directed to the Federal Inspector, not to the Commission. The Report records the views of persons who have given serious thought to the questions posed, based on hypothetical facts that may or may not arise. Those views should be accorded whatever weight the Federal Inspector deems appropriate, at such time in the future (if any) as these or related factual issues are presented to him for decision. The Commission expresses no views of its own on any of these matters.

X. Other IROR Issues

A. Labor Cost Adjustment Index

In [Order No. 31-B](#) (at 28-30), the Commission deferred for later resolution the selection of appropriate labor cost adjustment indices. At the technical conferences, Alaskan Northwest proposed use of an "index or indices which are explicitly defined in the terms and conditions of the Project Labor Agreement." The Adger/Berman Report recommended rejection of that proposal on grounds that it would be inconsistent with the requirement in [Order No. 31-B](#) (at 28 to 30) that the indices be based on "published, objective price and cost data that are not substantially affected by the actions of that project sponsors."²⁵⁵ The Report concluded that if the ANGTS is the only major pipeline project in Alaska during a measured period, the Project Labor Agreement negotiated by Alaskan Northwest for this project would factor into the IROR whatever wages Alaskan Northwest agreed to pay for their labor, including inflation adjustments built into the Project Labor Agreement itself. Accordingly, the Report recommended adoption of a composite index comparable to the one approved by the Commission for Northern Border. That index involved nine labor categories, with measures of wage rates taken from the National Pipeline Agreements and the Richardson Construction Cost Trend Reports.

Alaskan Northwest, in its Comments, contends that use of a national index will fail to reflect historically higher labor inflation in Alaska. While preferring the index it proposed at the conferences, Alaskan Northwest requests, as an alternative that utilizes a national labor index, an index "based on the *Means* skilled average labor rates as adjusted by the *Means* weighted average labor index for Anchorage."²⁵⁶ Staff did not comment on this issue, nor did any other party.

The Commission has previously considered and resolved the basic principles applicable to selection of labor cost indices:

" . . . the Commission would like to use a national average labor rate for each labor category, rather than a rate for each state as provided in the National Pipeline Agreements. Since the Northern Border project may be the only pipeline under construction in a particular state and will most likely be the largest project in that state, an inflation adjustment mechanism based on a state by state breakdown of labor

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costs and wage rates would, for all practical purposes, amount to using actual wages paid by the project sponsors to measure inflation in wage rates. Using a national average for each labor category would preserve the sponsors' incentive to negotiate for the lowest possible labor cost in the regions in which the project will be built."

[Order No. 31-B](#) at 29 to 30. Although discussed in the context of Northern Border, the same principles are equally applicable to the Alaska pipeline segment. *See also* [Order No. 31](#) at 116 to 117.

Alaskan Northwest's proposal to use the Project Labor Agreement as the measure of labor inflation is inconsistent with the Commission's previously stated objectives, for the reasons elaborated in the Adger/Berman Report. The use of the *Means* skilled average labor rates would appear to be acceptable as an objective standard that would not be unduly affected by ANGTS activities in Alaska. Adjusting that index by the *Means* weighted average labor index for Anchorage, however, would propel the index back into the problems sought to be avoided in [Order Nos. 31](#) and [31-B](#). Accordingly, the Commission will approve use of an index based on the *Means* skilled average labor rates without adjustment by the weighted index for Anchorage.

Pursuant to the authority vested in the Federal Inspector by Reorganization Plan No. 1 of 1979, to implement and enforce the Commission's orders with respect to the ANGTS, the Federal Inspector has ample authority to approve the precise format of the index as well as to substitute for it an alternative index that best approximates the one approved herein (and that best satisfies the Commission's objectives as set forth in [Order Nos. 31](#) and [31-B](#) and this order) in the event that the index approved herein becomes unavailable in the future. In this regard, we are aware that the particular labor cost adjustment index approved in this order is not the precise index requested by Alaskan Northwest, and that there may be one

or more other national indices (which Alaskan Northwest might prefer) that would meet the standards adopted in [Order Nos. 31](#) and [31-B](#) as reaffirmed in this order. Alaskan Northwest has already had more than ample opportunity to propose such an alternative. Nevertheless, in the interest of efficient implementation and enforcement of the Commission's ANGTS orders, the Federal Inspector may, in his discretion, consider and approve any alternative labor cost adjustment index that meets the standards set forth in [Order Nos. 31](#) and [31-B](#) as reaffirmed herein. In this regard, the composite index recommended in the Adger/Berman Report, which, as stated above, is comparable to the index we approved for Northern Border, obviously meets the requisite standards, and may therefore be substituted for the index approved herein if Alaskan Northwest so prefers.

B. Cost Estimate Formats

The Adger/Berman Report (at V-1) recommends adoption of the cost estimate formats used by Alaskan Northwest in preparing its estimate. Staff agrees with the use of those formats, and no party disagrees. Accordingly, Alaskan Northwest's cost estimate formats will be adopted.

XI. Findings

The Commission additionally finds:

1. The application of Alaskan Northwest Natural Gas Transportation Company in [Docket No. CP80-435](#) is necessary and related to the construction and initial operation of the Alaska Natural Gas Transportation System within the meaning of Section 9 of the Alaska Natural Gas Transportation Act.

2. With the exceptions noted above, the record in this subproceeding provides a valid basis for establishing the Certification Cost Estimate and the Center Point for the Alaska pipeline segment of the Alaska Natural Gas Transportation System.

3. Findings of fact with respect to specific elements of the estimate and other related matters are set forth above in the text of the order. Except as modified by this order, the Commission accepts and adopts the findings of fact set forth in the above described Adger/Berman Report and Smoler/Berman Report (including the findings adopted by reference in those two reports).

XII. Order

The Commission orders:

(A) The following terms and conditions shall be incorporated into the conditional certificate of public convenience and necessity issued to Alaskan Northwest Natural Gas Transportation Company by the Commission in its order of December 16, 1977 in [Docket No. CP78-123](#), *et al.*, [1 FERC ¶61,248](#), as supplemented by [Order Nos. 31](#) and [31-B](#) in [Docket No. RM78-12](#):

1. The Certification Cost and Schedule Estimate (CCE) for the Alaska pipeline segment of the Alaska Natural Gas Transportation System (ANGTS), as defined in Condition No. 7 attached to [Order No. 31](#),

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except for CCE components deferred in this order, shall be \$6.930 billion.

2. The Center Point for the Alaska pipeline segment of the ANGTS, as defined in Condition No. 12 attached to [Order No. 31](#) as clarified in [Order No. 31-B](#), shall be 1.2.

3. The labor cost adjustment index to be used in implementation of the inflation adjustment mechanism set forth in Condition Nos. 5 and 18 attached to [Order No. 31](#), as amended by [Order No. 31-B](#), shall be the *Means* skilled average labor rates. The Federal Inspector, in his discretion, may consider and approve any

alternative labor cost adjustment index that meets the standards set forth in [Order Nos. 31](#) and [31-B](#), as reaffirmed herein.

4. The cost estimate formats filed by Alaskan Northwest, as described in this order, are adopted.

(B) Except to the extent that they are modified by, or are otherwise inconsistent with, the determinations, terms, and conditions set forth in this order, the recommendations set forth in the Adger/Berman Report and the Smoler/Berman Report are approved and adopted.

(C) The record in the Alaska pipeline segment CCE subproceeding in [Docket No. CP80-435](#) shall be kept open, and the reconvened technical conference mechanism instituted by the Commission's order of December 9, 1981 shall be maintained, to receive and consider additional filings by Alaskan Northwest, and additional reports by the presiding officers, on the items deferred in this order as discussed more fully in the order.

(D) Parties to the above-captioned dockets may file applications for rehearing of this order within 30 days of the date of issuance of this order. The applications for rehearing shall be submitted pursuant to the procedures set forth in Rule 713 of the Commission's Rules of Practice and Procedure.

-- Footnotes --

¹ See generally [Order No. 31](#), "Order Setting Values for the Incentive Rate of Return, Establishing Inflation Adjustment and Change in Scope Procedures, and Determining Applicable Tariff Provisions," [Docket No. RM78-12](#) (June 8, 1979), [7 FERC ¶61,237](#); "Order No. 31-B on Rehearing," [Docket No. RM78-12](#) (September 6, 1979), [8 FERC ¶61,250](#).

² The application omitted all materials relating to financing and cost of service analysis; those matters will be considered in related proceedings as and when appropriate applications are filed. See the Commission's procedural order of April 30, 1982 in the above-captioned dockets, [19 FERC ¶61,078](#).

³ Interim reports were submitted on September 26, 1980 and April 10, 1981, describing progress as of those dates.

⁴ In the Adger/Berman Report (cited and discussed *infra*), the November 1980 Amendment is referred to as the "October 27 Amendment" because it was circulated at the technical conferences on that date, bore that date on its face, and was widely referred to in that manner at the technical conferences. In this order, it will be referred to as the "November 1980 Amendment" to reflect the date of its formal filing with the Commission.

⁵ Report to the Commission on Certification Cost Estimate and Related Incentive Rate of Return Issues for the Alaska Segment of the Alaska Natural Gas Transportation System, July 1981.

⁶ Evaluation of Certification Cost Estimate, Alaska Segment, Alaska Natural Gas Transportation System, prepared for Office of the Federal Inspector, Washington, D.C., Williams Brothers Engineering Company, July 1981.

⁷ Order Inviting Comments and Granting Interventions, August 21, 1981. This subproceeding comes within the scope of the Alaska Natural Gas Transportation Act (ANGTA), [15 U.S.C. §§719](#)-719m, because it implements certain financial conditions stipulated in the President's *Decision (Decision and Report to Congress on the Alaska Natural Gas Transportation System, Executive Office of the President, Policy and Planning, September 1977)* and is necessary for, and related to, the construction and initial operation of the transportation system approved by the President's *Decision*. Section 9 of ANGTA, [15 U.S.C. §719 g](#), mandates expedition in the issuance of Federal authorizations for the ANGTS. Notice and comment procedures provided an expeditious and appropriate method for resolving the IROR issues presented in the Adger/Berman Report, particularly in light of the extensive opportunities for discussion and comment in the technical conference process that led to the Report. Therefore, the Commission decided to use the

notice and comment process authorized by Section 403(c), [42 U.S.C. §7173](#) (c), of the Department of Energy Organization Act (DOE Act). Section 403(c) authorizes the Commission to use rulemaking procedures to establish rates and charges under the Natural Gas Act. The Commission has previously determined, in [Order No. 31](#) (at 232), that the setting of the incentive rate of return for the ANGTS is an establishment of a "rate or charge" within Section 7 of the Natural Gas Act and, *per force*, Section 403(c) of the DOE Act.

⁸ Hearings were held in Alaska on April 20 and 21, 1982 on the socioeconomic and related issues, and, at the request of the presiding officers, substantial additional data and comments were submitted to them in April, May and July of 1982.

⁹ Report to the Commission on the November 1981 Amendment to the Certification Cost Estimate, April 16, 1982; Memorandum to the Commission and Notice of Invitation for Comments, April 16, 1982.

¹⁰ Evaluation of Certification Cost Estimate, Alaska Segment, Alaska Natural Gas Transportation System, Supplemental Report for Revised CCE, prepared for Office of the Federal Inspector, Washington, D.C., Williams Brothers Engineering Company, April 1982.

¹¹ Adger/Berman Report at I-18.

¹² Smoler/Berman Report at 7.

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¹³ Alaskan Northwest S/B Initial Comments at 1. The requested Center Point is derived from a Center Point allowance of \$2.28 billion. In its original application, as amended on November 17, 1980, Alaskan Northwest requested a CCE of \$8.177 billion and a Center Point allowance of \$2.304 billion. Following the March 1981 technical conferences, where a draft of the Williams Brothers Evaluation was discussed, Alaskan Northwest re-evaluated its filing and requested a CCE of \$8.133 billion and a Center Point allowance of \$2.278 billion. Alaskan Northwest further reduced the amounts requested in its comments on the Adger/Berman Report. *See* Alaskan Northwest A/B Initial Comments at 4 (Table I). References herein to Alaskan Northwest's application in its broadest sense (*i.e.*, as amended and revised through the technical conference process) refer to the CCE and Center Point values requested in the Alaskan Northwest S/B Initial Comments, filed on May 7, 1982.

¹⁴ *See* Smoler/Berman Report at 57 to 59.

¹⁵ "Notice of Application and Order Establishing Procedures," issued in [Docket Nos. CP80-435](#) and CP78-123, *et al.*, at 10-11.

¹⁶ *E.g.*, Alaskan Northwest A/B Initial Comments at 15.

¹⁷ If the design had only progressed through 5 to 10 percent of the entire design process, the CCE would not be approved at all. The IROR mechanism was established on the premise that all major design issues would be resolved prior to the filing of the CCE. Notice and Order of August 1, 1980, *supra*, at 10.

¹⁸ Adger/Berman Report at I-5 and n.17, and Attachment B.

¹⁹ *See* [Order No. 31](#) at 41-42.

²⁰ Adger/Berman Report at II-5 to II-7.

²¹ Alaskan Northwest A/B Initial Comments at 10.

²² *See* Adger/Berman Report at II-2 to II-8; Smoler/Berman Report at 4 to 5.

²³ Alaskan Northwest A/B Initial Comments at 3 and 13; Alaskan Northwest S/B Initial Comments at 3.

²⁴ Adger/Berman Report at II-8; Smoler/Berman Report at 5.

²⁵ Adger/Berman Report at II-5.

²⁶ Adger/Berman Report at II-9 to II-13.

²⁷ Smoler/Berman Report at 9; *see* Williams Brothers Supplemental Evaluation at 6-1.

²⁸ Productivity and civil quantities were the subject of separate analyses and are discussed *infra*, in sections V.A.2. and V.A.3. of this order.

²⁹ Adger/Berman Report at II-9.

³⁰ See November 1981 Amendment, Vol. XXXIV at 3-32 to 3-38. Alaskan Northwest, after reviewing a draft of the Williams Brothers Evaluation, agreed to a reduction of \$10 million. When that \$10 million is combined with the \$55 million "reconciliation" in the November 1981 Amendment, Alaskan Northwest has agreed with a total of \$65 million of the Williams Brothers recommended reduction.

³¹ Alaskan Northwest A/B Initial Comments at 32.

³² Alaskan Northwest A/B Initial Comments at 22.

³³ Contrary to Alaskan Northwest's suggestion, nothing in the Adger/Berman Report implied that equipment interchange between sections - Northway and Prudhoe in Alaskan Northwest's example - was expected.

³⁴ Williams Brothers Evaluation, Vol. III at 6-62 to 6-66.

³⁵ Smoler/Berman Report at 29; Williams Brothers Supplemental Evaluation at 6-3.

³⁶ Furthermore, these calculations are premised on operation of the equipment for only a single 10 hour shift per day. In the event that Alaskan Northwest's contractors use the equipment on overtime or double shifts, the contractors could recover an even higher percentage of the purchase price of the equipment.

³⁷ Williams Brothers Evaluation, Vol. III at 6-63 to 6-64.

³⁸ *Id.*

³⁹ Alaskan Northwest A/B Initial Comments at 23.

⁴⁰ Williams Brothers Evaluation, Vol. III at 6-65.

⁴¹ The *Engineer Contract Instructions* (ER 1180-1-1), the COE's implementation of the Armed Services Procurement Regulations, at 3-808.2, directs the use of the weighted guidelines method by all estimators and negotiators whenever a Government estimate is prepared and/or where profit is negotiated as an element of price. Under the COE's current weighted guidelines method, a construction contractor's profit may range from 3 percent to 15 percent, depending on the "weight" assigned to each of the following factors:

	Percentage Range
Degree of risk6 -- 3.0
Relative difficulty of work45 -- 2.25
Size of job45 -- 2.25

Period of performance45 -- 2.25
Contractor's investment15 -- .75
Assistance by Government15 -- .75
Subcontracting75 -- 3.75

3.0 -- 15.0

New guidelines are now being considered by the COE which change the percentage range to 2 percent \pm to 18 percent \pm (United States Corps of Engineers Technical Report P-109, August 1980). However, under the proposed guidelines, the fixed asset investment component (*i.e.*, contractor-owned plant, equipment, computers, etc.) carries a much higher weight (0 to 6 percent) than the current guidelines. The proposed guidelines provide that for projects such as ANGTS, where the fixed asset costs are between 10 percent (low level) and 20 percent (medium level) of the contract cost, and assuming a normal market demand for the used assets, the allowable profit factor for fixed assets would be about 1.5 percent. Thus, if all other factors received the maximum weight, the total indicated profit would be 13.5 percent \pm .

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⁴² Alaskan Northwest A/B Initial Comments at 23.

⁴³ Williams Brothers Evaluation, Vol. III at 6-64.

⁴⁴ The Adger/Berman Report's recommended reduction is \$105,458,000; the Smoler/Berman Report's recommended reduction is \$177,000. The respective reductions are cumulative.

⁴⁵ Williams Brothers Evaluation, Vol. III at 6-18 to 6-21.

⁴⁶ Smoler/Berman Report at 29; Williams Brothers Supplemental Evaluation at 4-32.

⁴⁷ The COE guidelines, *supra*, would also be applicable to subcontracts - *i. e.*, the allowable range would be 2 to 18 percent. Further, as the use of subcontractors increases, the allowable contractor profit decreases.

⁴⁸ Adger/Berman Report at II-12 to II-13 and n.38. In its November 1981 Amendment, Vol. XXXIV at 3-32, Alaskan Northwest makes a "reconciliation" adjustment of \$6.455 million, presumably in partial agreement with Williams Brothers.

⁴⁹ Alaskan Northwest A/B Initial Comments at 24.

⁵⁰ Adger/Berman Report at II-13, n.37.

⁵¹ Williams Brothers Evaluation, Vol. I at 1-82 to 1-84.

⁵² *Id.* at 1-74.

⁵³ Alaskan Northwest A/B Initial Comments at 24 to 25. *See also* Williams Brothers Evaluation, Vol. I at 1-72.

⁵⁴ Adger/Berman Report at II-9 to II-12.

⁵⁵ Williams Brothers Evaluation, Vol. I at 1-41.

⁵⁶ Transcript, October 22, 1980, Appendix (Williams Brothers Engineering Company 48-inch Pipe Lay Rates on NWA Project). Alaskan Northwest's independent assessment of efficiency factors did not differ significantly from Williams Brothers'. Alaskan Northwest Comments, April 13, 1981, Vol. II at 1-5.

⁵⁷ Williams Brothers Evaluation, Vol. I at 1-39 to 1-51; Transcript, October 22, 1980, Appendix (Williams Brothers Engineering Company 48-inch Pipe Lay Rates on NWA Project).

⁵⁸ Alaskan Northwest A/B Initial Comments at 17 to 19.

⁵⁹ Comments of Alaskan Northwest Natural Gas Transportation Company on the Draft Report of the Alaskan Delegate and the OFI Division Director, April 13, 1981, Vol. I, Exhibits 6 and 7.

⁶⁰ Alaskan Northwest A/B Initial Comments at 18.

⁶¹ Williams Brothers Evaluation, Vol. I at 1-48.

⁶² Comments of Alaskan Northwest Natural Gas Transportation Company on the Draft Report of the Alaskan Delegate and the OFI Division Director, *supra*, Vol. I, Exhibit 6, at 2.

⁶³ Williams Brothers Evaluation, Vol. I at 1-49.

⁶⁴ See discussion of Northern Border, *infra*, and Staff A/B Reply Comments at 6-7 and Exhibit VI. Note that Staff's adjustment of the Williams Brothers lay rate estimate, based on a weld speed of 14 inches per minute, indicates an average lay rate less than actually experienced by Northern Border - even before including an efficiency factor for weather, terrain, etc.

⁶⁵ Alaskan Northwest A/B Initial Comments at 18.

⁶⁶ Adger/Berman Report, Attachment G (Memorandum from William T. Black, Director, Office of Engineering Review, to Richard Berman, Director, Office of Audit and Cost Analysis, July 23, 1981).

⁶⁷ It does not suffice to say, as Alaskan Northwest would have it, "that six execution contractors and two highly regarded welding experts recommend a speed lower than . . . [Williams Brothers recommends]." (Alaskan Northwest A/B Initial Comments at 18.) The Commission (as well as the Alaskan Delegate, the OFI Division Director, and Williams Brothers) has given serious consideration to the views expressed by the execution contractors, but on balance, after weighing all of the evidence in the record, is persuaded that a faster lay rate is more realistic.

⁶⁸ Alaskan Northwest A/B Initial Comments at 19.

⁶⁹ Williams Brothers Evaluation, Vol. I at 1-41 and 1-44 to 1-45.

⁷⁰ See Comments of Alaskan Northwest Natural Gas Transportation Company on the Draft Report of the Alaskan Delegate and the OFI Division Director, *supra*, Vol. II at 1-4.

⁷¹ In this regard, we firmly reject Alaskan Northwest's misguided attempt (Alaskan Northwest A/B Initial Comments at 20) to impeach the competence and credibility of the engineering consultants retained by OFI to assist the Alaskan Delegate and Division Director in analyzing the estimate. Williams Brothers is not a party to the proceeding, does not represent any party to the proceeding, and has no independent interest in its outcome. Given the sheer size and technical complexity of the subproceeding in relation to the Commission's limited technical resources, we greatly appreciate the Federal Inspector's willingness to make available to the Commission, through the OFI Division Director and our Alaskan Delegate, the considerable experience and expertise of OFI's engineering consultant. In any event, advice and assistance that Williams Brothers has provided to other persons with respect to other pipeline construction projects, in the context of different facts, is irrelevant to resolution of the factual issues presented in this proceeding.

⁷² Alaskan Northwest A/B Initial Comments, Appendix B (Letter of V. A. Breitenbach, Sohio Gas Pipeline Company, to Cuba Wadlington, Jr., September 15, 1981).

⁷³ Alaskan Northwest provides no explanation as to why this analysis was not offered during the technical conferences, where a number of questions might have been answered.

⁷⁴ See Williams Brothers Evaluation, Vol. I at I-50.

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⁷⁵ On TAPS, Alyeska's contracts were "reimbursable cost plus fixed fee plus fixed overhead." Report to the Congress of the United States by the Comptroller General, Lessons Learned from Constructing the Trans-Alaska Oil Pipeline, June 15, 1978, at 22. In contrast, Alaskan Northwest "has adopted a fixed price approach to contracting," (using, *e.g.*, "firm fixed price contracts" and "fixed unit price contracts"). July 1980 Application, Vol. I at 1-10. In this regard, Alaskan Northwest has indicated that "ECs [execution contractors] will control as much of their operation and support as is practical." *Id.* at 1-9.

⁷⁶ Sohio states that there is no data to show that fixed unit rate contracts increase performance. Nevertheless, common sense indicates that they would increase incentive, for the same reasons that the IROR itself increases incentive.

⁷⁷ Northern Border Comments.

⁷⁸ Staff A/B Reply Comments at 5 to 6.

⁷⁹ See Staff A/B Reply Comments at 6 to 7 and Exhibit No. VI.

⁸⁰ Staff A/B Reply Comments at 7.

⁸¹ Alaskan Northwest A/B Reply Comments at 7 to 8, and Attachment B (letter from W. J. Deyell, Executive Vice President, Foothills Pipe Lines (Yukon) Ltd., to Darrell B. MacKay, Northwest Alaskan Pipeline Company, September 30, 1981).

⁸² See Lay Rate Report of Alaskan Northwest Natural Gas Transportation Company, November 7, 1980, at 10.

⁸³ Alaskan Northwest has assumed in its own estimate that "the joining of the pipe was the pacing operation" and that the key crews controlling this are those performing line up, hot pass, and firing line operations. See Lay Rate Report of Alaskan Northwest Natural Gas Transportation Co., *supra*, at 5.

⁸⁴ Adger/Berman Report at II-9; Williams Brothers Evaluation, Vol. I at 1-51.

⁸⁵ Alaskan Northwest A/B Initial Comments at 21-22.

⁸⁶ The Adger/Berman Report recommends reductions in the direct costs of operations 601 (pipeline survey) through 615 (cleanup) of the CCE, as well as reductions of the indirect costs of operations 701 (project office) through 715 (maintain owner vehicles) and 723 (control).

⁸⁷ Alaskan Northwest A/B Initial Comments at 22.

⁸⁸ See Adger/Berman Report at II-12, adopting the adjustments in the Williams Brothers Evaluation, Vol. I at 1-51. Crew sizes are adjusted elsewhere in the Report.

⁸⁹ Lay Rate Report of Alaskan Northwest Natural Gas Transportation Company, *supra*, at 7.

⁹⁰ Williams Brothers Evaluation, Vol. I at 1-50.

⁹¹ July 1980 Application, Vol. XXVI (No. 2) at 140. Similar statements are made with respect to other disputed crews. *See, e.g., id.*, Sec. 5.0.

⁹² November 1981 Amendment, Vol. I at 9; Vol. XXIV at 9-2.

⁹³ Staff S/B Initial Comments at 7 to 9.

⁹⁴ Smoler/Berman Report at 29.

⁹⁵ They do not include adjustments made to reflect the increased lay rate or material quantity reductions found in the Adger/Berman Report and adopted herein. These were found to be inconsequential in comparison to the costs of calculating them.

⁹⁶ Alaskan Northwest S/B Initial Comments at 6-1.

⁹⁷ Williams Brothers Supplemental Evaluation at 4-32.

⁹⁸ Alaskan Northwest S/B Initial Comments at 6-1.

⁹⁹ *See* Adger/Berman Report at II-15, and IV-16 to IV-19.

¹⁰⁰ November 1981 Amendment, Vol. XXXIV. *See also* Alaskan Northwest A/B Initial Comments at 25 to 28.

¹⁰¹ Smoler/Berman Report at 9.

¹⁰² Alaskan Northwest S/B Initial Comments at 2-1 and 2-4.

¹⁰³ Alaskan Northwest A/B Initial Comments at 25.

¹⁰⁴ Williams Brothers Evaluation, Vol. II at 2-14.

¹⁰⁵ Williams Brothers Evaluation, Vol. II at 2-21.

¹⁰⁶ Alaskan Northwest A/B Initial Comments at 26.

¹⁰⁷ Alaskan Northwest A/B Initial Comments at 27.

¹⁰⁸ Williams Brothers Evaluation, Vol. I at 1-87 and 1-88.

¹⁰⁹ Alaskan Northwest A/B Initial Comments at 27 to 28.

¹¹⁰ Alaskan Northwest S/B Initial Comments at 2-2 to 2-3.

¹¹¹ *See* Williams Brothers Evaluation, Vol. I at 1-90.

¹¹² *See* Comments of Alaskan Northwest Natural Gas Transportation Company on the Draft Report of the Alaskan Delegate and the OFI Division Director, *supra*, Vol. II at 1-30.

¹¹³ Alaskan Northwest S/B Initial Comments at 2-3.

¹¹⁴ Williams Brothers Evaluation, Vol. I at 1-99 to 1-100.

¹¹⁵ Alaskan Northwest A/B Initial Comments at 28.

¹¹⁶ November 1981 Amendment, Vol. XXXIV at 4-1 to 4-35.

¹¹⁷ Smoler/Berman Report at 16 to 18. The Smoler/Berman Report also adopted a further Williams Brothers recommended reduction of \$1,021,000 attributable to deletion of the associated communications facility. That issue is dealt with in section V.E. of this order, Communications and Supervisory Systems, *infra*.

¹¹⁸ Williams Brothers Supplemental Evaluation at 2-3, 2-4 and 5-3.

¹¹⁹ Alaskan Northwest S/B Initial Comments at 2-1, 2-2 and 5-1.

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¹²⁰ Staff S/B Initial Comments at 2. Staff noted that Alaskan Northwest's deletion did not include a reduction for PMC Field Costs. Staff, however, did not propose specific reductions. The Williams Brothers Evaluation (at 2-19) had added \$593,000 to the proposed CCE for increased Quality Control Staffing for the two metering stations initially planned. The Williams Brothers Supplemental Evaluation (at 2-5) deleted the portion attributable to Metering Station No. 1. Thus, PMC costs have been reduced.

¹²¹ November 1981 Amendment at 8.

¹²² Smoler/Berman Report at 19.

¹²³ Alaskan Northwest S/B Initial Comments at 2-4 to 2-5.

¹²⁴ Alaskan Northwest A/B Initial Comments at 29.

¹²⁵ Williams Brothers Evaluation, Vol. II at 3-7.

¹²⁶ If Williams Brothers had used 52 hours per week in the latter calculation, it would also have needed to reduce the duration from 4 months to 3 months. Since 52 hours is 30 percent greater than 40, the duration would also be reduced by 30 percent.

¹²⁷ See July 1980 Application, Vol. XXXII at 1.

¹²⁸ Alaskan Northwest originally requested \$909 million for Temporary Facilities and Services, including \$439 million for the purchase, relocation, refurbishment, and demobilization of pipeline and pump station camps owned by Alyeska. See Alaskan Northwest A/B Initial Comments at 4 and 29. At that time, Alaskan Northwest was negotiating with Alyeska to purchase Alyeska's old camps. Those negotiations eventually collapsed. Thereafter, in its November 1981 Amendment (Vol. 1 at 8), Alaskan Northwest increased its request by \$183 million, principally to reflect the higher cost of constructing new camps.

¹²⁹ Adger/Berman Report at II-15. Alaskan Northwest's acceptance of \$8.2 million of the \$41 million reduction is reflected in its November 1981 Amendment. See Alaskan Northwest A/B Initial Comments at 4 and 30; November 1981 Amendment, Vol. XXXIV at 3-17.

¹³⁰ Smoler/Berman Report at 19 to 28.

¹³¹ See Williams Brothers Evaluation, Vol. I at 1-58 to 1-59; Williams Brothers Supplemental Evaluation at 4-16 and 4-26.

¹³² Alaskan Northwest A/B Initial Comments at 30 to 31.

¹³³ Williams Brothers Evaluation, Vol. I at 1-57 to 1-59.

¹³⁴ With respect to the remaining craft labor productivity adjustments, Williams Brothers individually evaluated each crew size, finding many to be overstated. *See, e.g.*, Williams Brothers Evaluation, Vol. II at 4-44 and 4-50.

¹³⁵ Alaskan Northwest A/B Initial Comments at 31.

¹³⁶ Williams Brothers Evaluation, Vol. II at 4-30, 4-42 and 4-49; Williams Brothers Supplemental Evaluation at 4-23 to 4-24.

¹³⁷ Alaskan Northwest A/B Initial Comments at 31; Alaskan Northwest S/B Initial Comments at 4-27.

¹³⁸ Williams Brothers Evaluation, Vol. II at 4-35, 4-46 and 4-51.

¹³⁹ Williams Brothers Supplemental Evaluation at 4-18 and 4-24.

¹⁴⁰ Williams Brothers Evaluation, Vol. II at 4-33 and 4-34.

¹⁴¹ Alaskan Northwest A/B Initial Comments at 31 to 32.

¹⁴² *See* Williams Brothers Evaluation, Vol. II at 4-33 and 4-34.

¹⁴³ Smoler/Berman Report at 25 to 28.

¹⁴⁴ Alaskan Northwest S/B Initial Comments at 4 to 8.

¹⁴⁵ Williams Brothers Supplemental Evaluation at 4-7, and 4-27 to 4-30.

¹⁴⁶ Smoler/Berman Report at 27.

¹⁴⁷ Staff S/B Initial Comments at 2a.

¹⁴⁸ Staff contends that, in light of the 20 percent contingency for camps included in the July 1980 Application, which was based on refurbishing Alyeska's old camps, and which was part of the total dollar value by which the 12 percent contingency was originally derived, the overall contingency should be reduced. As discussed below, we disagree. (*See* section VI.A. of this order, on Normal Contingency.) We note, however, that inclusion of the recommended salvage value more than offsets the 12 percent contingency.

¹⁴⁹ Williams Brothers Supplemental Evaluation at 4-16, and 4-26 to 4-27.

¹⁵⁰ Alaskan Northwest A/B Initial Comments at 32.

¹⁵¹ Williams Brothers Supplemental Evaluation at 4-14.

¹⁵² Alaskan Northwest S/B Initial Comments at 4-22.

¹⁵³ Smoler/Berman Report at 22 to 25.

¹⁵⁴ Williams Brothers Supplemental Evaluation at 4-15 and 4-22.

¹⁵⁵ Smoler/Berman Report at 28 to 29; Williams Brothers Supplemental Evaluation at 5-3, and 5-9 to 5-10.

¹⁵⁶ Alaskan Northwest S/B Initial Comments at 5-1 and 5-2.

¹⁵⁷ *See* Williams Brothers Evaluation, Vol. IV at 7-3.

¹⁵⁸ *Id.*

¹⁵⁹ Adger/Berman Report at IV-6 to IV-7.

¹⁶⁰ In this regard, we note the argument made by Alaskan Northwest that changes in the physical design of the pipeline could necessitate changes (*i.e.*, increases) in management requirements. (*See* Alaskan Northwest A/B Initial Comments at 34.) As discussed elsewhere in this order, approval of design change guidelines falls within the exclusive discretion of the Federal Inspector pursuant to his legal responsibilities for enforcement and implementation of [Order Nos. 31](#) and [31-B](#). Without in any way seeking to influence the Federal Inspector's determinations with respect to whatever guidelines, if any, he may approve, we would merely note that one

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reasonable interpretation of the guidelines proposed in the Adger/Berman Report is that management changes required by a change in the physical design of the pipeline could be construed as costs incidental to design changes, while changes in the management plan unrelated to any change in the physical design of the pipeline would not by themselves constitute design changes qualifying for CCE adjustment.

¹⁶¹ Alaskan Northwest A/B Initial Comments at 33-34.

¹⁶² Staff A/B Initial Comments at 11-12.

¹⁶³ Alaskan Northwest A/B Reply Comments at 8-9.

¹⁶⁴ Smoler/Berman Report at 58-59.

¹⁶⁵ Alaskan Northwest S/B Initial Comments at 8 to 9.

¹⁶⁶ Office of the Federal Inspector for the ANGTS, "Decision on Adjustments to the Certification Cost and Schedule Estimate for Phase I of the Eastern Leg of the Alaska Natural Gas Transportation System (ANGTS)," April 15, 1981, at 5.

¹⁶⁷ Williams Brothers Evaluation, Vol. IV at 7-6. The Williams Brothers evaluated reduction for this item totaled \$16.15 million.

¹⁶⁸ Comments of Alaskan Northwest Natural Gas Transportation Company on the Draft Report of the Alaskan Delegate and the OFI Division Director, *supra*, Vol. III at 7-42.

¹⁶⁹ Williams Brothers Evaluation, Vol. IV at 7-12.

¹⁷⁰ While the latest available contract terms provide the best possible estimate for CCE purposes, any contract changes subsequent to CCE approval would constitute pricing changes. Thus, any design changes submitted to OFI for approval must also use the rates approved in the order establishing the CCE.

¹⁷¹ Williams Brothers Evaluation, Vol. IV at 7-13.

¹⁷² November 1981 Amendment, Vol. II at 2-1 to 2-22.

¹⁷³ Williams Brothers recommended reducing the \$52,540,000 by \$553,000, consistent with their comparable recommendations on the original Alaskan Northwest filing. The Smoler/Berman Report deferred consideration of the \$553,000 because the issues involved in that determination (principally the disputed benefits and burdens allowance) had been deferred in the Adger/Berman Report. (*See* Smoler/Berman Report at 14.)

¹⁷⁴ Williams Brothers Evaluation, Vol. IV at 7-51 to 7-55.

¹⁷⁵ Williams Brothers Supplemental Evaluation at 7-13 to 7-14.

¹⁷⁶ Williams Brothers Evaluation, Vol. IV at 7-54.

¹⁷⁷ Alaskan Northwest A/B Initial Comments at 36; Alaskan Northwest S/B Initial Comments at 7-3.

¹⁷⁸ Staff S/B Initial Comments at 2a, 6 and 7.

¹⁷⁹ Project Directorate is excluded from the ratio because resolution of many of its components (including the costs of Project Management, Alyeska data, socioeconomic impact, monitoring, highways, and affirmative action training--comprising the vast majority of that cost component) has been deferred. The Federal Inspector can derive and apply a comparable ratio to determine cost estimate adjustments attributable to the tax consequences of whatever design changes (and, if appropriate, schedule changes and scope changes) he may approve.

¹⁸⁰ See [Order No. 31-B](#) at 41 to 42.

¹⁸¹ See [Order No. 31](#) at 120 to 138; [Order No. 31-B](#) at 31 to 40.

¹⁸² See [Order No. 31](#) at 124 and 127.

¹⁸³ Williams Brothers Evaluation, Vol. IV at 7-42 to 7-51.

¹⁸⁴ Williams Brothers Supplemental Evaluation at 7-14 to 7-22.

¹⁸⁵ Alaskan Northwest A/B Initial Comments at 36 to 38; Alaskan Northwest S/B Initial Comments at 7-4 to 7-6.

¹⁸⁶ Staff S/B Initial Comments at 2a.

¹⁸⁷ Adger/Berman Report at IV-10 to IV-11.

¹⁸⁸ Smoler/Berman Report at 53 to 54.

¹⁸⁹ Staff S/B Initial Comments at 4; Alaskan Northwest S/B Reply Comments at 5.

¹⁹⁰ Order Approving in Part and Disallowing in Part Expenditures Claimed for Inclusion in Rate Base, [Docket No. CP78-123](#), *et al.*, [19 FERC ¶61,218](#).

¹⁹¹ We note that on July 14, 1982, Alaskan Northwest filed a petition for reconsideration of the Commission's June 1, 1982 order. This order herein is without prejudice to that petition. Nevertheless, pending resolution of that petition, as of the date of issuance of this order herein the June 1, 1982 order constitutes the best current estimate of pre-1980 certification costs.

¹⁹² Although the Smoler/Berman Report does not mention "assigned contingency," we presume that it was intended to be subsumed in either the base estimate or normal contingency. The Center Point allowance is determined by multiplying the Center Point by the CCE and then subtracting the CCE.

¹⁹³ We note that the matter of the Commission's ANGTS fee structure is currently pending in [Docket No. RM79-63](#). Nevertheless, as of the date of this order establishing the CCE, the best estimate is the one based on the regulation currently in effect.

¹⁹⁴ This total may need to be adjusted in a subsequent order in the event that the Commission approves

additions to the CCE for items deferred in this order.

¹⁹⁵ Staff S/B Initial Comments at 5; Alaskan Northwest S/B Reply Comments at 5.

¹⁹⁶ November 1981 Amendment, Vol. XXXIV, at 2-1, 2-22, and 2-24 to 2-42.

¹⁹⁷ Smoler/Berman Report at 14.

¹⁹⁸ Staff S/B Reply Comments. We would take this opportunity to note that Alaskan Northwest's statement that a Center Point event it posited was premised on occurrence of such event after the approval of a Final Design cost estimate does not preclude the Federal Inspector from ruling, pursuant to Condition No. 9 of [Order No. 31-B](#), that costs attributable to an event occurring prior to

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commencement of construction are covered by the Center Point. In this particular case, however, Condition No. 9 explicitly allows for CCE alterations attributable to schedule changes. Therefore, it would be reasonable for the Federal Inspector to determine that pre-Final Design schedule changes were not intended to be covered by the Center Point.

¹⁹⁹ Alaskan Northwest S/B Reply Comments at 1 to 3.

²⁰⁰ See Quarterly Report No. 12, Quarterly Report to the President and Congress on Construction of the Alaska Natural Gas Transportation System, Office of the Federal Inspector, July 29, 1982, at 1.

²⁰¹ See discussion of Project Management, section V.F.1. of this order, *supra*.

²⁰² See Smoler/Berman Report at 11. This issue is discussed in Section V.F.1. of this order, *supra*.

²⁰³ Adger/Berman Report at II-17; Williams Brothers Evaluation, Vol. I at 1-30 to 1-36, and Vol. IV at 8-1 to 8-35.

²⁰⁴ Alaskan Northwest A/B Initial Comments at 38.

²⁰⁵ Alaskan Northwest S/B Reply Comments at 5.

²⁰⁶ Staff S/B Initial Comments at 5.

²⁰⁷ Nothing in this determination precludes the Federal Inspector from utilizing a different factor for normal contingency in calculating the cost consequences of design changes, based on his valuation of the risks inherent in CCE adjustments that reflect the design changes he approves, and nothing precludes the Federal Inspector from considering whether the cost consequences of particular design changes have already been subsumed within the factor for normal contingency in the CCE approved by the Commission. These and other matters fall within the discretion of the Federal Inspector pursuant to Condition No. 9 in [Order No. 31-B](#).

²⁰⁸ Staff S/B Initial Comments at 5.

²⁰⁹ The Smoler/Berman Report (at 54, n.74) makes this recommendation with respect to precertification costs, the only CCE element for which it contemplated use of actual costs.

²¹⁰ See Adger/Berman Report at II-18, and III-A-1 through III-A-24, particularly III-A-2; Williams Brothers Evaluation, Vol. IV at 8-13 to 8-15, 9-4 to 9-50, and 9-60.

²¹¹ Alaskan Northwest A/B Initial Comments at 43.

²¹² See Staff A/B Initial Comments.

²¹³ Smoler/Berman Report at 3, and 57 to 58.

²¹⁴ Adger/Berman Report at IV-4 to IV-6, and V-9.

²¹⁵ Adger/Berman Report at V-4 to V-8.

²¹⁶ Alaskan Northwest S/B Initial Comments at 9.

²¹⁷ Transcript, February 18, 1982, at 220 to 230.

²¹⁸ Adger/Berman Report at IV-8, n.33.

²¹⁹ The agreements are signed by Alyeska's owners, affiliates of the Prudhoe Bay producers.

²²⁰ The precise formula for the deferred payment factor is that the payments are to be multiplied by a factor "equal to $(1.0002739)^n$ where n is the number of days between the effective date of agreement on the [base price] and the date such payment is paid or becomes due," whichever comes first.

²²¹ In light of our resolution of this issue, the respective positions of the parties are fully preserved.

²²² Alaskan Northwest S/B Initial Comments at 9 to 12.

²²³ Staff S/B Initial Comments at 4.

²²⁴ Alaskan Northwest S/B Reply Comments at 4 to 5.

²²⁵ Alaskan Northwest S/B Initial Comments at 11.

²²⁶ See transcript of prehearing conference, May 19, 1982, and Presiding Administrative Law Judge's Report to the Commission on Prehearing Conference, May 27, 1982, both in the above captioned dockets [[19 FERC ¶63,068](#)].

²²⁷ Our rough calculation indicates, for instance, that if Alaskan Northwest meets its currently anticipated completion date of November 1989, the cost for Alyeska data pursuant to the deferred payment factor in the contract--*unadjusted for inflation*--would increase from \$92.23 million to approximately \$122 million.

²²⁸ [Order No. 31](#) at 41. [Order No. 31](#) established alternative methods for setting the Center Point value. The first method used a mathematical formula that would set the Center Point based on the relationship between the requested CCE and the March 1977 cost estimate. [Order No. 31](#) also provided, however, that the Center Point could be set without reference to the formula if there had been a major change in the nature of the project that would cause the total estimated costs, including likely overruns, to exceed the 1977 cost estimate referred to in the President's *Decision*. On rehearing of [Order No. 31](#), the Commission determined that a major change in the project had occurred and that the second method, rather than the formula approach, was appropriate for setting the Center Point for the Alaskan pipeline segment. See [Order No. 31-B](#) at 4.

²²⁹ See Alaskan Northwest A/B Initial Comments at 4. Alaskan Northwest expresses its proposed Center Point Ratio by means of the following formula:

Center Point = 1.0 + expected value of abnormal events

²³⁰ Alaskan Northwest S/B Initial Comments at 2.

²³¹ Alaskan Northwest A/B Initial Comments at 39.

²³² Adger/Berman Report at III-16 to III-18.

²³³ Adger/Berman Report at III-4.

²³⁴ We do not readily perceive why any event with a probability of occurrence of 100 percent should be considered abnormal. Nonetheless, because the Report uses this analysis as only one factor among several, and because part of the cost consequences of many of these events were reassigned to contingency

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(*see* discussion, *supra*, in section VI.B. of this order, on Assigned Contingency), we will accept the analysis for guidance purposes without further reductions.

²³⁵ Order No. 31 (at 54) requires the CCE to include "costs resulting from normal conditions to be expected during construction." This would necessarily include all costs resulting from normal estimating uncertainty. Alaskan Northwest, however, limited its definition of normal contingency to include only:

Accuracy of material quantity estimates.

Accuracy of material price estimates.

Human productivity assumptions.

Equipment reliability assumptions.

Engineering/design development.

Accuracy of scheduled durations.

Accuracy of bid specifications based on current project definitions.

See, e.g., July 1980 Application, Vol. XXXIII at 7. Alaskan Northwest itself acknowledged that during its final review certain Center Point events were identified as more appropriate for classification as part of the engineering estimate - presumably as contingency events. *See* Adger/ Berman Report at III-19, n.46; Transcript, October 22, 1980, Appendix (Report to the Alaskan Delegate and the Director, Audit and Cost Analysis, Office of the Federal Inspector, at 1).

²³⁶ Adger/Berman Report at III-16 to 17 and III-19 to 20. The figure of 1.235 is premised on the CCE requested by Alaskan Northwest in its July 1980 Application as amended in November of 1980, but does not include the November 1981 Amendment (which would have reduced the figure below 1.235).

²³⁷ Center Point Events Nos. 19 to 23, respectively, allow for changes in domestic markets for construction materials (19), changes in world markets for transportation services (20), changes in domestic markets for construction equipment (21), changes in domestic markets for qualified contractors (22), and

changes in domestic markets for craft labor foremen (23).

²³⁸ [Order No. 31](#) at 111 to 119.

²³⁹ Adger/Berman Report at III-20, n.51.

²⁴⁰ Alaskan Northwest A/B Initial Comments at 44.

²⁴¹ See [Order No. 31](#) at 111 to 119, and Condition No. 5 (at 241 to 242).

²⁴² See Adger/Berman Report at III-8.

²⁴³ See [Order No. 31](#) at 54.

²⁴⁴ Event No. 36 of Alaskan Northwest's analysis was a catch-all category for events referred to as unknown-unknowns, or "unk-unks." Unk -unks are by definition abnormal events whose precise identity cannot be ascertained in advance of their happening. The cost consequences of this event are inherently unquantifiable, and there is no record of reliance on this unique concept in estimating costs for a project of this sort. If unk-unks are excluded from the analysis of abnormal events, the cost consequences for abnormal events would reduce the Center Point range (*i.e.*, the range suggested by Staff, Williams Brothers and the authors of the Adger/Berman Report) to between 1.104 and 1.177 (based on the Center Point analysis in the Adger/Berman Report, which does not reflect the November 1981 Amendment). Adger/Berman Report at III-26, n.57.

²⁴⁵ See Adger/Berman Report at III-8, n.24.

²⁴⁶ Adger/Berman Report at III-10.

²⁴⁷ Alaskan Northwest A/B Initial Comments at 39.

²⁴⁸ See Adger/Berman Report at III-27 to III-28.

²⁴⁹ Adger/Berman Report at I-5, and Attachment A.

²⁵⁰ Adger/Berman Report, Section I at 7-18, and Section IV.

²⁵¹ Adger/Berman Report at IV-2.

²⁵² Alaskan Northwest A/B Initial Comments at 45 to 48; Alaskan Northwest A/B Reply Comments at 10 to 11.

²⁵³ Findings and Order Issuing Certificates of Public Convenience and Necessity Authorizing the Importation of Natural Gas, [Docket No. CP78-123](#), *et al.*, [11 FERC ¶61,088](#); see also Order Granting Applications for Rehearing in Part, issued June 20, 1980 in [Docket No. CP78-123](#), *et al.*, [11 FERC ¶61,302](#), at 23 to 25. The order granted certificate authority to Northern Border Pipeline Company for "prebuilding" its segment of the ANGTS including, *inter alia*, approval of Northern Border's own CCE.

²⁵⁴ Staff A/B Initial Comments at 7 to 8; Staff A/B Reply Comments at 11 to 18. Staff and Alaskan Northwest also discuss the correct interpretation and effect of certain design change agreements they made during the technical conference process. See Staff A/B Initial Comments at 8 to 10; Alaskan Northwest A/B Reply Comments at 11 to 12. In an effort to put this long running controversy to rest, suffice it to say that, based on the comments received, the parties are not now in agreement on this subject and probably never were, and are free to press their respective positions in all appropriate fora.

²⁵⁵ Adger/Berman Report at V-1 to V-4.

²⁵⁶ Alaskan Northwest A/B Initial Comments at 49 to 50.