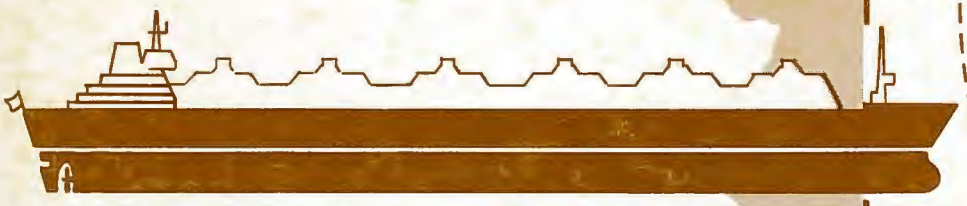
ALASKA NATURAL GAS TRANSPORTATION SYSTEMS

Final Environmental Impact Statement



FEDERAL POWER COMMISSION STAFF

VOL. IV

COMMENTS AND RESPONSES
PART II

April 1976

Alaskan Arctic Gas Pipeline Company
Washington Office: Suite 230, 1730 Pennsylvania Ave., N.W.
Washington, D.C. 20006
(202) 331-0933

William W. Brackett, Vice Chairman

January 21, 1976

The Honorable Kenneth F. Plumb
Secretary
Federal Power Commission
825 North Capitol St., N.E.
Washington, D.C. 20426

Re: El Paso Alaska Company, et al.
Docket Nos. CP75-96, et al.

Dear Mr. Plumb:

Pursuant to your letter of November 28, 1975, and the Federal Power Commission's ("Commission") "Order Allowing Extension of Time to Comment on Draft Environmental Impact Statement" issued January 14, 1976, there are transmitted herewith for filing with the Commission, on behalf of Alaskan Arctic Gas Pipeline Company ("Alaskan Arctic"), thirty (30) copies of the "Comments of Alaskan Arctic Gas Pipeline Company on Federal Power Commission Staff Draft Environmental Impact Statement on Alaska Natural Gas Transportation Systems".

As noted in the Comments, since the Staff has "accepted" certain portions of the Department of Interior's ("DOI") Draft Environmental Impact Statement ("DEIS") pertaining to "Alaska Natural Gas Transportation System", under letter dated December 8, 1975, I transmitted for filing with the Commission, among other things, the Comments of Alaskan Arctic on Parts II, III and VI of the DOI-DEIS. Those Comments are incorporated by reference in the Comments which we are filing on the FPC Staff's DEIS. In this regard, I am simultaneously lodging with the Commission copies of those reports submitted to the DOI in support of Alaskan Arctic's Comments.

Pursuant to your letter, I am filing ten (10) copies of our Comments with the Council on Environmental Quality, Executive Office of the President, 722 Jackson Place, N.W., Washington, D.C. 20006. In addition, I am serving copies of our Comments upon all parties reflected on the Secretary's official service list.

Should you have any questions concerning the foregoing, kindly contact the undersigned.

Very truly yours,

ALASKAN ARCTIC GAS PIPELINE COMPANY

By _____
William W. Brackett

Enc.

jcu

cc: The Honorable Nahum Litt, Presiding
Administrative Law Judge
Brian J. Heisler, Staff Counsel
Michael J. Sotak, Bureau of Natural Gas
All Parties

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

El Paso Alaska Company, et al.) Docket Nos. CP75-96, et al.

COMMENTS OF
ALASKAN ARCTIC GAS PIPELINE COMPANY
ON FEDERAL POWER COMMISSION STAFF
DRAFT ENVIRONMENTAL IMPACT STATEMENT ON
ALASKA NATURAL GAS TRANSPORTATION SYSTEMS

Introduction

Alaskan Arctic Gas Pipeline Company ("Alaskan Arctic" or "Arctic Gas"), pursuant to the letter of the Secretary of the Federal Power Commission ("Commission") dated November 28, 1975, submits herewith its comments on the Draft Environmental Impact Statement ("DEIS") prepared by the Commission Staff in the referenced proceedings. These comments will begin with some general, and overall comments, before proceeding with specific comments on the DEIS, in page number order.

The Secretary's letter dated November 28, 1975, provides in pertinent part that "[c]omment will be received not only on the material prepared by the Commission Staff but also on those portions of the Department of Interior's Draft Environmental Impact Statement which has been accepted by the Commission Staff." Pages I-3 and I-4 of Volume I of the DEIS provide the particular portions of the Department of Interior's ("DOI") Draft Environmental Impact Statement (hereinafter referred to as "DOI-DEIS") "accepted" by the Staff, i.e., Parts II and III pertaining to Arctic Gas, Parts IV and V (with certain exceptions) pertaining to Pacific Gas Transmission Company ("PGT") and Interstate Transmission Associates (Arctic) ("ITA(A)") and Northern Border Pipeline Company ("Northern Border"), and Part VI, Volume I, pertaining to alternatives. On October 24, 1975, Arctic Gas and its joint applicants, ITA(A), Northern Border and PGT, filed extensive comments on the DOI-DEIS as well as certain other documents underlying the DOI-DEIS.

By letter dated December 8, 1975, Mr. William W. Brackett, Vice Chairman of Alaskan Arctic, transmitted for filing with the Commission, among other things, the comments of Arctic Gas on Parts II, III and VI of the DOI-DEIS. To the extent that the DOI-DEIS has been "accepted" by the Staff, Arctic Gas' comments on that document are incorporated herein and made a part hereof by reference. Therefore, the DOI-DEIS accepted by Staff should be corrected, modified, etc., in accordance with those specific

comments. In addition, the supplementary documents listed on page 5 are being or have been submitted, and changes should be made in accordance with the facts shown there. Those documents were previously submitted to the DOI and should be considered as a part of the comments of Alaskan Arctic filed relative to the DOI-DEIS, and thus incorporated herein.

At this point, procedural comment is required relative to the DEIS incorporation of all or portions of two DOI documents. With regard to the DOI-DEIS, Arctic Gas has commented in detail and, as described above, incorporated such comments herein. However, unless publicly announced plans for time schedule by DOI have been or will be abandoned, it is certain that the Final EIS of DOI relative to the Arctic Gas Project will be published before the subject FPC Staff Final EIS can be completed. Does the FPC Staff intend to incorporate the Final EIS of DOI in its Final EIS? If so, it will presumably be that final document which will be sponsored at hearings herein, presumably by witnesses qualified relative thereto.

The other DOI document incorporated by reference in the subject DEIS raises similar, but also additional, questions and problems. The similar question is that the DEIS incorporates a study by consultants to (the "Aerospace Corporation"), and some members of DOI, entitled "Alaskan Natural Gas Transportation Systems: Economic and Risk Analysis." There are two volumes: "Conclusions and Results" and a larger backup document. Both are labeled draft and have been so referred to by DOI officials. Those documents were issued as part of the preliminary effort toward the preparation of a report to Congress by the Secretary of the Interior, as required by law. Those documents were not reports sponsored by the Department of Interior or its Secretary.

In addition, however, such documents have now been superseded in two ways. First, the Secretary of the Interior has now issued his final "Report to the Congress, Pursuant to Public Law 93-153." It consists of a letter to the Vice President, as President of the Senate, and Speaker of the House of Representatives, dated December 8, 1975, from the Honorable Thomas Kleppe, Secretary of the Interior, a copy of which follows this page. As can be seen, the Secretary's report states a single conclusion: that the two "hypothetical systems" studied are feasible, subject to environmental examination and possible other future information. The Secretary's Report stresses that DOI and its cooperating Cabinet Departments have studied "two hypothetical, competitive delivery systems similar in certain respects" to the Arctic Gas Project and the liquefaction-tanker project proposed by El Paso Alaska Company.

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

December 8, 1975

Honorable Nelson Rockefeller
President of the Senate
Washington, D. C. 20510

Honorable Carl Albert
Speaker of the House of Representatives
Washington, D. C. 20515

Gentlemen:

I write in response to the Congressional mandate expressed in Title III, Section 302, of Public Law 93-153, entitled "The Trans-Alaskan Oil Pipeline Authorization Act." That section directed the Secretary of Interior to investigate, and report to the Congress concerning, the feasibility of one or more oil or gas pipelines traversing Canada from the North Slope of Alaska to the lower 48 States.

Subsequent to the passage of that Act, proponents for two competing natural gas transportation systems filed applications with the Federal Power Commission for certification to transport North Slope natural gas to the lower 48 States. One project contemplates a pipeline through Canada and the other would utilize an Alaskan pipeline/cryogenic tanker system. The latter system would transport gas across Alaska by pipeline, pressurize it at an Alaskan port, and then transport it as liquid natural gas in a tanker system to west coast facilities. In addition to the foregoing, the proponents of the Trans-Canadian pipeline have filed applications with the Department of the Interior for the requisite rights-of-way across Federal lands. No right-of-way application has been received by this Department for the trans-Alaskan proposal.

It was the consensus that a meaningful basis for the study directed by P.L. 93-153 would be a study predicated upon an analysis of two hypothetical, competitive delivery systems similar in certain respects to those specific proposals referred to above.

I am enclosing a study which has served as a basis for the conclusion as to feasibility which I express below. This study is a work product prepared under the lead supervision of the Department of the Interior. The section relating to national security was prepared by the Department of Defense; the section which considers international factors was prepared by the Department of State; and the section which considers financial constraints was prepared by the Department of the Treasury.

CONSERVE AMERICA'S ENERGY

Save Energy and You Serve America!

This study does not deal with environmental considerations; its primary orientation is toward matters involving technical and economic considerations. The Department of the Interior has also prepared a draft environmental impact statement which has as its primary subject the trans-Canadian pipeline right-of-way applications. This draft EIS has been released to the public. Not until the final EIS has been completed, released, and analyzed, will the Department of the Interior be in a posture to consider and act on the pending right-of-way applications for the transportation of North Slope natural gas.

On the basis of all information now available to me, I have concluded that both hypothetical systems discussed in the accompanying study for the transportation of North Slope natural gas are economically and technologically feasible, subject, however, to consideration of the environmental impacts disclosed by the final EIS. My conclusion in this respect is based on factors which are known as of the time of this writing. I would emphasize, however, that the proposals which have been under consideration are an amalgam of many complex technological, economic, and political factors; many of which are, of course, subject to change. This may require ongoing analyses which would supplement and possibly modify conclusions in the enclosed study as well as, to some extent, my present conclusion of economic and technical feasibility herein expressed.

Sincerely yours,

Secretary of the Interior

Enclosure

The Secretary's Report was accompanied by a study which is referred to in the DOI release as "staff contributions bound into a 239-page document", the work of "16 government analysts", which is "unlike earlier portions of the study, which were prepared by the Aerospace Corporation".

In view of the above, it is clear that the Secretary's Report has superseded the "earlier portions", as have the later "staff contributions"; but it is those "earlier portions" which the FPC Staff DEIS has incorporated by reference. Again, will the attached Final Report of the Secretary now be substituted for incorporation into the Final FPC Staff DEIS? If so, will it be alone or with the new "staff contributions", which are very much different?

There is another, very basic procedural question raised by the incorporation of the DOI Report under Public Law 93-153, and the staff "economic and risk" documents referred to: What is their relevance to an Environmental Impact Statement? Please note that the attached Report of the Secretary clearly and sharply distinguishes the DOI-EIS from that Report and the Staff and Aerospace studies. All go to economic, cost, technical, legal and political matters, not environmental. As pointed out below, an EIS is not an action document. Instead, it is one tool in the evaluative process by which an agency makes a decision. In this case, the Commission, in its decision, will presumably consider cost, economic, legal and technical matters - and perhaps political - as well as environmental matters. Certainly, environmental matters are one, but not the only, consideration: it must be balanced with economic and other considerations in reaching a decision. But that does not mean this balancing, and consideration of such other factors, is to be done in an EIS. Such other subjects are far afield from environmental matters. And, in this case, the problem is compounded by adoption of the now superseded studies of others.

Arctic Gas submits that the matters covered in Section B.1 ("Analysis of Net National Economic Benefits") should be deleted in preparation of the Final FPC Staff EIS. This should be done for the relevance and other procedural reasons discussed above, as well as the preliminary and now superseded nature of the material incorporated.

On the merits, both the incorporated preliminary "economic" material and the superseding staff "Feasibility Study", rate the all-land pipeline, something like the Arctic Gas Project, as not only feasible, but superior to the alternative liquefaction-tanker system on the basis of "net economic benefits" for most of the cases devised and studied. In addition, the text discussion rates an all-land pipeline superior on most of the unquantified factors considered. But those reports grossly understate the degree of

superiority of the all-land pipeline method. Some of the problems with those reports will be discussed in the "Specific Comments" which are submitted later in these comments, and certain comments and criticisms submitted to the DOI staff relative to the incorporated preliminary "Economic and Risk Analysis" are submitted herewith. It is submitted that the deficiencies described there constitute another reason for not incorporating such preliminary work, or the successor "Staff Feasibility Study". (Incorporation of the attached Secretary's Report is unobjectionable, if desired).

If, however, one or more of the DOI Staff documents are to be incorporated into the Final FPC Staff EIS, and thus, presumably, into the record of these Commission proceedings, then witnesses who are qualified to explain and justify the material in such documents, on cross-examination, must appear in support of such material. That would constitute a major effort by the Department of Interior and perhaps its consultants, before the Commission, as a party. Since the subject matter is not environmental it would mean the injection of non-environmental matters into the hearings during a phase now planned to be used for environmental subjects. The answering cases to that "environmental" evidence would thus necessarily be partially non-environmental. Depending upon how many other evidentiary phases had by then been completed, it could cause a second phase of answering cases on economic, cost and technical subjects.

In light of all of the foregoing, Alaskan Arctic respectfully suggests that the FPC Staff reconsider whether it wishes to incorporate any DOI or DOI Staff "economic" material into its Final EIS (and if so, which such material, in light of the new documents, and which witnesses to present relative thereto).

The comments contained in this document are being filed in order to amplify upon the comments already submitted to the Department of Interior, as well as to directly respond to certain statements made in Volumes I and II of the DEIS.

List of Reports Submitted
With and as Part of These Comments

1. Study of the Feasibility of Basing Natural Gas Pipeline Operating Pressure on Hydrostatic Test Pressure. American Gas Association, New York, N.Y., February, 1968.

2. Criticism of Aerospace Corporation Report, Chapter 1.1.1.3.A.1 and the Highlights Pipe Thickness, Stress Analysis and Metallurgy.

3. Study of Potential Alternate Fuels for Fairbanks, Alaska. Alaskan Resources Sciences Corporation, April, 1974.

4. Reference Book of Water Crossings.
   Vol. II River Crossing Design, October, 1974. NESCL
   Vol. V Preliminary Design of Selected River Crossings, Alaskan Coastal Route, February, 1975. NESCL

5. Inuvik Snow Road Construction, Testing and Environmental Assessment, 1973-74, NWT Canada.

6. Inuvik Snow Road Environmental Assessment.

7. Responses to Pipeline Application Assessment Group Requests for Supplementary Information.

8. Carter, L.J. 1975. Icebergs and Oil Tankers: USGS Glaciologists are Concerned. Science 190:641-643.

9. Complete set of Arctic Gas comments on DOI-DEIS.*

---

* Submitted December 8, 1975, with above-mentioned letter of Mr. W. Brackett.

General Comments

Before responding in detail to various statements made in the DEIS, some general observations with respect to the document are in order. An environmental impact statement prepared by Staff is not an "action" document, i.e., it does not grant or deny any right or privilege. Rather, it is an evaluative and informational document which is intended to form the basis for subsequent decision making. In this case, the applicants comprising the Arctic Gas Project desire to construct and operate a natural gas pipeline system in Alaska, Canada, and many of the contiguous 48 states, and have, therefore, applied to the Commission for a certificate of public convenience and necessity in order to construct and operate their respective pipelines.

It is the decision of the Commission relative to such applications which constitutes the "action", based inter alia, upon the environmental impact statement prepared by the Staff together with all of the other evidence of record. The purpose of a DEIS and a Final Environmental Impact Statement is, therefore, to provide the decision maker (in this case the Commission) with an informed basis for rendering a judgment on environmental factors. It is not the purpose of an EIS to recommend: (1) one proposal over another; (2) one alternative over another; (3) a redesign of proposed facilities; or (4) conditions to be imposed upon a certificate which may be issued. The rationale for this is clear: the Commission must take into account a myriad of factors, i.e., gas supply, engineering, markets, economics, financing, as well as environmental considerations, in rendering the final judgment on whether a certificate should be issued and on what terms and conditions. Therefore, the EIS presented to the decision maker should present an unbiased and objective evaluation of all environmental considerations so that the document can be used together with all the other evidence in rendering a decision.

The Staff is not precluded in these circumstances from offering witnesses who have a preference for one route over another, one proposal over another, or to recommend conditions which it believes should be imposed upon any certificate that is issued. Such witnesses may then be cross-examined on the basis of the environmental information contained in the EIS, as well as the other information of record, to determine precisely what they have taken into account in arriving at such conclusions. The Staff will have the opportunity to place witnesses on the stand to testify in this regard and will not be prejudiced in any fashion by proceeding in this manner. Arctic Gas, therefore, recommends that the FEIS refrain from drawing any conclusions.

If Staff is, however, unwilling to delete the recommendations and conclusions contained in its DEIS, then Arctic Gas submits that those recommendations should conform to the overwhelming record evidence demonstrating that the Arctic Gas Project provides the most reliable, reasonably priced and environmentally desirable system of delivering the volumes of gas from the Arctic regions of North America to the lower 48 states of the United States.

In this regard, the Arctic Gas Project has for the past five years, in Alaska and Canada alone, invested well over $15 million in extensive research (biotic, abiotic, and socio-economic) to construct and operate the most environmentally desirable line in order to bring the gas supplies in the Arctic to markets badly in need of such supplies. Such research was conducted by a group of highly respected independent scientists with vast experience in environmental matters. These individuals, who have researched the literature, and performed field and laboratory studies, have concluded that the Arctic Gas Project has taken appropriate steps to avoid or mitigate potential adverse environmental impacts, and that if the Arctic Gas Project constructs, operates, and maintains the pipeline as proposed, it will not have a serious adverse impact on the environment. Massive application materials in the form of environmental statements (and other supplemental materials) have been submitted to the Commission to demonstrate this point. Numerous independent environmental consultants have been presented to the Commission to testify with respect to the extensive studies undertaken by them and to the conclusions arrived at as a result of those studies. Nowhere in the DEIS does the Staff question, much less refute, the substantial evidence that the Arctic Gas Project is the preferred means of delivering the Arctic Gas supplies to market.

In its DEIS, Staff recommends, with respect to the Arctic Gas Project, that Alaskan Arctic utilize the "Fairbanks Corridor", that the western legs of the project be eliminated, and that the proposed Northern Border line be totally changed in route to the Kankakee, Illinois area, and that east of Kankakee, the line be eliminated. Thus, the proposal includes utilization of unknown, untested and unanalyzed exchange-displacement agreements for delivery of the gas in the lower 48 of the United States. No proposal is made for routing in Canada but that proposed by Canadian Arctic Gas Pipeline Limited does not run between the two border points proposed by the Staff DEIS.

No reasons have been advanced by the DEIS in support of its wholly different proposal. Although the DEIS states that the Staff has made an "in-depth review of the applicants' environmental analysis and information from other sources," its analysis does not appear in the DEIS and the "information from other sources" has not been delineated. Nor is there any analysis in the DOI-DEIS, relied upon by Staff, which would reasonably support this conclusion.

The "Fairbanks Corridor" is discussed in detail below, but it is clear from the application materials and other documents supplied by Arctic Gas, together with the evidence presented by its independent environmental consultants, that the Fairbanks Corridor is less preferable than the Prime Route proposed by Arctic Gas from an environmental, engineering, cost and reliability standpoint. Of equal importance, the Staff's proposal simply does not serve the project concept since it makes no provision for obtaining the Mackenzie Delta Reserves and makes no provision for direct delivery of the gas to markets. Those reasons which we believe Staff is relying upon in support of its recommendation, i.e.: (1) utilization of a "utility corridor"; (2) avoidance of the Arctic National Wildlife Range; and (3) provision of gas to Fairbanks, have all been shown to be without merit in the present case, where it has been demonstrated that construction, operation and maintenance of the Arctic Gas Project (both in the United States and Canada) along the proposed Prime Route will not have a significant adverse impact on the environment and that any market for Prudhoe Bay gas in Fairbanks, Alaska, on an economic basis, is "highly speculative."

Given the fact that the applicants have devoted considerable resources to the analysis of the routes proposed and that those routes accomplish the purpose for which the project was conceived: namely, to transport natural gas from the Prudhoe Bay Area of the Alaskan North Slope and from the Mackenzie Delta Area to markets in Canada and the lower 48 states, it serves no purpose to propose arbitrarily that the applicants select alternative routes, particularly when those alternative routes do not accomplish the purpose for which the project was conceived and would result in no net environmental benefits.

From pages I-207 through I-219, the DEIS lists the "environmental impacts" of the Arctic Gas Project. These so-called "environmental impacts" were drawn from the DOI-DEIS. The section creates the erroneous impression that the summary consists of proven, undisputable, supported facts, which simply is not the case. It does not take into account the mitigative measures proposed by Arctic Gas and that these predicted impacts were responded to in detail in the comments filed by Arctic Gas with the DOI. Either a more extended introduction, including revisions in accordance with Arctic Gas' comments to the DOI-DEIS should be prepared, or the section deleted in its entirety. (See also the earlier discussion of the fact that the DOI-DEIS will shortly be superseded by a Final - and possibly quite amended - EIS of DOI).

In any event, the relative extent of the physical impact of the natural gas pipelines involved should be more clearly identified at the outset. The proposed pipeline will be buried in a ditch approximately seven feet wide and the surface and any affected subsurface structures, other than the widely spaced above-ground stations, will be restored to essentially their pre-existing

condition. The area along the right-of-way disturbed during construction will be revegetated, and only a narrow right-of-way will be kept clear of trees, tall shrubs and brush, the remainder reverting to its previous use or condition. In farm or grazing land, the entire right-of-way can revert to its previous usage. The compressor stations and other above-ground facilities will be located many miles apart and require very little land when compared to the area traversed and the broad area of the North American continent served by the project. Moreover, operation of the proposed facilities will comply with all requisite noise, air and water quality standards.

Hundreds of thousands of miles of natural gas transmission systems have been constructed in the United States during the past fifty years. 1/ They pass, largely unseen, beneath the ground, with a safety, efficiency and environmental record unmatched by any other form of transportation. During those many years of experience in pipeline construction, methods have been developed to avoid or effectively mitigate any undesirable impacts. To illustrate the minimal nature of the physical impact of a pipeline, it is necessary only to look at a map of the hundreds of thousands of miles of natural gas and other pipelines which honeycomb this country, and at the same time consider that the ordinary citizen is normally wholly unaware of their physical existence, although he should be manifestly aware that he can heat his home, cook his food, in many instances obtain employment, and enjoy a myriad of benefits because of their existence and operation.

Section C of Volume I of the DEIS sets forth, in subsection c thereof, predictions as to the impact of the El Paso system in Alaska. Its placement immediately after the predicted impact of the Arctic Gas Project may lead one to conclude that the two projects should be compared on the basis of the information contained in the DEIS at those pages. However, the DEIS treatment of the competing systems is seriously lacking in balance. The document attempts no independent evaluation of Arctic Gas' environmental effect, but purports to summarize "the more significant impacts of the Arctic Gas System pipeline" as described by the DOI-DEIS. On the other hand, it presents its own assessment of the impact which would result from El Paso's proposal. The following are representative of the anomolous results of this methodology:

1/ There were approximately 263,000 miles of natural gas transmission pipeline constructed in the United States as of December 31, 1974. There were an additional 67,000 miles of natural gas gathering and field lines and approximately 646,000 miles of distribution lines (American Gas Association 1974 Gas Facts, p. 50).

(1) Ice fog: The Arctic Gas proposal is described as emitting water vapor at compressor sites which "would affect the climate immediately adjacent to each compressor station in the Arctic areas" and would result in ice fog. On the other hand, a purported advantage of a Fairbanks corridor is the encouragement of industrial growth in the Tanana Valley, yet the statement is made (Vol. II, p. II-253) that "construction of the pipeline should have no effect on the climatology of the region", even though the same paragraph recognizes that even now "ice fogs are quite common in the Fairbanks area". No mention is made of added industrial vapor emissions. In the one case (Arctic Gas) the result is presumably adverse, even though there is no human habitation which would be affected by ice fog; in Fairbanks, it is "insignificant" even though it is near the area covered by Alaska's second largest city. Moreover, no mention is made of the fact that the microclimatological favorability for ice fog formation is far greater in the Fairbanks area than on the North Slope. In fact, ice fog is not a significant factor. See Appendix C, Arctic Gas Comments on DOI-DEIS, Part II, Alaska.

(2) Topography: It is claimed that the Arctic Gas Project "would change the character of the terrain in certain local instances, modifying its contours and dimensions" (Vol. I, p. I-208) whereas "Topographic impacts of the proposed [El Paso] pipeline would be primarily confined to the vicinity of the pipeline" (Vol. II, p. II-253). This is a juxtaposition of relative impact in view of the fact that Arctic Gas will utilize the flat coastal plain while both El Paso and the Fairbanks Corridor traverse severe mountain terrain.

(3) Landslides: Landslides are cited as the potential cause of immediate danger and/or loss of life or future pipeline rupture on the Arctic Gas route (Vol. I, p. I-209) but were apparently deemed not worthy of mention by the FPC Staff, relative to the Brooks or Alaska Ranges and areas of high seismic risk.

These examples of inconsistency could be extended considerably but they serve to demonstrate that broad acceptance of DOI's summary findings, without regard to mitigating measures, cannot be utilized as a basis for comparison of the environmental impact of the two systems.

Arctic Gas believes that it has demonstrated in its application materials and evidence that a pipeline can be constructed in Arctic and sub-Arctic areas with engineering integrity and minimum environmental impact, provided sufficient site specific work is undertaken to construct, operate and maintain such pipeline. To the extent that the DEIS attacks this concept in Volume II, Arctic Gas strongly disagrees. However, Arctic Gas would point out that it has undertaken over seven years of study, including five years of site specific study, and that the El Paso Project, which has been studied to a much lesser degree and for a much less period, has undertaken substantially less field work. Whereas Arctic Gas could promptly proceed to construct its pipeline on the basis of the information it has gathered, El Paso Alaska Company ("El Paso") would still be required to undertake substantial detailed field work (see cross-examination of Messrs. McCollom, Murphy and Craig in Volumes 59 through 64 of the transcript in El Paso Alaska Co., et al., Docket Nos. CP75-96, et al.) before it could proceed to construction. El Paso and the DEIS frankly admit this in several places, see, e.g., pp. II-274, 279, 286 and 290.

In any event, it should be clearly understood that the El Paso proposal is not truly an alternative to the Arctic Gas Project, since it would not transport Canadian gas, as well as Alaskan gas. It must also be recognized that the liquefaction-tanker system suffers from the following defects, among others: (1) Even a cursory analysis of the cost of transportation service to be rendered by the two projects demonstrates that the Arctic Gas Project is far less costly to the American consumer than is the El Paso Project; (2) Since the Arctic Gas Project involves the Canadian Mackenzie Valley gas reserves, the Arctic Gas Project will permit the prompt development and delivery of those reserves to markets in Southern Canada. This, in turn, will help maintain higher levels of Canadian exports of gas to the United States than would otherwise be the case: this is extremely important, and required by the national interest at this time of critical energy shortage. A Canadian-only line could not be built in time to achieve this advantage when needed; (3) The Arctic Gas Project will use substantially lesser volumes of fuel than the El Paso Project, in delivering gas to market - an important conservation and environmental consideration; (4) The Arctic Gas Project is the most environmentally sound method for the transportation of the gas and provides significantly greater reliability and security of service than the El Paso Project; and (5) As noted above, the Arctic Gas Project can be placed in operation sooner than the El Paso Project. If the Staff proposes to draw a conclusion in the DEIS as to its preference for either system, these facts should be taken into account: they clearly demonstrate the superiority of the Arctic Gas proposal.

Finally, Arctic Gas submits that the DEIS is particularly deficient in that it does not emphasize the critical necessity for prompt delivery of the Arctic Gas supplies to market, or the critical role that Alaskan gas will play in fulfilling energy, environmental and economic requirements of the United States. This deficiency is inconsistent with both the comprehensive market showing of the applicants of the Arctic Gas Project, as well as the facts available to, and enunciated by, the Commission in numerous proceedings. There is no doubt that the United States is presently faced with a critical gas supply shortage which will continue for the foreseeable future, and the Arctic Gas Project is the biggest single step that can be taken to alleviate it. Therefore, it is important to place any consideration of the environmental impact of the Arctic Gas Project in perspective to the substantial benefits it will bring to residential, commercial and high priority industrial consumers in a very large part of the United States. The essential point that must be recognized from the outset is that, even if all presently projected natural gas supplies from whatever source are in fact available from the inception of this project, all such supplies will be required just to meet residential, commercial and high priority industrial requirements. Even in that eventuality, there will be a substantial shortfall. For example, based upon Commission estimates, just to make up the projected decline to 1985 in natural gas production in the lower 48 states, it would require over ten projects of the magnitude here proposed, or approximately 100 standard sized coal gasification plants.

Without this project, the United States faces annual losses of many billions of dollars in Gross National Product and hundreds of thousands of jobs with the attendant human suffering resulting therefrom. But the unemployed will not be the only ones affected. Residential consumers also would be curtailed in many areas and forced to bear the economic burden of conversion to other forms of energy, assuming other forms of energy are available and environmentally acceptable. Even then, that course would have a serious adverse impact on the total energy picture and unnecessarily increase dependence on foreign oil.

In these circumstances, the critical importance of making the vast supplies of Arctic gas available to the markets in the lower 48 of the United States badly in need of such supplies must be emphasized in the Commission Staff's Final EIS.

Detailed comments on the Commission Staff's DEIS are set forth in the following portions of this document:

DETAILED COMMENTS

Section A - General

Introduction, Pages I-1 through I-3

Page I-1

Statement: Reference in second paragraph to "Arctic Gas System application" being filed by six companies, and to a seventh Canadian pipeline company.

Response:

The reference may be misleading. The applications filed with the FPC for the major parts of the Arctic Gas Project are four: by Alaskan Arctic, Northern Border, Interstate Transmission Associates (Alaska), and Pacific Gas Transmission Company. In addition, Canadian Arctic has filed in Canada. This involves 17 sponsor companies: nine United States and eight Canadian. All sponsor Alaskan and Canadian Arctic and some sponsor the other parts. Some also will have relatively minor facilities in the United States on their own systems (individual companies in Canada will also need facilities).

The United States member companies who sponsor these Projects are gas pipeline and distribution companies serving areas from coast to coast: California, the Pacific Northwest and Mountain States, the Midwestern areas, Eastern, including Appalachian areas, and New England.

Pages I-3 through I-17

Statement: "Parts of the U.S. Department of the Interior's Draft Environmental Impact Statement Accepted by the Federal Power Commission Staff"

Response:

These pages relate to the DOI-DEIS, which has been discussed generally above. Included are the comments which the FPC Staff filed in letter form, relative to the DOI-DEIS. As noted earlier, such comments do not incorporate nearly all of the constructive criticism and changes which is required relative to the DOI-DEIS. (See the voluminous comments filed by the members of the Arctic Gas Project, incorporated in these comments and filed as a part thereof.) Some specific comments on the comments which have been made by the FPC Staff follow. An attempt is made not to duplicate comments by other Arctic Gas Project members.

Page I-5

Statement: "a)"

Response:

Part of the difference between estimates of reserves in Prudhoe Bay (Sadlerochet Reservoir) involves whether it is recoverable or in place reserves. The DeGolyer and McNaughton estimate is recoverable reserves.

Pages I-5 and I-6

Statement: "b)"

Response:

The reference to the confidentiality of information relative to Mackenzie Delta Canadian reserves has been made outmoded by the evidence presented on the record by the Witness Olson, on behalf of Arctic Gas.

Pages I-6

Statement: "c) Beginning on page II-81 ... construction schedule ..."

Response:

Witnesses for Arctic Gas have now noted that it is now almost certain that the 1979-80 completion dates for the system cannot be maintained.

Page I-7

Statement: "h) In order to reduce the potential for significant environmental impacts associated with testing the pipeline with a methanol-water solution, as cited on pages II-669 and 699, such as differential settling of the pipeline and spillages of methanol. . ."

Response:

The DEIS refers to differential settling of the pipeline during testing with a water methanol solution, and use this to substantiate a recommendation that compressed air be used to test the pipeline. There will be no differential settlement in frozen soils

during hydrostatic testing. The reference to differential settlement, contained in the Arctic Gas application, has been taken out of context by both DOI and FPC. The only place where settlement during testing will be significant is in relatively deep deposits of unfrozen peat. No such deposits are found along the Arctic Coast or along the Interior alternative route. The pipeline in Alaska traverses no compressible unfrozen soils, therefore, differential settlement cannot be used to justify testing with compressed air.

Page I-7

Statement: ". . .compressed air be used to test the pipeline."

Response:

Arctic Gas presently plans hydrostatic testing with a water-methanol solution, rather than with air or gas, because it is felt that hydrostatic testing will permit a greater degree of detection of possible pipeline defects. Arctic Gas is aware of the potential consequences of a spill of a water-methanol solution, and has done considerable research in this area. As a result, Arctic Gas is confident that the possibility of a spill will almost be eliminated, and that if a spill should occur, the consequences would be local and short-term.

One of the more comprehensive studies of hydrostatic testing was done for the Pipeline Research Committee of the American Gas Association by the Battelle Memorial Institute of Columbus, Ohio. The research was started in 1964 and was fully documented in the report "Study of the Feasibility of Basing Natural Gas Pipeline Operating Pressure on Hydrostatic Test Pressure", American Gas Association, New York, New York, February 1968, submitted herewith.

The main disadvantage of an air test is that Title 49, part 192.503 limits the hoop stress during an air test to 80% of the pipe's SMYS (specified minimum yield strength) whereas Arctic Gas proposes to hydrostatically test to 100% of the SMYS. As pointed out in the AGA report, "the principal value of the high-pressure test is its ability to remove defects. After a successful hydrostatic test to high pressures, the line is free of defects that are injurious at operating pressures". It is also pointed out that any defects which do survive the hydrostatic test are stress-relieved, and the subsequent failure stress of defects is equal to or greater than the stress induced under hydrostatic test.

It has been argued that yield testing of pipelines can be detrimental. However, the AGA study concluded that "a hydrostatic test to actual yield does not do damage to a line but is, in fact, beneficial".

Measurements taken after hydrostatically testing to yield indicated that there was minor yielding, and that mechanical property changes due to yielding were negligible.

During the AGA study, the authors of the final report presented a paper in May 1966 to the AGA Transmission Conference in Dallas. In the paper the authors presented data from a large number of hydrostatic test records. For the tests studied, approximately 77% of all test failures occurred at test pressures in excess of 80% of the SMYS, and 55% occurred in excess of the 90% SMYS mill test pressure. An air test to 80% of SMYS would clearly minimize the changes of locating these defects during the test.

Arctic Gas' measures are also planned which will effectively reduce the possibility of a rupture under test at points where none should be expected. Arctic Gas has specified an unusually stringent 100% hydrostatic mill test pressure, as well as several other non-destructive tests, which should ensure that the pipe leaving the mill is free of any defects which would result in a rupture under test. In addition, radiographic examination is proposed for all field welds, and the use of an instrumented internal inspection device (pig) is proposed to detect any construction damage (wrinkles or dents) which may cause a failure under test.

In the unlikely event of a spill, the spill will be self limiting due to the fact that the freezing point of the solution would be close to the ground temperature at pipeline depth. Because ambient air temperatures are colder than the ground temperature during the winter construction season, the solution will tend to freeze and contain itself. The presence of any snow will further increase the tendency to freeze by diluting the solution and raising its freezing point.

The performance of TransCanada PipeLines, Ltd., is indicative of current capabilities. That company has not had a rupture in approximately 1,000 miles of big inch pipeline the last six years utilizing hydrostatic testing. Because of the stringent manufacturing and construction specifications as well as field inspection prior to test, Arctic Gas is confident that TransCanada's record can be exceeded.

Page I-7

Statement: i) "The statement, "There appears to be sufficient data now available which indicates substantial problems with the use of low-carbon X-70 steel at low ambient temperature", on page II-981, should be supported by specific information and with references of where these data are available. If such information is not available, this statement should be deleted."

Response:

Arctic Gas agrees with the comments of the FPC Staff on the DOI DEIS as reflected above. However, Arctic Gas has shown in its "Criticism of Aerospace Corporation Report, Chapter 1.1.1.3.A.1, et seq", page 13, item 3 (submitted herewith), that there are not "substantial problems" with the use of low-carbon X-70 steel pipe at low ambient temperatures, and no such valid support for the above-quoted allegation is available.

Page I-13

Response:

The agreement between Natural Gas Pipeline Company of America and Exxon Company, U.S.A., noted at this page, has been cancelled and one half of the gas there involved has been made the subject of agreement with Northern Natural Gas Company

Page I-14

Statement: "As far as speculative reserves are concerned . . ."

Response:

In light of the huge potential reserves involved on the North Slope of Alaska and the likelihood of only one transportation system being feasible, it is submitted that not allowing "speculative" (presumably potential) reserves to have an effect upon choice line size is not desirable here.

Page I-17

Statement: "c)"

Response:

Reference is made in point c to the FPC Staff proposed alternatives of stopping the Northern Border line near Chicago and eliminating the western "legs" of that system, in combination with "displacement, reverse flow and modest additions of new facilities", and it is stated that such system should be considered in the Final DOI EIS. In fact, an infinite number of such exchange, etc., combinations can be conceived of, and to cover all explicitly would place an unmanageable task upon the agency preparing an EIS.

The DOI-DEIS is adequate to allow evaluation of what environmental impacts would be eliminated by eliminating portions of the proposed Arctic Gas system. If others conceive of specific exchanges, etc., which might be substituted for portions of the proposed system, such parties must show the environmental advantage of such proposal. As discussed in more detail earlier, and in later sections of these comments, that showing has not been made in the FPC Staff DEIS relative to the subject "alternatives".

Pages I-18 through I-26

Statement: "Northern Border Pipeline Company's System Modification"

Response:

The description at these pages are subject to the comments above relative to the Natural Gas Pipeline-Exxon Agreement, and to the fact that a Northwest Pipeline Company system company has executed an agreement with one of the "all others" producers (Chevron) relative to some of the volumes shown.

The Interstate Transmission Associates (Arctic) filing referred to at page I-23, has now been made.

Pages I-27 and I-28

Statement: "No consideration" is given to the "rate of inflation" induced by construction of the various alternative natural gas pipeline routes.

Response:

The proposed Arctic Gas route will cause less inflation than any of the other alternative routes.

Page I-29

Statement: Net economic benefits to the United States under a "base case" and under an "optimistic case" are greater for Arctic Gas than for El Paso. (The pessimistic case is "unlikely".)

Response:

This conclusion comes from the U.S. DOI's Alaskan Natural Gas Transportation Systems: Economic and Risk Analysis, prepared by the Aerospace Corporation. This conclusion is mentioned briefly on page I-29, but is ignored thereafter. The conclusion is at odds with much of the subsequent part of the FPC DEIS. The computation of net economic benefits is based on an Arctic Gas system without any West Coast pipelines and without any extension of the Northern Border line to Delmont, Pennsylvania.

Section B - Economic Analysis

Subsection 1. Analysis of Net National Economic Benefits, Pages I-27 through I-39

This section of the DEIS consists of references to and adoption of a preliminary study prepared for Department of the Interior consideration, a brief summary of that study and some comments on it. The fact that such study has been superseded has been discussed in the introduction to these comments, where the DOI "net economic benefit" analysis is discussed generally.

By adoption of such study, the DEIS has been expanded in scope beyond all normal limits, and has apparently "adopted" all of the methodological deficiencies of such study.

As indicated in the introduction to thse comments, it is appropriate that the Final EIS of the FPC Staff not adopt any DOI staff or consultant "net economic benefit" study.

Arctic Gas has not yet completed its analysis of the "final" DOI staff study. Its methodology is complex and it is based upon relative system cost calculations for systems not proposed by the Applicants. Preliminary analysis indicates the final DOI staff study is substantially changed, but not necessarily improved overall, from the preliminary report adopted by the DEIS here. Some illustrative examples of such changes are:

A. The base cost and engineering figures for some systems studied have been changed. This has been done in a multiplicity of ways and places, so as to totally change the results and computations;

B. Gas volume assumptions have been changed;

C. A partial effort to include previously ignored displacement costs has been made;

D. The problems and possible impossibility of displacement is now mentioned to some extent;

E. The advantage of a pipeline system across Canada in maximizing gas exports from Canada is at least now mentioned;

F. New sections, prepared by other Cabinet Departments, are added relative to foreign relations, financing, security, etc.

We agree that the evaluation of net economic benefits is an ongoing enterprise and that there is considerable uncertainty and scope for disagreement regarding some factual matters. The environmental staff's response to the North Alaskan Arctic Gas Pipeline Company's comments will be found in the body of the revised text for "Analysis of National Economic Benefits." The response will be given only to Comments 8 and 11 here.

As noted earlier, although the "final" DOI staff study continues to find the Arctic Gas Project superior on the bulk of the bases studied, and by a greater margin than the earlier study, generally the margin of superiority is understated and the methodology faulty in many respects.

The reasons why neither the preliminary nor final DOI staff "net economic benefit" study should be incorporated in the FPC Staff Final EIS are clear from the foregoing. However, some examples of significant errors and deficiencies are presented below for review. In addition, there is attached as an appendix, a group of documents furnished to the Department of Interior relative to the adopted "preliminary study" which show some of its deficiencies (the first document therein is an August 19, 1975, letter to the Honorable Dale K. Frizzell, Acting Secretary of the Interior).

(1) The DOI staff study has not correctly calculated the cost of the two systems studied. The liquefaction-tanker system costs are understated (both capital and operating) while the all pipeline costs are overstated. This problem affects the entire study, of course, since such costs are the basis of all calculations;

(2) The problems and costs of displacement-exchange of gas are wholly disregarded. Accordingly, the study does not relate to systems which can get Alaskan gas to the markets which need and have contracted for it;

(3) As indicated earlier, no recognition is given to the gas supply advantages of a pipeline through Canada, carrying Canadian frontier gas.

An important benefit of the Arctic Gas Project is the fact that frontier Canadian reserves will be made available to Canadian markets or for export or a combination of both. In either eventuality, the level of gas supplies available for existing or additional imports from Canada will be substantially increased. Since the Alaska LNG system would mean that Canada would have to wait for frontier reserves until it could justify its own line, construction of the Arctic Gas system would have very substantial additional benefits, especially in the early years of the project. (The new DOI study - not incorporated in the DEIS - speculates as to the potential increase in benefits in dollar terms, but leaves it out of "net economic benefit" comparisons, again creating an erroneous impression.);

(4) Energy usage figures are incorrect for the systems involved;

(5) Time required for construction of the systems involved are not correctly computed;

(6) Expansion advantages of an all-land pipeline are ignored. It should be recognized that the Arctic Gas proposal (conventional natural gas pipeline system) is so located as to traverse the potential sources of gas supply along the Arctic Coast and may be readily expanded to obtain such supplies. El Paso, on the other hand, would not have this flexibility, nor is a liquefaction-tanker system able to tailor expansion to supply as precisely, easily or quickly, or with as much economy;

(7) No recognition is given to either the costs to governments of alternative projects (especially if the technique of omitting U.S. taxes as a cost is to be used), or the effect of induced exports to Canada and reduced imports as a result of the Arctic Gas Project;

(8) No recognition is given in the basic analysis to the effect upon gas consumers, as consumers;

The effect upon gas consumers, as consumers, and as perceived by consumers, is analyzed in a standard fashion.

(9) Canadian frontier gas supply, even for Canada, is grossly understated, which totally twists the study results;

(10) The original DOI study adopted by Staff treated all Canadian taxes as a cost, while no U.S. taxes were so treated, thereby ignoring effect on consumers. The technique also overlooks important factors such as international trade, income redistributions, and resulting benefits to U.S. citizens and firms in Canada. The DEIS nonetheless adopts the original DOI approach, albeit with some reservation (see p. I-37). In the later DOI Staff papers, while the general approach to U.S. and Canadian taxes was retained, some modifications were made, including an allowance for taxes flowing to the U.S. Government as a result of increased Canadian purchases of U.S. goods. As a result, the cost of Canadian taxes is significantly lower in the DOI report to Congress, i.e., $464 million vs. $842 million in the study adopted by Staff. The adjustment did not overcome the full deficiency, however, and does not overcome the basic error of failure to include U.S. taxes as a true cost, and other deficiencies of the "net economic benefit" method, as compared to a cost of service approach;

(11) The DOI staff study is based on measuring both total gas demand and Alaskan gas demand on the basis of "incremental" rather than "rolled-in" pricing. This is unrealistic since it fails to consider that consumer demand is based on the price paid at the burner tip and consumers make no distinction as to source of supply. The Staff apparently recognizes this in its comment on page I-37;

Comment 11 is based upon a misapprehension. Benefits to consumers are measured at market clearing prices for all gas in markets that are assumed competitive. Measuring benefits on the basis of rolled-in pricing in regulated markets will attribute to Alaskan gas some of the benefits that, in fact, flow from a price for existing supplies that is below the market clearing price.

(12) The DOI study calculates the value of energy independence on the premise that increased gas supplies will allow the reduction of oil stockpiles and that consumers would benefit in an amount equal to the value of the freed oil. This benefit is understated to the extent that it does not take into consideration the reduction in other costs resulting from the increased gas flow, i.e., the construction and maintenance costs for such an oil stockpile. The recent DOI study submitted to Congress does in fact recognize this additional benefit to some extent and estimates that the value of the oil storage facilities saved is $1.20 for each 6 Mcf of new natural gas supplied from Alaska (see p. 115);

(13) The study does not take into account cost of interruption, i.e., reliability of the two systems from the standpoint of vulnerability to natural catastrophes or from a national defense standpoint. Thus, the defined net economic benefit does not reflect the relative potential costs arising from the interruption of the gas supply from Alaska which may arise. Of critical importance, of course, is the fact that the possibility of a lengthy interruption in deliveries (three months or longer) is much greater for El Paso's system than for that of Arctic Gas. While rupture of a pipeline or mechanical failure of a pipeline compressor would affect both proposed systems equally, the Arctic Gas system does not include any single item critical to the entire transportation system which would require significant time to repair or replace as does the El Paso system. Recall, for example, that on page II-374 the DEIS states: "if a seismic wave of high magnitude is generated in or near Prince William Sound, the likelihood is that the marine terminal facilities as well as a ship berthed at the terminal would be destroyed." And on the previous page it is stated "it is not unlikely that an 8.5 magnitude event at an epicentral distance of some 20 miles would occur during the lifetime of the project" -- most likely resulting in "a seismic wave of high magnitude". How does one measure the cost of a three-month to two-year interruption of gas supply from Alaska? Should not the relative probability of such an interruption occurring in each of the two systems affect the calculated NEB?

Conclusory Comments

The above discussion, and that in the introduction to these comments, while making no attempt to be a full critique, are sufficient to show why neither the preliminary nor final "net economic benefit" study should be incorporated into the Final EIS. Many of the subjects in such studies are appropriate for the general hearings in these Commission proceedings, and have been and will be covered there. But if one or more of those studies

are to be utilized, it should be by sponsorship of responsible witnesses on behalf of a party, subject to cross-examination and rebuttal, and they are not appropriate for an EIS.

Comments Relative to Pages I-27 through I-39 of DEIS

Page I-27

Statement: "3. A description of the differential allocation of the benefits of supplying and consuming the gas."

Response:

Alaskan Arctic does not understand what is meant by this third criterion for assessing the alternative supply systems. It needs clarification. Moreover, there are a number of additional criteria which, while they generally could by considered to fall within the framework of environmental impact (criterion 2), are sufficiently important to be considered separately, e.g., reliability of the alternative transportation systems, vulnerability to natural catastrophes, vulnerability from a national defense standpoint, the net quantum of energy available via either system, etc.

Page I-28

Statement: See beginning of page I-28.

Response:

At the top of Page I-28 it is stated that the effects of inflation have been disregarded in determining the net economic benefit. A major impact which will arise from choosing either the El Paso system or the Arctic Gas system is that of the long-term cost of the gas. Inasmuch as El Paso's system has higher operating costs than the Arctic Gas system, the ultimate price of gas during the later part of the project life will be less subject to escalation from the Arctic Gas system than using El Paso's, as well as having a lower transportation component from the beginning. The impact of these long-term lower gas prices for the consumer have not been considered in this DEIS.

Page I-29

Statement: Table.

Response:

The tabulation on page I-29 summarizes the results of the study, which substantially understates the benefits and margin of benefit of the Arctic Gas Project. Such results have been superseded.

Page I-30

Statement: "Description of Alaskan Natural Gas Transportation Systems Studied"

Response:

The hypothetical nature of the systems studied, and the unrealistically low level of Canadian gas deliveries, are set forth on this page.

Page I-31

Statement: "Two categories of benefits were estimated: The first is the value of Alaskan gas to lower 48 consumers. The value is measured by the maximum price that consumers would be willing to pay for gas rather than to do without or turn to other sources of energy . . ."

Response:

The above statement tends to suggest a definitive cross elasticity of demand between all types of energy utilized by consumers. It should be pointed out that substitution elasticity from one form of energy to another, due to price differential, is unlikely to take place by many customers, including residential customers inasmuch as it takes a minimum of several thousand dollars to switch over to another fuel, assuming other fuels are available.

Page I-32

Statement: "Consequently, taxes paid to foreign governments are included as a cost but U.S. taxes are not."

Response:

The report wrongly omits U.S. taxes (including corporate income taxes and property taxes) as a cost, as discussed above and in the appendix.

In the calculation of Net National Economic Benefits, Canadian taxes are treated as a cost while U.S. taxes are not. The DOI rationale for this treatment is that taxes paid to the United States will eventually be used to provide goods and services for the citizens of this country. Canadian taxes, they

contend, are lost from a national standpoint. That is, U.S. dollars flow to the Canadian Government and are used to provide goods and services to a foreign country.

The above logic, as noted earlier, ignores the fact that U.S. taxes are a real cost to consumers. If, however, they were to be omitted, then the treatment of Canadian taxes is incorrect. First, a number of benefits which would accrue to U.S. citizens and firms as a result of Canadian tax payments are ignored in the DOI treatment. For example, the pipeline system carrying U.S. gas and the U.S. citizens working on the pipeline would receive services, including those of the Canadian police, fire departments, etc. In short, Canadian payments would entitle the Alaska-Canada System to obtain certain benefits from the Canadian Government just as U.S. taxes would entitle the LNG System to obtain certain beneifts from the U.S. Government (Coast Guart protection, fire protection at LNG facilities, etc.). The Canadian Government will have to pay for these services just as the U.S. Government would.

Whether in the U.S. or Canada, certain benefits flow in that country at a cost to that country's government. Benefits would accrue not only to the pipeline system and system employees, but also to other U.S. citizens and this nation as a whole. There is a substantial interrelationship between the United States and Canada, with significant economic, geographic, and political ties. The payment of Canadian taxes may result in construction of roads, state parks, or airports. Such facilities would be used and enjoyed by numerous U.S. citizens and firms. Further, increased payments by the pipeline system may cause a decrease in taxes on other U.S. firms in Canada (this possibility is recognized by DOI from the standpoint of the LNG System possibly lowering other U.S. taxes). Also, Canadian tax payments will stimulate the Canadian economy. This stimulation would result in increased purchases of U.S. goods and services, thereby generating economic activity and employment in this country. Substantial tax payments could also cause a revaluation of the Canadian dollar, thereby making U.S. goods more attractive in the U.S.-Canadian market.

In short, to purport that all taxes paid to U.S. authorities entail no costs, while all taxes paid to Canada entail no benefits, is a gross oversimplification. From the standpoint of comparing the two transportation systems, the results are most misleading.

Page I-32

Statement: In the last paragraph it is stated that the cost of producing gas will not differ according to the transportation system.

Response:

This is true as to gross cost, but the Arctic Gas Project will have a lower production cost per unit of gas delivered to the market place, since its more efficient system uses less gas and thus delivers more to the markets.

Page I-33

Statement: "a. Base Case"

Response:

The references on this page to Mackenzie Delta deliveries of 1 Bcf/d and to the assumption that 75% of the Canadian facilities are attributed in the study to the United States gas, is another indication of the adverse effects of the inaccurate underestimate of Canadian gas available.

Page I-33

Statement: Second paragraph.

Response:

On page I-33, the second paragraph states that each year's delay in the beginning of construction will reduce the net economic benefits by about 10%. The methodology used to obtain that is not made clear.

Page I-34

Statement: "b. Optimistic Case"

Response:

The discussion of the "optomistic case" shows that the DOI staff study understates the benefits of inexpensive expansibility of the all pipeline system, while purporting to recognize the advantage to that system from this factor.

Pages I-35 and I-36

Statement: "c. Pessimistic Case"

Response:

The unrealistic nature of the assumptions underlying the "pessimistic case" -- 100% increase in northern costs, huge increase in Canadian taxes only and even further increase (to 85%) of the pipeline capacity used by U.S. gas - is made clear on these pages.

Pages I-36 through I-39

Response:

On these pages, the DEIS authors state substantial dissatisfaction with the methods and factors of the DOI staff preliminary study. Those objections, plus others described hereinabove, however, should lead to the conclusion that the preliminary "Net Economic Benefit" study should not be adopted.

Particularly significant are comments relative to the handling of Canadian taxes on page I-37.

Section B

Subsection 2. Projected Socio-Economic Impacts of End-Use in Lower 48 States, Pages I-40 through I-64

This section of the DEIS is the principal place where the failure to emphasize the importance of northern Alaskan gas to the nation is evident, as has been noted in the "General Comments" section, above. The thesis of the lack of importance of the Alaskan gas, and thus of the subject transportation projects to carry that gas, is set forth on page I-40. The "socio-economic impacts" are said to be "marginal", because it is assumed the economy will recycle consumer expenditures in some way, and it is assumed there is fully available alternative energy, at similar cost, and very broad demand elasticity and convertibility between forms of energy. This is the importance of the fact that, as stated at page I-41, "It is assumed throughout this analysis that the issue of energy availability is one of price, rather than of quantity."

Accordingly, in one short subsection, the largest (measured in dollars and volume) certificate case ever before the Federal Power Commission is dismissed as of "marginal" effect, even though it constitutes the largest single step that can be taken in the domestic energy supply efforts. The importance of micro-economic analysis is brushed aside by assumptions and overall conclusions of economy-wide achievement of ultimate equilibrium, and the goals of even moving toward greater national energy independence are either pronounced to be unimportant, or easily achievable (it is impossible to tell which). This is not only inconsistent with findings of other governmental agencies, but also those of the Commission itself.

In short, this section suffers from insufficient analysis and support and should be deleted or greatly amended in the Final EIS. In detail:

Pages I-40 and I-41

Statement: "The volume of gas . . . will constitute from 4% to 7% of U.S. consumption . . ."

Response:

The reference to a gas supply increment of 4% to 7% of U.S. consumption as of marginal effect is not supported. It rests wholly on an analysis in terms of "economic aggregates", and ignores specific changes and burdens produced in identifiable sectors of the economy. A 4% to 7% gas shortfall is of major importance. This is particularly true since there is not, as seems to be the assumption at the end of the third paragraph, full ability of users to switch to alternate energy. Those passages also implicitly assume the continued, uninterrupted availability of other energy, with no discussion of either physical or geo-political factors in this regard. This overlooking of that key factor continues in the pages I-41 and I-42 discussion of "National Energy Availability."

The page I-40 discussion also sets out the preoccupation with gross aggregate effects (in which any single project, enterprise or other economic step would be dwarfed) and the characterization of only drastic (movement of affected industries from the West Coast to East Coast) actions and results as significant.

Finally, in the last paragraph of page I-40, it is implicitly assumed that only industrial users of natural gas will be affected by gas supply shortages, which thus limits the analysis at pages I-45, et seq. to the industrial sector. There is no support given for this assumption, and this is particulary inappropriate in view of the fact that Arctic Gas Project witnesses have demonstrated the contrary on the record in these proceedings.

Page I-42

Statement: ". . . it has been widely agreed that fuel consumption is price elastic . . ."

Response:

Those sources which are "widely agreed that fuel consumption is price elastic", and the location and extent of such demand elasticity is not stated. No indication of its seeming inconsistency with the Commission's National Gas Survey analysis is given.

Further, no support is indicated for the assumption that "the national choices expressed in our environmental legislation will reduce "total energy use" by "25% to 35% from the levels projected prior to 1973", nor is it indicated which pre-1973 projections are referred to.

Pages I-43 and I-44

Statement: Sub-sections III, IV and V

Response:

Subsections III, IV and V seem to be highly summarized and theoretical remarks relative to the national and regional effects of "environmental costs", including requirements for less polluting processes or substances. The relevance of such discussion to the subject DEIS is not apparent, nor is it explained. Unless it can be shown, the discussion should be omitted in the Final EIS.

Pages I-44 through I-64

Statement:

Response:

These 20 pages consist of a discussion of a computer model devised by the "FPC Office of Energy Systems", which appears to have been developed to analyze "the extent to which higher fuel prices and conservation might cause changes in the patterns of fuel use and economic growth," nationally and regionally. Confining effect to industrial use the model was apparently used to try to calculate the effect on economic growth factors by industry groupings, nationally and regionally, as a result of availability of northern Alaskan gas.

Arctic Gas has not had access to the model program, nor does the subject seem sufficiently relevant to justify the expense of analysis of it. Thus, only limited comments seem feasible and justified.

First, the unsupported and highly dubious assumptions of great demand elasticity, free interchangability of energy forms by users, unlimited availability of some usable form of energy to all users and the sole importance of aggregate analysis - national, regional, state, industry groups - permeate the model, apparently, limiting its use.

Second, the volume and pricing assumptions made as input to the model are of importance, and are not justified. Only initial flow volumes are used from northern Alaska.

Third, it is stated that a 20-state analysis is made by the model relative to the Arctic Gas Project (the states do not seem to be given). In fact, the Arctic Gas Project is presently planned to deliver gas to more than 20 states, from coast to coast, and will serve even more when northern Alaskan volumes increase as a result of new drilling.

Finally, and perhaps most important, the purpose and thrust of setting forth the model runs results in the DEIS is not apparent.

It is unclear whether an effort is being made to show relative unimportance of an increasing energy, and especially natural gas, supply to the Nation. (Arctic Gas notes the conclusion, at page I-51 and Tables I.B.2-7 (p. I-58) and I.B.2-13 (p. I-64) that the "total Earnings" from the Arctic Gas Project would be about two and one-half times larger than for the El Paso Project but fears the effects are understated.) If the thesis of unimportance of energy supply is being put forward by the staff, it should be done more explicitly.

In any event, if the analysis of pages I-40 through I-64 is to be included in the Final FPC Staff EIS, and thus presumably placed on the record, Staff will have taken the burden of presenting witnesses competent to defend and demonstrate the accuracy of the model and allied analysis, the reasons why presented and the relevance to these proceedings. Such a burden would not seem worth taking.

Section B

Subsection 3. Projected Socio-Economic Impacts in State of Alaska, Pages I-65 through I-196

The central feature of these pages, relative to the Arctic Gas Project, is that these pages cannot reasonably be read to provide rational and sufficient support for the later recommendation in the DEIS that the Arctic Gas Project utilize the "Fairbanks Route".

There is considerable concentration in the DEIS on the conclusion that the State of Alaska will take its royalty gas in kind, for use within the State. The concept that Alaska has a market for such quantities of gas has not been and cannot be supported, and the concept that such demand will grow in the foreseeable future is gross and unsupportable speculation. In addition, pages I-154 through I-156 of the DEIS show that northern Alaska gas would not be competitive in Alaska with south Alaskan gas, except in Fairbanks, and all such comparisons and conclusions are skewed (and the Fairbanks conclusion switched) by the unrealistic assumption that there will be a 15 cents per Mcf higher wellhead price for southern Alaska gas than for northern Alaska gas and by omission or understatement of transmission, branchline and distribution costs. Finally, the DEIS, as discussed earlier, adopts the "Aerospace Corporation Report" (DEIS page I-28), but that report assumes the State of Alaska will not take its gas in kind.

See new section entitled "Supplemental Analysis" in Volume I, Appendix C for a discussion of these issues. No final conclusion has been reached by the State of Alaska as to whether it will take its royalty gas in kind. (See direct testimony of Mr. Guy Martin cited in Volume 99 of the hearing transcript, Docket No. CP75-96 et al.)

Further, it is submitted that the DEIS understates the socio-economic effects on the State of Alaska which would be produced by use of the Fairbanks Corridor, or the "El Paso" or "El Paso Alternate" routes. It should be noted that the DOI-DEIS, which has been adopted and incorporated in the DEIS, stresses those impacts. In that regard, see particularly the comments below, relative to page I-165.

The environmental staff believes that the impacts of these three alternative routes have been fairly evaluated Since the environmental staff has done an independent analysis of socioeconomic impacts in Alaska, the USDI DEIS discussion of socioeconomic impacts in Alaska has not been adopted in this FEIS, except where specifically noted.

It is also submitted that the subject of the desirability of natural gas for use in Fairbanks is distorted by failure to discuss the oil refinery now under construction near Fairbanks, to utilize Alyeska transported oil. Costs of a gas distribution system also seem to be omitted and the costing methodology and assumptions are not clear.

See new section entitled "Supplemental Analysis" in Volume I, Appendix C for a discussion of these issues.

Specific comments on particular portions of pages I-65 through I-196 of the DEIS follow:

Page I-80

Statement: The DEIS states that in April, 1975, the occupancy rate in rental housing in Fairbanks "was said to be around 103%."

Response:

This statement details an adverse socio-economic impact caused by the Alyeska pipeline. The DEIS fails to state that similar negative socio-economic impacts would be caused by the El Paso project and by the Fairbanks alternative. Furthermore, the DOI-DEIS states that a substantial reassessment should be made of the socio-economic impacts caused by a gas pipeline carrying Prudhoe gas for use within Alaska. (DOI-DEIS, Part II, Volume 3, pp. 2265-2266).

The FPC-EIS discusses the impacts of both the El Paso proposal and the use of gas in Alaska.

Pages I-80 and I-81

Statement: The DEIS gives an example of rent increases in Fairbanks, and then states that the "largest percentage of increases was under 10%."

Response:

This statement is unclear and seems incorrect. Presumably, the DEIS means that the "median" rental increase was under 10%. In any event, in the example cited by the DEIS on page I-80, an apartment that rented for $375 in February, 1975, was renting for $500 in August. This is clearly an increase of 125/375 or 33% in only a six-month period.

This statement refers to the mode, not the median. The median, or average, increase was almost 50 percent; this includes extreme rent-gouging cases which skew the figures.

Pages I-93, 94

Statement: The DEIS states that "[r]ural communities have experienced special problems because of the [Alyeska] pipeline . . .", and then describes what these special problems have been (reduction in the pool of available labor, loss of community spirit, etc.). The DEIS also mentions the increased traffic and crime in Anchorage and Fairbanks caused by Alyeska.

Response:

In this, and other instances, it is clear that similar socio-economic impacts will be caused by the El Paso project and by the Fairbanks alternative, but not by the Arctic Gas Prime Route system.

The impacts of the El Paso system are discussed in the EIS.

Page I-96

Statement: The DEIS states that "much of the adjustment in the economy attendant to a major construction project has or will have already occurred [when gas pipeline construction begins]."

Response:

Even before the Alyeska project began, there were significant deficits in the supply of both public goods and of private goods. The Alyeska project has greatly exacerbated these deficits. By the time that gas pipeline construction begins, Alaska will be fortunate if it has "caught up" to and narrowed its service deficits to pre-Alyeska levels. The smaller Arctic Prime Route system would be of lesser affect.

The larger service base, smaller workforce, and the Alyeska construction period experienced should make the gas pipeline construction impacts relatively less than for Alyeska. The Arctic Prime Route should cause a smaller socioeconomic impact than the El Paso proposal.

Page I-110

Statement: The DEIS states that the "need for expansion [of local government budgets] because of Alyeska construction should have evaporated by the time the gas pipeline is started. In fact, the demand for many local government services may be falling at the time construction of the gas pipeline is expected."

Response:

First of all, the budgets of Cordova and Nikiski will not be significantly affected by Alyeska construction and, therefore, will not "be falling" at the time of gas pipeline construction. Moreover, the budgets of these towns will obviously have to be expanded greatly if the El Paso prime (Cordova) or alternate (Nikiski) route is built.

The environmental staff agrees.

Second, budgets in most towns and cities throughout Alaska will continue to expand after Alyeska construction is over. As explained previously, the Alyeska project has exacerbated an already existing public and private service deficit in Alaska. When Alyeska construction is over, Alaskan local governments will still be attempting to "catch up" to this service deficit and may be expanding their budgets accordingly.

Third, the flow of revenue that is expected with the completion of the oil pipeline will go to the state, not the communities. The state at that time will face the problem of developing a revenue sharing mechanism so that Alaska's local governments can pay for their expended capital improvements and services.

The environmental staff agrees.

Pages I-111 through 151

Statement: On pages 111 through 151, the DEIS describes and summarizes a document entitled, Impact on the Alaska Economy of Alternative Gas Pipelines, Institute of Social, Economic and Government Research, U. of Alaska, April, 1975 [hereinafter the "ISEGR Report"].

Response:

In general, the ISEGR Report is favorable for Arctic Gas. However, the DEIS' summary of the ISEGR Report does not satisfactorily describe why the ISEGR Report in fact is favorable.

Specifically, the ISEGR Report shows that:

(1) In the long run, Arctic Gas will increase real per capita personal income by $1.00 in 1990, while El Paso will actually cause a decrease of $0.20 in per capita personal income by 1990. (DEIS, p. 132);

(2) El Paso (but not Arctic Gas) will create another boom-and-bust cycle in Alaska. Arctic Gas and El Paso-induced increases in total personal income, wages and salaries, gross state product, employment, and population will peak in 1980 - the year of peak pipeline construction. Following 1980, Arctic Gas-induced declines in these five economic indicators will occur for only one or two years at most (until 1981 or 1982). Thereafter, Arctic Gas will cause all five of these economic indicators to grow steadily, and by 1990, the Arctic Gas-induced increases in these indicators will be significantly greater than the increases during the peak construction year of 1980.

There will be no boom-bust cycle induced by El Paso except in the south central region as noted on page I-128 of the DEIS. Arctic Gas definition of boom-bust focuses only on the El Paso induced part of the five variables whereas the staff's includes total per capita income comparisons and are shown in the FEIS.

It is true that the El Paso-induced increases in personal income, wages and salaries, GSP, employment, and population decline for a few years after construction before returning to an upward trend. However, the environmental staff would not term this a boom-bust cycle. For a boom-bust cycle to occur, total GSP, employment, etc. in the state would have to rise and then fall, and the MAP model does not show this occurring under either the Arctic Gas or El Paso proposals.

On the other hand, after 1980, El Paso-induced declines in personal income, wages, and salaries, gross state product, employment, and population will occur for four or five years (until 1984 or 1985). Thereafter, though all five economic indicators will increase steadily through 1990, the El Paso-induced increases in these indicators will be significantly smaller in 1990 than the increases during the peak construction year of 1980.

DEIS, pp. I-118 (population), I-122 (gross state product), I-125, 126 (employment), I-132 (personal income), and I-33 (wages and salaries);

(3) In the long run, El Paso will cause a far greater per capita increase in state and local government expenditures than will Arctic Gas. By 1983, Arctic Gas-induced increases will total $79 per capita, while El Paso-induced increases will total $158 per capita. (DEIS, p. 148). By 1990, the comparable figures will be $125.2 for Arctic Gas and $171.6 for El Paso. (ISEGR Report, p. 29).

Page I-130

Statement: The DEIS correctly provides that the lower manpower requirements and the remote location of Arctic Gas will induce less in-migration of unemployed workers to Alaska than will the El Paso project.

Response:

The DEIS fails to add that, because of El Paso's greater manpower requirements, the El Paso project will retard much more than will Arctic Gas the post-Alyeska out-migration of unemployed workers.

While some retardation of outmigration is possible, the net effect of the El Paso proposal is expected to be a dampening influence on total post Alyeska unemployment in the state.

Page I-135

Statement: The DEIS provides that "there is a possibility that [gas pipeline] construction related shortages or bottlenecks . . . could temporarily exert upward pressure on prices." The DEIS also adds that the "El Paso project would be expected to have a greater impact on short run prices than the Arctic proposal."

Response:

First of all, the DEIS neglects to mention regional inflation. The El Paso-induced regional inflation in Cordova (or Nikiski) will

Expected inflation impacts in Cordova have been mentioned in a subsection of the socioeconomic analysis in the FEIS entitled "Impact on Specific Localities."

be greater than the statewide inflation and certainly will be analogous to the situation that is now occurring in Valdez and Fairbanks.

Secondly, the DEIS' choice of the phrase "short run" to describe the duration of the El Paso-induced inflation is curious. El Paso construction is scheduled to last nearly five years. Five years of El Paso-induced inflation is more than a "short run" phenomenon.

This failure to mention intermediate run inflation has been corrected in the FEIS.

Page I-136

Statement: The DEIS describes the village of Kaktovik as "an extreme example of impact." The FPC seems to assume that Kaktovik will be an egregious example of negative socio-economic impacts.

Response:

The village of Kaktovik would not be adversely affected by the construction and operation of the pipeline. Indeed, Arctic Gas has continuously apprised the Arctic Slope Regional Corporation and Kaktovik of its plans concerning the pipeline. Pipeline employment opportunities will be available to the villagers of Kaktovik which desire it and construction and operation will be planned and carried out to have only the effects which the people of Kaktovik desire. Moreover, the people of Kaktovik are active participants in the planning of the Arctic Gas Project and their inputs have and will continue to be considered in the planning of the Arctic Gas system.

Based on analysis by the U. S. Department of the Interior, the FPC environmental staff believes there will be some decrease in the availability of subsistence resources utilized by residents of the Village of Kaktovik.

Page I-137

Statement: The DEIS provides that, "Because of the greater amount of facilities in Alaska, the El Paso proposal would be expected to provide more native employment opportunities and cause greater disruption to native subsistence activities than would Arctic Gas."

Response:

Presumably the author would feel that the same statement holds true for the Fairbanks-Big Delta alternative, but does not so state. In fact, no pipeline need disrupt subsistence ability if planned properly.

Page I-138

Statement: The DEIS, in discussing the El Paso-induced impacts on Cordova, merly says that there will be "higher total income and increased commercial development in Cordova."

Response:

The DEIS totally ignores the severe adverse impacts that will occur in Cordova because of the El Paso project. A description of these negative impacts certainly should be made. The DEIS does, however, refer to some of these negative impacts subsequently on pages I-141, I-150, and I-171.

Relevant impacts are discussed at various places in the socioeconomic analysis.

Page I-140

Statement: The DEIS states that URSA's estimates of Arctic Gas employment are far higher than ISEGR's, and that if ISEGR had used URSA's figures, ISEGR's projections of total Arctic Gas impact would have been higher.

Response:

URSA used peak annual employment figures, while ISEGR used annual average employment figures.

Average annual employment figures have been used in the FEIS.

Page I-141

Statement: "Under the Arctic proposal, there would be the possible impacts on the native village of Kaktovick [sic] where changes in native lifestyles would probably occur. . ."

Response:

It should be pointed out that the lifestyle of the people of Kaktovik centers around subsistence hunting and fishing. The pipeline will provide an opportunity to have economic activity which is compatible, not inconsistent, with the needs and desires of the people. It should also be pointed out, however, that the development of military radar in the 1940's and the DEW line construction in 1953, provided employment for some Kaktovik village residents and introduced a cash economy

This may be so. Nevertheless, the Village of Kaktovik would be impacted by the pipeline, and at a level commensurate with the amount of pipeline activity near the village.

Pages I-152 through 164

Statement: This 12-page portion of the DEIS deals with the "possible use of North Slope natural gas in Alaska for industrial, commercial, and residential purposes . . ." (p. I-152). It is this section of the DEIS upon which the Staff relies in recommending that either the Fairbanks-Big Delta alternative or the El Paso-Nikiski alternative be built. This section of the DEIS assumes that the State of Alaska will in fact take its 12.5% royalty share in kind and that North Slope natural gas will be supplied to Fairbanks and to communities south of Fairbanks.

The subsection of the socioeconomic analysis entitled "Use of Prudhoe Bay Gas in Alaska" had no influence upon any staff recommendations concerning route location that appeared in the DEIS or that appear in the FEIS. It should also be pointed out that an assumption that the state will use its royalty gas in-state for the purpose of analysis is not the same as making a projection that the state will in fact use its royalty gas in-state.

This entire 12-page section is based on a report prepared for the Staff by Resource Planning Associates, Evaluating the Use of North Slope Natural Gas in Alaska, Cambridge, Massachusetts, October, 1975, [hereinafter the "RPA Report"].

Response:

(1) Neither the DEIS nor the RPA Report discusses the most basic question: what is the probability that North Slope natural gas will in fact be taken in kind by the State as its royalty share. The DEIS and the RPA Report simply assume that Alaska's royalty will in fact be taken in kind.

(2) The RPA Report (and therefore the DEIS) makes the further assumption that "Kenai/Cook Inlet gas will be used exclusively to satisfy traditional markets in the Anchorage and on the Kenai Peninsula, and that all new industrial users in the State of Alaska will use North Slope gas." (RPA Report, p. 5. See also RPA Report, p. 3-1).

This is obviously a very restrictive assumption;

(3) But the RPA Report states that "[i]f Kenai/Cook Inlet gas remains available, there is insufficient demand under any of the pipeline-route alternatives to justify retention of Alaska's royalty share of North Slope gas for in-state usage." (RPA Report, p. 9).

The DEIS, though it explicitly states that pages 152 through 154 are based on the RPA Report, omits to mention this crucial conclusion made by RPA.

(4) Pages 152 through 164 of the DEIS do not even mention the oil refinery that is currently being constructed at North Pole, just outside of Fairbanks. This oil refinery is designed to use North Slope oil.

(a) The oil refinery is currently being built, and it will have the capacity to fulfill more than the needs of Fairbanks.

(b) According to the ISEGR, in its Report, supplying North Slope gas in Fairbanks "would undercut the economic viability of the North Pole [oil] refinery." (ISEGR Report, p. 62).

See Volume I, Appendix C, especially the subsection entitled "Supplemental Analysis" for a discussion of points and issues raised on pages 40 to 52 of Arctic Gas' comments relative to use of Prudhoe Bay gas in Alaska.

(c) Neither the DEIS nor the RPA Report mentions the costs of undercutting or harming the economic viability of the oil refinery. Moreover, neither the DEIS nor the RPA Report shows that North Slope natural gas in Fairbanks will have a cost advantage over North Slope oil in Fairbanks, since this is not at all certain when the low demand, cost of a gas distribution system, and other relevant factors are considered.

Thus, the transport of Prudhoe Bay gas to Fairbanks could discourage or cancel out one of the industrial options planned for Fairbanks, to its detriment. A modern refinery, using Prudhoe crude, would serve many of the same needs as a gas supply, in addition to reducing gasoline costs and encouraging the use of Fairbanks as a transpolar air traffic center. These have been needed for at least ten years and should be promoted, not discouraged.

Even more significantly, the Staff analysis clearly recognizes that much, if not most, of the gas proposed for industrial use would go to boiler fuel. This use is at the very bottom of the Commission's own categories of end-use priority. By Federal policy, such use is directly interdicted by FEA orders. Staff's proposal would also require consumers in the U.S. to underwrite substantially higher natural gas delivery costs. The DEIS also does not mention the prospects for further restrictions on industrial use of natural gas under Federal jurisdiction. And it fails to discuss whether State royalty gas, when intermingled with gas flowing in an interstate stream, will be subject to the end-use determinations of the Commission or other Federal authority.

(d) In its April, 1975 report, ISEGR states that "there is some possibility that, under the climatic conditions in Fairbanks during the winter, the use of gas for home heating might produce more environmental problems than the use of oil." (ISEGR Report, p. 62).

(5) The FPC does not mention and fails to take into account the fact that taking royalty gas in kind will mean lower royalty revenues for the State and increased costs for providing public services. RPA briefly mentions this fact. (RPA Report, p. 8).

Page I-153

Statement: Under the Arctic Gas proposal, potential Prudhoe gas available for in-state use in 1990 would be 103 Bcf. Under the El Paso proposal, potential amount in 1990 would be 150 Bcf.

Response:

RPA (page 2-2 and Exhibit 2-2) says that potential gas available for in-state use would total 103 Bcf in 1990, while potential El Paso gas would total 143 Bcf.

See response on page 41 of Arctic Gas' comments.

However, as pointed out by RPA, on page 2-2, the "differences in volumes represent the pipeline companies' differing assumptions on Prudhoe Bay production and transportation rates." Therefore, such difference is not of consequence, since the amount of gas to be transported in 1990 will be what is able and allowed to be produced, and will not be affected by the differing estimates of the two projects as to what production rates will be allowed.

Page I-153

Statement: "The potential amount of gas that would be available for in-state use through 1990 from the Kenai/Cook Inlet fields is less than would be available under the El Paso proposal, and is more than would be available under the Arctic proposal."

Response:

See immediately preceding comment above as to alleged difference between gas availability under the El Paso and Arctic Gas proposals.

See response on page 41 of Arctic Gas' comments.

Page I-154 and 157

Statement: The DEIS calculates the "delivered city gate price of gas" from the Kenai/Cook field and from the Prudhoe Bay field. The DEIS concluded that Prudhoe Bay gas would be cheaper than Kenai/Cook gas in Fairbanks. The "delivered city gate price of gas" is arrived at by summing:

(1) the wellhead price;

(2) the mainline tariff; and

(3) the branchline tariff.

But the DEIS assumes a wellhead price of $0.15 per Mcf for Kenai/Cook gas and a zero wellhead price for Prudhoe Bay gas.

Response:

(1) The DEIS states that a zero wellhead price at Prudhoe is assumed "so as to estimate the maximum potential usage of North Slope gas." (DEIS, page I-154).

RPA makes the identical statement on page 2-5 (RPA Report, page 2-5).

However, a zero price for the Prudhoe Bay gas is an impossible assumption. The DEIS assigns a 50-cent price for this gas elsewhere in the document. Even 50 cents is only the Btu equivalent of $2.50 to $3.00/bbl oil. There is also no support for the assumption of a 15-cent higher price for Kenai/Cook gas.

See response on page 41 of Arctic Gas' comments.

(2) RPA (and therefore the DEIS) assumes that the State of Alaska will take its royalty share of Prudhoe Bay gas in kind and therefore have a zero wellhead price. This overlooks lost revenues as a result of such action.

On the other hand, RPA states that "the State of Alaska has always taken its [Kenai/Cook] royalty and gas in value rather than in kind. . ." (RPA Report, page 2-2).

RPA and the DEIS should be consistent in their methodology. Either both Prudhoe and Kenai gas should be taken in kind or both should be taken in value, for a comparative study.

(3) If Prudhoe and Kenai royalty gas are taken in value, valuing the gas at the market rate would make for a more realistic analysis. It seems doubtful that 15 cents per Mcf is the market wellhead price for natural gas in Alaska.

Pages I-154, 155 (also page I-157)

Statement: The second element in the DEIS' estimate of delivered price of Prudhoe gas is the mainline tariff. In Fairbanks, the mainline tariff of the Fairbanks alternative is $0.35 per Mcf, while the mainline tariff for the El Paso prime is $0.29 per Mcf.

Response:

(a) RPA states that mainline tariffs were calculated by apportioning "costs linearly on the basis of pipeline miles from the wellhead to the branching point." (RPA Report, p. 2-5). It is hard to understand, and not demonstrated, why the El Paso route is so much shorter, or the line cheaper, than the Fairbanks alternative, so as to produce the 6¢/Mcf cost differential ($0.35/Mcf vs. $0.29/Mcf). (RPA Report, page 2-5).

See response on page 41 of Arctic Gas' comments.

(b) In its estimates of mainline (and branchline) tariffs, RPA divided the daily cost of service estimate by the annual average flow rates for the respective pipelines. The flow of the El Paso pipeline is assumed to be 3.283 Bcf/day, while the flow of the Arctic Gas pipeline is assumed to be 2.000 Bcf/day. (RPA Report, Appendix C, pp. 3,4). This corresponds to assumptions made by the two parties, but as described earlier, reflects different predictions only. Differences would not, in fact, exist. Thus, in order to calculate comparable mainline and branchline tariffs for both Arctic Gas and El Paso, RPA should have used identical flow rates for the main pipelines of both the Arctic Gas and El Paso proposals. It should be noted that ISEGR in its Report did in fact use the identical flow rate of 3.5 Bcf/day in projecting the impacts of the two pipeline projects (ISEGR Report, p. 18).

In fact, RPA obliquely refers to its questionable methodology of using different flow rates for the two pipeline projects in a footnote contained in a completely different part of its Report than that part which deals with mainline and branchline tariffs. RPA states that its estimate of tariffs "was adjusted to reflect the higher volume assumption" for El Paso and that this assumption "probably results in a somewhat low estimate of [El Paso] tariffs." (RPA Report, n. 3, p. 2-5).

Page I-155 (also p. I-157)

Statement: The third and final element in the DEIS' estimate of the delivered price of Prudhoe gas is the branchline tariff.

As shown on page I-157, no matter which alternative is chosen, Arctic Gas' branchline tariff is higher than El Paso's.

Response:

Branchline tariffs referred to above are based on a formula which includes the mainline tariff. (DEIS, p. I-155).

See response on page 41 of Arctic Gas' comments.

This, in turn, relates to the different volume assumptions used, as described above relative to the flow rate for the main pipelines, with El Paso's flow rate significantly greater than Arctic Gas'. (RPA Report, Appendix C, p. 4). The same infirmity, therefore, exists.

Page I-156

Statement: "Assuming that Kenai/Cook Inlet gas is available for use in in-state, Prudhoe Bay gas would not likely be used south of Fairbanks, except along major pipeline routes. However the availability of Kenai/Cook Inlet gas for future use in Alaska through 1990 cannot be conclusively determined. Increasing wellhead prices and curtailments in the lower 48 states, foreign demand, or other factors may result in new commitments of remaining Kenai/Cook Inlet reserves, thus making them unavailable for long term in-state use. If this occurs Prudhoe Bay gas may have a potential for use in other Alaskan markets, besides Fairbanks and along mainline routes."

Response:

The DEIS provides that Cook Inlet has proven reserves in excess of 6.6 Tcf at the present time, with less than half of that amount committed to contract. The largest single increment of Kenai/Cook Inlet gas production is currently converted to LNG and exported to Japan. Over 50 Bcf followed that route in 1974 (FPC News Release 8, 23, June 6, 1975) out of Alaska's total marketed production of about 129 Bcf.

See response on page 41 of Arctic Gas' comments.

There are indications of intensified exploration and development south of the Alaska Range, and particularly in the offshore areas. Recently concluded litigation opens the lower Cook Inlet to Federal leasing (beyond the three mile limit). Extensive geophysical surveys and some test drilling have been conducted in the Northern Gulf of Alaska and a Federal lease sale is scheduled in February, 1976. Bristol Bay has long been regarded as an area of great potential, in addition to providing favorable water depth and climatic conditions. In the DOI Final Environmental Impact Statement on the Gulf of Alaska lease sale, additional reserves amounting to as much as 9 tcf (5% probability level) have been suggested by U.S.G.S.

If any or all of these areas in southern Alaska should produce discoveries up to their predicted potential, such gas supplies would be available for marketing in Alaska and elsewhere. Given national gas and other energy demands, export of additional supplies of gas is highly speculative, as is the ability of "lower 48" markets to outbid those intrastate Alaskan markets which do exist or come into being.

Page I-157

Statement: On page I-157, the DEIS sums the cost of the wellhead price, the mainline tariff, and the branchline tariff in order to arrive at a delivered "city gate" price for Prudhoe gas and Kenai/Cook gas.

Response:

(1) It has already described how the DEIS underestimated, and made artificially different, the wellhead price both for Arctic Gas' gas and for El Paso gas, and further how the DEIS also underestimated the mainline and branchline tariffs of El Paso gas.

See response on page 41 of Arctic Gas' comments.

(2) In addition, the DEIS almost entirely neglects to include the distribution or delivery costs of delivering Prudhoe Bay gas from city gate to end-users in Fairbanks and other Alaskan cities. (On page I-159, the DEIS does briefly mention distribution costs for residential and commercial users.) The cost of such a system is substantial, involving capital costs of several million dollars, and substantial operating costs.

RPA, in its Report, states that the costs of distributing natural gas from city gate to end-user was not within the scope of its study. However, RPA does cite Arctic Gas' Study of Potential Alternate Fuels for Fairbanks, Alaska, and states that delivery costs could range from $0.11 per Mcf for large customers (primarily electric generating facilities) to as much as $2.25 per Mcf for commercial and domestic customers (RPA Report, page 2-7). Furthermore, on pages 3-9 and 3-10, the RPA Report mentions delivery costs of $1.75 per Mcf (page 3-9) and $1.50 per Mcf (page 3-10).

(3) The FPC also does not include the conversion costs of converting homes in Fairbanks to natural gas. In April, 1974, Arctic Gas estimated the cost at $1,300/house. (Study of Potential Alternative Fuels for Fairbanks, Alaska, p. I-12)

Page I-158 through 161

Statement: The DEIS estimates the potential in-state demand for Prudhoe Bay natural gas. The projected demand consists of: (1) new industrial demand; (2) institutional (large fuel-user) demand; and (3) residential and commercial demand.

Response:

(1) In calculating potential demand for Prudhoe gas, the DEIS and RPA do not mention the predicted delivered price of fuel oil from the North Pole oil refinery now being constructed near Fairbanks. The proposed supply of Prudhoe natural gas to Fairbanks would compete directly with the supply of heating oil produced by the North Pole refinery. In Arctic Gas' Study of Potential Alternate Fuels for Fairbanks, Alaska, the price of heating oil from this North Pole refinery for commercial and industrial customers is projected. (pp. I-19 through I-21).

See response on page 41 of Arctic Gas' comments.

(2) Also, the DEIS and RPA assume that Prudhoe natural gas will be less expensive as a heating source in Fairbanks than will coal which is currently being mined at Healy and which is the energy source for much of Fairbanks. (The DEIS quotes a price of $0.80 per million BTU for large-fuel users of coal in Fairbanks. DEIS, p. I-159). Arctic Gas, in its Study of Study of Potential Alternate Fuels for Fairbanks, Alaska, concludes that coal will be less expensive than natural gas. (Tables I-13A, 13B, and 13C at pp. I-19 through I-21.)

Pages I-158 through 161

Statement: With respect to the first category of potential in-state demand for Prudhoe gas, new industrial demand, the DEIS

assumes that there will be demand for four new projects. However, even the DEIS calls this demand "highly speculative." (DEIS, p. I-159).

Response:

The "highly speculative" nature of the four new industrial users is stressed in the RPA Report (RPA Report, pp. 3-1 through 3-7). Two of the four new users (a methanol plant and a polyethylene plant) are petrochemical industries.

See response on page 41 of Arctic Gas' comments.

ISEGR, in its April, 1975 Report, states that "it is not clear that a gas-using industry would choose to locate in Alaska without state subsidies." (ISEGR Report, p. 63).

Pages I-158 through 161

Statement: With respect to the second category of potential in-state demand for Prudhoe Bay gas, institutional or large fuel-user demand, the DEIS simply says that "[e]ach pipeline alternative. . . would appear to generate demand for Prudhoe Bay gas by electric utilities and institutions in the Fairbanks area." (DEIS, p. 159).

Response:

RPA, in making its estimate of large fuel user demand which the DEIS quoted explicitly assumed that all 3 "utilities" south of Fairbanks in the South Central region north of Anchorage would switch to natural gas by 1990. (RPA Report, p. 3-8).

See response on page 41 of Arctic Gas' comments.

Pages I-159 through 161

Statement: With respect to the third category of potential in-state demand for Prudhoe Bay gas, residential and commercial demand, the DEIS cites the RPA study and states that 50% of existing fuel users in Fairbanks and 80% of all new users in Fairbanks would switch to gas (DEIS, p. 159).

In addition, the DEIS assumes that the suggested El Paso alternative route will generate a demand of 1.9 Bcf in the new state capital if 100% of the residential users in the new capital use natural gas (DEIS, p. I-161).

Response:

The foregoing analysis makes clear that the lion's share of the gas would be made available to consumers other than Priorities I and II, i.e., to consumers who are not in the highest priority

See response on page 41 of Arctic Gas' comments.

and who are to be curtailed first in the event curtailment should occur on an interstate pipeline system. Indeed, boiler fuel use appears to be one of the main uses for this gas in Alaska. Priority I and II consumers are those to be served by the pipelines who intend to deliver gas to the lower 48 of the United States.

Page I-158

Statement: "Because of the uncertainty about the future availability of Kenai/Cook Inlet gas for in-state use, it was assumed that gas from this source would be available in-state to serve only traditional market areas in Anchorage and on the Kenai Peninsula, and that all new gas users in the state from different market areas would use Prudhoe Bay gas. This assumption results in a 'maximum' demand estimate for Prudhoe Bay gas."

Response:

There does not appear to be any basis for the assumption, especially in light of the facts contained in the response to the comment on page I-156, supra.

See response on page 41 of Arctic Gas' comments.

Page I-159

Statement: "They currently pay more than $.80 per million Btu for coal . . . compared with the projected city gate price to Fairbanks of $.29-.35 per million Btu for Prudhoe Bay gas."

Response:

A wellhead price of $.50 would increase the city gate gas price to from $.79 to $.85 per million Btu. Moreover, the city gate price does not take into account the cost of service of a branchline from the mailine to the city gate. Finally, the DEIS overlooks the cost of distributing gas in the city of Fairbanks which should be substantial by any margin.

See response on page 41 of Arctic Gas' comments.

Displacing coal would put a major Fairbanks industry (coal) out of business. DEIS estimates on delivered price are far less than Arctic Gas' estimates (Study of Potential Alternate Fuels for Fairbanks, Alaska Resource Sciences) and also provide no demand adjustment for capital cost provision for providing the extra capacity for the maximum volume requirements on any one day.

Page I-161

Statement: "If the above sources of potential demand were eliminated, the remaining demand would consist of the copper processing facility in the Brooks Range, Fairbanks large fuel users and residential/commercial users, and large fuel users south of Fairbanks along the El Paso prime route."

Response:

The rationale for eliminating the cited sources of potential demands would appear to be equally applicable to all sources of potential demand assuming the availability of Kenai/Cook gas to potential markets in Alaska.

See response on page 41 of Arctic Gas' comments.

Pages I-162 through 164

Statement: The DEIS again citing the RPA Report, projects the socio-economic impacts on the State of Alaska caused by the in-state use of Prudhoe Bay gas. As the DEIS states on page I-162, for "the two El Paso route alternatives, these 1990 projections nearly equal or exceed estimated impacts from construction and operation of the El Paso prime route."

Response:

These large impacts rest upon the following assumptions (all of which have been criticized above):

See response on page 41 of Arctic Gas' comments.

(1) Alaska will take all of its royalty share of Prudhoe gas in kind;

(2) Kenai/Cook gas will not be used to satisfy new industrial users in Alaska, nor other users in the new state capital, nor most of the new residential and commercial users in Fairbanks;

(3) Prudhoe gas will have a zero wellhead price and the mainline and branchline tariffs for El Paso gas from Prudhoe tariffs will be lower than the corresponding tariffs for Arctic Gas for gas delivered from Prudhoe;

(4) the oil refinery at North Pole will not be able to compete in terms of price with Prudhoe gas supplied to Fairbanks;

(5) natural gas from Prudhoe will cost less in Fairbanks than will coal which is currently being mined at Healy and which is the heating source for much of Fairbanks; and

(6) four "highly speculative" new industrial users of Prudhoe natural gas will locate in Alaska; all utilities and institutions in Fairbanks and 3 "utilities" south of Fairbanks switch to Prudhoe natural gas; 50% of existing fuel users in Fairbanks and 80% of all new users will switch to Prudhoe gas; and 100% of all residential users in the new capital will use Prudhoe gas.

Page I-165

Statement: The DEIS states that the "impacts" of the Fairbanks alternative will be "more extensive than under the prime route."

Response:

The DOI-DEIS, Part II, Volume 3, pp. 2265-2266, states that its "analysis is presented on the basis of transporting gas from Prudhoe Bay to domestic markets in the lower 48 states without distribution in Alaska. In the event that gas from Prudhoe is made available for use in Fairbanks, a substantial reassessment of environmental, social, and economic impacts caused by the Fairbanks alternate pipeline system will be necessary."

Since the DEIS adopts the relevant sections of the DOI-DEIS, it also adopts the below quotations taken verbatim from the Department of Interior's analysis of the Fairbanks alternative:

"The impact on Fairbanks will be to increase its tax base through greatly increased population and to increase city and borough spending to service population, etc." (emphasis added) DOI DEIS, Part II, Vol. 3, p. 2369.

Population is not a tax base. See the comment on independent analysis on the next page.

"Sociological impacts will range from increased cultural improvement opportunities because of greater demand to an increase in crime, a lower standard of housing, greater traffic problems, an excellerated [sic] rate of decline of Native culture and other [sic]." (emphasis added) DOI DEIS, Part II, Vol. 3, p. 2370.

The environmental staff is unclear as to the meaning of this statement.

"Constructing a pipeline parallel to the highway will cause a significant increase in traffic on the highway. This traffic will increase the annual maintenance costs." (emphasis added) DOI DEIS, Part II, Vol. 3, p. 2370.

"Small residential areas in Alaska are not capable of reacting to large housing demands in relatively short periods of time. This leads to substitute housing such as trailer housing, use of campers, and this use is often accompanied by improper location of such facilities, thereby further impacting other resources." (emphasis added) DOI DEIS, Part II, Vol. 3, p. 2372.

The environmental staff agrees with these statements.

See above response.

Finally, the section of the DOI-DEIS which deals with the Fairbanks alternative has a cross-reference to the more detailed analysis of the Fort Yukon alternative (p. 2369, cross-reference to 8.1.1.4, or pp. 1775-2080). The following page references are to sections of the description of the Fort Yukon alternative which detail socio-economic impacts that will be caused by construction of the Fort Yukon gas pipeline.

Part II, Vol. 3, pp. 1901-1902
Part II, Vol. 3, pp. 2038-2039
Part II, Vol. 3, p. 2042
Part II, Vol. 3, p. 2044
Part II, Vol. 3, pp. 2047-2048

Since the environmental staff has completed an independent analysis of socioeconomic impacts in Alaska, these sections of the USDI DEIS have not been accepted.

Page I-169

Statement: "However, the impact on one community, the native village of Kaktovick [sic], could be substantial in terms subsistence resources that would be disrupted. With the possible exception of Kaktovick [sic], the Arctic proposal would have very little additional social impact or impacts on private services."

Response:

The assumption that there would be substantial impact on Kaktovik through reduction of subsistence resources is unfounded. "Subsistence resources" should be defined by the DEIS. Arctic Gas has made extensive studies and is unaware of any "subsistence resources" which will be seriously disrupted by pipeline construction and operation. Extensive environmental research has resulted in the development of appropriate mitigative measures which will prevent any significant impact on such resources.

See the socioeconomic description section for a definition of subsistence. The environmental staff statement that there could be substantial impact is based on the U. S. Department of the Interior's DEIS which stated, "The proposed AAGPC pipeline will have major and significant adverse impacts on subsistence activities of people living in Kaktovik . . ." (Part II Alaska, Volume I, page 878).

Pages I-170 through 172

Statement: The DEIS summarizes the socio-economic impact of the El Paso proposal.

Response:

In its summary, the DEIS:

(1) fails to mention the El Paso boom-and-bust cycle projected in the ISEGR Report. (See Comments to pp. I-111 through 151 of the DEIS);

See response to last comment on page 37 of Arctic Gas' comments.

(2) fails to mention that ISEGR projects that El Paso will cause: (a) a long-run decrease in real per capita personal income and (b) a long-run increase in state and local government expenditures that is significantly greater than the increase caused by Arctic Gas. (See Comments to pp. I-111 through 151 of the DEIS);

Since El Paso would produce more government revenue, it is likely that government expenditures would also be higher.

(3) fails to explain adequately the negative impacts that Cordova will undergo as a result of the construction of the El Paso LNG plant; and

The discussion of impacts to Cordova has been expanded in the FEIS. See response to previous comments on this subject.

(4) depends on the unsubstantiated assumption that Alaska will take its royalty share of Prudhoe gas in kind.

See response to previous comments dealing with use of Prudhoe Bay gas in Alaska.

Page I-172

Statement: "Any industrial use of Prudhoe Bay gas appears highly speculative at this point . . ."

Response:

Arctic Gas agrees that "any industrial use of Prudhoe Bay gas appears highly speculative at this point. . .", and, as discussed earlier, the possibility of major new industrial developments using Prudhoe Bay gas, is remote.

Pages I-174 through I-196

Statement: Appendices

Response:

These pages consist of appendices and a bibliography. These comments have attempted to related to the point of major significance and will not go into detailed differences with the appendices.

Section C

Comparative Assessment: Pages I-197 through I-256; end of Volume I

These pages are a combination of description of proposed action and statements of conclusions. The material is varied, so that specific comments relative to the various positions are most productive.

Pages I-197 to I-198

Note appropriate changes in FEIS.

Statement: "1. Background of Discovery of Oil and Gas"

Response:

With regard to the statements in Subsection A.1., which relates to the "Background of Discovery of Oil and Gas," it is believed that the transportation of oil through the Alyeska Oil Pipeline is likely to begin in 1977, rather than 1978. It is also believed that the gas reservoir analysis will be made prior to the time that the natural gas pipeline can be completed to the Prudhoe Bay area and, given the present status of proceedings, it is the approval and construction of the pipeline which will be the limiting factor on the production of natural gas, rather than any factors relative to reservoir information or oil production.

Pages I-198 to I-201

Statement: Subsection "B. Arctic Gas System, 1. Proposed Action".

Note appropriate changes in text of FEIS.

Response:

In Section B-1, which undertakes to describe the Arctic Gas system, there is a reference to 5,551 miles of pipeline from Prudhoe Bay to the United States termination points of the major proposed transportation systems. This total is made up of the mileages described for the separate parts of the proposed system, at pages I-200 to I-201. For clarification, it should be noted that the proposed length of the Canadian section of the Arctic Gas Pipeline is now not 2,430 miles. Instead, with the adoption of the cross-Delta routing by Canadian Arctic Gas Pipeline Limited, the total mileage proposed in Canada is now about 2305. The 917 mile figure given at page I-200 is approximately the length of the existing line of the Pacific Gas Transmission and Pacific Gas & Electric systems from the Idaho-Canadian border to the San Francisco area. However, it should be noted that full looping

of the existing line over that distance and route is not proposed by those systems. Instead, several possible designs are filed, including a totally new line at two different sizes. At the present time, the volumes under option by the Pacific Gas & Electric system in Prudhoe Bay, appear to be approximately 200 million cubic feet per day. To transport such additional volumes, that system's filings indicate that approximately 460 miles of 36-inch loop on the presently existing system would be needed. It is this total which should be used if mileage for the Interstate Transmission Associates (Arctic) system is also to be utilized, since a larger PGT-PG&E system would appear to be duplicative of the bulk of the ITAA proposal, based upon presently known and optioned Prudhoe Bay reserves. If a greater amount of looping on the PGT-PG&E system is to be utilized (such as the 874 miles of loop required to transport an additional 600 million Mcf per day on that system), then the ITAA proposal would be duplicative in large part.

Accordingly, the appropriate mileage is about 4100 miles for the Alaskan Arctic, Canadian Arctic and Northern Border systems, plus approximately 850 to 900 miles of construction for the western system combined, for a total of something over 5000 miles.

Page I-201

Statement: Subsection "b. Total Reserves and Volumes to be Transported".

Note appropriate changes in text of FEIS.

Response:

The above description of mileages, with particular reference to the Western facilities in the lower 48 states, applies to the discussion of capacity. The system addition proposal of the PGT-PG&E system, which is not duplicative of the ITAA proposal, would have an estimated additional capacity of .2 billion cubic feet per day, rather than .85. It is .2 Bcf which is compatible with the proposed ITAA pipeline having a capacity of from .4 to .6 Bcf per day.

It is understood, of course, that all capacities given in the subject subsection are prior to looping which is in addition to that now contemplated for existing systems.

The statement in the first paragraph on page I-202 that approximately one half of the volumes to be transported on the Arctic Gas system would be designated for Canadian markets is subject to qualification. First, it is proposed that in the first year of gas production from Alaska (as soon as the pipeline can be constructed) the volume produced from Prudhoe Bay will be approximately 2. to 2.25 Bcf per day

(estimates by others project higher availability at that time, and if such predictions prove to be true, such additional volumes will be handled by the Arctic Gas Project also.) The 2.25 Bcf/day volume is utilized in the exhibits of the Arctic Gas Project for Prudhoe Bay gas, with no growth shown. In fact, however, growth is likely, even during the early years and can be handled. With regard to Canadian gas to be transported by the system, a beginning volume of 1.25 Bcf/day is utilized for planning purposes, with a build-up by the fifth year to 2.25 Bcf/day. Accordingly, it is only after that buildup that one-half the volumes are shown as being transported from Canadian reserves for Canadian delivery. In view of the possibility of further buildup of deliveries from Alaska, and the earlier stated corrections relative to the capacity of the contiguous 48 States' facilities, the statement in the first paragraph on page I-202 that there is excess capacity of .7 billion cubic feet per day in the lower 48 States' facilities proposed is not correct. However, those facilities do have the ability to be expanded easily, both with the addition of compression and by incremental looping.

Page I-202

Statement: "No compressor facilities would be constructed on the 195 mile, 42-inch gas transmission pipeline in . . ."

Note appropriate changes in text of FEIS.

Response:

The reference to 42-inch gas transmission pipeline should be changed to 48-inch, which is the Alaskan Arctic proposal.

Page I-202

Statement: Footnote 1/ "The pipeline in Alaska would be operated as a chilled gas pipeline in order to reduce damage to permafrost"

Response:

The purpose of operating the pipeline with chilled gas is to eliminate, not reduce, the damage to permaftost.

Page I-204

Note appropriate changes in text of FEIS.

Response:

As indicated earlier, the mileages and land requirements shown on the table on this page have been superseded, and are duplicative, in some respects.

Page I-202

Statement: "Other ancillary facilities required for the pipeline in Alaska include 7 material stockpile sites, 2 seaport areas in addition to the Prudhoe Bay port facilities, 20 aircraft facilities including 14 helipads and 6 airstrips, 9 communication sites, . . ."

Note appropriate changes in FEIS.

Response:

There are only three independent stockpile sites in Alaska, i.e., those at Prudhoe, Camden and Demarcation Bays (others are at the four future compressor sites) and the latter two are at the "seaport areas". Arctic Gas intends to utilize a satellite communications system, thereby eliminating the previously required intermediate terrestrial microwave communication sites. Moreover, the 20 aircraft facilities should now be reduced to 16 to reflect the change in communication systems. This causes a reduction in the land requirements on page I-204.

Page I-205

Statement: "In Canada the construction of the pipeline and related facilities and supply lines would not be completed until the seventh year of construction. Actual pipeline construction would begin late in the second construction year and be completed in the fifth construction year. Compressor station construction would be accomplished between the third and seventh years of construction."

Note appropriate change in FEIS.

Response:

Insert after the second sentence: Flow of Prudhoe Bay gas at 2 Bcfd will start at this time.

Page I-206

Statement: ". . . . aboveground facilities would be sold or salvaged".

Note addition in FEIS.

Response:

Some facilities may also be left in place if desirable from the standpoint of local usage.

Pages I-207 through 219

Statement: These pages are entitled: "Environmental impacts of proposed action".

Response:

This entire section is taken from the DOI DEIS, Volume 1 of 1 Overview, pp. I-361-408. The DEIS, however, has not taken into consideration the comments provided by Arctic Gas on this section. These comments appear in "Comments of Arctic Gas Project Applicants to Part I Overview Draft Environmental Impact Statement of the U.S. DOI Regarding the Alaskan National Gas Transportation System", pp. 3-1 through 3-28. Such comments are incorporated herein and made a part hereof by reference. In addition, by letter dated December 8, 1975, Mr. William W. Brackett, Vice Chairman of Alaskan Arctic, transmitted for filing with the Commission, Arctic Gas' Comments on Parts II and III of the DOI-DEIS. Those Comments are also incorporated herein and made a part hereof by reference.

Page I-207

Statement: "The following is a summary of the more significant impacts of the Arctic Gas System pipeline on the existing environment: . . ."

Note appropriate changes in FEIS.

Response:

The statement creates the incorrect impression that the summary which follows consists of proven, undisputable, supported facts, which simply is not the case. It fails to take into account the mitigative measures proposed by Arctic Gas and that these statements were responded to in detail in the comments filed by Arctic Gas with the DOI. Either a more extended introduction, including revisions in accordance with Arctic Gas' comments to the DOI-DEIS should be developed, or the section should be deleted in its entirety.

Page I-207

Statement: "Compressor station turbine exhaust emissions of some 7,200 gallons of 600°F water vapor per hour . . ."

Note appropriate changes in FEIS.

Response:

The amount of water vapor given off by the stations is stated to be 7,200 gal/hr. It is also implied that stations with refrigeration systems would give off additional water vapor from the refrigeration system turbines. The calculated quantities of water vapor at -40°F for the base case system are as follows:

a) 30,000 hp station with chilling - 4,800 gal(US)/hr.
b) 30,000 hp station with double chilling- 6,000 gal(US)/hr.
c) 55,000 hp station with cooling - 6,200 gal(US)/hr.

Page I-207

Statement: ". . . . formation of ice fog at these sites".

Response:

Note appropriate changes in FEIS.

Arctic Gas' proposed compressor stations are not located near populated areas and, therefore, any ice fog produced at such sites will be inconsequential. See Appendix C of Comments of Alaskan Arctic Gas Pipeline Company Relative to Part II (Alaska) of the DEIS of the DOI Regarding the Alaskan Natural Gas Transportation System.

Page I-207

Statement: "Compressor stations requiring mechanical refrigeration equipment could cause additional local micrometeorological change. . ."

Statement eliminated in FEIS.

Response:

Although the possibility of any change is highly unlikely, it should be pointed out that any change in micrometeorological conditions would be insignificant.

Page I-208

Statement: "Wind erosion of disturbed soils and gully erosion following construction would change the pipeline right-of-way topography and also cause secondary impacts by transporting the soil to other locations."

Note change in FEIS.

Response:

This statement maintains that there will be soil erosion following construction. While soil erosion is possible at certain specific locations, there are no data to support the inference that it will be widespread and, in fact, it will not be widespread in Arctic and sub-Arctic regions.

Page I-208

Statement: "In the open tundra of the Arctic, the pipeline ditch berm, gravel roads, airfield embankments and various buildings and towers would create new elevations. . ."

Statement eliminated in FEIS.

Response:

The pipeline berm will initially have a low crown and following implementation of Arctic Gas' revegetation and restoration program, the berm will be difficult to detect, particularly from ground level. The crown of spoil over the trench backfill is intentionally placed there to compensate for natural subsidence of backfill material. It will thus subside to produce a near level surface over the trench. In that Arctic Gas proposes to use snow-ice roads for construction, only a very few miles of permanent gravel roads (less than 10 miles) will be required at staging and stockpile sites and from compressor stations to airstrips. Arctic Gas has eliminated the communications towers associated with the previously planned terrestrial microwave system.

Page I-208

Statement: "The installation of the pipeline and its associated airfields, roads, and communications network would stimulate prospecting and development of additional oil and gas reserves and mineral deposits in the arctic . . ."

Response:

The national need for energy from all sources will generate exploration and development of gas reserves in the Arctic and elsewhere. The Arctic Gas prime route lies closest to most of the more likely state owned areas of future hydrocarbon production so that future lines to connect those areas with the main trunk pipeline, if they should be developed, will also be short and have minimal environmental impact.

Page I-208

Statement: "Activities which would increase the depth of this layer . . .".

Response:

During operation and following successful implementation of the revegetation and restoration program, the active layer thickness will not be significantly increased as a result of disturbance caused by construction. Furthermore, the use of snow roads will prevent compaction or other damage. The relatively low relief of the terrain along the 200 miles of pipeline provides additional assurance that minimal damage will occur.

In addition, the fact that the active layer is increased does not necessarily lead to the types of instability cited in the DEIS. Such instability only occurs in areas of ice-rich soils which are readily detectable prior to construction. Natural variation in the active layer is probably greater than the variation induced by construction activities.

Page I-209

Statement: "Landslides might be induced at many places along the routes if slopes were undercut while the pipeline ditch was being excavated. The slides could cause immediate damage and/or loss of life or they could occur at a later time and possible rupture the pipeline."

Note appropriate changes in text of FEIS.

Response:

Areas where previous slope instability is evident have been avoided by the pipeline alignment. Less than 5% of the route traverses slopes greater than 3° inclination. Wherever the route encounters a significant slope it is oriented to run perpendicular to the natural contours. Therefore, undercutting will not occur. Arctic Gas has developed drainage and erosion control measures to avoid slope deterioration after construction.

Page I-209

Statement: "This mixing of subsoil on the surface of the backfilled ditch . . ."

Response:

For tundra conditions this is purely speculative and entirely without supportive documentation. Arctic Gas' soil sampling and analysis programs have shown that very little difference in nutrient levels occur in surface soils as compared with subsurface soils (Arctic Gas' Biological Report Series,Vol. 21).

In southern areas, this discussion does not take into consideration Arctic Gas' proposal to mitigate any potential loss of soil productivity through the addition of soil amendments, revegetation and agronomic techniques.

Page I-210

Statement: "I. Construction and operation of the proposed natural gas pipeline system would present potential water resource impacts at each stream crossing . . ."

Note change in text of FEIS.

Response:

Arctic Gas proposes to cross streams during the winter when flows are negligible. Therefore, potential water resource impact will be minimized. Furthermore, measures will be taken to mitigate the effect of erosion, sedimentation and introduction of pollutants. Submitted herewith are the NESCL "Reference Book of Water Crossings, Vol. II, River Crossing Design, Oct. 1976, and Vol. V, Preliminary Design of Selected River Crossings, Alaskan Coastal Routes, Feb. 1975.

Page I-210

Statement: "II. Hydrostatic testing of the completed pipeline would require huge volumes of water, and the indiscriminate use of surface waters . . .".

Note change in wording in text of FEIS.

Response:

Arctic Gas has repeatedly stated that water for construction use will only be withdrawn from those areas where such removal will not affect aquatic resources, both biotic and abiotic.

Adequate information is available from fisheries studies and water availability studies to prevent indiscriminate water withdrawal from springs and lakes with overwintering populations of fish and invertebrates. Special precautions, i.e., withdrawing from a sump downstream of major concentrations of fish, will be used.

Furthermore, hydrostatic testing involves only a small portion of the total amount of water required. A water availability study (final report due January, 1976) has been completed which indicates more than adequate water for all requirements and precludes "indiscriminate" use of surface waters. (Refer to FPC/DOI Question No. 39 herein submitted).

Page I-210

Statement: "IV. Indiscriminate withdrawal of water from springs . . .".

Response:

Indiscriminate withdrawal would have serious adverse effects. However, Arctic Gas does not intend to withdraw water indiscriminately. A water availability study nearing completion (Final Report due in January, 1976) will identify available water along the Prime Route in Alaska and describe how sufficient water can be obtained without adverse effects on fish or invertebrates.

Page I-210

Statement: "V. Erosion resulting from construction . . . the use of large volumes of domestic water and discharge of sewage . . ."

Note changes in text of FEIS.

Response:

All sewage will receive secondary treatment and the resulting effluent discharge will be controlled to ensure that there is no significant decline in water quality downstream.

Furthermore, most construction N. of 60° will be in winter so there will be no erosion. Streams will be turbid in spring in any case.

The volumes of domestic water required will be small in relation to the volumes available.

Page I-210

Statement: "VI. Fuel and lubricant spills . . .".

Note appropriate changes in text of FEIS.

Response:

Arctic Gas is developing rigorous contingency plans in the unlikely event that spills occur. Fuels and lubricants will be stored in

such a way that spills are unlikely to contaminate natural waters.

Page I-211

Statement: "I. Vegetation and terrain surface integrity would be destroyed . . ."

Response:

In tundra communities, only the vegetation along the actual pipeline ditch will be affected. However, recent results obtained during a tundra stripping study indicate that total destruction to plants along the ditch-line may be prevented. Revegetation will also be carried on.

Page I-211

Statement: "Vegetation would be destroyed and/or altered by one or more of the following: construction of winter roads; the alteration of associated drainage patterns; forest, grass and tundra fires; fuel and methanol spillage; sulphur dioxide emissions; and off-road vehicle use for pipeline emergency repairs."

Response:

(a) The disturbance created to vegetation by winter roads will be negligible (see NESCL Reports: "Inuvik Snow Road Construction Testing and Environmental Assessment, 1973-74 Inuvik, N.W.T. Canada", and "Inuvik Snow Road Environmental Assessment" herewith submitted). Arctic Gas has shown that construction of winter roads will not destroy or alter the vegetation to any marked degree. On each of the several snow road tests a slight diminution in the amount of vegetation occurred the first summer after the snow road was used but recovery was quick.

(b) No significant changes in drainage will occur (see NESCL Report: "Drainage and Erosion Control Measures" submitted herewith).

(c) The effects of methanol on vegetation are presently under study by Arctic Gas and indications are recovery is quick. In addition, protective measures make spills unlikely.

(d) The calcuated ground level concentrations of sulfur dioxide will be well below the amounts lethal to plants.

(See Appendix C in Comments of Alaskan Arctic Gas Pipeline Company Relative to Part II (Alaska) of the DEIS of the DOI Regarding Alaskan Natural Gas Transportation System incorporated herein by reference.)

(e) If off-road vehicle use for emergency repair is required, only low ground pressure vehicles will be used.

Page I-211

Statement: "III. A number of proposed ecological preserve sites . . .".

Note changes in text of FEIS.

Response:

If DEIS is referring to proposed IBP sites then a number of pertinent points should be examined: (1) the pipeline route was selected prior to the proposed IBP sites; (2) the pipeline is not incompatible with the intentions of the IBP. For example, the proposed sites in the Rat River and Brackett Lake areas were recently extended by IBP so that the pipeline route would be included in this site in order to provide IBP a basis for monitoring the effect of the pipeline on the site; and (3) Arctic Gas has been in contact with IBP personnel to assure minimal interference with the respective projects.

Page I-211

Statement: "IV. Invasion by weedy plant species . . .".

Statement eliminated in FEIS.

Response:

Pipeline construction through lands managed for wildlife or forests will result in a setback of plant succession to the pioneering stage. Plants which invade and colonize a denuded area are referred to by plant ecologists as pioneering species. This is a natural ecological phenomenon. The same pioneering species are referred to by people with an agricultural interest as weedy plant species. This is a misleading criticism as the phenomenon referred to is a proper and natural process. These plants will not persist as plant succession progresses.

Page I-211

Statement: "V. The incidence of fire would probably increase in the forested, tundra, and grassland sections, especially during summer construction activities."

Response:

It should be pointed out that the ability to detect and fight fires should they occur will be greatly increased as a result of the plans which Arctic Gas has developed in this regard.

Page I-212

Statement: "I. The greatest changes would occur. . .".

Response:

It should be noted that in the tundra ecosystems, clearing is not required.

Page I-212

Statement: "II. Caribou, particularly those in the internationally-ranging Porcupine caribou herd, face the greatest potential for serious impact. The section of the pipeline which would cross the Arctic National Wildlife Range in Alaska would bisect the caribou calving ground area. Adverse impacts and drastic reduction in caribou numbers would be expected to occur."

Note appropriate changes in text of FEIS.

Response:

Arctic Gas has undertaken over five years of intensive study of the Porcupine caribou herd. That study unequivocally demonstrates that the construction, operation and maintenance of the pipeline will not have a serious adverse impact on such herd. Furthermore, there is no scientific evidence that a "drastic reduction in caribou numbers" will occur (see pp. 1-18, Comments of Alaskan Arctic Gas Pipeline Company Relative to Part II (Alaska) of the DEIS of the DOI Regarding Alaska Natural Gas Transportation System).

Page I-212

Statement: "Disturbance factors would include . . .".

Response:

The DEIS does not take into account the mitigative measures proposed by Arctic Gas such as the guidelines restricting aircraft activity which would eliminate or reduce disturbance. The statement itself

is drawn from the DOI DEIS. Arctic Gas' Comments to that general conclusion are set forth in a number of places in such Comments, see, e.g., aircraft activities, Appendix B; animal harrassment, page 3; hunting activities, page 3; compressor station noise, page 4; in "Comments of Alaskan Arctic Gas Pipeline Company Relative to Part III (Canada) of the Draft Environmental Impact Statement of the Department of Interior Regarding Alaska Natural Gas Transportation System."

Page I-212

Statement: "IV. Project-caused disturbance would drive birds from their nesting and resting areas and, in the case of waterfowl, could affect the molting and fall staging periods, resulting in a possible drop in population numbers."

Response:

This comment does not take into consideration the mitigative measures such as construction timing and realignment considerations proposed by Arctic Gas. In almost all cases where project disturbance would affect birds, such areas will either be avoided completely or avoided during the time that the birds are in those areas. In any event, the disturbance during the time that the birds are in the area will be very slight, because the vast majority of construction effort will occur during the winter, when the birds are not present. Comments on birds presented in Comments of Alaskan Arctic Gas Pipeline Company Relative to Part II (Alaska) of the DEIS of the DOI Regarding the Alaska Natural Gas Transportation System, pages 19-24, should be taken into account in the Final EIS.

Page I-212

Statement: "V. Bird populations could also be adversely affected . . .".

Note change in FEIS.

Response:

See previous comment.

Page I-213

Statement: "VI. Increased turbidity and sedimentation from upstream erosion due to pipeline stream crossing activities would also be a major cause of fish and associated aquatic organism losses."

Note change in FEIS.

Response:

This is not a valid argument for the following reasons:

(a) Actual stream crossings would be made in winter and in areas which do not support overwintering populations of fish (with the possible exception of the Sagavanirktok Delta). Thus, fish would not be destroyed by "turbidity and sedimentation".

(b) The following spring when flow begins again, there should be little serious effect since streams are already turbid at break-up and the fish are able to move to different areas.

(c) The pipe crossing area would be "cleansed" at break-up and there would be little subsequent turbidity; but again, even if there was, it wouldn't seriously affect fish since there are only a few "critical fish areas" situated in downstream areas (Sagavanirktok, Hulahula, Kongakut and possibly Canning).

(d) Aquatic invertebrates are not of significant concern since "stream drift" would quickly repopulate affected areas.

(e) Almost all of the stream crossings along the Prime Route in Alaska are frozen to the bottom during the winter construction period and no sedimentation will occur during stream crossing activities. Where flows do occur it is unlikely that there will be any major losses of fish or other aquatic organisms for the following reasons:

    (1) During winter, discharges are low and the sediment carrying capacity of streams is small. As a result, the downstream movement of materials is limited.

    (2) The concentrations of suspended sediments occurring downstream of the crossing are not likely to cause distress to overwintering fish (juveniles and adults).

    (3) Sedimentation of the stream bottom could cause mortailities to eggs and alevins, which are much more sensitive than free-living fish. However, the pipeline route generally avoids critical spawning areas and none have been identified immediately downstream of any pipeline crossing.

Page I-213

Statement: "VII. Pollutants such as construction camp sewage plant effluents, spills of petroleum products, methanol spills and pesticides, blasting near fish spawning areas where eggs are present and increased or decreased water temperatures resulting from vegetative changes or pipeline operations would also adversely affect fish populations."

Note word change in FEIS.

Response:

All sewage will receive secondary treatment. Methanol will be suitably disposed and will not adversely affect fish. Furthermore, preliminary results of studies conducted by Applicant indicate that methanol solutions of 1% or less do not adversely affect the fertilization process of chum salmon eggs. Pesticides will not be used in Canada nor in Alaska. No fish spawning was occurring close enough to the pipeline route to be affected by blasting during construction. Water temperatures will not be significantly changed.

Page I-213

Statement: "I. The disturbance of the organic cover . . .".

Statement eliminated in FEIS.

Response:

When addressing the total ecosystem, it is necessary to consider the spatial and temporal characteristics of that ecosystem. No rational foundation exists for suggesting that temporary disturbance to a narrow strip of that ecosystem (a trench approximately seven feet wide) could upset the entire mechanism. Furthermore, it is not unlikely that primary productivity could be increased as a consequence of the construction activity including the revegetation and restoration programs proposed by Arctic Gas.

Page I-213

Statement: "III. The prairie potholes region contains a very special ecosystem . . ."

Statement eliminated in FEIS.

Response:

This is a highly speculative statement which is not based on any factual material and also assumes that Arctic Gas' drainage control measures will be unsuccessful. Furthermore, no spatial boundaries have been applied to the so-called "special ecosystem."

Page I-214

Statement: "V. Complexities of processes and interactions within ecosystems make it difficult to predict the impact of the proposed pipeline system on the many eco-systems involved. Experience has shown, however, that the indirect consequences are potentially more significant than the direct and more obvious ones."

Statement eliminated in FEIS.

Response:

The DEIS does not indicate what is meant by "indirect consequences" occurring as a result of the construction, operation or maintenance of a pipeline. The statement is so speculative that it should be deleted.

Page I-214

Statement: "IV. Adverse impacts would come about because of short-term surges of demand for housing; demand for Federal, state and community services; . . . education, . . ."

Response:

Because of the smaller scale of activities in Alaska of the Arctic Gas Project, as compared with Alyeska, it is anticipated that services will be available in Alaska to handle the demands of the Arctic Gas Project.

Page I-214

Statement: "During construction, production would be destroyed in agricultural . . . throughout much of the route. . ."

Response:

It should be pointed out that the landowners would be compensated for crops not produced during the construction period. There is, of course, no agriculture on the North Slope of Alaska.

Page I-215

Statement: "I. In areas where the proposed pipeline right-of-way would cross substantial portions of agricultural land the impact during the construction period would be significant."

Statement eliminated in FEIS.

Response:

This statement is misleading as the impact of the pipeline will be restricted to a narrow strip of land and will be insignificant in terms of crop production. Restoration procedures will restore the farmland to pre-construction levels.

Page I-215

Statement: "II. Soil disturbance could have long-range impacts upon the productivity of some types of farmlands, . . ."

Response:

Research studies conducted by the University of Saskatchewan have shown that construction of pipelines have an effect on the productivity of some types of farmlands and this effect has been the increase in productivity. Such works should be referenced as the reader is left with the impression that there will be a detrimental effect on productivity.

Page I-216

Statement: "II. Very little is known about the prehistory occupation. . .".

Response:

Arctic Gas plans to conduct an archaeological survey along the proposed route prior to construction. Significant sites discovered along the route will be excavated prior to construction while any encountered during construction will be salvaged to the extent possible. Arctic Gas has undertaken the preparation of an extensive archaeological program which has been supplied to the Staff of the Commission in the "Archaeological Supplement to the Biological Report Series" dated February, 1974.

Page I-216

Statement: "1) I. The Arctic Slope of Alaska is largely uninhabited at this time and the proposed pipeline and its associated transportation and communication facilities would add noise, machinery and people which would have long-term detrimental effects on this area and its aesthetic resources."

The environmental staff has reviewed this report. Prepared by J.F.V. Millar of the University of Saskatchewan, the report refers to the Canadian portion of the pipeline.

Note appropriate changes in FEIS.

Response:

A detailed response to this statement is provided in "Comments of Alaskan Arctic Gas Pipeline Company Relative to Part II (Alaska) of theDraft Environmental Impact Statement of the Department of the Interior Regarding the Alaska Natural Gas Transportation System" pp. 67-75, submitted herewith.

Inasmuch as Arctic Gas is using satellite communications, its proposed communications facilities would neither add noise nor machinery to the area.

The Arctic Slope of Alaska, while not a metropolis such as Fairbanks or Anchorage, nevertheless is inhabited. Moreover, there are DEW Line stations in this area. A more complete discussion of this area is contained in the section dealing with the Fairbanks Corridor.

Page I-217

Statement: "III. The cleared and disturbed pipeline right-of-way would be a discordant element in the tundra and boreal forest vegetation for many years and would show up as a long, straight line with a color and texture different from the surrounding landscape".

Response:

This statement is true for the boreal forest but requires some clarification for tundra situations:

(1) it implies that the viewer is in an aircraft and not on the ground;

(2) any change in color or texture of the revegetated right-of-way in the tundra would be temporary.

Page I-217

Statement: "IV. Visual impacts would be most apparent in forested areas and in open range or desert country, . . ."

Response:

The Fairbanks route proposed by the Staff crosses considerable forested lands which have commercial value while the Arctic Gas "prime route" crosses none, in Alaska.

Page I-217

Statement: "VI. Pipeline construction access roads would provide public vehicular access in previously inaccessible areas".

Response:

Short permanent roads (total mileage less than 10) only will be built on the North Slope, between airstrips and compressor stations and at staging and stockpile sites. There will not be a permanent haul road across the North Slope, so that "access" by road will not be increased.

Page I-217

Statement: "II. Sulfur dioxide emissions . . . in sufficient concentrations to kill lichens . . .".

Response:

This is not true. Detailed studies have shown that the ground level concentrations of SO_2 will be well below the lethal limit to lichens. Studies on the effects of sulphur dioxide on lichens indicate that there might be acute damage at 0.03 parts per million of sulphur dioxide, some chronic damage at 0.006 parts per million and no damage whatsoever at 0.002 parts per million (F. LeBlanc and N.D. Rao, 1973, Effects of Sulphur Dioxide on Lichen and Moss Transplants. Ecology 54:3:612-617). The maximum concentration of sulphur dioxide in the ambient air at ground level from a 30,000 hp station with refrigeration is expected to be less than 0.0008 parts per million, which is well below the levels considered to be harmful to lichens. (See Appendix C in Comments of Alaskan Arctic Gas Pipeline Company to Part II (Alaska) of the DEIS of the DOI Regarding the Alaska Natural Gas Transportation Systems).

Furthermore, there are few caribou that winter on the North Slope as most caribou migrate south of the Brooks Range. Also lichen are not a major component of plant communities along the Arctic coastal plain.

Page I-218

Statement: "Concentrations of construction equipment at some sites could cause nitrogen dioxide concentrations that exceed National Ambient Air Standards under certain meteorological conditions."

Response:

It is highly doubtful that there would ever be enough equipment in one place, all operating at the same time, so as to produce enough NO_x into the air to violate national standards. Moreover,

If the new data supplied by the applicant is correct, it would appear that the anticipated ground level SO_2 concentrations would not have an immediate adverse impact on lichen. If must be stated, however, that the long-term cummulative impacts of noxious emissions on vegetation are not known. Coupled with the unique characteristics of lichen to absorb and concentrate contaminants, care should be given by the applicant to ensure no adverse impact occurs through the life of the project. Therefore this statement has been eliminated.

Statement eliminated in FEIS.

the DEIS should specify the "certain meteorological conditions" to which it has reference.

Page I-219

Statement: "V. Repair activities at some locations, . . .".

Note additions to statement in FEIS.

Response:

Applicant has repeatedly pointed out that ground access to tundra locations requiring repair during the summer will be provided by low-ground-pressure vehicles.

Whereas the specific types of vehicles have not been selected, a number are being considered, including:

(1) Low ground pressure tracked vehicles which are capable of transporting a payload of 40 tons while exerting a ground pressure of less than 5 psi.

(2) Balloon-tired vehicles.

(3) Rolligon - these vehicles are presently being used on the Alaska North Slope for clean-up operations and comply with existing regulations.

(4) Air cushion vehicles - these vehicles are capable of transporting up to 100 tons with a ground pressure of less than 1 psi.

Further details regarding repair activities are provided in Response #22, Responses to Pipeline Application Assessment Group Requests for Supplementary Information, submitted herewith.

Pages I-219 through 221

Statement: "Four alternative route corridors have been proposed by Alaskan Arctic for the routing of the pipeline through Alaska . . ."

Response:

It should be pointed out that the Arctic Gas application indicated that in the Beaufort Sea offshore route, there is still no technology to guarantee that in the event of a disruption of service, repairs could be made within the very short time that they would be required. As to the Fairbanks and the Fort Yukon corridors, Arctic Gas indicated that they are much longer with such additional costs as to make use of these routes uneconomic; and furthermore, the additional many miles of route,

much of it through environmentally important territory, indicated to the applicants that the environmental impacts in these areas would be greater than on the proposed coastal route.

Furthermore, in the comparison of the two long routes with the preferred route, Arctic Gas noted that there has already been disturbance along the Beaufort Sea coast and the MacKenzie River Valley. In addition, Arctic Gas indicated that the two most important aspects to be considered were, namely, the much greater length of the proposed alternatives than the Coastal route, which resulted in more mileage from which environmental impact may arise which, in turn, would require more pipe, and consequently, more fuel required to transport the gas. This, in turn, would result in there being less gas in the marketplace.

Perhaps even more important is the fact that the north coastal area, particularly the offshore, is looked upon by geologists as having the greatest potential for additional gas reserves. If this evaluation is correct, then one would anticipate in the future, development of these reserves and a pipeline to connect them. Such a line could be near the coast, or perhaps threading through the mountains to the southern alternative routes to carry this gas to markets. There is, therefore, a substantial possibility that if the Fairbanks or Fort Yukon corridors were used, there would later be need to construct some or all of the northern portion of the Arctic Gas proposed Coastal Route to connect additional gas supplies. Clearly, such a situation would mean many more miles of pipeline in this region, and the ultimate result would be a pipeline or pipelines in areas along the coast where the "Prime Route" is now proposed.

As between the Prime Route and the Interior Route, Arctic Gas has preferred the Prime Route because it is substantially less expensive than the Interior Route and would have less potential for environmental impact than the Interior Route.

It should be noted that Arctic Gas has demonstrated that a route through the Wildlife Range will result in no significant adverse impact upon the Range itself or wildlife usage of the Range. Further, the "Coastal Route" proposed by the Bureau of Land Management is, in fact, a minor variation from the Prime Route proposed by Arctic Gas. As indicated in Arctic Gas' Comments to the DOI-DEIS, Arctic Gas has chosen a route slightly farther from the coast than the "Coastal Route", but still wholly on the Coastal Plain, north of the foothills of the Brooks Range. These two routing variations within the general coastal plain corridor are not markedly different.

Page I-222

Statement: "Subsection b) Canadian Route Alternatives"

Statement eliminated in FEIS.

Response:

The DEIS also discusses several alternative routes in Canada which fall into two categories:

(a) Routes which enter Canada south of the Prime Route (for the Interior, Fort Yukon and Fairbanks routes) and allow the mainline to stay well west of the Prime Route in the Territories (Fort Yukon and Fairbanks routes), and are joined by the Mackenzie Delta supply line at or to the southwest of the Prime Route junction;

(b) Routes which are joined by the Alaskan supply line in Canada in the same area as is the case with the proposed Arctic Gas Prime Route, and utilize the Mackenzie River corridor route, but then lie well to the east of the Prime Route through the Canadian Provinces.

Each of the routes in category (a) were discussed at length by Arctic Gas in its Environmental Report and were shown to involve no environmental advantage in Canada, more difficult logistics in construction (in part because of the distance to the Mackenzie River), mountain construction, and more pipeline miles and cost.

The category (b) routes do not deviate from the Mackenzie River Corridor but lie to the north and east of the proposed route in the Canadian Provinces and of the Northern Border proposed route in the United States. The routes are somewhat longer in Canada. The Liard River - Wolf Lake - Emerson Corridor parallels existing pipelines less than the Prime Route in Canada and somewhat more in the United States, while the Edmonton-Regina route follows an oil pipeline part way. None of these routes was deemed, in preliminary analysis, to have environmental advantages over the Arctic Gas project, and therefore were not studied further, as more detailed work progressed in the planning of the project.

Page I-226

Statement: "In view of the fact that ITAA has amended their application to propose a 390-mile route from Kingsgate, British Columbia to Rye Valley, Oregon, the originally proposed east and west alternatives of the applicant and the combined PGT-PG&E-ITAA-SoCal route alternative proposed by DOI do not appear to be viable alternatives."

Note appropriate changes in FEIS.

Response:

Applicant does not understand the meaning of the statement: it is simply unclear what is not viable alternatives and why.

Pages I-226, 227

Statement: "e) System Reduction Alternative"

Response:

In subsection e), pages I-226 and 227, the DEIS proposes a "possible alternative" in which the "West Coast lines" would not be constructed, so that all gas would be delivered into the Northern Border system and "volumes destined for the western United States" would be taken from the "Permian Basin reserves, and to some extent the Hugoton-Anadarko supplies", which would "be diverted for use on the West coast." It is also proposed that the Northern Border facilities "be sized down to accommodate the initial gas volumes of 2.2 billion cfd to be produced in Prudhoe Bay." This is an oversight, in view of the fact that, as noted at page I-201, the Northern Border capacity is 1.5 Bcf/day, and this would have to be "sized up" to carry all of the Prudhoe Bay gas. The proposal also is that the Northern Border line be terminated "in the Chicago area rather than continue on to Delmont, Pennsylvania".

Note word change in FEIS.

These proposals by the DEIS do not state whether they are made on the basis of environmental, economic or other considerations. In fact, no reasons for the proposals are given . However, at pages I-255 and 256, the general recommendations are repeated as "environmental conclusions". This time, however, two additional recommendations are made: (1) that the Alaskan Arctic line be built along the "proposed Fairbanks Corridor alternative route"; (2) that the Northern Border route be along the "Red River Corridor". Again, no rationale for the proposals is given. In addition, no mention whatsoever is made of Canada. It is obvious that the proposals would require a wholly different route in Canada than proposed as the Prime Route by Arctic Gas, covering a different territory, both in the line which would carry the Prudhoe Bay gas, and also in the supply lateral from the Mackenzie Delta to the intersection of the line carrying the Prudhoe Bay gas. No mention is made of the Canadian line, environmental consequences relative thereto, or Canadian attitudes relative to such proposed alternative.

The recommendations of the DEIS will be dealt with in detail later in this document (Fairbanks Corridor, p. I-255) and in the comments simultaneously being filed by Northern Border, ITA(A) and PGT. Suffice it to state at this point that Arctic Gas can see no measureable environmental advantage to the elimination of the Western legs of the system. The proposed lines are to be constructed in the most modern manner, after extensive surveys of wildlife in the area, soil and other natural conditions and methods of construction. Accordingly, any environmental change produced will be exceedingly temporary, during the construction period, and will have no injurious effect upon the natural environment.

Nor can Arctic Gas see any environmental benefit in the routing proposed for Northern Border along the Red River Corridor or for the elimination of the proposed facilities east of Kankakee, which are also planned for construction and operation in an environmentally protective manner. No showing of such benefits is made in the DEIS.

Page I-227 through 254

Statement: "C. El Paso Alaska System"

Response:

The predicted impact of the El Paso system in Alaska is set forth immediately after the predicted impact of the Arctic Gas Project. This would lead one to conclude that the two projects should be compared on the basis of the information contained in the DEIS at those pages.

However, the DEIS treatment of the competing systems is seriously lacking in balance. The document attempts no independent evaluation of the Arctic Gas' environmental effect but purports to summarize "the more significant impacts of the Arctic Gas System pipeline" as described by the DOI-DEIS. On the other hand, it presents its own assessment of the impact which would result from El Paso's proposal. The following are representative of the anomolous results of this methodology:

a. Ice fog. The Arctic Gas proposal is described as emitting water vapor at compressor sites which "would affect the climate immediately adjacent to each compressor station in the Arctic areas" and would result in ice fog. On the other hand, a purported advantage of a Fairbanks corridor is the encouragement of industrial growth in the Tanana Valley, yet the statement is made (Vol II, p II-253) that "construction of the pipeline should have no effect on the climatology of the region", even though the same paragraph recognizes that even now "ice fogs are quite common in the Fairbanks area." No mention is made of added industrial vapor emissions. In the one case (Arctic Gas) the result is presumably adverse, even though there is no human habitation which would be affected by ice fog; in Fairbanks, it is "insignificant" even though it is near the area covered by Alaska's second largest city.

Note changes in FEIS.

The environmental staff reiterates that ice fogs are common in the Fairbanks area because of vapor emissions from vehicles, heating systems and industries and that emissions of water vapor from compressor stations would not significantly affect pipeline operations in Fairbanks, the Tanawa Valley and elsewhere.

b. Topography. It is claimed the Arctic Gas Project "would change the character of the terrain in certain local instances, modifying its contours and dimensions" (Vol. I, p. I-208) whereas "Topographic impacts of the proposed [El Paso] pipeline would be primarily confined to the vicinity of the pipeline" (Vol. II, p. II-253). This is a juxtaposition of relative impact in view of the fact that Arctic Gas will utilize the flat coastal plain while both El Paso and the Fairbanks corridor traverse severe mountain terrain.

Note changes in FEIS.

c. Landslides. Landslides are cited as the potential cause of immediate danger and/or loss of life or future pipeline rupture on the Arctic Gas route (Vol. I, p. I-209) but were apparently deemed not worthy of mention by the FPC Staff, relative to the Brooks, Alaska, or Chugach Ranges and areas of high seismic risk.

See Page I-231, number 5 of DEIS.

These examples of inconsistencies could be extended considerably, but they serve to demonstrate that broad acceptance of DOI's summary findings, without regard to mitigating measures, cannot be matched against the fuller discussion accorded the alternate routes.

Page I-227

Statement: "The proposed pipeline through Alaska would essentially follow the pipeline corridor delineated for the Alyeska oil pipeline from Prudhoe Bay to Valdez."

Note appropriate changes in FEIS.

Response:

While both pipelines could be located in a common "utility corridor", they still will not be located within a common right-of-way. As a result, the El Paso route would traverse non-impacted terrain even though it could be located within the oil "corridor" established for Alyeska. In addition, the El Paso route diverges from the utility corridor for considerable distances, e.g., Thompson Pass to Gravina Point.

Page I-230

Statement: "This ice fog could result in a safety hazard . . ."

Note appropriate changes in FEIS.

Response:

The incidence of ice fog would be greater along a pipeline route in the interior of Alaska than for a route paralleling the coast. This is due to the greater frequency of inversion conditions in the interior than along the coast.

Page I-230

Statement: "II. Construction of the LNG terminal facilities would also result in terrain modifications but their areal extent would not be intensive".

Note appropriate changes in FEIS.

Response:

The LNG plant site itself would require approximately 450 acres of forrested area in the Chugach National Forest. It is, therefore, unclear what the drafters mean when they state the "areal extent would not be intensive."

Page I-230

Statement: "c) Geology and soils".

Appropriate statement has been added to FEIS.

Response:

No consideration is given to the likelihood of avalanches, landslides, icings, or glacial surges. These hazards are particularly critical in the South Coastal Region of the El Paso route.

Page I-231

Statement: "2) Large amounts of gravel . . . for installation of this proposed El Paso gas pipeline."

Response:

Furthermore, the DOI-DEIS (Part VI, p. 856-857) states "An estimated 6.5 million cubic yards or more of construction materials would be required during construction of this alternative. Most of the material would be gravel taken from active and fossil floodplains. This would have a serious impact because it would be the third major construction project along portions of the route. In the Gulkana Basin the gravel supply is inadequate for construction of the oil pipeline. In the Sagavanirktok River Valley the construction of the road has seriously depleted the gravel resources in several areas. The gravel requirement for construction of the oil pipeline will very likely carry the total gravel commitment beyond reasonable and acceptably limits in some areas."

Page I-234

Statement: "The vegetation, especially lichens, could be affected by the sulphur dioxide emissions from the compressor stations. This could affect the abundance of primary winter food sources to the caribou."

Statement eliminated in FEIS.

Response:

Compare this statement concerning sulphur dioxide emissions on the El Paso line with a similiar statement on page I-217 concerning sulphur dioxide emissions on the Arctic Gas line. The latter is a much stronger statement, for no apparent reason. These statements should read the same for the two systems, and, as pointed out above, the effects will not be injurious.

Page I-236

Statement: "2) Pipeline construction and operation in Alaska would cause interference with the migrating movements of the caribou . . .".

Note additions to statement in FEIS.

Response:

The Trans-Alaska pipeline would pass through the over-wintering habitat of the Arctic, Nelchina and the Central Brooks Range herds.

Page I-235 - 237

Statement: "f) Wildlife".

Note additions to "Wildlife" section in FEIS.

Response:

No mention is made regarding the fact that the El Paso route passes through or close by to critical sheep habitat (mineral licks and lambing areas), raptor nesting sites (Franklin Bluffs, Gravina Point), and critical fisheries areas (spawning, rearing, migration and overwintering areas).

Page I-238

Statement: "The DEIS provides that the El Paso project would 'attract immigrants to the state, increasing the population over what it would otherwise have been. This in turn would create a demand for social services, schools, housing, health care, and public safety.'"

Response:

The result is that the El Paso project will probably increase the unemployment rate in Cordova and in Alaska as a whole.

Page I-230 through 245

Statement: "Environmental Impacts of Proposed Action".

Response:

The DEIS should consider ice bergs in its determination of impact. The U.S.G.S. reports that ice bergs have been calving off the Columbia Glacier in Prince William Sound and is the cause of considerable concern with regard to navigation (see article: Carter, L. J., 1975, "Icebergs and Oil Tankers: U.S.G.S. Glaciologists Are Concerned. Science 190:641-643, submitted herewith).

The Columbia Glacier problem was addressed on Page II-495 in the DEIS.

Page I-255

Statement: "The Alaskan Arctic route of the Arctic Gas System should be constructed along the proposed Fairbanks Corridor alternate route. This right-of-way would involve construction of approximately 735 miles of pipeline in Alaska. The first 460 miles would extend south from Prudhoe Bay adjacent to the Alyeska oil pipeline right-of-way to just northeast of Fairbanks. From the point the route would proceed southeasterly along the Alaskan Highway for 275 miles to the Canadian border.

Response:

The DEIS provides that the "route of the Arctic Gas System should be constructed along the proposed Fairbanks Corridor." This statement appears under the subtitle "FPC Environmental Staff Conclusions." However, it must be emphasized at the outset that no reasons nor rationale have been provided by the DEIS in support of this "environmental conclusion." It is not stated why the Fairbanks Corridor should be utilized, or why it is environmentally preferable to the Prime Route proposed by Arctic Gas from an environmental, engineering, cost, or any other standpoint.

Indeed, although the DEIS provides that the Staff has made an "in-depth review of the applicants' environmental analysis and information from other sources," its analysis does not appear in the DEIS and the "information from other sources" has not been delineated. Nor is there any analysis in the DOI DEIS, relied upon by Staff, which would reasonably support this conclusion.

If, contrary to what we request above, Staff is unwilling to withdraw the conclusions set forth in its DEIS, then plainly this conclusion must be changed to accord with the overwhelming

environmental (biotic, abiotic, socio-economic), engineering, economic, cost, etc., evidence presented by Arctic Gas. This evidence demonstrates that the Prime Route proposed by Arctic Gas is preferable to the "Fairbanks Corridor", or any other route or mode of delivering the vast supplies of Arctic gas to markets badly in need of such supplies in the lower 48 of the United States and southern Canada. Furthermore, in the DOI-DEIS section entitled "Comparisons of Impacts for All Alternatives" in Vol. 3, Part III, it is stated, "Thus, facilities along the Wolf Lake and Fairbanks Corridor would have substantially greater impacts, in Canada, than those along the prime route"; (p. III-1786).

Arctic Gas has invested nearly 15 million dollars during the past five years in unprecedented environmental research on wildlife (mammals and birds), fish and vegetation, and in the preparation of extensive socio-economic studies and archaeological programs. The purpose of these studies was to determine the most environmentally desirable route to transport the vast amounts of natural gas in the Arctic regions of the State of Alaska and in Canada to markets in the lower 48 of the United States and the southern regions of Canada.

This research, which presently is ongoing. thoroughly is reported in the 34 volumes of the "Biological Report Series" published by Arctic Gas to date (and the various archaeological and socio-economic supplements to such Series). It was summarized in Alaskan Arctic's Environmental Report filed with its application to the Commission. The environmental work undertaken by Arctic Gas has been recognized to be of immense scientific value and the results of such research have been made available to the Governments of the United States and Canada, the academic and scientific communities and the public at large.

Arctic Gas' environmental research was undertaken under the supervision and direction of a team of highly respected independent scientists. For example, Dr. A. W. F. Banfield, a world-renowned mammalogist, who presently is Professor of Environmental Studies at Brock University, provided overall advice and expertise to the environmental program conducted by Arctic Gas and particular expertise on mammals. Dr. Banfield, a Fellow of the Arctic Institute

of North America, formerly was the Director of what is now the Canadian National Museum of Natural Sciences, and has conducted considerable work in Arctic and sub-Arctic regions throughout the world since 1946. Other independent consultants included:

(1) Fish: Dr. Peter J. McCart, President of Aquatic Environments Ltd., a zoologist with particular expertise in ichthyology, who previously served as a consultant to Alyeska Pipeline Service Company;

(2) Mammals: Mr. Ronald D. Jakimchuk, President of Renewable Resources Consulting Services Ltd., a zoologist, formerly Regional Wildlife Coordinator for the Canada Land Inventory for the Canadian Wildlife Service, and Mr. David G. Roseneau, Senior Wildlife Biologist for Alaskan Programs for Renewable Resources, with Degrees in Wildlife Management and Zoology;

(3) Birds: Dr. William W. H. Gunn, President of LGL Ltd., a zoologist with particular expertise in ornithology;

(4) Vegetation: Mr. Donald L. Dabbs, Manager of the Environmental Division of R. M. Hardy and Associates Ltd., with Degrees in Agriculture and Plant Ecology;

(5) Geotechnical: Dr. John I. Clark, Supervisor of Geotechnical and Enviornmental Studies for Northern Engineering Services Company Ltd., a Civil Engineer specializing in soil mechanics and foundation engineering; and

(6) Socio-Economic (Alaska): Mr. David Boorkman, a Partner in Urban and Rural Systems Associates, who specializes in social and economic impact assessment and who has done extensive socio-economic work for, among others, the Federal, state and municipal governments including the State of Alaska.

These specialists have worked closely with Mr. R. A. Hemstock, Director of Environmental Studies for Canadian Arctic, and Dr. Karl E. Francis, Director of Environmental Affairs for Alaskan Arctic, both of whom have extensive experience in Arctic and sub-Arctic regions. Mr. Hemstock is a Civil Engineer and has over 30 years of pipeline and related experience in Arctic and sub-Arctic regions. In 1973, he was elected as a Fellow of the

Arctic Institute of North America. Dr. Francis holds Degrees in Geology and Mineralogy, Natural Resources and Geography. He has done graduate work in glaciology and has conducted broad research in the State of Alaska and in the Northwest Territories of Canada.

The educational and professional background of each of these individuals was presented in the testimony submitted by them to the Commission in connection with Alaskan Arctic's application and such individuals were cross-examined with regard to their respective studies and the conclusions reached as a result of those studies. Of course, many other professionals with training in the environmental disciplines and with experience in the North worked on this project throughout the years.

The field and laboratory environmental research programs which have been conducted by Arctic Gas have extended from Prudhoe Bay in Alaska to the two delivery points on the International Boundary between Canada and the lower 48 of the United States. "Baseline studies" were designed to obtain fundamental information on the existing environment. "Disturbance studies" were designed to assess the effects on wildlife, fish and vegetation of disturbances arising from the construction, operation and maintenance of the proposed pipeline such as compressor station noise, aircraft activities, human presence, etc. All of these studies were designed and carried out in order to assure the construction, operation and maintenance of the most environmentally desirable pipeline.

It is important to emphasize that these specialists believe that the proposed coastal route can be constructed without serious adverse impact to wildlife, fish and vegetation, provided that Arctic Gas constructs, operates and maintains its proposed pipeline in accordance with the plans it has developed. The environmentalists agree that Arctic Gas has taken practicable steps to avoid or mitigate adverse environmental impacts both in locating its line so as to avoid environmentally sensitive areas and through the development of major engineering features such as winter construction of a buried and chilled pipeline. Other environmentally mitigative features include revegetation and restoration of the right-of-way, the use of winter snow and ice roads, the use of low ground pressure vehicles, control of aircraft flight patterns and traffic, and the development of management procedures for the control of personnel.

In this regard, it should be noted that the proposed coastal route is preferred to the Fairbanks Corridor by the mammal, fish, vegetation, socio-economic, and geotechnical consultants as well as from an overall environmental standpoint by Dr. Banfield, Dr. Francis and Mr. Hemstock. The consultants on birds prefer the

Interior Alternative Route or Fairbanks Corridor because they principally are concerned about some presently unforeseen factor or combination of factors degrading portions of the shoreline environment, an important area for birds such as snow geese. It is Dr. Banfield's judgment that since the pipeline will be constructed in the winter when the birds are not there, such concern is much less significant than other considerations pertaining to the Interior Route or Fairbanks Corridor. Dr. Banfield's testimony and cross-examination in this regard are attached hereto as an Appendix. Dr. Banfield has concluded that the "Fairbanks Corridor [would have] more environmental impact than the coastal route" (T. 3290-91).

Staff does not address this overwhelming environmental evidence in the DEIS. However, it clearly demonstrates that on environmental grounds alone, the Coastal Route is preferable to the Fairbanks Corridor.

Other comparisons are appropriate. For example, seismic activity along the Arctic Gas "Prime route" is low. The United States Geological Survey in its 1971 paper, "Existing Environment of Natural Corridors from Prudhoe Bay, Alaska to Edmonton, Canada", (U.S.G.S. Paper 502) states, "seismicity does not pose significant engineering problems." Seismic activity along Fairbanks route is considerably higher especially in the Fairbanks and Big Delta areas of Alaska and the Shakwak Valley in Canada.

Faults are not a major factor as the "Prime Route" crosses only one fault in Canada, and that is inactive. Routes through southern Alaska and into Canada by the Alaska Highway lie in close proximity to the Denali Fault in Alaska. In Canada, the continuation of the "Fairbanks" route crosses the Skakwak Valley Fault at the Slims River. This major fault is known to have experienced significant lateral slip in the holocene epoch (Grantz, 1966). The Prime Route of the Arctic Gas pipeline crosses gentle rolling land cut by narrow steep sided but shallow valleys through Alaska and northern Canada. The DEIS would require the selection of the second best pipeline alignment through the Brooks Range, the removal of significantly more trees, and the construction through miles of muskeg areas, across deeply incised river valleys up to several hundred feet deep, and along narrow, steep river valleys, some averaging only 100 feet wide.

Although the Arctic Gas "Prime Route" crosses the Arctic National Wildlife Range, which is discussed below, the Fairbanks route crosses the Tetlin Northway Area which has been proposed as a National Wildlife Refuge. In addition, it involves construction through the intermittently forested land in the Tanana River Valley and the muskeg areas near the Canadian border, which are important wildlife areas.

Finally, this longer, high capital and operating cost, more environmentally disturbing and high geotechnical risk route, would require that about 6% more gas be burned as fuel, resulting in less gas being delivered to the gas consumer.

The Fairbanks Corridor has the surface appearance of following "disturbed areas" and thus offering little additional impact. In fact, however, the Fairbanks Corridor is more difficult from a design and construction point of view, and is very substantially more expensive for consumers than the Prime Route. The substantial additional expense is a function of the greater length of the route, and of the more difficult terrain through which it must be constructed. Arctic Gas computed the cost of such route in 1973 dollars at about $2.4 billion more expensive than the Prime Route, with about 50% higher operating costs. Since then, cost estimates have increased and the differential has widened somewhat. The difficulties inherent in the construction of the Fairbanks Corridor are obvious, i.e., it passes through the Brooks Mountain Range, which poses several engineering problems, and also requires extra construction because of its length. This length, however, also has environmental ramifications, as does the routing. And, as noted above, Dr. Banfield and other experts have concluded, after extensive study, that the "Prime Route" of Arctic Gas is best, on balance, from a purely environmental point of view. These represent a balanced biological point of view, by totally-qualified independent experts.

Moreover, although the "Fairbanks Corridor" would run in the general vicinity of the Alyeska Oil Pipeline, it deviates from it by substantial distances at many places and is not on the same right-of-way, even before it swings to the east and totally leaves the "oil corridor." Whether it is environmentally preferable to have two pipelines adjacent, or more widely separated, is a question which seems to have supporters on both sides. What is important to note is that none of the alternatives really contemplate adjacent pipelines so that:

(a) if adjacent location is an advantage, it is not achieved by the "Fairbanks Corridor", which thus does not have an advantage over the Arctic Gas Prime Route; and

(b) if adjacent location is a disadvantage, that is not produced either by the Fairbanks Corridor, but is also not produced by the Prime Route.

The same point is true of the relationship of the Fairbanks route and the Alcan Highway.

Moreover, as discussed more fully below, a "corridor" which leads 90° away from a target destination, i.e., the Mackenzie Delta reserves, is of little use in achieving the purpose of the instrumentality involved. A corridor may also become overloaded to the point where incompatible uses constitute a safety hazard. When a corridor becomes so large as to constitute an adverse environmental impact in and of itself, sound ecological management may well dictate a new and separate route.

A Fairbanks route will not serve Canadian reserves efficiently. That corridor simply does not go where the gas pipeline service is needed. Nor have all the consequences of a single corridor through northern Alaska (north of Alaska Range) been thoroughly evaluated. Three systems (highway, oil and gas) using a single crossing of the Yukon River poses a major problem of service interruption in the event of that span's failure. At a number of points, this so-called "corridor" may well be many miles wide due to construction, safety or other factors, with results exactly opposed to those being sought. Such a concept leaves no provision for facilities which may be needed in the future and for which no other route is feasible (a second oil line to serve Petroleum Reserve No. 4, for example). These contingencies or limitations tend to neutralize or defeat any claimed advantage of common corridor planning.

The proposed Arctic Gas System not only is superior environmentally to all other routes but is aligned so that it lies adjacent to the last major unexplored sedimentary basin in the North American Continent in Alaska and Canada. An alignment through the interior of Alaska and outside of the Coastal Corridor will by-pass these sedimentary basins. Therefore, construction of future pipelines to connect these reserves to a pipeline built along the Fairbanks Corridor would have far more environmental impact than if such pipelines could be attached to a pipeline constructed along the Prime Route.

Additionally, plans are now being considered to develop and produce oil and gas reserves from Navel Petroleum Reserve No. 4. Since the present design capacity of the Alyeska Oil Pipeline is 2,000,000 bbls per day, a second hot oil pipeline will be required to be constructed when oil from Navel Petroleum Reserve No. 4, or from additional oil reserves developed, is produced (U.S. Department of Interior, Final Environmental Impact Statement - Proposed TransAlaska Pipeline, 1972-PB 206 921 6). The existing Arctic Gas pipeline is designed to transport 4.5 bcf/day eastward into Canada. This capacity increase over the filed capacity of 2.25 bcf/day can be obtained by the installation of compressor stations in Alaska. If the Fairbanks Corridor is occupied by an oil and gas pipeline, the second hot oil pipeline may be

required to be routed eastward through the Arctic National Wildlife Range or southwestward through the proposed Gates of the Arctic Park, Alaska Resource Lands and/or the Gates of the Arctic Reserve outside of the existing transportation corridor. A third large diameter pipeline would most likely require pipeline construction through Anaktuvuk Pass to get from Prudhoe Bay through the Brooks Mountain Range.

After considering the probable hydrocarbon producing areas of Alaska, especially for natural gas, it becomes apparent that North Slope gas should be transported eastward, north of the Brooks Range to markets in the lower 48. This plan is not only environmentally superior and more economically viable than other alternatives, but aligns the energy transportation systems through Alaska so that their operating characteristics (hot oil vs. refrigerated gas) are compatible with their surrounding soil conditions.

It should be noted that after considering the ruggedness of the land and the natural hazards (i.e., earthquakes, faults, soil problems), it is correct to install cold operated gas pipeline facilities in a northern corridor through Alaska and into the northern Yukon Territory.

The applications filed by the Arctic Gas Project are explicit in setting forth the comprehensive purpose which they are collectively designed to serve. That purpose has, at all times, been twofold: (1) to obtain gas supplies from the two major producing areas of the Arctic coastal regions of Alaska and Canada; and (2) to directly deliver natural gas to market areas critically in need of such supplies by a single conventional natural gas pipeline transmission system with a minimum amount of environmental impact and yet achieving the maximum economy of pipeline mileage and related facilities. The Arctic Gas System was conceived and designed by cooperation of the United States and the Canadian energy industry to provide the most feasible system, both economically and environmentally, to transport growing reserves of natural gas from the Arctic regions to energy deficient markets in both countries. The recommendation of the DEIS that Arctic Gas utilize the Fairbanks Corridor totally ignores this basic route design concept.

The fact that the Arctic Gas Project will carry Canadian gas will be beneficial to the United States, as well as Canada, in several basic ways. One is that the large volume transportation of U.S. and Canadian gas jointly produces economies of scale in transportation costs, with benefits to each nation, including production stimulation. The Arctic Gas "Prime Route" best satisfies the principle of economies of scale.

There are other gas supply benefits too. First, like any nation, Canada will export its products if it has enough to meet its own demand and can carry on the export in an economic fashion. Canada too, is running short of energy. However, Canada has discovered huge volumes of gas, not only in the Mackenzie Delta, but also in the Beaufort Sea, and there is prospect of much more. The Arctic Gas Project is the most feasible way to secure that gas, since there is not yet enough gas to make a "Canada-only" line feasible, and it would provide more expensive transportation in any event. When the Arctic Gas Project is accomplished, and the gas reserves of the Arctic areas of Canada are developed, the prospects of greater volumes of gas to be sold to the United States than would otherwise be the case are clear, with obvious potential benefit to the United States.

More immediately, however, the United States is now importing substantial quantities of gas (about three billion cubic feet a day) from Canada. Canada, without early access to Delta reserves, will have difficulty in meeting its own needs and existing export commitments. In fact, shortages may occur prior to connection to Delta supplies, which could result in a sharing of such shortages between the export and domestic Canadian markets. Access by Canada to its Arctic gas will greatly reduce, and hopefully eliminate, the chances of such occurrence, so again the United States has a direct stake. But, as explained above, the Arctic Gas Project is Canada's only way to get access to its Arctic gas in a timely and economical fashion.

One possible reason why the DEIS recommends the Fairbanks Corridor is because it avoids the Arctic National Wildlife Range. However, if this is a basis for the Staff's proposal, it has no justification in fact. The Wildlife Range is located in a remote portion of northeastern Alaska and is bordered on the north by the Beaufort Sea, on the east by the Yukon Territory, and on the west and south by Alaska. It is a huge expanse of land of approximately 9,000,000 acres in size and is comprised of Arctic coastal plain, foothills, and the Brooks Mountain Range. Arctic Gas' proposed pipeline will be located in the northern portion of the Range in the Arctic coastal plain.

From the standpoint of wildlife, the coastal plain is distinguished for two principal reasons: (1) it is the traditional calving grounds for the Porcupine caribou herd; and (2) the area along the coast of Alaska is known as a major area for waterfowl. With respect to the caribou calving grounds, the area used by the Porcupine Herd for calving is over 4,000 square miles, and the proposed pipeline route is north of the major portion of the calving grounds. The pipeline will be constructed during the winter, before calving takes place and when the herd is on its wintering grounds, well south of the pipeline alignment. Nor will waterfowl be in the area when the pipeline is being constructed.

As noted above, Arctic Gas has undertaken over five years of intensive environmental studies in the North at a cost of 15 million dollars. The expert zoologists, ornithologists, and ichthyologists undertaking these studies have concluded that if Arctic Gas constructs, operates and maintains the pipeline as it proposes, it will have no serious adverse impact on fish or wildlife. Obviously, the "Wildlife Range" principally was established for the benefit of wildlife. Therefore, when, as here, the experts agree that the pipeline will not adversely impact wildlife usage of the Range, or the Range itself, it follows that the pipeline will be consistent with the principal purpose for which the Range was established.

Given these facts, the focus of attention of persons apparently opposed to the pipelime has shifted to the so-called "aesthetic" or "wilderness" characteristics of the Range, which argument follows that portion of Secretary Seaton's Public Land Order 2214, dated December 6, 1960 (25 Fed. Reg. 12598), establishing the Range. Such Order provides, in part, that the purposes of the Range include the preservation of "unique wildlife, wilderness and recreational values." Although the Range is not a "wilderness area", since it has not been designated as such by Congress, the argument is made that the entire Range is de facto wilderness. Nothing could be further from the truth, as far as the coastal portion of the Range is concerned.

The area in which the pipeline will be buried has long been used as a transportation corridor by both primitive and modern man. Today, the area is used as a land, air and marine corridor for the transportation of men and materials. Economic activities commenced along the coast with the advent of whalers in the mid-nineteenth century. Whalers exploited wildlife in the area and, as a result of their presence, a local economy developed between them and native peoples. A village of approximately 160 people exists at Kaktovik which is located on Barter Island within the boundaries of the Range (see Secretary Seaton's Order 2214). Subsequently, Defense Early Warning ("DEW Line") stations were established by the United States Government in order to protect the national security. 1/ An active DEW Line station (with about 50 personnel) presently exists at Barter Island and other abandoned DEW Line sites exist along the coast. The area here involved (i.e., the coastal plain) certainly cannot be compared with an area such as Fairbanks, but plainly it is no "wilderness", as that term is commonly understood.

1/ It is not unreasonable to suggest that a pipeline transporting vitally needed Arctic gas supplies is just as much in the national security as the DEW Line sites.

With respect to "aesthetic qualities" of the coastal portion of the Range, the pipeline, of course, will be buried and the ditch line revegetated so that the pipeline itself cannot be said to detract from the Range's "aesthetic qualities." In the future, a maximum of four compressor stations, about fifty miles apart, will be installed as necessary to assure full utilization of the line (thereby keeping consumer costs to a minimum) but those stations should not materially detract from the "aesthetic quality" of the landscape, in light of the DEW Line stations presently located along the coast. They will add to the evidence of man's presence, but their impact will be local in nature and only to those who choose to utilize the coastal plain. In any event, any "aesthetic impact" will be dependent upon the perception of the individual, the method by which the coast is viewed, i.e., land, air, or sea and the nature of the surrounding elements (air, water, odor, vistas, wildlife, temperature, etc.) at the time they are viewed. The pipeline right-of-way and associated facilities will be more visible from the air. On the ground, these facilities will be unobservable or unperceived short distances away from their actual location. Hunters, fishermen, photographers, mountain climbers, boaters and students utilize the Range but the construction, operation, and maintenance of the proposed pipeline and related facilities certainly will not alter whatever recreational use presently is made of the 9,000,000 acre Range.

Some have argued that the pipeline "would cut across an essentially undisturbed continuum of Arctic Coast, Arctic Coastal Plain, Northern Foothills and the Brooks Range" (see DOI-DEIS at p. I-215). The key work here is "essentially", and that requires emphasis, for whatever "continuum" there may have been has already been broken by the establishment by the Government of DEW Line sites and by the villagers of Kaktovik. Nor should the reader be deceived that the pipeline will traverse all of the components mentioned above. The pipeline will only traverse the Arctic coastal plain and will not be in the foothills or the Brooks Range. Finally, the area where the pipeline will be located is not "unique", inasmuch as similar sequences of terrain can be found all across the coastal plain.

In light of the fact that the pipeline and related facilities would not adversely affect the Range itself or wildlife usage of the Range, this is no basis for preferring the Fairbanks Corridor. This is especially true when the experts agree that the Prime Route is preferable to the Fairbanks Corridor from a purely environmental standpoint, as well as for economic and energy conservation reasons, and this should be the all important point to governmental, as well as to interested environmental groups.

Another possible reason for Staff's recommendation is its belief that gas could be made available to the City of Fairbanks if its proposal were implemented. However, there is no justification for this since, by Staff's own admission, the possible new industrial user demand in the Fairbanks market is "highly speculative" and much of the existing demand would be for boiler fuel. (See earlier discussion re pages I-152 to I-164).

The DEIS appears to rely upon the following documents in concluding that the Fairbanks Corridor should be preferred:

(1) "Alaskan Natural Gas Transportation Systems; Economic and Risk Analysis," prepared by the Aerospace Corporation, June 1975;

(2) "Impact on the Alaska Economy of Alternative Gas Pipelines," prepared by the Institute of Social, Economic and Government Research, University of Alaska, April, 1975;

(3) "Evaluating the Use of North Slope Natural Gas in Alaska," prepared by Resource Planning Associates, October, 1975.

In general, the Staff's recommendation of the Fairbanks Corridor does not follow directly from the findings of any of these Reports. In the case of the socio-economic impact in the Fairbanks Corridor, there simply is not extensive data even when the DOI DEIS, Part II, Volume 3, which is referred to by the Staff as the basis for its findings, is taken into account. In any event, three basic questions should be considered:

1. Cost of Service to Fairbanks

The DEIS first assumes that Alaska will take its royalty gas in kind rather than in value, an assumption which is questionable in light of the analysis of the RPA document. The DEIS then assumes a zero wellhead price as a means to determine the market for gas in Fairbanks. This assumption stands in contrast to the normally discussed wellhead price of 50¢/Mcf. The methodology utilized by the DEIS to compare Kenai/Cook gas to Prudhoe gas is suspect since it assumes different wellhead prices for the two gas sources (15¢/Mcf for Kenai and zero for Prudhoe Bay). In addition, the calculations of service cost do not include the gas distribution system which will be necessary in Fairbanks. Also, there are substantial questions raised concerning the costs of constructing a pipeline to Fairbanks.

See subsection entitled "Supplemental Analysis" in Appendix C of Volume I for a discussion of these issues.

2. Market for Prudhoe Bay gas in Fairbanks

There is no discussion in the DEIS of the impact on the North Pole oil refinery already under construction outside Fairbanks. It is planned to supply 80% of the area's future energy needs. The DEIS makes the questionable assumption that gas is competitive with oil when most of Fairbanks' present energy is provided by coal. Further, the Fairbanks local demand would only be 9.4 bcf/yr (Table 1.B.3.b, VII-2, though as written it includes a mathematical error in the section on Fairbanks Utilities and Institutions). The DEIS adds another 51.0 bcf/yr in demand from induced industrial users, even though the DEIS admits that these ventures are all "highly speculative" projects (p. I-159).

See subsection entitled "Supplemental Analysis" in Appendix C of Volume I for a discussion of these issues.

Finally, the use of natural gas in Fairbanks may be contrary to the stated policies of federal agencies. The FEA encourages first the use of coal and then second the use of oil by-products as an energy resource. Gas is a higher priority item than both of these resources. The distribution of natural gas to Fairbanks would first diminish the use of coal (assuming it is competitively priced) and second, limit the market for fuel oild from the North Pole refinery, both actions contrary to FEA policy.

3. Socio-economic impact on Fairbanks

The DEIS relies upon the DOI DEIS which states specifically: "in the event that gas from Prudhoe Bay is made available for use in Fairbanks, a substantial reassessment of environmental, social, and economic impacts caused by the Fairbanks alternate pipeline system will be necessary." (II:2266). The information and analysis provided by the DEIS does not appear to accomplish this reassessment.

See Appendix C, Volume I for a discussion of possible impacts that might result from use of Prudhoe Bay gas in Fairbanks. At the present time, it is not known whether any of this gas will be available for use in Fairbanks.

The Staff recommends what is tantamount to an entirely different project from that proposed by the sponsors. This revised project serves only one of the resource areas involved and results in greater pipeline length and does not reduce environmental impact. It significantly increases unit costs over the route applied for.

The foregoing makes clear that there is no environmental, engineering, cost, reliability or socio-economic benefit in utilizing the Fairbanks Corridor preferred by Staff. Indeed, as we have shown, the Prime Route is preferable in all these areas. Consistent with the substantive evidence presented, the Staff, if it decides to make a recommendation, should prefer the Prime Route of Arctic Gas over all other routes and modes of transporting the gas. If it continues to persist in the recommendation for the Fairbanks Corridor, the Staff should provide the explicit basis for its recommendation, for examination at hearings.

Page I-255

Statement: The DEIS proposes that "the Northern Border route of this system should be routed along the Red River Corridor alternative route proposed by USDI", which would run through Minnesota and Iowa to the Kankakee, Illinois area near Chicago, where it would terminate and then "utilize existing facilities together with exchange arrangements".

Response:

Implementation of this recommendation would mean a total abandonment of the proposed Northern Border route, which has been thoroughly researched and is environmentally sound. No reason has been given or evidence shown, in support of abandonment of that route, or in support of the proposed route. The environmental rationale of use of the proposed routing is not given, nor is any analysis on a comparative basis given. What existing facilities and exchanges are to be used, and the consequences thereof, are also not given. This is another example of the lack of basis and justification for choices and recommendations on the DEIS.

Page I-256

Statement: The recommendation is made that the "PGT-PG&E and ITAA routes should not be constructed at this time", and that "exchange of gas agreements" be substituted.

Response:

As in the case of the proposal regarding Northern Border, no rationale or basis is given for rejecting environmentally sound proposals, nor is the type of exchanges, or consequences thereof given.

Pages I-255, I-256

Response:

One major and significant element is missing in the recommendations on these pages: any proposal for or concept of the Canadian routing to be used. No single route in Canada covered by the Applicant connects the two border points (on the Alaska-Yukon border and the "Lower 48"-Canadian border) proposed implicitly by the DEIS, nor is there any proposal made in the DEIS to solve the problem. Even a combination of parts of routes studied is not a reasonable way to accomplish the goal, since it would be indirect and circuitous.

There is, therefore and obviously, no showing that the Canadian route necessitated is environmentally desirable, much less preferable. Again, the recommendations are shown to be unsupported and unwarranted.

GENERAL COMMENTS ON VOLUME II

Arctic Gas has demonstrated in its application materials and evidence submitted to the Commission that a pipeline can be constructed in Arctic and sub-Arctic areas with engineering integrity and minimum environmental impact provided sufficient site specific work is undertaken to construct, operate and maintain such pipeline. To the extent that the DEIS attacks this concept in Volume II, Arctic Gas strongly disagrees. However, Arctic Gas would emphasize at this juncture that it has undertaken over five years of site specific engineering and environmental study to assure that its proposed pipeline is constructed with engineering integrity and minimum environmental impact. On the other hand, El Paso simply has undertaken substantially less field study (see cross-examination of Messrs. McCollom, Murphy and Craig in Volumes 59 through 64 of the transcript in El Paso Alaska Co., et al., Docket Nos. CP75-96, et al.) Thus, in the area of the proposed pipeline north of Valdez, critical habitat for mammals, birds and fish have not been located (T. 9401-02) and in the area South of Valdez substantial baseline field work is required (see Exhibit AA-28). This work would not be undertaken until after a certificate is issued. Thus, whereas Arctic Gas could expeditiously proceed to construct its pipeline on the basis of the information it has gathered, El Paso would still be required to undertake detailed field work at a cost of millions of dollars before it could proceed to construction. El Paso and the DEIS frankly admit this, see, e.g., DEIS, pp. II-274, 279, 286 and 290. Arctic Gas is, therefore, years ahead of El Paso in terms of field work undertaken which is an important environmental consideration in assuring that the Arctic gas supplies promptly are brought to market. And, of course, this same point pertains to the Staff's proposal for the Nikiski site and the pipeline route delivering gas to that site.

It is recognized that the El Paso pipeline in Alaska would be located for part of its length in the "utility corridor" in which Alyeska is located. Therefore, our comments pertaining to the Fairbanks Corridor are equally applicable here and are, therefore, incorporated by reference. But it is important to emphasize: (1) that the El Paso project would not be located on the same right-of-way as the Alyeska project within this corridor; (2) that the El Paso route would diverge from the Alyeska route by further than one mile for 28.8% of its length; (3) that in areas where the gas pipeline is less than one mile from the oil pipeline, the two routes are frequently located in completely different terrain and habitat types; and (4) that the pipeline from Thompson Pass to Gravina Point (the location of the LNG plant and marine terminalling facilities) is miles away from the Alyeska line to the oil terminal facility at Valdez. No specific studies were undertaken to determine what an "incremental impact" is (T. 9411).

Moreover, El Paso's witness Dr. R. Sage Murphy of Dames and Moore specifically testified that he used the word incremental in a descriptive and not qualitative or quantitative sense (T. 9407). In these circumstances, there simply is no basis for concluding that the utilization of a "utility corridor" for the delivery of Arctic gas supplies to market is environmentally preferable to the proposed Prime Route of Arctic Gas especially when Arctic Gas has demonstrated by hard scientific evidence that construction, operation and maintenance of its pipeline and related facilities will not have a significant adverse impact on the environment.

Staff states with respect to the El Paso proposal that (P. II-265):

> "The occurrence of large earthquakes is a potentially serious hazard to the integrity of the pipeline system. Seismic shaking or surface faulting accompanying a large shock could rupture the pipeline directly or cause failure in the foundation material that could lead to rupture. Furthermore, large earthquakes could trigger landslides and sea waves that could jeopardize the integrity of the pipeline, the LNG plant, loading dock, and tankers."

And yet, nowhere in the DEIS has the Staff sought to quantify the potential of a major disruption to the LNG plant; and, more importantly, the DEIS has not determined or even discussed the impact that such a reasonably potential but major disruption could have on the markets utilizing such gas. This is an extremely critical consideration since it goes to the heart of the service reliability of the El Paso project. Certainly, the Arctic Gas Project is not subject to this significant threat and we believe that it renders the risk of the El Paso project much less acceptable.

Finally, if the Staff decides to render a conclusion as to which proposal should be certificated in the DEIS, then it is clear from the overwhelming record evidence that the Arctic Gas Project must be preferred from an environmental, cost, reliability and every other standpoint. Arctic Gas has undertaken the studies necessary to determine that its project will not have a significant adverse impact on the environment and is ready to proceed to construction when certificates are issues. El Paso has extensive environmental and engineering work which remains to be done before it could proceed to construction. Given the critical need of the markets in the lower 48 of the United States for the gas here involved and the minimum environmental impact of the Arctic Gas Project, it should be the preferred applicant, on environmental, as well as other, grounds.

VOLUME II

Page II-15

Statement: "The bends would not exceed 10 degrees per 40-foot joint. Single joints would be used at places requiring a greater bend."

Response:

We do not understand why the DEIS refers to a 10 degree restriction on bending while the code permits bends of greater degree. Using normal bending practices, the pipe could be bent to at least 12.8 degrees per 40-foot joint. The statement that "single joints would be used at places requiring a greater bend" is not understood.

The 10° restriction was made by the applicant. The last statement should be corrected to read, "More joints would be added at places requiring a greater bend."

Page II-16

Statement: "The previously stripped tundra would be replaced and the construction areas would be revegetated with native grasses."

Response:

There is no justification for confining the revegetation program to the utilization of native species. Research conducted by Arctic Gas has shown that such limitation could in fact lead to failure of the revegetation program.

El Paso has provided no indication that detailed specs have been prepared for its revegetation program but rather has repeatedly stated that specs developed for Alyeska will be used. However, Alyeska plans on including introduced agronomic species in its revegetation program.

The statement on Page II-16 is incorrect. El Paso Alaska has stated that the type of seed has not been finally selected. It would probably be a combination of exotic grasses with native grasses added if they are available in sufficient quantities. The final selection would be made after considering results from current research and the Alyeska experience.

Page II-16

Statement: "Where the pipeline crosses the Alyeska crude oil pipeline the gas line would be laid beneath the oil line, except in areas where blasting would be required where the pipe would be laid above the oil line."

Response:

Has it been determined how closely the authorities and Alyeska will permit blasting to the oil pipeline and under what terms and conditions?

The proximity, terms, and conditions have not yet been determined.

Page II-16

Statement: "The Yukon River would probably be crossed by attaching the pipe to one side of the Yukon River State Highway bridge."

Response:

El Paso has not received permission to utilize the bridge across the Yukon River. If failure of the gas line occurred on the bridge, it could destroy both the bridge and the oil line. The DEIS does not provide an analysis (i.e., environmental, security of supply, safety, etc.) of such an occurrence.

This subject was addressed during hearings by the Alaska State witnesses.

Page II-16

Statement: "The pipeline would be tested using air . . ."

Response:

See comment relative to page I-7, supra.

This subject was addressed during hearings by the Alaska State witnesses.

Page II-19 and Page II-20, Table I

Statement: "During peak construction activity approximately 4200 workers would be required."

Reponse:

Anticipated manpower requirements are not related to the availability of services, housing, health care, and other socio-economic impact categories.

Page II-45

Statement: "Figure 22 - LNG Plant Seawater Cooling Slock Flow Diagram."

Response:

What will be the salinity of "Seawater return to ocean" as compared with "Seawater supply from ocean"? El Paso will be discharging concentrated brine from the LNG plant into Orca Bay and it is necessary to consider the salinity of this brine to determine the potential impact on marine organisms.

The increase of salinity in the 658,670-gpm discharge due to the desalination of 725 gpm of water would be small and insignificant. The predominant impact from the discharge would be the temperature rise of 20.7°F.

Pages II-67 thru II-251 and II-253 thru II-316

Statement: Description of the Existing Environment (Section B) and Environmental Impacts of the Proposed Project (Section C) with respect to socio-economics.

Response:

The discussion of the socio-economic existing environment and impacts understates impacts, in part because it fails to discuss potential secondary effects of the proposed project, some of which may be significant.

The socio-economic impacts of the El Paso project have not been emphasized in the sections describing the existing environment and the impacts of the project even though negative socio-economic impacts are given as a major reason for the FPC staff recommending an LNG plant site at Nikiski on Cook Inlet rather than the Gravina Point site in the alternatives section. The Point Gravina LNG plant site cannot be reached by highway; in fact, at the present time there are no roads in the Eastern Prince William Sound Unit (661,000 acres) of the Chugach National Forest (p. II-235) where the site is located. Therefore, either men and construction supplies and equipment would have to be transported to the site by water or air, or a new access road would have to be built. Also neither of the nearest communities of Valdez or Cordova are directly connected by highway with southeastern Alaska or the Lower 48 states although both are serviced by ferry. Since the number of construction workers (a peak of 4,200 is expected at the plant) and amount of construction material will be significant, a serious strain on existing transportation facilities would result.

Page II-73-105

Statement: Topography, Physiography, Geology

Response:

Treatment of the El Paso pipeline right-of-way and the Alyeska route as identical except at the southern terminus is misleading. The generalized route description partly justifies this treatment, but there should be some discussion of the right-of-way requirement and sites where the two pipelines will not be parallel. Approximately 28% of the proposed route will lie at a distance greater than one mile from the Alyeska oil pipeline.

Page II-90

Statement: "Recently formed scarplets as high as 30 feet can be seen on several longitudinal faults."

See Page II-102 of DEIS.

Response:

At least some of the numerous active faults referred to in the above statement and elsewhere are strike-slip faults on which horizontal displacement has occurred parallel to the trace of the fault upon the ground. Displacements of this type that may occur in the future will impart a maximum stress to a pipeline crossing the fault at right angles. The size of the displacements that have occurred in the past and the present high level of seismicity (e.g., p. II-91, line 13) make the possibility of future pipeline rupture seem likely.

Page II-95

Statement: "There is no estimate of these available reserves of gravel and sand that will remain after the construction of the oil pipeline."

The statement refers to the lack of quantitative data on reserves. A general statement of deficiency on certain local areas is not inconsistent with the statement.

Response:

See comment to page I-231 wherein the DOI DEIS provides that gravel required for the construction of the El Paso project would have "a serious adverse impact." The two statements should be reconciled.

Page II-103

Statement: "Similar detailed studies of seismicity . . ."

Response:

It is indicated that detailed studies of seismicity have not been undertaken in the vicinity of Gravina Point; but it is acknowledged that earthquakes of magnitude 8.5 have occurred in the area adjacent to Prince William Sound. Further, on page II-373 it is stated that "it is not unlikely that an 8.5 magnitude event at an epicentral distance of some 20 miles would occur during the lifetime of the project." Considering those two observations, a strong case could be made -- and should be -- that a design earthquake of something in excess of 8.5 should be used for the liquefaction plant.

Page II-106

Statement: "Expansive or collapsing soils are not known to exist at the site either, although the FPC staff is unaware of any detailed soil or foundation investigations covering the proposed property."

Response:

In view of: (a) the strike of bedrock parallel to Gravina peninsula; (b) its steep dip toward the south (toward Sheep Bay, Fig, 40, p. II-105); and (c) lineaments possibly representing faults within two miles of the site (p. II-104), a detailed subsurface investigation is necessary to determine the possibility of earthquake shocks from displacement along the faults causing massive slippage of bedrock beneath the proposed plant site into Sheep Bay. The subsurface investigation should be made before a commitment is made to the site.

Page II-120

Statement: "II - Surface water hydrology."

Response:

This section has been taken from Craig & McCart (1974), a report prepared for Arctic Gas. See, Craig, P. C., and McCart, P., (1974). Classification of stream types in Beaufort Sea drainage between Prudhoe Bay, Alaska and the Mackenzie Delta. Arctic Gas Biological Report Series, Vol. 17, Chapt. 1

Page II-124

Statement: "Table 10"

Response:

See comment to page II-120

Page II-127

Statement: "Figure 46"

Comment accepted.

Response:

The "JTU" units are incorrect, and should read "ppm Si O_2" as indicated on the errata sheet for this report (Craig and McCart, 1974).

Page II-130

Statement: Last Paragraph - "Echooks Spring"

Response:

Comment accepted.

"Echooks Spring" should be "Echooka Spring".

Page II-131

Statement: "In some instances, aufeis deposits are 2000 or more feet thick . . ."

Comment accepted.

Response:

This same statement appears in the DOI DEIS and is an obvious error which has been corrected in Arctic Gas' Comments to such document. This figure should read 20 feet. Furthermore, on p. II-99 the DEIS states "Within the Brooks Range aufeis is extensive, reaching thicknesses of 12 to 15 feet."

Page II-157

Statement: "The Tazlina and Klutina Rivers have the potential for outburst flooding."

Comment accepted.

Response:

The El Paso pipeline passes through another known glacier outburst flood course resulting from blockage of Trap Lake in the Tsina River Valley area (El Paso MP 735-750).

Page II-166

Statement: "Only one stream along the pipeline route in the drainage is reported to be subject to outburst flooding."

Comment accepted. Validation of the outburst flooding courses indicated by Alaskan Arctic in this comment is provided by Post and Mayo (Glacier Dammed Lakes and Outburst Floods in Alaska, USGS Hydrologic Investigations Atlas HA-455, 1971).

Response:

A glacier outburst flood course is present in the Keystone Canyon between El Paso MP 757-765.

Page II-168

Statement: "Density currents, which occur as a reult of freshwater flowing into an estuary or fjord have not been measured in or calculated for Orca Bay. The major source of freshwater to Orca Bay nearest the LNG plant site is the Rude River, 20 miles east."

Response:

Orca Bay will be more directly affected by the impacts of construction and operation of the LNG facility. Assumptions and extrapolations from other areas of Prince William Sound do not truly describe Orca Bay.

See response on following page.

Page II-170

Statement: "Typically, fjords in Prince William Sound demonstrate a circulation pattern in which less saline surface waters flow seaward and more saline deeper layers move landward. Additionally, a general counterclockwise

circulation of surface water occurs because of the Coriolis effect.1/ Both of these circulation features would be expected to exist in Orca Bay.

The mixing and flushing characteristics of Orca Bay are not presently known, but it would be expected that vertical mixing would increase with distance from the head of Orca Bay, and would be more rapid during the winter when freshwater inflows are minimal."

Response:

Typically, all fjords and other types of estuarine systems exhibit this type of circulation pattern but it is highly dependent upon the amount of freshwater runoff into the estuary. A description of circulation and mixing in Orca Bay is desirable.

Vertical distribution of the two water masses is also significant.

This discharge of 658,670 gpm of water at ΔT of + 20.7°F., could affect the local vertical distribution of water masses in Orca Bay.

Page II-170

Statement: "Calculations for waves from the north and northwest were not made owing to the sheltered nature of the site."

See response below.

Response:

Though north and northwest waves would not be significant at the LNG site because of the sheltered nature of Orca Bay, they would be significant in shipping in the remainder of Prince William Sound and in Hitchenbrook Entrance. Maximum fetch in the sound is from the northwest.

Page II-171

Statement: "Because oceanographic baseline data on chemical parameters for Prince William Sound and/or Orca and Sheep Bays are practically nonexistent, only very general statements can be made."

The environmental staff has indicated in several places in the DEIS that pertinent information about Orca Bay and design features of the seawater cooling system is largely unavailable. This concern is reflected in several recommendations. However, until this information becomes available, it cannot be reported nor can specific impacts be assessed.

Response:

The nature of the existing marine biota is dependent upon physical-chemical conditions of the water body, and the construction and

operation of an LNG tanker facility could have wide-ranging impacts on the oceanographic regime of Orca Bay.

Page II-171

Statement: "Icebergs are common in northern and western Prince William Sound, but there are no known reports of them in Orca Bay."

Response:

Recent information from the U.S.G.S. indicates that the Columbia Glacier is calving icebergs at a rate which is causing considerable navigational concern in Prince William Sound (see comment in Vol. 1 relative to pp. I-230 through 245).

The environmental staff's concern is that the retreat of Columbia Glacier could result in a dramatic increase in the number of icebergs calved by that glacier, thereby creating ice hazards substantially greater in scope and area than those presently seen in Prince William Sound.

Pages II-173 through 188

Statement: "Description of the Aquatic Biota."

Response:

This section provides only a general description of aquatic environments. Notably absent from the discussion are the locations of fish overwintering areas (e.g., Sag Delta, El Paso MP 138.3, El Paso MP 179-200, El Paso MP 247-250), spawning areas (e.g., El Paso MP 83.7, El Paso MP 86.5, El Paso MP 88.5, El Paso MP 122.2), rearing areas (e.g., El Paso MP 139.7, El Paso MP 270, El Paso MP 295), and migration (e.g., El Paso MP 516-517). There is no mention of fish utilization near coastal areas although El Paso intends to barge supplies into the area.

Page II-173

Statement: "They feed on plant material . . .".

Response:

While plant material does occur in grayling stomachs it is likely that this is taken incidentally during the course of feeding on animal materials. It is unlikely that the grayling derive any significant benefit from ingested plant materials.

Page II-173

Statement: "Spawning takes place in beaded . . . streams . . .".

Response:

Spawning takes place in foothill streams but these may, or may not be, beaded.

The environmental staff agrees with this comment. Page II-173, paragraph 2, line 5 should read as follows: "Spawning takes place in foothill streams in early June."

Page II-173

Statement: "One of the most important species present in the Arctic Drainage is arctic char . . . ."

Response:

This is an inadequate description of the complex life cycle of the Arctic char, particularly the comment on the significance of nonconsecutive spawning. In fact, the migrant population includes four distinct groups:

(1) juvenile fish which never spawned;

(2) maturing fish which have not previously spawned but which will spawn during the next spawning season;

(3) mature fish which have spawned before but which will not spawn in the next spawning season (e.g., are resting for a year); and

(4) mature fish which have spawned before and will spawn in the next spawning season (fish which may or may not have rested the previous season).

The environmental staff agrees with this comment. Page II-173, paragraph 3, the last sentence should read: "This means that in any given year the migrant population includes four distinct groups:

(1) juvenile fish which never spawned;
(2) maturing fish which have not previously spawned but which will spawn during the next spawning season;
(3) mature fish which have spawned before but which will not spawn in the next spawning season (e.g., are resting for a year); and
(4) mature fish which have spawned before and will spawn in the next spawning season (fish which may or may not have rested the previous season)."

Page II-173

Statement: "Their diet then consists of small char, char eggs, plant material . . .".

Response:

While plant material does sometimes occur in char stomachs it is probably taken incidentally to other food and does not constitute an important source of nutrition. Char stomachs are poorly adjusted to the digestion of plant materials.

The environmental staff agrees with this comment. Page II-173, paragraph 4, line 3 should read as follows: "Their diet then consists of small char, char eggs, and insects."

Page II-174

Statement: "The round whitefish is one of the most widespread . . .".

Response:

There is no indication of the source of this information, and it is erroneous.

(1) The round whitefish is not one of the most widespread fish in Arctic Slope Drainages. On the contrary, it appears to be restricted to a few large streams. It occurs in the Colville, Sagavanirktok and Canning River Drainages but has not been reported from any stream east of the Canning in Alaska and is uncommon west of the Mackenzie River in Canada.

(2) The round whitefish is not common in coastal areas away from the deltas of the drainages where it occurs. It appears to be stenohaline and therefore non-anadromous. In Arctic Gas studies, a single round whitefish has not been taken among approximately 4,000 fish captured at four coastal locations between the Firth River, Yukon Territory and the Canning River, Alaska.

(3) While round whitefish may be locally important in subsistence fisheries (e.g. the Colville Delta), they do not appear in catches in the vicinity of Barter Island, the only subsistence fishery in Alaska likely to be affected by the Arctic Gas Prime Route.

The environmental staff agrees with this comment. Page II-174, paragraph 1 should read as follows: "The round whitefish appears to be restricted to a few large streams. It occurs in the Colville, Sagavanivktok and Canning River drainages. It appears to be stenohaline and therefore non-anadromous. The round whitefish may be locally important in subsistence fisheries."

Page II-174

Statement: "Burbot, also known as inland or freshwater cod, or Ling . . .".

Response:

Very little is known of the distribution and life history of burbot on the Arctic Slope. They are nowhere very common and are probably absent from many drainages east of the Canning River. The source of the information on spawning is not given. In most areas this species spawns in mid-to late-winter not fall and early winter as stated.

The environmental staff agrees with this comment. Page II-174, paragraph 2 should read as follows;

"Burbot, also known as inland or freshwater cod or ling, is the only member of the cod family found in freshwater. Very little is known of the distribution and life history of burbot on the Arctic Slope. They are nowhere very common and are probably absent from many drainages east of the Canning River. In most areas this species spawns in mid-to late-winter."

Page II-176-188

Statement: Paragraphs d) and e) - Aquatic biota of Prince William Sound and the Gulf of Alaska.

Response:

Species of commercial importance are discussed in relative terms, such as "commercial importance" or "considerable economic importance." Very little discussion of ecological importance is presented. No discussion is presented concerning primary producers: phytoplankton and benthic algae.

Data on catches and economic value of commercial fish and shellfish species are available, and show a decline for many species.

There is no discussion of zooplankton in the DEIS. Many commercially important species spend part of their life cycles as planktonic larvae, e.g., king crab larvae, in inshore areas.

Page II-189-194

Statement: "F. Vegetation."

Response:

Common plant names are used in the Vegetation section (pages II-189-194), but no scientific names are given. This is in contrast to the Aquatic Biota and Wildlife Sections, which both reference common names with scientific names. The Vegetation section is not as detailed as other sections of the description of existing environment. Vegetation reflects the integration of many factors such as soil, moisture, temperature, topography, and geology, and vegetation determines the distribution of wildlife species.

The descriptions of the six vegetation types of Alaska are oriented on a broad regional basis. Whereas Figure 54 (Page II-190) shows the distribution of the six vegetation types in relation to the proposed route of El Paso gas pipeline, the discussion was not directed toward the distribution and extent of the vegetation types along the proposed route.

The environmental staff did not include the scientific names for the plants mentioned in the "Vegetation" section because it was felt that references are readily available for those who desire the information.

Page II-189

Statement: "The proposed natural gas pipeline from Prudhoe Bay to Gravina Point would pass through three major vegetative divisions in Alaska . . ."

The environmental staff agrees with this comment. Page II-189, paragraph 1, sentence 1 should read as follows: "The proposed natural gas pipeline from Prudhoe Bay to Gravina Point would pass through three major physiographic divisions in Alaska."

Response:

The three divisions as outlined by the DEIS are more correctly referred to as "physiographic divisions" and not "vegetative divisions".

Page II-192-194

Statement: "V. Closed Spruce-Hardwood Forests."

Response:

Relative to the description of Closed Spruce-Hardwood Forests in the Interior Basin, such forests occur on alluvial bottoms, terraces, and outwashes between the Brooks Range and the Chugach Mountains. On these sites, high quality stands consisting of white spruce and balsam poplar frequently occur intermingled with willow and alder thickets. Such sites often support the only commercial-quality spruce in the region, are important habitat types for animals such as moose. The proposed El Paso pipeline will follow Koyukuk, Delta, and Tiekel Rivers for long distances and cross numerous streams and rivers where such stands occur.

The environmental staff agrees with this comment. The following paragraph should be added to the description of the Closed Spruce-Hardwood Forests on Page II-192: "Closed Spruce-Hardwood Forests in the Interior Basin occur on alluvial bottoms, terraces, and outwashes between the Brooks Range and the Chugach Mountains. On these sites, high quality stands consisting of white spruce and balsam poplar frequently occur intermingled with willow and alder thickets. Such sites often support the only commercial-quality spruce in the region, are important habitat types for animals such as moose. The proposed El Paso pipeline will follow Koyukuk, Delta, and Tiekel Rivers for long distances and cross numerous streams and rivers where such stands occur."

Page II-200

Statement: "Caribou".

Response:

There is no discussion of the movements of the various herds within their ranges. Critical areas have not been delineated. The Porcupine herd does not just traditionally "winter in the foothills and southern slopes of the Brook Range". Also "140,000" for the porcupine herd is high - "120,000" would be a better figure based on work since 1972 including Alaska Department of Fish and Game work (Le Resche Photo Census 1972). Hemming may have referred to Lentfer (1965) when he gave the 140,000 figure.

There is no mention made of what appears to be a third subpopulation of caribou in the Brooks Range and Arctic Slope Region, i.e., Central Brooks Range Herd. In fact, the Colville River appears to be the eastern boundary of the Arctic herd in recent years and the Canning River the western boundary (north of the continental divide) of the Porcupine herd. In between these two herds there appears to be a third subpopulation of about 5,000 animals.

The environmental staff contacted Mr. Robert LeResche, who referred to the 1972 census figure of 110,000 animals for the Porcupine herd. Mr. LeResche also noted the existence of the Central Brooks Range subpopulation, but suggested that it may simply be a temporary offshoot from either the Procupine or the Arctic herd. This group of caribou presently calves in the Prudhoe Bay area.

Page II-202

Statement: "Figure 56".

Response:

(1) Dark areas marked on the Porcupine and Yukon rivers as "key waterfowl and falcon areas" appear to be key falcon areas.

(2) The darkest area shown east of the Canning River as apparently "key waterfowl and falcon area" is misleading in that "falcon" densities are not as high here as the other areas shown in the northern portion of this map and again no "key falcon area" is outlined on the Sag River. All of the dark areas outlined in the Anchorage area (and others) are used by migrating falcons but not nesting although they are "key" waterfowl marshes.

(3) The map does not indicate that some caribou calving occurs in the vicinity of Prudhoe Bay.

(4) No caribou wintering areas are shown.

(5) Sheep populations are not represented.

(6) Bear denning is not shown north of the Yukon River.

(7) In general the map best illustrates waterfowl areas, and next best illustrates the falcon nesting areas but poorly represents caribou and bear, while it omits sheep and makes no reference to other groups such as furbearers (for instance the shaded area centering around Fort Yukon is also important mink, beaver and muskrat habitat).

(8) The source of this information is not provided.

Figure 56 is a composite of two maps from the Department of the Interior's Alaska Natural Gas Transportation System DEIS, Part VI. Waterfowl and falcon areas were not differentiated in the source maps, but the text of the FPC environmental staff's DEIS (Volume II, Section B-8) described the locations of these birds separately. Other information on caribou, sheep, and bear was provided in the same portion of the DEIS, as was a discussion of furbearers. Visual depiction of all this information was not considered necessary.

Page II-203

Statement: "Dall Sheep".

Response:

The DEIS fails to provide the locations of critical areas for Dall sheep along the El Paso route, e.g., mineral lick El Paso MP 117-132, El Paso MP 142.3; lambing areas El Paso MP 117-132, 167.5-170, 170-174.4, 176.5-180, 183-189, 191.5-196.

The environmental staff agrees that specific milepoints were not provided, although the DEIS did mention that the route passed near important lambing areas along the Atigun Canyon, and that important mineral licks were also nearby. The milepoints listed in this comment correspond to this area, but the environmental staff is unable to attest to these coordinates without knowning their source.

Page II-203

Statement: "Dall Sheep".

Response:

This is a very general statement. Arctic Gas found that in the Canning Valley little difference between seasonal ranges often occurred. Sheep were in the lowlands essentially throughout the summer. Mineral licks are very important during June.

In general the DEIS description lends itself a bit better to sheep ranges in Alaska other than those of the Brooks Range.

No mention is made of sheep numbers in general or the numbers found along this route or the estimated numbers that might be affected.

Page II-204-205

Statement: "Bear".

Response:

The use of an "indicator species" to define wilderness is misplaced in this section, and tenuous in its application at best. For example, would one define the garbage dump at Mt. McKinley National Park, - a site frequented by grizzlies, as wilderness. Wilderness is a concept created by man for aesthetic appreciation, not biological evaluation.

Grizzlies in the Brooks Range use a combination of alpine habitat and riparian valley habitat during the summer. Denning occurs from early October until mid to late April. Dug dens appear to be the most commonly used, while rock cave dens are occasionally used by some individuals.

Again no mention is made of numbers of bears.

Page II-209

Statement: "One endangered bird, the Arctic peregrine falcon, nests in the Sagavanirktok Drainage . . .".

Response:

There appear to be inconsistencies: Here one finds mention of the peregrine falcon nesting in the Sag Drainage. There was no reference to this in Vol. I, but this fact does not appear on the map on page 202, Vol. II, and no mention is made of numbers, how close to the route they occur, etc.

Population of sheep and bear are too variable to allow a meaningful estimate of their numbers in relation to the pipeline. The statement that the grizzly bear is an indicator of a wilderness environment is borne out by the species' general intolerance to man's influence. That there are dumps in Mt. McKinley National Park and that bears frequent them are simply indications that the bears and their wilderness environment may be encroached upon, to the ultimate detriment of both.

See changes in Section C.8.e, Impacts on Unique Ecosystems.

Page II-210

Statement: "Muskrats are found along the proposed route from the Brooks Range south wherever there is suitable habitat, which is essentially the same as that for beaver".

This statement should be changed to read: "Muskrats are found along the proposed route from the Brooks Range south wherever there is suitable habitat, which may be similar to that of the beaver but which also includes marshy areas not associated with tree vegetation."

Response:

The beaver almost invariably produces his own habitat within what would otherwise be well drained river valleys. The muskrat needs a natural marshy area. Moreover, since the muskrat does not require materials for dam and lodge construction it can accomodate to marshy areas far removed from tree vegetation.

Page II-211

Statement: "The pygmy shrew is by weight probably the smallest animal in the world, and its habitat preferences are similar to those on the North Slope".

Response:

Perhaps the authors mean mammal rather than animal. The pygmy shrew is certainly not the smallest animal in the world.

"Mammal" is correct.

Page II-215

Statement: "The route passes through two major winter-use areas of the Nelchina caribou herd and either of these areas may contain 10,000 to 20,000 or more caribou during the winter months . . .".

In 1967, the ADFG estimated the adult caribou population of the Nelchina herd to be 45,700 animals. In the summer of 1972, the total population, including calves, was estimated to be only 8,099. The population has grown since then, however, with total populations in 1973 and 1974 estimated to be 8,485 and 10,245, respectively.

Response:

The estimated size of this population is high. The current population is about 8,000 and declining. Hence, this herd is extremely sensitive to additional encroachment.

Page II-217

Statement: "d) Lowe River Drainage".

Response:

The DEIS fails to point out that El Paso has stated that "the terrestrial and aquatic environments of this region are the least known of the three divisions (i.e., Arctic Drainage Division, Interior Basin Division and South Coastal Division)." (El Paso application Vol. IV, p. 2A.6-95). Furthermore, the El Paso application states "The occurrence of species in the Prince William Sound region ranges from poorly to well known".

Page II-234

Statement: "Cordova and Valdez are the home ports for the largest part of the Gulf of Alaska commerical fishing fleet."

Response:

The Gulf fisheries are of "considerable economic importance" both nationally and internationally. While it is concluded that the increase in tanker traffic in Prince Willian Sound "would interfere with commercial fishing" (p. II-367), the magnitude and extent of the impact are not given. Will it significantly affect the ability of local residents to earn a living? It is also acknowledged that "recreational boating along the LNG tanker route would also be greatly curtailed" (p. II-367). However, the impact this may have on the small tourist industry which has been developing at Cordova is not specified.

Page II-236

Statement: "The proposed pipeline would cross the Yukon River on the highway bridge now under construction."

Response:

Past discussion with the Highway Department - State of Alaska - indicated that no provision had been made for a gas line crossing, although provision was made for a pipeline on each side of the bridge. It was assumed that Alyeska would loop that crossing. See Comment on Page II-16.

This subject was addressed during the hearings by the Alaska State witnesses.

Page II-241

Statement: Discussion based upon report prepared by Robert L. Humphrey, Jr. of the Iroquois Research Institute.

Response:

Since "zones of high archaeological potential" were predicted, a discussion of how these determinations were arrived at is desirable. The last sentence in this paragraph indicates that records through 1974 were used and that there were only 160 known sites within a 10 mile corridor. During 1974, a large number of sites were found along the oil pipeline and the 160 sites referenced appears low, since on page II-244 in the second paragraph it is stated that there are no known sites in sections 10 and 11. Yet, in 1974 several sites were found near Tonsina.

This report is now complete in two volumes and is entitled, Archeology and History Along Alaskan Natural Gas Routes.

Zones of high archaeological potential are those areas delineated in the Iroquois report which concentrations of known sites. In addition, the report noted that sites are more likely to occur at the confluences of streams and on bluffs and terraces overlooking expanses of terrain. The former would have afforded prehistoric men the opportunity to catch more fish than at a single stream, while the latter would have served as excellent lookouts for game. The environmental staff recognizes the incompleteness of the record of archaeological resources, hence the recommendation for comprehensive preconstruction surveys.

Page II-245

Statement: "12. Historical Resources."

Response:

Since this is a descriptive section a discussion for why there might be possible effects on the Sourdough Lodge should be given.

There are several standing structures at Coldfoot which date to the mining era and this area is potentially eligible for inclusion in the National Register of Historic Places.

Since the final pipeline alignment has not been determined and the lodge is the only site identified within the corridor, the possibility of an adverse impact does exist.

Indeed, there are numerous structures along the entire route which may be eligible. Hence, the recommendation for surveys prior to construction.

Page II-251

Statement: ". . . A comparison of the two tables shows that sulfur oxide and nitrogen dioxide concentrations are well below the standards which were established by the Environmental Protection Agency. . . Particulate concentrations are also well below the standards except in downtown Fairbanks, where the ambient concentrations are much higher than in other regions of the proposed route."

Response:

It is unclear how the Staff determined the NO_2 concentrations were well below national standards, since the table indicates that the sampling locations did not test for NO_x. Also, the implication is given that Fairbanks exceeds the national standards for particulate matter. This is not true.

The annual average NO_2 concentration in Fairbanks for 1974 was 56.4 ug/m_3, which is well below the national standard. This number was not included in the DEIS because it was inadvertantly omitted. Fairbanks does not exceed the Federal standards for particulate matter.

Page II-253

Statement: "Three factors are necessary for ice fog to form: (a) a temperature lower than -25 degrees F; (b) a moisture source and (c) condensation nuclei present in the air for droplet and ice particle formation".

Response:

Since ice fog frequently forms through spontaneous nucleation, there is no necessity for condensation nuclei as there is with other kinds of hydrometers. On the other hand, one of the critical factors involved in ice fog formation is very stable surface atmospheric condition. The stable air permits extremely low ground temperatures, it also traps the available moisture in those lower layers and minimizes the possibility of wind dispersal.

Statement declaring that condensation nuclei must be present for the formation of ice fog has been deleted.

Page II-253

Statement: "For example, the pits created by borrow operations in active floodplains, on level land and sidehills would remain, unless concerted to fill, grade, cover with soil and revegetate were made".

Response:

Apparently a word such as "efforts" was omitted after "concerted" in the third line.

Page II-253

Statement: "Topography"

Response:

The El Paso proposal crosses the Brooks, Alaska and Chugach mountain ranges as well as the California Coast Range. Each of these major mountain ranges has environmental impacts, pipeline integrity and design problems, as well as potentially high construction and operating costs.

In negotiating the topography of these mountains, the El Paso cuts must be larger than those required for the Alyeska pipeline. Since the oil line has taken the only nearly-level terrain thru many valleys and passes, any additional lines must cut deeply into steep, unstable side slopes. These could cause permanent long term pipeline maintenance and integrity problems.

Page II-254

Statement: "The overall visual impact of the backfill mound on existing topography is considered to be slight and incremental because of the road, oil pipeline and other man-made intrusions which would already exist along the route."

Response:

This statement could only be valid for the portions where the El Paso route closely parallels the Alyeska route. However, 28.8% of the El Paso route lies further than 1 mile distant from Alyeska. Furthermore, to imply that an "incremental impact" is minor requires considerable explanation for purposes of permitting the reader to evaluate the basis for the suggestion. Moreover, the use of the word "incremental" should clearly be in the descriptive context and not in the context of a "value judgment" since incremental can mean "acceptable" or "unacceptable" or "large" or "small". (T. 9407 of transcript in El Paso Alaska Co., et al., Docket Nos. CP75-96, et al.)

Page II-254

Statement: "b) Gravina LNG site"

Response:

The effect of topographic modification at Gravina Point is on one of the finest shorelines of the Chugach National Forest.

Page II-256

Statement: "The requirement for 6.5 million cubic yards of gravel would, in some areas, compel the builders to utilize active riverbeds".

Response:

This statement is misleading in that the majority of the gravel required for the Alyeska project in the Arctic Drainage Division, comes from the active floodplain of the Sagavanirktok River. It is this supply of gravel that is rapidly being exploited to the point where, in some areas, there is a question as to whether sufficient borrow for Alyeska will be available. In this region, there are no alternative gravel borrow sites. Thus, the ramifications of further demands for borrow by El Paso appear to be more serious than stated in the DEIS.

Page II-258

Statement: "Work by the Russians on underground pipelines in permafrost regions indicates that unchilled pipe would be lifted out of the ground during the winter because of frost heaving and other natural forces acting on the pipe".

Response:

The work performed by Arctic Gas demonstrates that frost heave is a controllable phenomemon. Attention is called to results at the Prudhoe and San Sault test sites where there is no indication of frost heave dangerous to the pipeline.

Page II-259

Statement: "Frost heave is caused by the difference in volume between frozen and unfrozen water. Frost heave, or the expansion of the soil profile through ice formation, is possible where three conditions exist: freezing temperatures, a source of water, and frost-susceptible soils (soil of fine-grained materials.)".

Response:

This is an incorrect statement. Arctic Gas states on p. 29 of the Environmental Report of Alaskan Arctic Gas, Chapter II, Section D, that "Frost heave in soil is a result of two phenomena: volumetric expansion due to the freezing of in-situ water, and that due to the build-up of segregated ice or ice lenses."

Page II-259

Statement: "Although . . . soil conditions".

Response:

These statements are contradictory and inconsistent with previous statements. In perenially frozen soils, below the active layer there will be no "advancing freezing front of the frost bulb". The soil is already frozen. Moreover, the backfill in the ditch will freeze very rapidly once the line is in operation. A thermal gradient, somewhat different from the natural thermal gradient, will exist in the frozen soil surrounding the pipe. It is theoretically impossible that unfrozen water in the frozen soil could migrate and form ice lenses which could cause heaving. The hydraulic conductivity of the frozen soil is so low, however, that even if such migration did occur under the maximum thermal gradient possible within the range of operating temperature, the total heave over the life of the pipeline would not exceed two to four inches, which is negligible. Frost heave will not be a problem in perenially frozen soils.

Page II-259

Statement: "Frost heave of the unchilled . . . is also a problem".

Response:

This is not true. The seasonal freezing of unfrozen ground will not extend below the pipe except for soils which have a very low latent heat (i.e. dry gravel or sand), such soils are not frost susceptible. In perenially frozen ground the active layer will not dip below the pipe prior to operation again except for soils of very low latent heat. These soils are thaw stable and non-frost susceptible.

Page II-269

Statement: "Since topsoils have better structure and are more fertile than underlying materials."

Response:

This is often the case, but is not universally true. If it is true for the proposed pipeline right-of-way, then references or actual data should be given.

Page II-269

Statement: "Vegetation removal on slopes would lower the permeability of the soil, resulting in increased runoff and erosion".

Response:

Permeability is the ability of a medium to transmit fluid. The presence or absence of vegetation has nothing to do with permeability. Because the last phrase of the sentence does follow--"removal of vegetation does result in increased runoff and potentially increased erosion"--the statement may represent a typographical or an editing error.

The statement in the DEIS should be changed to the following: "Vegetation removal on slopes would expose the soil to erosion and would lower the infiltration capacity of the soil surface, resulting in increased runoff and erosion."

Page II-269-270

Statement: "If a spilled petroleum product percolates into the soil, it could kill vegetation and contaminate groundwater supply. The extent of groundwater contamination would depend on the type and volume of the spilled product, . . .".

The next to the last paragraph on Page II-269 of the DEIS answers part of the comment. The last paragraph on Page II-269 should be changed to the following: "If a spilled petroleum product percolates into the soil, it could kill vegetation and contaminate groundwater supply. The depth of petroleum product penetration and the extent of possible groundwater contamination . . ."

Response:

The erroneous impression is created that any spill results in some groundwater contamination. It should be pointed out that most spills are of very small volumes and are absorbed by the soil before reaching the groundwater table. Even if these small, individual volumes of petroleum products did reach the water table, it is unlikely that large volumes of groundwater would be rendered unfit for human use, assuming it was so fit to begin with.

Page II-271

Statement: "Snow/ice roads would also effect surface drainage. These roads would melt more slowly than adjacent areas . . .".

Response:

Observations of snow roads in the Arctic have revealed that snow roads melt sooner than the snow in adjacent areas. This is due to the greater thermal absorption of the snow road caused by the presence of foreign material in the snow such as soil particles.

Page II-271

Statement: "The Applicant estimates that approximately 6.7 million cubic yards of gravel and fill material . . .".

Response:

See comment re p.I-231 in Volume 1.

Page II-272

Statement: "This would increase the depth of the active layer and would accelerate deeper thawing of the permafrost".

Response:

Arctic Gas has conducted specific studies to determine the effects of snow road construction and operation on the vegetation mat. The results show that no statistically significant increase in active layer thickness occurs. ("Inuvik Snow Road Construction, Testing and Environmental Assessment 1973-1974, Inuvik, NWT, Canada" prepared by NESCL; "Inuvik Snow Road Environmental Assessment", prepared by NESCL herewith submitted).

Page II-274

Statement: "Repeated small spills of fuels and lubricants along the proposed pipeline route could be as serious a water quality problem as a single large spill."

Response:

Unqualified as it is, this statement is incorrect. Quantity does make a difference; see statement and comment for pp. II-269, 270.

Page II-274

Statement: Paragraph e) Potential impacts on the oceanography of Prince William Sound.

Response:

This section makes no mention of the impacts associated with the construction and operation of the LNG cooling water intake and heated discharge. These impacts could result from:

(1) Increased turbidity from construction operations.

(2) Alteration of the bottom topography from construction and from scouring from the 658,670 gpm discharge.

(3) Alteration of the thermal regime of the sound.

Page II-279-282

Statement: "Marine Biota"

Response:

On page II-282, the DEIS indicates that significant fishing and crabbing operations will be permanently displaced from the Alaskan economy by the LNG carrier traffic in Orca Bay. The document does not, however, quantify the loss of fishing and crabbing income to Alaskan fishermen; nor does it comment on either the availability of other employment for those who are displaced by that, and the consequences on the appropriate type of fish and crab supplies to the markets which they now serve. The price of king crab meat could be seriously inflated due to a decrease of supply resulting from this proposed LNG operation. Although that would be mitigated by choice of Nikiski instead of Gravina Point for the shipping terminal, the DEIS should, perhaps, be more complete with regard to the proposed Gravina Point siting.

Insufficient data at this time precludes quantification of the impact on fishing and crabbing operations.

Page II-283

Statement: "The short term effects of snow road have been documented by Adam (1973) . . . The amount of plant cover remaining was determined to be 10 percent under the road . . . Thaw was found to be 65 percent deeper on the road.

Response:

Studies on the effects of snow roads on vegetation conducted by Arctic Gas showed that in the first year following operation of the snow road, no significant change occurred in the active layer thickness and that plant cover on the road was 40-50 percent. The loss of plant cover was attributed primarily to shrub breakage.

The sole reference provided on this subject, Adam (1973), does not present complete coverage of the topic and leads the reader to incorrect conclusions regarding the suitability of snow roads and their ability to protect vegetation and consequently permafrost terrain integrity.

Comment accepted in Section C.7, "Vegetation."

Page II-284

Statement: "The Applicant has stated that the so-called "super ditcher" would only be used in selected situations due to their uneconomical operation. Ditching would be accomplished by a combination of blasting and excavating with backhoes".

Response:

Arctic Gas has conducted studies which indicate that super-ditchers can be economically operated in tundra conditions. Also, the use of a wheel ditcher would minimize the problem of handling large chunks of frozen material in the backfilling operations.

Page II-284

Statement: "III. Revegetation"

Response:

The DEIS has discussed the reasons for revegetation and has pointed out that it is an important protective measure in northern pipeline construction. However, El Paso has not filed a detailed reclamation plan.

As a general comment on this section, the DEIS has identified a number of problems or potential concerns but has made no effort to relate these concerns to the El Paso project.

Page II-286

Statement: "The frost bulb would reduce the amount of thaw of the active layer which would limit root growth . . .".

Response:

The frost bulb will not affect the successful establishment of vegetation on the pipeline crown. The development of an active layer is dominated by solar radiation and the growth of the frost bulb to the surface of the soil profile will be prevented. Results obtained by Arctic Gas from geothermal analysis and instrumentation at the Sans Sault test facility have shown that the surface rooting zone temperatures are not influenced by the frost bulb.

The depth of soil available for root frowth would potentially be less over the pipeline than that some distance away due to the potential formation of a frostbulb.

Page II-286

Statement: "The frostbulb around the pipeline would also reduce or stop completely subsurface movement of ground water."

Response:

The only significant flow of subsurface water in perenially frozen ground areas occurs in the active layer. The pipeline will not prevent the development of an active layer but it will be somewhat reduced in thickness over the pipe. Subsurface flow can still occur when the active layer is active. Moreover, the permafrost table is not a place; it has an undulating irregular boundary, reflecting minor changes in topography, vegetation, soil texture, and so on. The same type of irregularities will occur over the pipeline and subsurface flow will occur at the low points. In areas where flow is significant, i.e., natural drainage courses where a thickened active layer occurs, berm breaks will be backfilled with gravel which will result in a thickened active layer over the pipe and a more permeable soil which will conduct subsurface flow. Subsurface flow will be impeded locally by the frost bulb but it will never "stop completely."

Data available to the environmental staff indicates ponding along the pipeline route would be a problem which could lead to a redirection of natural drainage patterns in certain areas.

Page II-287

Statement: "An abandoned road near Normal Wells . . .".

Response:

"Normal" Wells should read "Norman" Wells.

The environmental staff agrees with this comment. Page II-287, paragraph 1, line 6 should read as follows: "An abandoned road near Norman Wells . . ."

Page II-288

Statement: "Loss of lichen would have a detrimental impact on caribou populations".

Response:

The majority of the caribou from both the Arctic and Porcupine herds do not winter along the Arctic coastal plain but move across the Brooks Range to the Interior. Furthermore, studies by Arctic Gas have revealed that lichens are not a major component of the plant communities along the Arctic coastal plain physiographic unit.

The section from which this statement was taken refers to interior Alaska as well as the Arctic coastal plain.

Page II-289

Statement: "The impacts of the proposed El Paso gas pipeline would be expected to approach in nature those impacts encountered in the construction of the Alyeska oil pipeline which would be paralleled for the greater portion of its route . . . However, the significance of impacts in general would be minor".

Response:

To suggest that because El Paso parallels Alyeska that impact will *per se* be minor is an over-simplification. First, the El Paso route diverges from the Alyeska route by further than 1 mile for 28.8% of its total length. Furthermore, within the areas where the gas line is less than 1 mile from the oil line, the two routes are frequently located in completely different terrain and habitat types. There is no evidence to indicate that this further intrusion on the environment will be within tolerable limits. In fact, it could be synergistic. In any event, El Paso's witnesses on environmental matters have concluded that "incremental" means "acceptable" or "unacceptable" (T. 9407 in El Paso Alaska Co., *et al.*, Docket Nos. CP75-96, *et al.*) depending on the nature of the impact. If the "significance of [the El Paso] impacts in general would be minor", this same conclusion pertains to the Arctic Gas Project and should be so stated since this would be consistent with the overwhelming record evidence demonstrating this fact.

See changes in the introduction to Section C.8, "Impacts on Wildlife."

Page II-295

Statement: "Impacts of construction and operation of the alternative pipeline . . .".

Response:

This comment was taken directly from the DOI DEIS (Part VI, p. 880), as was most of the section on impact, and when it refers to "alternative pipeline" the DOI DEIS means the El Paso Project.

"Alternative" has been deleted from the phrase.

Page II-297

Statement: "c. Seabirds".

Response:

No mention is made of the potential impact of the heated, concentrated brine effluent on seabirds.

See addition to Section C.8.c.

Page II-298

Statement: "While the magnitude of environmental impacts in the marine ecosystem appears of minimal potential,. . .".

Response:

El Paso states that "Only a few population studies, . . ., have been conducted in the Sound . . . Therefore, understanding of marine communities in Prince William Sound is derived from other studies outside the Sound . . .". (El Paso Application, Vol. IV, p. 2A.6-120). Furthermore, this rather brief treatise fails to consider the impact of the LNG plant effluent on marine mammals.

See addition to Section C.8.d.

Pages II-299, 300

Statement: ". . . Arctic peregrine falcons occur with the area only as passage migrants within the coastal zone".

Response:

In 1974, 14 pairs of raptors nested along the 7 to 8 mile stretch of the Sag River near Sagwon. They included 2 peregrines, 2 gyrfalcons, 3 ravens and the remaining rough-legged hawks. This is an important community of cliff nesters. Known peregrine nests also occur in the Franklin Bluffs.

See addition to Sections C.8.e and f.

Page II-301

Statement: "The environmental impact expected to occur as a result of the proposed pipeline is, due to its

relative uncomparability with any similar undertaking, largely conjective. The impacts upon the ecosystems are expected to be in general, temporary and minor."

Response:

We believe that a pipeline can be constructed with a minimum environmental impact provided sufficient site specific field work is undertaken to construct, operate and maintain the pipeline. Arctic Gas has devoted over 15 million dollars over the past five years in environmental research to avoid speculation and conjecture. If the Staff feels that the El Paso project will have general, temporary and minor impacts, certainly that is true with respect to Arctic Gas and should be so stated by the DEIS.

Experience gained in the course of the Alyeska oil pipeline venture will indeed be of general value in assessing and mitigating potential environmental effects of either project. However, it should be recognized that the El Paso route does not parallel the Alyeska route for its entire length; it will involve additional right-of-way requirements even where such proximity is maintained; the El Paso route may pass through entirely different vegetational communities than the Alyeska route; and the operating temperatures and certain key construction features will be entirely different hetween the two projects. Thus, theimpact of the El Paso proposal must be dealt with on its own.

Pages II-302-306

Statement: "Impacts on Land Use."

Response:

It is briefly mentioned that 65 permanent homes will be constructed about 3/4 mile west of the plant site (p. II-28) but no further information is given on the acreage required to develop this community or the impacts on land use expected to result from its construction. Further discussion on this topic is desireable.

There is internal inconsistency with respect to impacts to land use. Because most of the El Paso pipeline would be constructed within the Trans-Alaska Pipeline "utility corridor," it is concluded

See revised section pertaining to "Impacts on Land Use," Vol. II-C.

in the impacts section (p. II-305) that the impact on total land use in Alaska would be minimal. However, in the section evaluating commitments of resources and productivity, it is stated that clearing the land "would have a major impact on some 17,000 acres of land use" (p. II-372).

The clearing of the 17,000 acres of land might be considered by some as a major impact on the subject land affected, but would be insignificant in terms of the area of the State of Alaska.

Page II-305

Statement: "Most of the El Paso route of the pipeline would be constructed within the utility corridor . . . In view of this, the impact of such activity on total land use in Alaska would be minimal."

Response:

The impact resulting from the construction of the proposed El Paso pipeline is discussed in a very general manner in the DEIS. Such topics as impacts on transportation, residential areas and other types of land use referred to in Section 10 (Land Use), Page II-230 to II-240, Volume II, Alaska Natural Gas Transportation System, should be discussed.

See revised section in Volume I subsection entitled "Projected Socioeconomic Impacts in the State of Alaska."

Page II-317

Statement: "This monitoring would provide necessary environmental information from which potential adverse impacts could be predicted . . .".

Response:

The DEIS appears to have misused the term "monitoring". The first step of the monitoring process consists of gathering biotic and abiotic data at site specific locations prior to the implementation of the project over a sufficient period of time to provide an adequate baseline. The same parameters are measured during and after the construction phase. In this manner, it is then possible to determine the actual impact that resulted from construction.

Paragraph 1, sentence number 2: Change the beginning to "<u>These activities</u> would provide necessary environmental . . ."

Page II-319

Statement: "El Paso has chosen a pipeline route . . .".

Response:

Again, no consideration of the 28.8% of the route where it diverges by more than 1 mile from the oil line is given.

Page II-319

Statement: "Some of the measures which El Paso is considering . . . insulating the pipe".

Response:

Select backfill material will not prevent frost heave in that the source of the heave is in the unexcavated soil below the pipe. The material used to backfill the ditch will have very little influence on the rate or amount of heave. With respect to the use of insulation, in order to retain the 32°F isotherm within the insulative cover, a very thick layer would be required. This is not a viable method of preventing frost heave except in relatively warm soil or soil which has sufficient ground water flow to retain the freezing front within the insulation by convection. Such soils with high permeability are not frost susceptible. None of the methods of preventing or reducing frost heave proposed by El Paso are viable. El Paso has not demonstrated a basic understanding of frost heave. Frost heave can be kept within limits tolerable to the pipeline by the techniques described by Arctic Gas.

Page II-325

Statement: ". . . since fish would be overwintering in other parts of the stream . . .".

Response:

The DEIS has not furnished the location of critical fish overwintering areas; therefore, on what premise is this mitigative measure based?

The locations of fish overwintering areas are not known. However, the fact that fish are concentrated in these areas during the winter reduces the possibility of disruption due to construction activities. Overwintering usually occurs in deeper areas which would be avoided if at all possible at crossing sites.

Page II-326

Statement: "The culverts would be designed to provide a maximum velocity of 0.6 fps . . .".

Response:

This design velocity does not seem practical from an engineering point-of-view.

Originally, the U. S. Fish and Wildlife Service placed culvert flow criteria at 3.0 fps. As a result of the present investigations, this will probably be raised to 4.0 fps as it apparently is not possible to achieve the lower figure. El Paso has proposed to design and install culverts which will meet current criteria.

Page II-334

Statement: Paragraph d) Utilization of work camps, independent supply headquarters, and existing roads to the extent possible combined with employment of TAPS workers, to reduce impacts on natural resources and socio-economics.

Response:

Construction of new camps would be required for the southernmost part of the pipeline and the LNG plant construction. The LNG site is in a national forest, and the nearest town, Cordova, has fewer than 1,200 residents, while the peak construction manpower required will be 4,200 workers. Temporary quarters will have to be provided. The details of how the large number of construction workers will be housed in such a remote area should be given, and the level and duration of impacts specified.

The environmental staff anticipates the construction of one new camp along the southernmost part of the pipeline. The socioeconomic impacts related to camp construction at the Gravina site and its relation to Cordova and the Prince William Sound area are discussed in the "Socioeconomic" section, Volume I, DEIS.

Page II-347

Statement: "Landfills at the site . . .".

Response:

On page II-347 the DEIS discusses the need for landfills at the LNG plant site for solid wastes generated during the project's operation. The disposal of solid and sewage wastes during the construction period, however, is not discussed in the DEIS. It is estimated that as much as 1,000,000 cubic feet of loosely packed solid wastes will be generated during construction of the liquefaction plant, storage tanks and marine terminal. El Paso has not indicated the costs or provisions for removing such solid wastes from the area. Also, in addition to the 4,700 cubic feet per year of spent desiccant, solid wastes from plant operations and 65 family

On Page II-347 it is stated that "Solid refuse generated by construction and operating personnel and from the 65 personnel houses would be disposed of in landfills on the site or would be incinerated." El Paso would be required, as indicated in Appendix B, Volume II of the DEIS, to obtain permits from the State of Alaska for all sewage and solid waste treatment and disposal techniques and equipment in order to construct or operate the proposed facilities.

houses will amount to as much as 10,000 additional cubic feet per year. The 25 year total of operational and daily solid wastes, not including construction solid wastes, will result in 250,000 to 350,000 cubic feet total -- or a pile that is 25 feet high, 100 feet long and 100 feet wide.

Page II-365

Statement: "A mixing of this material results in an overall lower soil fertility . . ."

Response:

The statement may or may not be true, depending upon a particular soil. Some subsoils improve topsoils when mixed with them, some do not. Data supporting the statement, if available, should be presented.

Page II-365

Statement: "Large-scale removal of gravels for fill materials from stream and riverbeds would disrupt aquatic life and spawning beds on a short-term basis."

Response:

When evaluating the impacts of the proposed El Paso gas pipeline, one must consider the disruption of habitat already caused by the construction of the Alyeska Oil Pipeline and the synergistic impact of the two projects, since the El Paso line will parallel the same R.O.W. in places. Streams which will be taxed for gravel removal may already have been disturbed by construction of TAPS.

Page II-368

Statement: "F. Relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity".

Response:

See matrix (Table 32).

This section has been omitted.

Page II-374

Statement: Paragraph M

Response:

In Paragraph M on page II-374 the disruption to gas supplies which would result if the marine terminal facilities as well as a ship berth at the terminal were destroyed by a seismic wave is deemed to curtail "short-term uses" only. Inasmuch as the marine terminal will take approximately three years to construct, and would most likely take at least two years to re-construct, the use of the phrase "short-term" is somewhat misleading inasmuch as the lower 48 would be deprived of Alaskan gas for that entire period of time.

Two years, measured against the lifetime of the proposed project, was considered to be short-term.

Page II-376

Statement: "Nine engineering criteria have been identified in selecting a best route from a standpoint of technological feasibility and construction and material costs".

The environmental criteria utilized can be found on Pages II-376 and II-378 of the DEIS.

Response:

The DEIS should provide the environmental criteria utilized.

Page II-385

Statement: "This portion of the route would cross 150 small streams, 3 major rivers - the Tanana (1,320-ft. crossing), Healy Creek (990-ft. crossing), Susitna River (660-ft. crossing), Cook Inlet (approximately 16 miles) and would require a 660-ft. aerial crossing of Hurricane Gulch."

Doug Russell of Doug Russell Associates, San Francisco, a recognized authority on pipeline engineering, has advised the environmental staff's consultants that current technical knowledge would permit crossing of Cook Inlet.

Response:

Does the pipeline construction technical knowledge exist today which would permit the installation of a large diameter pipeline across Cook Inlet for a distance of 16 miles? The major problems, from a construction standpoint, would be the tides of 30 feet and the currents. The mud flats present a very special construction problem when they are flooded during each tide. Another major concern would be trying to repair the line -- due to the tides, currents and, in winter, due to ice movements.

Page II-459

Statement: "5600 construction workers . . ."

Response:

On page II-459 it is noted that up to 5,600 construction workers will be involved in the vicinity of Gravina Point. The DEIS indicates that some or all of them may temporarily reside in the Cordova area and commute daily to Gravina Point by a newly constructed road through the Chugach National Forest. The cost of such a road has not been discussed in El Paso's application, and the long-term impact of it in opening the forest to greater tourism has not been discussed in the DEIS. It is acknowledged on Page II-295 that the Black Bear has significant trophy value, but impact of this has been limited, in the DEIS, to the construction period only. The availability of a road from Cordova through forest will cause that impact and all others associated with increased human habitation to continue throughout at least the projects's life. Moreover, the presence of 60 to 70 families on Gravina Point will add to the number of tourists and visitors to that area -- a fact also neglected in the DEIS.

El Paso has not proposed to construct a road from Cordova to Gravina. The DEIS has stated that the plant personnel, not the construction workers, would have to commute to work, resulting in a need for such a road. The staff intended in this instance to point out that the lack of a connecting road makes the Gravina site less desirable because the site would be isolated. Without the road, tourists and visitors will have to resort to other means of travel just as they have always done.

Page II-484

Statement: "II) Site Assessments - Cook Inlet."

Response:

FPC Staff recommends the use of a site on Cook Inlet in lieu of Prince William Sound for El Paso's liquefaction plant. While many of the reasons for this change are persuasive (topography, existing railbelt development, seismic activity along pipeline, etc), the critical issue of winter navigation is not resolved, referring only to "conflicting opinions" (Vol. II, p. II-487). While keeping the matter open to further research, the DEIS appears to rely on existing use of Nikiski as an indication that the hazards are not serious. Two points need to be made in this connection: (1) the LNG tankers now using Nikiski are not in the size class planned by El Paso and (2) precise turn-around scheduling is not as critical to current operations as it would be to a system serving major segments of the U.S. economy. The latter point relates to system reliability and is most important.

Page II-495

Statement: "The continued stability of Columbia Glacier depends upon the ice margin remaining on the shoal upon which it presently ends, but evidence indicates that the glacier would probably retreat within the next 20 years, but not in the next 5."

Response:

Recent developments indicate that retreat could be imminent. Reference is made to a December, 1975 meeting at Alyeska with representatives of Alyeska, U.S. Geological Survey, Mobile, Sohio, Alyeska Pipeline Office/E.E.I., ARCO, State Pipeline Coordinators Office, Alaska Department of Environmental Conservation, N.O.A.A., U.S. Coast Guard, B.L.M., Alaskan Arctic Gas and El Paso in which the condition existing at Columbia Glacier was outlined and much concern was evidenced as to the unstable condition and potential imminent danger of major iceberg formation.

Page II-521

Statement: "Recommendations".

Response:

El Paso already proposes to conduct such studies. See Section D.

The FPC Staff does not include in its list of recommendations that El Paso should conduct studies, if it is the preferred applicant, to locate all critical areas for fish and wildlife.

Page II-524

Statement: "Restoration and Revegetation Procedures"

Response:

The DEIS puts forward a number of recommendations for revegetation based on work done by N.E.S. for Arctic Gas at the Sans Sault test facility. This does not change the earlier comment regarding the need for El Paso to prepare a specific plan of revegetation for its proposed pipeline system in order that it may be properly analyzed.

Page II-525

Statement: "a) Fertilizer required to establish and maintain vegetation growth on a pipeline backfill mound should be applied at the rate of 84 pounds per acre of nitrogen plus 112 pounds per acre of both phosphorus and potassium."

The statement has been modified to reflect this comment.

Response:

Fertilizer applications should be tailored to the specific soil type present following nutrient analysis and soil testing, rather than using a set rate for all areas.

Page II-545, et seq.

Statement: "Technical Report"

Response:

On pages II-545 and following, a report is given of the potential of a massive LNG spill from storage tanks at Gravina Point. The results of the study indicate that the lower flammable limit could extend for as much as 9-11 kilometers, which would leave none of the resident population at risk aside from plant personnel and their families. (The report fails to mention that the plant personnel and their families living nearby would be endangered.) Inasmuch as the staff has recommended the use of Nikiski as the liquefaction plant site, it appears appropriate to apply a similar analysis to that site. This has not been reported in the EIS. Besides population endangerment at Nikiski, it is likely that the Phillips/Marathon LNG Plant as well as the planned Pacific Lighting Plant on Cook Inlet will also be endangered. Thus, by one major accident, three LNG plants, accounting for all of Alaska's gas production, may be endangered if the plant is located at Nikiski.

Comment reflected in Section H. Alternatives.

Chevron

Chevron Shipping Company
555 Market Street, San Francisco, CA 94105
Mail Address: P.O. Box 3069, San Francisco, CA 94119

January 29, 1976

Mr. Kenneth Plum
Federal Power Commission
Washington, D.C. 20426

Dear Mr. Plum:

Chevron Shipping Company operates tankers calling at the Nikiski terminal and during 1975 approximately 90 of these tankers, ranging up to 70,000 DWT, used the terminal. We have had an opportunity to review that portion of the Draft EIS "Alaska Natural Gas Transportation Systems" issued by the Federal Power Commission Staff in November 1975, which deals with the possible establishment of a gas liquefication facility and LNG terminal in the Nikiski area of Cook Inlet. The proposal to locate such a facility in that location would increase the marine traffic in the Nikiski area by an estimated 350 ships per year which would have the effect of more than doubling projected traffic volumes.

Clearly, the impact of another marine terminal in the Nikiski area on vessel navigation and maritime safety must be carefully evaluated. We have serious concern that the projected increase in vessel traffic would result in unacceptable delays to all operators in the area. Prior to accepting it as a viable site alternative, marine operators who bring ships into existing facilities should have an opportunity to evaluate the overall impact in conjunction with the U.S. Coast Guard. Winter ice conditions along with prevailing current and tidal actions present conditions not normally encountered at other terminal locations and in other vessel operations. These should be assessed in conjunction with existing operations and vessel traffic patterns to determine to what extent present maritime operations would be adversely affected by locating another major terminal in the immediate area.

We are prepared to cooperate with the appropriate authorities in the assessment of such a site proposal should it continue to be regarded as a preferred location for the El Paso terminal.

Very truly yours,

T. S. Wyman, Manager
Maritime Relations

cc: Commander R. C. Nichols
U.S. Coast Guard
Anchorage, Alaska

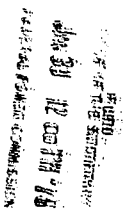
Reference: BNG-SOD/EES
El Paso Gas Co.
Docket #GP75-96 et al

Response reflected in Section H-2 of Volume II of the FEIS.

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

El Paso Alaska Company, et al.) Docket Nos. CP75-96, et al.

COMMENTS OF
COLUMBIA GAS TRANSMISSION CORPORATION
ON FEDERAL POWER COMMISSION STAFF
DRAFT ENVIRONMENTAL IMPACT STATEMENT ON
ALASKA NATURAL GAS TRANSPORTATION SYSTEMS



Dated at Wilmington, Delaware
this 28th day of January, 1976

COLUMBIA GAS SYSTEM SERVICE CORPORATION

ROBERT W. WELCH, JR.
VICE PRESIDENT
ENVIRONMENTAL AFFAIRS

20 MONTCHANIN ROAD
WILMINGTON, DELAWARE 19807

January 28, 1976

The Honorable Kenneth F. Plumb
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D. C. 20426

Re: El Paso Alaska Company, et al.
Docket No. CP75-96, et al.

Dear Mr. Plumb:

The following remarks are submitted on behalf of Columbia Gas Transmission Corporation (Columbia), an affiliate of Columbia Gas System Service Corporation, both of which are wholly owned subsidiaries of The Columbia Gas System, Inc. Columbia is a participant and a sponsor of the pipeline and facilities proposed to transport natural gas from Prudhoe Bay, Alaska (Alaskan Arctic Gas Pipeline Company), through Canada (Canadian Arctic Gas Pipeline Limited) to midwestern and eastern markets in the lower 48 states (Northern Border Pipeline Company).

The Columbia Gas System, Inc., a registered public utility holding company, is composed of a Service Company, and eighteen operating subsidiaries. The operating subsidiaries are primarily engaged in the production, purchase, storage, transmission, and distribution of natural gas at wholesale and retail. Columbia Gas System supplies directly through its retail operations, or indirectly through other utilities, the gas requirements of about 4,100,000 customers in an area having a population of approximately 18,000,000. Its service area includes large parts of the states of Ohio, Pennsylvania, Kentucky, New York, Virginia, West Virginia, Maryland and the District of Columbia. Columbia serves at retail 1,859,000 customers residing in communities with a total population of 7,500,000.

Columbia adopts and supports the responses made by Alaskan Arctic Gas Pipeline Company, Canadian Arctic Gas Pipeline Limited and the Northern Border Pipeline Company to the Federal Power Commission's Draft Environmental Statement on the Alaska Natural Gas Transportation Systems. In addition, attached hereto, and incorporated by reference, are Columbia's comments on the Department of the Interior's (DOI) Draft Environmental Impact Statement (DEIS) of the project involved in these proceedings.

In addition to the detailed and comprehensive comments previously submitted and referred to above, Columbia feels compelled to emphasize and reinforce in a summary way its principal grounds of objection to the Staff DEIS. Stated broadly, that objection rests on the fact that Staff has grossly distorted the function and purpose of an environmental impact statement. It is practically devoid of any factual or analytical contribution to knowledge of impact on the human environment, natural, social or economic. Instead, the DEIS is used as a vehicle to recommend radical changes in project design and routing: changes which are not supported by any evidence or analysis, however superficial, and which constitute in fact a complete non sequitur to the dominant content of a three-volume document. We insist that the function of an environmental impact statement is to present and analyze objective data reflecting on project consequences. Recommendations if at all appropriate, are of secondary importance, especially when emanating from Staff level; recommendations which are wholly unsupported by and unrelated to environmental analysis should have no weight in the Commission's ultimate decision.

Columbia is aware that the environmental facts the Commission must consider in evaluating this project are broad in scope. However, an analysis that requires consideration of a myriad of impractical alternatives just for the sake of alternatives or of social, economic, political and other unrelated considerations are only tangentially related to the environment seem both beyond the scope of the DEIS required to be made under NEPA and the needs of the Commission to properly evaluate the environmental impact.

It is clear that the Applicant's basic role in these proceedings is to affirmatively demonstrate the need for the Project and identify the environmental consequences associated with it as required by NEPA. This burden is indeed a heavy one; however, Columbia feels that Applicants have met this burden by the voluminous and systematic environmental assessments which accompanied the applications (Exhibits IV-F in this instance) and the thirty odd volumes of separate, detailed studies made available in support thereof. This is in sharp contrast to the Environmental Staff's failure to provide relevant and substantial evidence to support its proposed modification of the Applicant's route or to adequately evaluate it in compliance with the mandate of NEPA. An example of this approach is observed in the Staff's adoption of DOI's DEIS and its recommendations of the Fairbanks Corridor and Red River Corridor routes. On Page I-557 of DOI's DEIS it is stated that "The analysis generally showed that no alternative route showed the most favorable combination of all of the features considered desirable and the choice of route would have to depend on which factors were considered of most importance". However, DOI at page III-1786, under "Comparison of Impacts of All Alternatives" concludes; "Thus, facilities along the Wolf Lake and Fairbanks Corridor would have substantially greater impacts, in Canada than those along the 'prime route';..." In light of these statements which the Environmental Staff has accepted, the Staff draws the following conclusion: "...after an indepth review of the Applicant's environmental analysis and with information from other sources before it...[the Staff]...has arrived at the...environmental conclusions..." that the Fairbanks Route and Red River Corridor are preferable to Arctic Gas' and Northern Border's routing selection. This is a distortion of DOI's position without <u>any</u> substantive evidence to justify the conclusions drawn by the Staff.

The Commission, in evaluating the needs to be served by the various transportation systems, fails to adequately consider the proved reserves in Cook Inlet and other explored and unexplored areas and that potential impact on their proposed alternatives. In Cook Inlet, for example, the proved reserves are in excess of 6.6 Tcf with less than 50% committed to contract.

Furthermore, Staff has failed to point out that much of this gas committed to the Alaskan market is being utilized for low priority uses including electric power generation. Obviously, this use is inconsistent with the Commission's present policies.

Present indications are that there is substantial interest for intensified oil and gas exploration and development in Southern Alaska. Geophysical surveys and test drilling have been conducted in the Northern Gulf of Alaska. Federal leasing of the Alaskan OCS (Gulf of Alaska) and the lower Cook Inlet is imminent. Outer Bristol Bay, considered to have significant hydrocarbon potential and an area of favorable water depth and climatic conditions, is presently scheduled for leasing in late 1977. The potential reserves of Alaska are estimated at 76 Tcf (50% log normal probability, USGS circular 725). The DOI DEIS for the Gulf of Alaska lease sale reported probable gas reserves amounting to as much as 9 Tcf (USGS estimate) for this area.

The southern Alaska areas, by the early 1980's, could produce substantial discoveries of gas reserves. After considering the probable natural gas producing areas of Alaska, their possible reserves, their environmental differences, their separation by physical barriers and the transportation project proposals before the Commission, it becomes apparent that Alaskan North Slope gas should be transported eastward, north of the Brooks Range to markets in the lower 48 states, while reserving the future Bristol Bay, Cook Inlet-Kenai and Gulf of Alaska reserves for liquefaction and transport to the West Coast markets. This plan is not only environmentally superior, more economically viable but aligns the energy transport systems so that their operating characteristics are compatible with the physical environment they traverse.

It is apparent that the Staff gave little thought to the nature, extent, and location of these estimated reserves, in the Fairbanks Corridor route recommendation. It is possible that adoption of the El Paso's alternative would result in the situation akin to that in the Cook Inlet-Kenai

gas fields. In those fields the largest single contract for this gas is dedicated to exportation to Japan. This was the only economically available market for excess Cook Inlet gas, when the exports were first authorized. In 1974, over 50 billion cubic feet of gas, nearly 40% of Alaska's total marketed production, was converted to LNG and exported to Japan. Clearly, such a similar result now is not in the public interest.

Without consideration of the proven and estimated reserves in the area, a comprehensive and meaningful evaluation of the Staff's routes is impossible. Furthermore, it is imperative that the Commission's evaluation of this project reflect both environmental and cost-benefit analysis of the financial as well as potential social and economic impact associated with postponement of construction and development of these additional reserves as contemplated by the Staff's alternative proposals.

Additionally, the DEIS has not considered:

1) The effect that construction and operation of a high pressure large diameter gas pipeline parallel to an operating large diameter hot oil pipeline in the same corridor could have on the environment. Staff admits at page II-290 that "...there is no precedent for such a combination of petroleum products transportation systems..." or

2) The effect that construction and operation of a second large diameter hot oil pipeline in a corridor which contains a large diameter gas pipeline and a hot oil pipeline could have on the environment. The construction of a second hot oil pipeline to a southern Alaska port would be required when Naval Petroleum Reserve No. 4 is produced.

Comment reflected in Section C-8 of Vol. II of the FEIS.

The Staff should clarify the extent of their reliance on DOI's DEIS in reaching the conclusions concerning the proposed alternative routing and irreversible environmental

damage caused by the Applicant's route. Furthermore, it is imcumbent upon the Staff to recognize the steps that the Applicants will take to minimize these adverse environmental consequences. It is necessary that the Staff put this part of its study into a proper perspective. The Staff must directly refute the many studies conducted by the applicant which substantiate the minimal nature of the environmental impact as a result of mitigating measures taken.

Furthermore, it is imperative that the Staff inform the public of the lack of adequate studies to substantiate its proposals and El Paso's or in the alternative, to address the inadequacies of the relied-upon studies to deal with a thorough environmental analysis as required by NEPA.

Unless the Staff is willing to take an objective and critical approach to the data compiled and that data accepted from DOI's DEIS, then a meaningful review of the environmental consequences associated with its proposals and that of El Paso's as required by NEPA will be impossible.

Respectfully,

/s/ Robert W. Welch, Jr.

Robert W. Welch, Jr.

COLUMBIA GAS SYSTEM SERVICE CORPORATION

E. D. CALLAHAN
VICE PRESIDENT
ENVIRONMENTAL AFFAIRS

20 MONTCHANIN ROAD
WILMINGTON, DELAWARE 19807

November 4, 1975

EIS Task Force
Alaska Natural Gas Transportation System
Bureau of Land Management, Room 302
Department of the Interior
Washington, D. C. 20240

Gentlemen:

The following remarks are submitted on behalf of Columbia Gas Transmission Corporation (Columbia), an affiliate of Columbia Gas System Service Corporation, both of which are wholly owned subsidiaries of The Columbia Gas System, Inc. Columbia is a participant and a sponsor of the pipeline and facilities proposed to transport natural gas from Prudhoe Bay, Alaska, through Canada to the lower 48 states.

The Columbia Gas System, Inc., a registered public utility holding company, is composed of a Service company, and eighteen operating subsidiaries. The operating subsidiaries are primarily engaged in the production, purchase, storage, transmission, and distribution of natural gas at wholesale and retail. Columbia System supplies directly through its retail operations, or indirectly through other utilities, the gas requirements of about 4,100,000 customers in an area having a population of approximately 18,000,000. Its service area includes large parts of the states of Ohio, Pennsylvania, Kentucky, New York, Virginia, West Virginia, Maryland, and the District of Columbia. Columbia serves at retail 1,859,000 customers residing in communities with a total population of 7,500,000.

It is important for all who are involved in the decision-making process related to approval of the Arctic Gas Project, in particular, and projects of its nature in general, to know what are some of the obligations and responsibilities of the sponsors and operators of such major public service facilities. The charters under which they operate require, in addition to the development of reserves, construction and operation of the pipeline and transportation of gas, that they provide the service at

reasonable cost, that the service include an assured supply of the product which is being offered and that the business be conducted in a safe and efficient manner. The natural gas industry is probably the most extensively regulated industry in the U. S.

The consortium proposing the Arctic Gas Pipeline System has made a serious and sustained effort to develop the best information possible, the most efficient design practicable, and for the facilities to be constructed and operated with the least practical impact upon the environment. To accomplish this, the consortium has spent during the past four years approximately $18 million on environmental research and analytical studies before filing applications for certificates. It anticipates an additional $38 million will be required for environmental expenditures before the construction is completed. This brings the environmental cost of the project to approximately $56 million, which is more than 8 times the price the U. S. paid Russia in 1866 for Alaska. Voluminous resources have been expended for environmental studies and the EIS. The Arctic groups have had up to 70 scientists in the field over a 3-year period collecting and analyzing data. The Northern Border portion of the line utilized more than 50 people of diverse environmental disciplines to prepare the EIS which was filed with the FPC and DOI. In addition, FPC and DOI have made substantial studies, and at least in the case of DOI, has advised project sponsors that billings for its EIS could range from $3 to $12 million. Beyond the dollar expenditures has been the monumental consumption of resources. Preparation of the EIS filed by the applicant consumed something like 126 tons of paper. Considering the 17 volume DOI DEIS and assuming the FPC EIS is 50% the size of DOI's, one could visualize that by the time the Final Environmental Impact Statements (FEIS) are completed that 500 tons of paper will have been consumed. There appears to be a substantial duplication of effort and consumption of resources on this project which we concede is a significant one, but a project which has a relatively minor overall impact on the environment.

It is evident throughout the DEIS that the writers were conscientiously trying to prepare a document which would provide the reader with information on which to make an informed judgment as to the project's merit. It is also evident that the writers were unfamiliar with industry practices, regulations under which

the industry operates and the long and distinguished history of the industry in operating more than 260,000 miles of natural gas transmission lines in the U. S. We commend the effort made by the writers and would like to make a suggestion which could improve future project evaluations.

The present process requiring federal agencies to prepare and circulate the EIS without consultation with the applicant is illogical and the system could be improved by consultation or public hearings to cross-examine the applicant before the DEIS is written and circulated. This process would shorten the DEIS and provide the clearest evidence to the public. The Arctic Gas project environmental review process may consume as much as 500 tons of paper. An extraordinary amount! Our suggestion could conserve two-thirds of the resources expended through the needless paper usage. Conservation of resources takes on particular significance when one considers the low level of impact created by a project such as this, a fact substantiated by applicant's and DOI's impact statements.

The extent of the impact of the project is best put in perspective by the consideration of a ditch being 5 feet wide and 9 feet deep open for a few weeks during construction of the pipeline, then return of the ditch material and reestablishment of the surface vegetation by seeding. This is the same way any water or sewer line is constructed in the lower 48 states, Canada or Alaska. It is true that the right-of-way must be disturbed during construction; however, it will be revegetated and only 40 feet of grass covered right-of-way will be kept clear of trees and shrubs. The pipeline right-of-way will be available for its former uses by its owners immediately following construction with no more loss than a single growing season.

Hundreds of thousands of transmission pipelines have been constructed in the U. S. Some of these have operated for more than 50 years. All of them are subject to regulations by FPC and the Office of Pipeline Safety under the Department of Transportation. There is no new technology required or utilized in the construction of these facilities, with the exception of

the Arctic permafrost areas, and even here there is a history of construction which has been drawn upon, along with the research that the consortium has accomplished since 1970 in designing the facilities and providing for the construction techniques and schedules. We believe the impacts of the project on the environment are small and that the FEIS should make that fact clear.

The benefits in relation to the impact of these facilities are simply overwhelming. There is no need to cite statistics on the need for this energy on a national basis, but we believe mention should be made of the specific requirements for an area served by one of the largest gas companies in the lower 48 states. Because of a steady decline since 1970 in its supplies of gas, Columbia Gas System has frozen all sales at its 1971-72 contract levels of 1,407 billion cubic feet annually. Since 1972 supplies have continued to decline and the company had a 1974-75 deficiency of 176 billion cubic feet necessitating a 22% curtailment to seven affiliated and seventy-nine nonaffiliated distribution companies. This volume would supply four times the requirements of cities the size of Washington and Baltimore. The 22% curtailment must be absorbed by the industrial curtailment because residential and other human needs customers must receive priority. For the 1975-76 winter Columbia is going to curtail these distribution companies 26%. The curtailment has a serious impact on the nation's ability to supply fertilizer, to dry grain, to produce fibers and a number of other critical industrial processes that have a high reliance upon natural gas. It also impacts those energy sources which can be utilized to replace the natural gas lost due to curtailment. An example of this is the loss of propane to agriculture if it must be used to replace natural gas for heating.

Another benefit which this supply of gas will furnish, and that cannot be overlooked, is the billions of dollars in gross national product annually (measured in 1974 dollars) and the sustaining of hundreds of thousands of jobs which are now dependent upon natural gas. The loss of the gross national product and those jobs will bring suffering not only on the unemployed but due to curtailment could cause economic burdens on residential customers who may be forced to go to other forms of energy if those forms

are available. At this time there is no assurance that other forms will be available. The most likely substitute would be an increased dependence on foreign oil. The equivalent amount of energy available in foreign crude would cost $1.3 to $1.7 billion dollars annually. This is assuming crude at $12/barrel excluding tariff, importation and cost of which would have a substantial effect on this nation's balance of payments.

There is another important matter which should be discussed. At Page I-437 of Part I of the DEIS, the following suggestion is made:

> "... Mitigation might best be achieved by the establishment of technical review teams and construction monitoring teams for various stretches of the pipeline. Such teams should be financed by the applicant. These teams could include state and federal fish and wildlife biologists, archaeologists, soil scientists, and other resource personnel familiar with local conditions and values."

The DEIS indicates the following purpose of the suggested teams at Page I-440:

> "The recommended technical review teams should participate in the selection of the exact alignment of the route, in the choice of access routes, spoil areas, borrow areas, etc., and in the selection of land reclamation or resource replacement alternatives."

Clearly there is evidence to show that this unprecedented suggestion is without merit. There is virtually an endless number of federal, state and local agencies which have project approval requirements and which determine or administer regulations affecting the construction of facilities such as are here proposed.

To suggest that a team of agency overseers is required to assure that some of the best expertise in the United States will do a proper job of construction in light of the industry's history is a serious matter. The suggestion is both unnecessary and undesirable because it leads to delays in approvals, no improvement in techniques or procedures, an increase in cost to the

consumer, impingement, and the duplication of the specific responsibility and authority granted to certain other federal agencies by The Congress.

Columbia adopts and supports the response made by The Alaskan Arctic Gas Study Company, The Canadian Arctic Gas Study Limited, and The Northern Border Pipeline Company, to the Department of the Interior's Draft Environmental Statement.

Yours very truly,

/s/ Edward D. Callahan

EDC:ect

El Paso ALASKA COMPANY

P. O. BOX 1492
EL PASO, TEXAS 79978
PHONE: 915-543-2600

January 29, 1976

Secretary
Federal Power Commission
Washington, D. C. 20426

Attention: BNG-SOD-Alaska

Re: El Paso Alaska Company,
Docket Nos. CP75-96, *et al.*

Gentlemen:

Enclosed herewith for filing are twenty (20) copies of the Comments of El Paso Alaska Company ("El Paso Alaska") on the Federal Power Commission Staff's Draft Environmental Impact Statement on Alaska Natural Gas Transportation System ("DEIS").

El Paso Alaska appreciates the opportunity to comment on the DEIS, and hopes that these comments will be given serious consideration prior to publication of the Final Environmental Impact Statement.

As evidenced by the certificate attached hereto, copies of the comments of El Paso Alaska are being served on the restricted service list compiled by the Secretary in this proceeding.

Respectfully submitted,

EL PASO ALASKA COMPANY

By Walter G. Henderson
Walter G. Henderson
Vice President

Enclosures

Certificate of Service

I hereby certify that I have this day caused a copy of the foregoing Comments of El Paso Alaska Company to be served upon each person designated on the restricted service list compiled by the Commission Secretary in the consolidated proceedings at Docket Nos. CP75-96, *et al.*, in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated at El Paso, Texas, as of this 30th day of January, 1976.

Donald J. Mac Iver, Jr.

Of Counsel for
EL PASO ALASKA COMPANY

Preface

Because the Staff has "accepted" certain portions of the Department of Interior's (DOI), Draft Environmental Statement (DEIS), on Alaska Natural Gas Transportation System, El Paso Alaska is submitting herewith its comments to the DOI DEIS (sent to DOI on October 29, 1975) and incorporates by reference the comments to those portions of the DOI DEIS that have been accepted by the Staff.

Volume I - General Economic Analysis, Comparison of Systems

As a general comment, El Paso does not concur with all of the comparative analysis in Volume I. In several instances, the bases for the analysis have been superceded, with the result that the projects actually proposed have not been compared. There should be greater recognition of the fact that impacts associated with the proposed project will be incremental to those associated with TAPS. Specific comments are as follows:

1. El Paso notes that terms such as, "in the vicinity of this pipeline" have been used many times throughout the DEIS. As the Staff noted in its comments to the Department of Interior (DOI) DEIS on Alaska Natural Gas Transportation on page I-10(j) first paragraph, such terms are too nebulous and should be made more quantitative.

2. On page I-28, the Staff adopted the DOI report entitled "Alaskan Natural Gas Transportation Systems: Economic and Risk Analysis" subject to the Staff comments beginning on page I-36, which can be interpreted as being critical of some of the assumptions underlying the DOI report. The DEIS should elaborate on this criticism and develop alternate assumptions and test the impact of these assumptions on the conclusions of this report. Additionally, since publication of the DEIS, the DOI report has been issued in final form. Thus, the Staff's analysis should be addressed to the final version of that report.

3. The DOI report adopted by the Staff on page I-28 presents three alternative analyses, "base case", "pessimistic case", and "optimistic case." While this methodology presents three possibilities, the DOI report failed to assess the probability of occurrence for each case. El Paso believes that another - the Probable Case - should be developed by the Staff. In support of this contention, El Paso cites the following examples:

   On page I-33, first paragraph, there is recognition that additional reserves in the Mackenzie Delta must be proven in order to support the Arctic Gas delivery rate. Without these reserves, the economics of the Arctic Gas proposal would be adversely impacted. The probabilities of these reserves being proven should be factored into development of the Probable Case.

   On page I-34, the last paragraph assumes "that the Canadian Government would not require U. S. consumers of Prudhoe Gas to pay taxes to the Canadian Government." In fact, the Canadian Provinces could very well tax the U. S. gas transportation facilities. The probability of this occurring should be analyzed and included in the Probable Case.

   On pages I-35 and 36, there are three assumptions: (1) pipeline installation costs will increase, (2) the U. S. share of taxes will increase, and (3) the U. S. share of pipeline costs within Canada will increase. The Staff quantifies these

These matters are dealt with in the text of the FEIS.

We agree that it would be desirable to develop a probable case, suitably defined. However, at the time this response is written, we were not sure that this could be done in a fashion that will inspire confidence. We continue to believe, however, that even without a probable case it is helpful to analyze cases that span the reasonable range of variation in the important variables.

assumptions. However, based upon recent events, the Staff should determine the probability of occurrence of each of these assumptions as well as an estimate of the increased costs. These then should be factored into the Probable Case.

These examples illustrate that a Probable Case could be developed to provide a more realistic evaluation of the competing systems.

Also, Staff's attention is called to the DOI report, "Alaskan Natural Gas Transportation Systems" dated December, 1975. In that report, much of the draft material employed by the Staff has been superceded.

4. An example of the failure to employ correct input data to the comparative analysis occurs on page I-29. In the table of "Net Economic Benefits", use of El Paso's revised fuel consumption figures, as provided by El Paso's witness Pasek on September 29, 1975, would result in a Base Case NEB for Alaska-LNG on the order of 5.5 billions of dollars instead of the 5.1 appearing in the table.

5. The Projected Socio-Economic Impacts of End-Use in the Lower 48 States fails to give proper recognition to El Paso's displacement plans. The analysis of a 9 state El Paso region and a 20 state Arctic Gas region is not valid. El Paso has maintained from its initial filing that through displacement, Alaskan gas will find its way into midwestern and eastern markets as well as western markets. The direct effect of El Paso's project will not be restricted to the nine states mentioned on page I-48.

6. The economic model developed by the Staff for its analysis in pages I-44 through I-64 depends upon a series of assumptions, many of which may be invalid. For example, on page I-50 and I-51, reference is made to cheap fuel. Based upon recent statements by government and industry representatives, it is recognized that there will no longer be cheap fuel. This fact is recognized by the Staff on page I-51 where it is stated that "this model may not be realistic." Further, on page I-51, the Staff indicates that "the way in which prices are rolled into the average (gas) price will also have a major effect which we have not tried to model here." These statements and the underlying assumptions of the model all tend to render questionable the validity of the analysis utilizing the model.

7. The socioeconomic impacts projected in the DEIS are based on econometric models developed by the Institute for Social, Economic and Government Research (ISEGR) of the University of Alaska (see page I-111) while those presented by El Paso were developed on the basis of data outputs of a model developed by the Human Resources Planning Institute (as described in Appendix A of "Mid-1975 Socioeconomic Report: Trans-Alaska Gas Project", El Paso Alaska's Exhibit EP-144, filed November 4, 1975). The two models used different estimates of project manpower, costing, deployment and scheduling requirements and different estimates of sectoral economic interrelationships. It is recommended that at a minimum the ISEGR

These matters are dealt with in the text of the FEIS.

computer model be rerun using updated data inputs for the El Paso project construction and operating parameters, taking into account revised locational, timing, and cost factors developed in recent El Paso testimony.

The map model was rerun for the FEIS using data from the mid-1975 socioeconomic report and other El Paso testimony filed November 28, 1975.

8. In pages I-111 through I-164, the Staff has modeled socioeconomic impacts based on the assumptions given on page I-115. Two of these assumptions are not considered to be realistic:

    a) "Both projects will be completed on the schedules estimated by Arctic and El Paso." It is El Paso's considered opinion, and El Paso believes that the testimony to date verifies this, that the Arctic Gas project cannot meet its proposed schedule. This position is further substantiated by findings in the DOI report cited in Comment Number 3 in which the probability of schedule slip in the Arctic Gas project is concluded to be greater than for the El Paso project.

    Projection of construction schedules is very difficult at this early date. For the purpose of the socioeconomic analysis, it will continue to be assumed that in general the construction schedules for work in Alaska proposed by both applicants will be followed.

    b) "Both proposals would have equal natural gas throughput reaching a level of 3.5 bcfd from Alaskan sources." This differs from the projected gas volumes developed by El Paso and Arctic Gas. These volumes are given on page I-146 of the DEIS.

    The best assumption for socioeconomic analysis is that the throughput will be approximately the same regardless of which proposal is ultimately approved. For purposes of this analysis, the throughput has been assumed to be 2.5 billion cubic feet per day.

    In addition, however, the comparative analysis does not employ the revised schedule submitted by El Paso's witness Tseklenis on November 28, 1975.

    The revised schedule has been incorporated in the FEIS. See response at top of page.

9. El Paso Alaska employment figures shown on page I-126 are in error. Corrected manpower requirements were supplied in response to the Staff Data Request of February 7, 1975. In any case, however, peak quarterly manpower is inappropriate; the annual averages should have been used.

    The most recent El Paso annual average employment estimates have been used in the FEIS. See response at top of page.

10. The regional distribution of changes in population and employment and income caused by the El Paso project, as reported in the DEIS, varies substantially from that projected by El Paso Alaska in Exhibit EP-144. On pages I-118 (Population), I-129 (Employment), and I-134 (Wages and Salaries), Staff tabulates projections of a substantially higher proportion of the change in each variable to the South Central region (exclusive of Anchorage) than does El Paso Alaska. The El Paso Alaska study assumes the majority of households of construction workers employed in the South Coastal area will be maintained in the Anchorage area, due in part to the scarcity of housing in Cordova and Valdez.

    Comparing the two studies, in the peak construction year 1980, the Staff projects an incremental population in the Anchorage and "Southcentral" Regions of 37,200, of which 20,400 or 55% are in the Anchorage area (page I-118). In contrast, the El Paso Alaska study projects an increment of 51,500 in the "South Coastal Study Area", which consists of approximately the same region, with 46,000 or 89%

of the regional population growth taking place in the Anchorage area (Exhibit EP-144, page 39). Similar comparisons can be made for changes in employment and incomes.

The DEIS notes (page I-171) that, with the El Paso project, the population of Cordova would likely triple during the construction phase over pre-project levels with which we agree. Such an increase, on the order of 6,000 persons, would account for about 36% of projected 1980 population change of 16,800 in the Staff's South Central Region (page I-118). The question arises, where is the stimulus for an expansion of population in the amount of 10,800 persons in the remaining parts of the South Central Region, when the number of pipeline workers is but a fraction of those constructing the LNG Plant near Cordova? (See El Paso Alaska, Exhibit EP-144, "Mid-1975 Socioeconomic Report", Table 1, page 2, "Construction Manpower Schedule and Geographical Deployment Data").

On the basis of the above analysis, El Paso believes the DEIS seriously overstates the potential socioeconomic impacts of the El Paso proposal on the South Central Region of Alaska (as defined in the DEIS).

11. El Paso is unable to relate the Staff's projections of wage and salary income to those developed in El Paso Alaska Exhibit EP-144. Referring to page I-134 of Staff's DEIS, between 1978 and 1981 total (statewide) wages and salaries from the El Paso project are projected to be $1,288.0 million. In the same period, the El Paso Alaska study projects direct construction labor costs of $712.4 million, which, after payroll deductions, subtraction of estimated "leakage" to the Lower 48 and projected local income multiplier effects as a result of local spending and respending of direct wages, yield an estimated total infusion of personal income to the Alaskan economy during construction of about $750 million ("Mid-1975 Socioeconomic Report", Chapter 3, various tables and text). This value is about three-fifths the amount of income projected by the FPC report.

A large part of the difference between the DEIS estimate and El Paso estimate was due to the greater number of construction workers assumed in the DEIS. As was pointed out on the preceding page, FEIS projections are based on current El Paso employment projections. Thus, the estimate for the first 4 years of wages and salaries is now $959.4 million. The difference between this figure and the El Paso estimate is due primarily to the difference in models used to make the projections.

12. El Paso's impact upon the subsistence resources referred to on page I-136 will be incremental to that already caused by the Trans-Alaska Oil project. The fact that these impacts will be incremental should be recognized by the Staff.

This has been recognized in the FEIS.

13. The ISEGR impact model used in Staff's DEIS projects higher state and local government outlays during the construction phase of the El Paso project than does the El Paso Alaska study (compare DEIS page I-148 with El Paso Alaska, "Mid-1975 Socioeconomic Report", page 15, Table 5 and page 34, Table 18). El Paso is unable to reconcile the differences between the estimates, but believes that at least part of the difference is due to the excessively large population impacts projected in the DEIS for the South Central Region.

See the revised estimates in the FEIS which use the revised El Paso data.

14. The ISEGR impact model used in Staff's DEIS projects higher property tax revenue during the construction phase of the El Paso

project than is likely (assuming the LNG Plant is taxable). The table on page I-149 suggests that assessment, imposition and collection of the tax are accomplished in the same year for each year's increment to the project. A 1-1/2 to 2-year lag is more likely to occur. This lag should be reflected in the Staff's projections.

To the extent there is a lag in actual collections, the annual property tax revenues to the state would be overstated. See the revised text.

15. The DEIS section, "Use of Prudhoe Bay Gas in Alaska", beginning on page I-152, contains erroneous and misleading conclusions. The section is based upon invalid initial assumptions and, therefore, requires substantial revision. In particular, the present analysis specifies that in 1990, the following quantities of gas will be available for use in Alaska:

El Paso proposal	150 Bcf
Kenai/Cook Inlet	117 Bcf
Arctic Gas proposal	103 Bcf

To be consistent, the royalty share should be used in each case. Thus, the proper comparison is:

El Paso proposal	150 Bcf/year
Arctic Gas proposal	103 Bcf/year
Kenai/Cook Inlet:	
Total royalty gas	29 Bcf/year
or, Uncommitted royalty gas	15 Bcf/year

The RPA study suggests that 117 billion cubic feet per year could, not will, be available from Kenai/Cook Inlet fields. It is entirely possible that non-royalty gas would be available for in-state use from these reserves.

Further, as reported in the DEIS, the analysis assumed a wellhead price for Kenai/Cook Inlet gas of 15¢ per Mcf and for Prudhoe Bay gas of zero. Both assumptions are unrealistic and lead to misleading conclusions. Delivered gas prices to selected city gates as shown on page I-157 are similarly distorted. The underlying assumptions are simply not supported by fact. Economy of scale is a known and recognized factor in the pipeline industry.

Furthermore, a 1953 study by the Alaska Development Board estimated a Fairbanks city gate price of 70¢ per Mcf for Pet 4 gas. A 1962 study by A. D. Little estimated a range of transportation costs from Kenai/Cook Inlet to Fairbanks at 57¢ to 111¢ per Mcf. A Federal Power Commission study in 1969 estimated the Kenai to Fairbanks transportation cost at 44.5¢ per Mcf. Finally, current economic calculations by El Paso indicate that the 36¢ per Mcf reported in the DEIS for transporting royalty gas from Prudhoe Bay to Fairbanks in a small diameter pipeline is too low by 300% to 350%.

The conclusions reported in the DEIS imply that potential demand for Prudhoe Bay gas in 1990 is minimal because industries do not have "fully developed proposals" in 1975. For these reasons and others, the entire section, "Use of Prudhoe Bay Gas in Alaska", should be substantially corrected or eliminated altogether.

See section entitled "Supplemental Analysis" in Volume I, Appendix D, for a discussion of these issues.

16. El Paso is in general agreement with the Staff's summary statement of impacts of the El Paso proposal presented on pages I-170 to I-172. El Paso does not concur with the specific quantitative estimates of project-induced changes in population, gross state product, employment, personal income and real per capita income tabulated on page I-170 nor the specific estimates of state government revenues presented on page I-171, owing to differences in assumptions and methodologies between the Staff's DEIS and the El Paso Mid-1975 Socioeconomic Report. The differences, however, are not of sufficient magnitude (at the statewide level) to invalidate the findings of either study.

As has been noted in earlier responses, these specific quantitative estimates have been adjusted in the FEIS as a result of rerunning the map model using revised input data and assumptions.

17. Reference is made on page I-230 to development of ice fog as a result of emissions of "huge amounts of high temperature water vapor effluents" from compressor stations. Experience at compressor stations and power stations operating elsewhere in extremely low temperatures do not support this concern. The ice fog phenomenon is almost entirely related to very low altitude emissions of water vapor, as from automotive vehicle exhausts.

Statement has been modified in FEIS.

18. Item (5) on page I-231, is totally unrealistic. Every effort would be taken during construction to ensure that landslides and slumping would not occur.

Statement has been eliminated in FEIS.

19. Item (6) on page I-231 concludes that "large earthquakes could trigger . . . sea waves that jeopardize the integrity of various project components." El Paso finds it difficult to conceive of a sea wave of sufficient size to damage the buried natural gas pipeline at any point along the pipeline route. Speculative damage to the LNG Plant is inconsistent with (1) the site selection criteria specifying a minimum elevation of 100 feet as indicated on page II-418, (2) the topography data provided on page II-507, and (3) the average plant elevation of 50 feet above the minimum elevation of 100 feet as specified by El Paso Alaska Company in its Application. (See also statements concerning elevation sufficiency on page II-268). El Paso also considers the possibility of sea wave damage to an LNG carrier to be highly unlikely in light of the long period of large sea waves, historical marine data, planned fleet operating practices and sea wave advisory and warning systems operated by U. S. government agencies.

Note statement modification in FEIS.

20. See Comment Number 1 under this section. Reference is made on page I-231 to activities in the estuarine areas of Prince William Sound which would increase erosional processes with resultant impacts to the water systems. Prince William Sound is a body of water extending some 40 miles by 60 miles. Construction activity would be limited to a very small portion of the Sound with the resulting impacts being significantly smaller than that inferred in the Staff DEIS.

Note appropriate change in FEIS.

21. On page I-232, it is assumed that Alaskan streams would be utilized as water and gravel sources. The State of Alaska and federal agencies will determine the most appropriate locations for water

withdrawal (if required) and for borrow sites. Thus, it is El Paso's opinion that significant disruption of spawning beds will be avoided.

22. There is always a possibility of a spill of fuels or lubricants. However, depending upon the spill contingency plans and related availability of equipment to contain and cleanup spills, it is difficult to conceive of a spill which would have a major long-term adverse impact upon water quality as postulated on page I-233. This conclusion should be revised to take into account the fact that LNG spills would not have long-term impacts on water quality, and that spill contingency plans will be developed and implemented by El Paso.

The statement on Page I-233 refers to spills of fuels, lubricants, or toxic materials, not LNG spills.

23. On page I-234, without much further study, it would be difficult to demonstrate real destruction of lichens by the sulfur dioxide emissions from compressor stations. Further, the habitat reduction, if this postulated event were to occur, would be relatively insignificant compared to the normal avoidance area which would occur around the compressor stations. This point is addressed further in Comment Number 43 on Volume II.

Statement eliminated in FEIS.

24. Item (2) on page I-236 has not been demonstrated to occur with the Trans-Alaska Oil Pipeline Project and, based upon El Paso's construction schedule, should not occur with the Trans-Alaska Gas Pipeline Project.

In light of the recent decline in the population of the Arctic herd (242,000 animals in 1970; 100,000 in 1975), it may be premature to suggest that no impacts of this nature have been demonstrated to occur.

25. Items (3), (4), (5), and (6) on page I-236 grossly exaggerate the impacts related to El Paso's Trans-Alaska Gas Pipeline Project. El Paso has indicated it would withdraw approximately 6,700 acres of land during the construction phase. The impacts related to habitat disruption in this acreage are not nearly as great as inferred by the statements in (3), (4), (5), and (6) on this page. Further, none of these items has proven to be of any great significance during the construction of the Trans-Alaska Oil Pipeline.

Note modifications to FEIS.

26. The reference, on page I-237, to approximately one million gallons of seawater per minute apparently reflects data submitted in the initial Application, but which were subsequently revised. The correct flow rate is described on pages II-44 and II-279 of the DEIS.

Note appropriate change in FEIS.

27. On page I-237, item (9) incorrectly refers to ballast water intake and discharges from the shore facility. The LNG carrier fleet will be the only system component utilizing ballast water. These ships will utilize clean ballast systems wherein ballast water is carried only in the double hulls of the vessels. No contamination of the ballast water can occur with this separate ballast space design; and, El Paso plans no ballast water intake at the Gravina Point facility.

Note modification of statement in FEIS.

28. Land use in the Chugach Forest is designated multiple use and El Paso's proposed facilities are compatible with this designation, contrary to the statement on page I-240.

28. See #28 on the following page.

29. The statement made on page I-244 with respect to noise impacts upon wildlife is highly speculative. It is difficult to conceive of the pipeline causing a possible reduction in range sufficient to lead to a probable reduction in population.

30. Paragraph II on page I-245 implies that El Paso will operate "large LNG ships in confined harbors." Point Conception clearly cannot be considered a confined harbor by any means or definition. Operation in a confined harbor would expose an LNG carrier to increased traffic density, shallow water conditions, constraints on maneuverability and navigational freedom and other factors which have been shown statistically to be deleterious to shipping safety. The consideration of these potential problems resulted in the selection of the Point Conception site for a marine terminal.

31. Paragraph III on page I-245 also postulates "a major collision resulting in . . . release of an entire LNG cargo ($165{,}000\ m^3$)." The mechanism for complete structural failure of the entire ship and all its cargo tanks should be presented, along with a statement of the probability of that occurring.

32. Paragraph III on page I-245 properly states, "Although a major accident . . . is recognized as possible, it is considered to be unlikely." In the event that such an unlikely accident were to occur, the site offering the least potential for public involvement would inherently be the safest. The site choice of Point Conception reflects this philosophy and the emphasis that El Paso places on safety.

33. The Staff's recommendations regarding alternative sites will be discussed in El Paso's comments on Volume II.

The Multiple-Use Sustained Yield Act of 1960, 16 USC 531, states:

28. Multiple Use Means:

> The management of all the various renewable surface resources of the national forests so that they are utilized in the combination that will best meet the needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; that some land will be used for less than all of the resources; and harmonious and coordinated management of the various resources, each with the other, without impairment of the productivity of the land, with consideration being given to the relative values of the various resources, and not necessarily the combination of uses that will give the greatest dollar return or the greatest unit output.

The U. S. Forest Service, however, may have an interpretative program and policy for this specific management unit that would be in conflict with the El Paso proposal. For example, their letter of January 22, 1975 (sic), states that, ". . . the proposed El Paso project crosses the Chugach National Forest in an area inventoried as roadless and undeveloped." A general policy of the Forest Service is to disallow activities which will alter the wilderness quality until the completion of a Wilderness Study and determination of a long term management plan; and, for non-selected areas the Forest Service will not permit activities until an EIS is developed. Regardless, according to Public Law 93-153, which amended Section 28 of the Mineral Leasing Act of 1920, the Secretaries of the Interior and Agriculture are to coordinate efforts to grant rights-of-way and permits through Federal lands for natural gas, etc.

Statement has been modified in FEIS.

29. Note appropriate changes in FEIS.

30. Statement concerning "in confined harbors" has been eliminated in FEIS.

31. Statement has been modified in FEIS.

Volume II - El Paso Alaska System

Similar to the general comment on Volume I, El Paso disagrees with certain of the conclusions drawn with regard to environmental impacts because erroneous or outdated information appears to have been used by Staff in some parts of the analysis. Specific examples include El Paso's proposed shortened construction schedule, reduced fuel consumption in the LNG Plant, and reduced requirements for seawater in the cooling system of the LNG Plant. Again, El Paso wishes to point out that impacts of its proposed project will be incremental to those associated with TAPS.

In addition, it is El Paso's opinion that it would be helpful to readers of the DEIS if a material balance (overall fuel consumption) were included. Many of the figures included in the DEIS are unclear. Maps, in particular, should be clarified in terms of appropriate legends, and a reasonable scale and base map should be selected. Figure 1 in Volume II, for example, is not very helpful to the reader.

El Paso has also noticed that numerous statements appear in the DEIS without support. All references should be cited.

1. In describing temporary land requirements, a pipeyard is located at Milepost 118 on both pages II-11 and 12. It should be at Milepost 718.

2. On page II-15 of Staff's DEIS, the last sentence in the first partial paragraph states, "Single joints would be used at places requiring a greater bend" when referring to bends of 10° per 40-foot joint. This is a misconception. It should read "more joints would be added at places . . . ."

3. It is stated on page II-16 that major road crossings would be bored and cased. In fact, the criterion is to construct the crossings in accordance with the stipulations of the agency having jurisdiction. If casing is used, it will be 48 inch O.D. rather than 42 inch O.D. as shown in Figure 9 on page II-18.

4. In the first paragraph on page II-21, the total sulfur and hydrogen sulfide in the gas should be 1.00 grain per 100 SCF and 0.25 grain per 100 SCF, respectively, rather than in grams and CF.

5. Also on page II-21, the discussion of chilling the gas is not accurate. It is not accomplished "using multistage centrifugal compressors . . . ." It is done through a combination of evaporators and condensors with the compressors serving only a small portion of the cooling load. These facilities are correctly described on pages II-5 and 6.

6. The discussion on page II-26 regarding the use of lagoons is not clear. If a lagoon operates as described by Staff, it will not function as a point source unless there is a large and rapid increase of inflow.

1, 2. This change should be incorporated.

3. Change Page II-16, paragraph 3 to "Major road crossings would be installed in accordance with the stipulations of jurisdictional agencies." Delete ". . . by boring and would be cased under the roadbed."

4. This change should be incorporated.

5. Insert on Page II-21, paragraph 4, sentence number 2: "At compressor stations 1 through 11, chilling would be accomplished using a combination of evaporators, condensors, and multistage centrifugal refrigeration compressors driven by gas turbines."

6. Insert on page II-26, paragraph 6, prior to sentence number 3: "In areas where permeability is sufficient, these lagoons would also serve as leaching ponds whereby the treated effluent would be discharged into the grounds." Delete ". . . rather than as a point source into a surface water course." Add following sentence number 3: "Where soil structure or temperatures limit permeability, lagoons would serve to polish the treated effluent. Waters discharged from these lagoons would conform to standards set by the Environmental Protection Agency.

7. On page II-47, the LNG Plant fuel requirement is given as 190.7 million BTU/day in the text, but 190.7 billion BTU/day in the table. The word billion is correct.

Change "million" to "billion" on Line 9, Page II-47.

8. The last sentence on page II-57 indicates that "selection of the shipbuilding yard(s) would depend on the type of design chosen . . . ." It is misleading to imply that shipyard selection depends solely on the type of containment system design chosen. Factors considered by El Paso in the selection of an LNG carrier design from a specific shipyard include: (1) containment systems that meet regulatory body requirements; (2) shipyard technical and physical plant capability; (3) owner preference, experience and evaluation of a shipyard design and cryogenic design; (4) contract price; (5) any licensing agreements; and, (6) available delivery schedules for coincidental startup requirements of other project components."

No such implication was inferred.

9. The arrangement of traffic lanes for the Prince William Sound Vessel Traffic System discussed on page II-60, and shown in Figure 31, has been superceded by an arrangement shown in the Final Environmental Impact Statement issued by the U. S. Coast Guard in February, 1975 (referenced on page II-534 of Staff's DEIS).

The following map should replace Figure 31 on Page II-61 in the DEIS.

10. The discussion of Future Plans Related to Distribution of Alaskan Gas beginning on page II-64 contains several inaccuracies. The statement, "This proposal would also require the utilization of the Transwestern Pipeline Company systems in the eastward movement and displacement of Alaskan gas from California - Arizona border", is only true in Case IV, described in the September 1975 Supplemental filing. That case is not mentioned in the itemization of the various alternate studies.

The following response addresses comments 10 through 14:

11. Also on page II-64, the statement, "Under this preliminary proposal, El Paso would deliver . . . ", pertains only to Cases I, II and III. Case IV is not mentioned at all.

    If Case IV were to be included, the statement should be made that 65.6% of the Alaskan gas would go to east of Rocky Mountain customers and 34.4% would go to west of Rocky Mountain customers.

12. The fourth paragraph on page II-64 begins, "Three possible plans have been suggested . . . ." Case IV, the most recently proposed case, is not mentioned. Case IV is somewhat similar to Case III mentioned in the Staff's DEIS in that deliveries are divided between the Midwest (52.8%) - not the Anadarko Basin - and the Gulf Coast (47.2%).

13. The needed facilities identified on page II-64 are for Case IV only. Three different sets of facilities are required to cover Cases I, II and III in El Paso's proposal.

14. The total estimated cost of facilities is given on page II-65 as approximately $338,542,600. That cost is presumed to refer only

Future plans as discussed on Pages II-64 through II-66 in Section 4 of the "Description of the Proposed Action" should be replaced with the following discussion

4. Future Plans Related to Distribution of Alaskan Gas

El Paso has identified a preliminary proposal to utilize their existing pipeline system in the contiguous United States with appropriate modifications and extensions to transport Alaskan gas directly and by displacement eastward from the California-Arizona border to proposed interconnections with other pipelines in the Anadardo Basin area of southwest Kansas, and in the Texas Panhandle and Gulf Coast areas. From these areas, the gas could be transported directly, or by displacement, to markets in the Midwest and Eastern United States.

El Paso's present project schedule estimates first deliveries of gas to the lower 48 states in mid-1981. From that time there would be an incremental buildup of deliveries consistent with the phased completion of the Alaskan and marine transportation and delivery facilities.

Under this preliminary proposal, El Paso would deliver either directly or by displacement 65.6 percent of the 3.1 million Mcf/d available as peak day deliveries from the Western LNG terminal to markets east of the Rocky Mountains. This gas would be delivered to other existing pipeline systems at or beyond the eastern terminus of El Paso's existing system. The remaining 34.4 percent would be distributed to markets west of the Rockies.

Four possible plans have been suggested for the Eastern U.S. deliveries. Case I - assumes all 1.55 million Mcf/d would be delivered to the Anadarko Basin area. Case II - assumes delivery of the full 1.55 million Mcf/d to the Texas Gulf Coast. Case III - reflects a split of the volumes with 755 thousand Mcf/d to the Anadarko Basin and 775 thousand Mcf/d to the Texas Gulf Coast. Case IV - similar to Case III, also proposes to split the volumes with 818 thousand Mcf/d to the Midwest and 732 thousand Mcf/d to the Gulf Coast.

Implementation of any one of these plans would necessitate various levels of modification and construction.

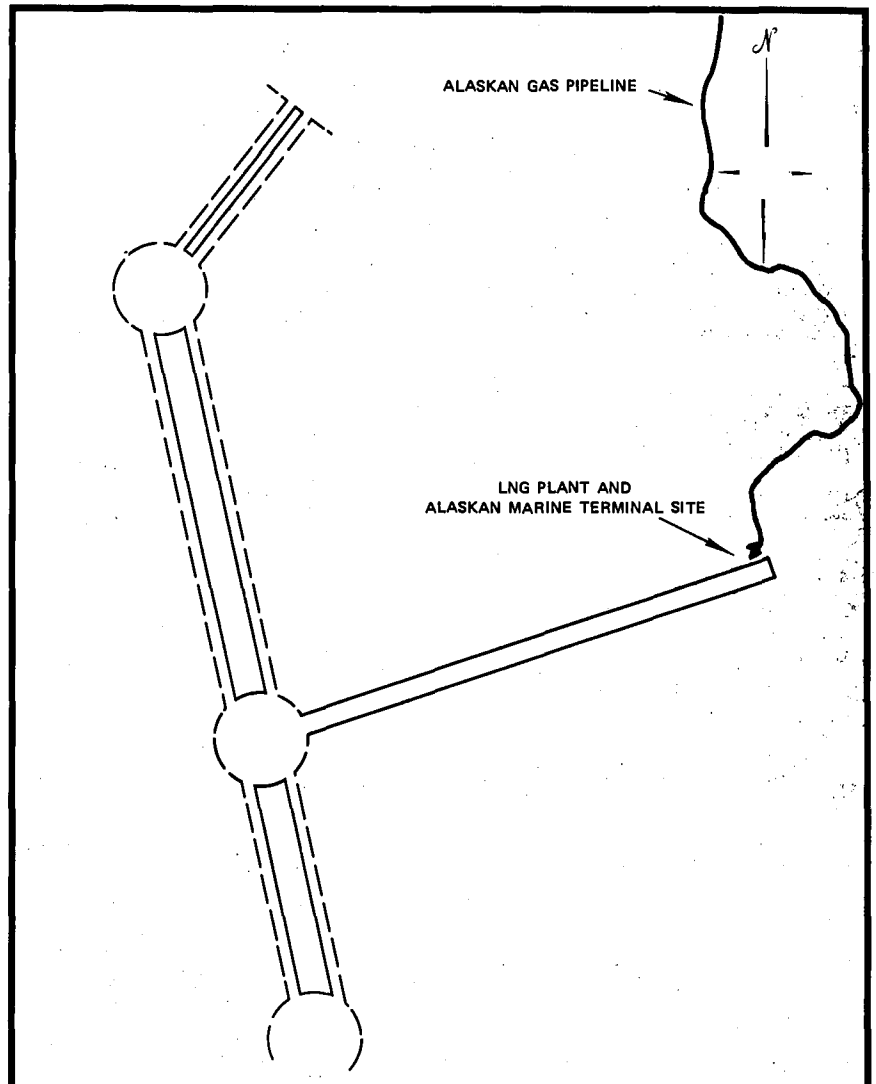
Case I - The principal facilities required would consist of approximately 114.9 miles of loop pipeline, 382 miles of new pipeline extending to the Anadarko Basin area, the addition of 27,660 compressor horsepower on the existing system, 141,324 compressor horsepower at new stations, together with certain piping and compressor unit modifications. The estimated total project cost would be $333,077.

Case II - The proposed facilities required would consist of approximately 121.1 miles of loop pipeline, 431.5 miles of new pipeline extending to the Anadarko Basin area, the addition of 66,460 compressor horsepower at existing stations, 99,500 compressor horsepower at new stations, together with certain piping and compressor unit modifications. The estimated total project cost would be $423,817,000.

Case III- The proposed facilities required would consist of approximately 69.7 miles of loop pipeline, 813.5 miles of new pipeline, the addition of 27,660 compressor horsepower on the existing system, 102,400 compressor horsepower at new stations, together with certain piping and compressor unit modifications. The estimated total project cost would be $446,880,000.

Case IV - The proposed facilities required would consist of approximately 106.7 miles of loop pipeline, 445.1 miles of new pipeline, the addition of 25,000 compressor horsepower on the existing system, 61,000 compressor horsepower at new stations, together with certain piping and compressor unit modifications. This plan would also require utilization of the Trans Western Pipeline Company (Trans Western) system in the eastward movement and displacement of Alaskan gas from the California-Arizona border. Design work indicates that two new 6560-horsepower compressor stations would be required on their Panhandle Lateral line, together with minor piping modifications at their stations numbered 1 through 9. The estimated total project cost, including the Trans Western system additions and modifications would be $344,348,000.

Prior to the construction of these facilities El Paso and/or Trans Western would be required to file an application with the Commission, and at such time the potential environmental impacts of these proposals would be evaluated.



Revised Figure 31 - Prince William Sound - Vessel Traffic System Showing Additional Precautionary Area and Tanker Safety Lane (General Representation) For The Approach to Gravina Point.

to Case IV, although the source of the $338,542,600 is not clear. The estimated total costs for the various cases filed are as follows:

	Original March, 1975 ($1,000)	Updated July 1, 1975 ($1,000)
Case I	307,901	333,077
Case II	396,398	423,817
Case III	419,312	446,880
Case IV	---	344,348

The Case IV cost estimate includes those costs related to the modification of the Transwestern Pipeline Company system.

15. On page II-70, the implications of severity of ice fog are exaggerated. This condition is not a frequent occurrence outside urban areas such as Fairbanks. It is a localized phenomenon, and in fact, most aircraft operations are not suspended when it occurs.

16. Stability data shown for Anchorage (pages II-70 and 71) are not descriptive of micrometeorological conditions encountered along the proposed route or at Gravina Point, nor at any of the alternative sites.

17. El Paso takes strong exception to Staff's position expressed on page II-72, that ". . . ice in Cook Inlet should not pose any major problems to marine transportation." Further discussion is presented in Comments Number 73 & 74 on Volume II.

18. On page II-75, the description of the proposed route is wrong. El Paso does not propose to cross the Sagavanirktok, Kadleroshilik, and Shaviovik Rivers as described.

19. The statement on page II-100 regarding aufeis is in error. It can and does form without permafrost; it is only coincidental that permafrost exists in most areas where aufeis exists.

20. The last paragraph on page II-101 refers to an alternative route. If the reference is to El Paso's proposed route, the word "alternative" should be deleted; if the reference is to another route, that route should be identified.

21. On page II-116, Staff's DEIS says that the El Paso pipeline will cross "532 streams." It also repeats the table provided by El Paso with 29 "major" streams and 43 "smaller but significant" streams. This paragraph should carry a general description of the other 460 "streams"; and should clearly state that they are only minor drainage features. Later in Volume II (page II-271) the number of stream crossings is given as 550 and this inconsistency should be resolved.

22. The locations of springs as described on pages II-130 and 131 are in error. Sadlerochit Spring is upstream from the proposed Arctic

15. The statement regarding suspension of aircraft operations has been deleted.

16. The following revised Table 6 should replace Table 6 in Volume II of the DEIS.

Table 6

Relative Frequency Of Occurrence of Stability Classes For Fairbanks, Alaska (Percent)

Pasquill Classification	Months D/J/F	M/A/M	J/J/A	S/O/N	Annual
a (Extremely unstable)	0.0	0.0	0.0	0.0	0.0
b (Moderately unstable)	0.0	0.7	10	0.2	0.5
c (Slightly unstable)	0.7	16	19	10	13
d (Neutral)	30	49	51	47	44
e (Slightly stable)	12	12	10	14	12
f (Moderately stable)	30	12	0.8	18	17
g (Very stable)	21	5	0.2	0.9	0.9

Source: National Oceanographic and Atmospheric Administration, 1975.

17. At the present time, LNG is being commercially exported from Cook Inlet to Japan. During the winter months, however, especially during February, pack ice can sometimes be menacing to docking and loading operations and can sometimes cause delays.

18. Change "crossing" to "paralleling" in the first line of the first full paragraph of Page II-75.

19. Delete first sentence of Page II-100 beginning with "Aufeis."

20. On Page II-101, last line, delete word "alternative."

21. The environmental staff feels that, due to the limited information available concerning Alaskan watercourses, it may not be appropriate to clump 460 watercourses under the broad general heading of "only minor drainage features." The applicant proposes to cross 532 watercourses in Alaska, and this fact is accurately represented in the FEIS.

22. Comment accepted. This revision should be noted in the FEIS.

Gas route, not El Paso's. Similarly, almost all of the known springs are located south of the proposed Arctic Gas route, but east of the El Paso route.

23. Regarding a discussion of aufeis on page II-131, thickness at an extreme might reach 200 feet thick. Two thousand feet is unknown and extremely unlikely; twenty feet is more likely.

24. The discussion of salmon spawning on page II-177 should be expanded or corrected to reflect the fact that many species of Pacific salmon migrate in mid-summer, their migration often extending into the fall.

25. The mention, on page II-184, of use of intertidal zones as spawning areas is incomplete and confusing. Pink and chum salmon migrate within a reach of a stream influenced by the tide but the actual deposition of the roe is below the level of low tide in the streambed.

26. Reference is made on page II-194 to the Appendix A list of endangered and threatened plant species found in Alaska. This list should be expanded to indicate the location of the endangered and threatened plants with respect to the pipeline corridor.

27. On page II-195, the implication is given that the mammals mentioned occur in significant numbers. Musk oxen are practically unknown along the route. There are 15 animals reported in the area which have separated from a transplanted herd to the northeast.

Coyote have a potential for being on the North Slope, but they are rare and this is north of their recognized range.

28. It is said on page II-203 that, "Mineral licks are important to the Dall sheep and several of these occur along the route." Those mineral licks should be identified with respect to location along the proposed route.

29. Reference is made on page II-217 to elimination of winter forage area for Sitka black-tailed deer. The areal extent of that disruption should be estimated and placed in context with the presently available winter range.

30. In discussing Land Use, on page II-230, the Matanuska Valley is said to be in interior Alaska. In fact, it is south of the Alaskan Range.

31. The population of Fairbanks is given, on page II-237, as 45,000. On page II-230, it was given as 14,771. This discrepancy should be resolved.

32. The Land Status map on page II-238 does not reflect later revisions in the Bureau of Land Management Utility Corridor. Excursions of the proposed El Paso route outside the corridor as indicated on that map are in error.

23. Comment accepted.

24. Change the sentence to read, "Adults of all Pacific salmon migrate from the ocean up freshwater streams to spawn during the spring, summer, or fall, depending on the species."

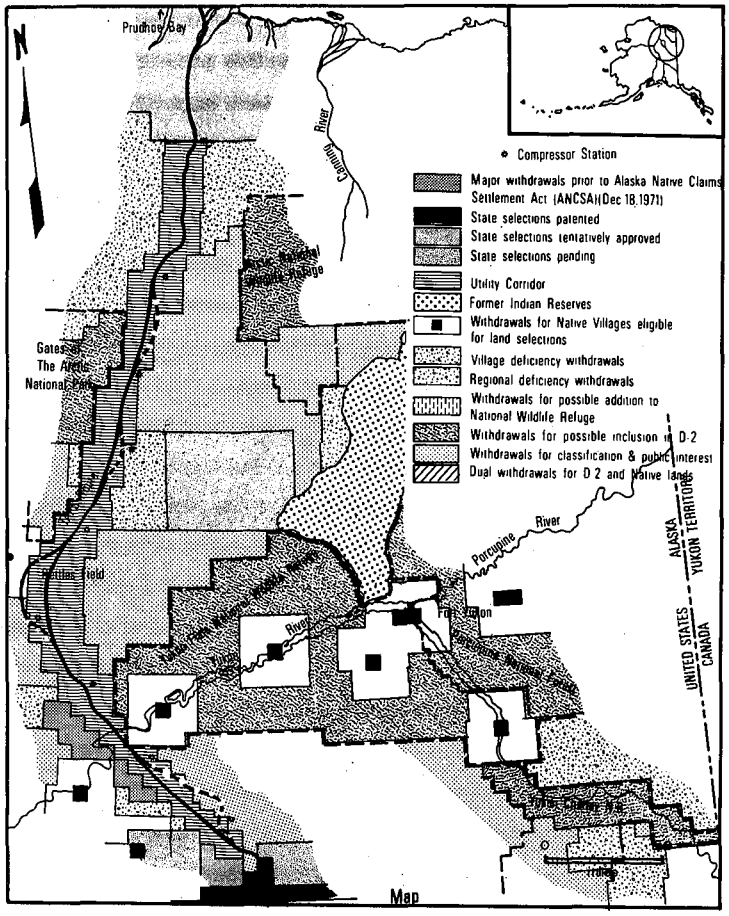
26. The location of these plants with respect to the pipeline corridor and centerline of the pipeline has not yet been determined, but should be among the items to be provided by El Paso Alaska.

28. As is the case with endangered and threatened plant species, the locations of mineral licks should be identified during the applicant's proposed preconstruction survey.

29. The expertise to quantify the area of winter forage that would be destroyed or avoided by the deer is not presently available. It is appropriate to assume, however, that should the proposed plant site be constructed, the remaining overwintering usable habitat would not support the present number of deer and that overgrazing of that remainder would affect more than those few deer physically displaced.

30 We agree. The intent was to note the Matanuska Valley was noted for individually large produce and that it was located in the interior as opposed to the coastal facade. However, the comment should read, "The agricultural Matanuska River Valley, noted for unusually large produce is south of the Alaska Range."

31 The population figure for Fairbanks is 14,771. This comment should read, "Fairbanks, the second largest city in the state has all of the facilities one would expect of a medium-size city." The U.S. Bureau of the Census reported that the State Revenue Sharing figures are estimates and that a Special State Census is scheduled for September 1976.



—— El Paso Alaska Company Proposed Route
--- Portion of Route Initially in Error

32. A check indicated the map was in error. Revision is shown on the adjacent map.

33. It is El Paso's firm opinion that the problems of frost heave and thermal erosion during the interval between construction and operation as discussed on pages II-258 and 259 are seriously overstated. El Paso does not agree that the pipeline buried below the active layer in perennially frozen soils would be susceptible to frost heave; nor does El Paso agree that frost heave of "the unchilled buried pipe" is a problem, by definition of frost heave. The statements in the section under Frost Heave appear to be contradictory. For example, while Staff correctly identifies a source of water as one of the necessary conditions, they appear to say that groundwater migration toward the freezing front of the frost bulb would transport water into the perennially frozen soil below the active layer.

Water migration into the zone of permafrost does occur.

34. On page II-260 the statement, "Thaw consolidation must be considered as an annual event which takes place rapidly" is not accurate. By definition, the word "consolidation" means the formation of a solid mass, and it is progressive to an end point. There probably will be a period of two or three years after construction disturbance during which portions of the ditch line will experience thaw consolidation. But it will progress to a point of equilibrium and not be "an annual event." Also, the word "rapidly" should be further defined or quantified. As much repair work as possible will be scheduled after freeze-up to minimize damage.

35. Hazards associated with large seismic events are again discussed on page II-265. It is El Paso's belief that natural hazards are overstated in this passage. See Comment Number 19 on Volume I.

36. On page II-267 and elsewhere in Volume II, it is said that the basic Marine Terminal structures would be designed to withstand 0.6g of bedrock acceleration but that the trestle carrying the LNG loading arms would be designed to withstand 0.3g. However, in prepared direct testimony of El Paso's witness Gibson, dated November 7, 1975, Staff was informed that the final design of the entire Alaskan Marine Terminal will use the criterion of 0.6g of ground level bedrock acceleration.

The change in the applicant's proposal is noted. The second sentence of paragraph 3, Page II-267, should be deleted and in the third sentence, "This level. . ." should be substituted for "The higher level.. . ."

37. On page II-268, the text hypothesizes the destruction of any ship struck by the design wave while berthed at the terminal. El Paso considers the occurrence to be highly unlikely. Provisions for quick castoff in emergencies, constant propulsion power readiness, manned bridges on the ships, advisory and warning systems and the characteristics of these types of earthquake-induced waves significantly reduce the probability of any such destruction.

38. Reference is made on page II-273 to erosion and siltation resulting from road crossings of streams. El Paso has assumed use of the existing TAPS haul road. However, construction of a few short access roads would be required. Once the crossings are in place, it is difficult to understand how there would be any potential for continued siltation.

According to a portion of the Alyeska Impact Statement (USDI, 1972) quoted in Volume V, Page 3A.2-26 of El Paso's application, "These [road crossings of streams] would generally involve a fill or cut requirement which, until stabilized, would erode." Additionally, "Probably the most serious siltation potential concerns washout of such road crossings. If this occurred, the fill would be washing downstream and could cause more siltation than the original construction. Reconstruction would add additional silt to the streams."

39. With regard to the discussion on page II-278 of impacts of water withdrawal upon overwintering fish populations, a directive from the regional supervisor for the Alaska Department of Fish and Game Habitat Protection to all North Slope lease holders and operators states, in part,

> " . . . you [have] received a notice from the Water Resources Section, Alaska Division of Lands, Department of Natural Resources, stating you must apply for water appropriation on the North Slope. Concomitantly this Department will review your application and issue our authorization pursuant to AS 16.05.870 to protect the fishery resources in the area. Because of the adverse impact of water use during the winter months to fishes overwintering in the major tributaries, it is our objective to encourage use of water from the upland lake areas to the greatest extent, and to encourage you to either singly or collectively devise a system (reservoir, etc.) where dewatering a major tributary will not occur."

While winter water removal should continue to be a major environmental consideration, this directive will cause all such withdrawals to undergo review prior to approval. This should cause situations as described on page II-278 to become less likely and ultimately dependent on the state government for prevention.

40. Considerable concern is expressed on pages II-279 through II-281 for the potentially significant impact on marine biota of Orca Bay due to the discharge from the seawater cooling system at the LNG facility. Those concerns are recognized by El Paso, and by Federal and State regulatory agencies. The final design of the cooling system will include provision for adequate mixing of the effluent into the waters of Orca Bay in order that the stringent requirements of regulatory agencies will be satisfied.

41. The Staff's DEIS indicates on page II-282 that fishing from the shore in the Gravina area "could be impaired as a result of waves generated by the passage of tankers close to fishing areas."

The LNG carriers will be approaching the Gravina terminal area under tug assistance prior to final maneuvering and actual berthing. The ships will be proceeding at such a slow speed in this area that any wave generated will be inconsequential. Therefore, onshore wave damage is highly unlikely.

42. The statements made on page II-286 concerning the effects of frost bulb formation are highly speculative. The possibility of some of the postulated effects actually occurring has been recognized, but it is El Paso's position that such effects can be minimized by appropriate design and construction.

It is doubtful that the waves generated by increased ship traffic in the Gravina terminal area would be "inconsequential." Moreover, the Cordova District Fisheries Union has agreed with the staff's assessment of this matter.

43. It is El Paso's opinion that the impact of SO_2 emissions from compressor station operations upon lichen is overstated on pages II-287 and 288. Those emissions are reported as 0.01 lbs/MMBTU on page II-314. From that, it can be calculated that the emission rate is approximately 0.433 grams/second at each station.

In El Paso's Application, an analysis of air quality impact due to operation of the LNG Plant and Marine Terminal included SO_2 emissions from two LNG carriers firing Bunker C fuel. The emission rate from those sources was reported to total approximately 72.6 grams/second of SO_2, or nearly 168 times the SO_2 emissions from each compressor station.

In that analysis, it was shown that the average annual ground level concentration of SO_2 due to the continuous emission of 72.6 grams/second is about 8 micrograms/cubic meter, or about 0.003 ppm, ten percent of the standard.

Even if one were to assume the worst possible climatological conditions for dispersion, it is inconceivable that SO_2 emissions from a compressor station could result in annual average ambient concentrations as high as those which reportedly are damaging to lichens.

Moreover, if the alleged impact on lichens were to occur, the approximate amount of winter range and approximate number of overwintering caribou that would be affected should be reported in the DEIS.

44. On page II-289 it is stated that, ". . . construction efforts would be greater . . . [than for the TAPS oil line]." That does not follow; for example, little road construction will be required by El Paso if the existing TAPS roads are utilized.

45. Impacts upon caribou migration such as those postulated on page II-290 have not occurred in connection with the TAPS oil line.

46. It is stated on page II-292 that the proposed pipeline would improve access to caribou herds. No access beyond that already in existence would be provided.

47. Reference to the alternative pipeline on page II-295 is confusing. It should be clarified or deleted.

48. With regard to the discussion of noise on page II-314, there are no annual maintenance checks requiring 45 minutes blow down on the pipeline. Also, the time required to blow down the compressor station is two to three minutes. The emergency shutdown system is checked twice a year, but the total plant is not completely blown down.

49. On page II-319, a paragraph should be added explaining that gravel backfill will be used in areas of ice-rich soil in order to mitigate problems that might be caused by thermal erosion, and to minimize thaw consolidation.

43. See response on Page 74 of Alaskan Arctic Gas Pipeline Company's comment.

44. Comment reflected in the deletion of this phrase from the appropriate sentence in the introduction to Section C.8 of Volume II of the FEIS.

45. Research is still underway concerning the effects of the TAPS oil line. Since the Arctic caribou herd has recently undergone a drastic reduction, the cause of which remains to be determined, it is probably too soon to state that the TAPS line has had no impact on the caribou.

46 Since a significant portion of the proposed pipeline would be constructed at some distance from existing rights-of-way, the staff maintains the resulting new right-of-way used by El Paso will allow increased access to caribou herds.

47 Comment reflected in the deletion of "alternative" from the appropriate sentence in Section C.8 of Volume II of the FEIS.

48. Comment accepted.

49. Add the following paragraph 4 on Page II-319: "In areas of ice-rich soil, gravel backfill would be used to mitigate potential problems caused by thermal erosion and to minimize thaw consolidation."

50. In the second paragraph on page II-324, the first sentence states that exhaust silencers on gas turbine drivers may be required; the second sentence states that all drivers will be equipped with exhaust silencing. The second is correct; the first should be deleted.	Delete ". . . and may also require exhaust silencers." from paragraph 2, first sentence.
51. On page II-325 another specific advantage of winter construction should be added: (6) less thermal erosion in the open ditch during construction and during the intervening period prior to start of operations.	This change should be incorporated.
52. A statement is made on page II-326 that, "The culverts would be designed to provide a maximum velocity of 0.6 fps under normal runoff and flow conditions." Staff's attention is invited to the fact that the Joint State-Federal Fish and Wildlife Advisory Team (JFWAT) is now measuring velocities through culverts along the haul road in Alaska. Originally, U. S. Fish and Wildlife Service had placed culvert flow criteria at 3.0 fps. As a result of the present investigations this will probably be raised to 4.0 fps as it apparently is not possible to achieve the lower figure. El Paso has proposed to design and install culverts which will meet current criteria.	Incorporated into the FEIS.
53. With regard to the Keystone Canyon tunnels, on page II-329 it is said that permanent ventilation fans will be installed. The sentence should be deleted or changed to indicate that during construction, and when repairs are being made, fans and portable power sources will be utilized.	Delete sentence 9 in paragraph 3 on Page II-329.
54. Cleared and maintained right-of-way is said to be 150 feet on page II-333. That should be corrected to 53.5 feet.	Comment accepted.
55. On page II-338 and again on page II-525, Staff indicates concern for a potential rollover problem in the LNG storage tanks due to the use of a bottom fill line only and suggests top and bottom fill. El Paso does not expect a rollover problem to arise because (1) the flashing effect of some of the LNG into the gas phase upon entering the storage tanks will cause a continuous mixing action within the storage tanks, (2) any change in gas composition and/or product composition occurs gradually over a long period of time, and (3) the residence time of any LNG product in the storage tanks will be only two to three days.	The environmental staff is still of the opinion that a top fill line would improve the operational flexibility to the LNG storage tanks, especially in the event of abnormal operating conditions.
56. The statement as to locations of ultraviolet flame detectors on page II-342 is incorrect. They will be used at the LNG Plant.	Comment accepted; however, no information has been provided to indicate the location of such detectors at the terminal.
57. On page II-346 the statement is made, "Cooling water intake and discharge for the liquefaction process would amount to approximately 1.1 million gallons per minute. As mentioned in Comment Number 26 on Volume I, the correct seawater intake rate is 658,670 gallons per minute. Also, the sentence beginning "According to El Paso the intake velocity . . . ." should be deleted and the following sentence added: "Intake velocity will be 0.5fps."	Comment accepted. Page II-346 should be revised.

58. There is a statement on page II-346 that air quality impacts are discussed elsewhere in the DEIS. However, the only other discussion of air quality relates to compressor station impacts. See Comment Number 43 on Volume II.

Emissions from the LNG plant are discussed in the FEIS concerning Alaska in the section on "Impacts to Air Quality."

59. The last paragraph on page II-348 says that the trestle and berths at the Marine Terminal will be designed for 0.3g ground accelerations. This statement is incorrect. See Comment Number 36 on Volume II.

Comment accepted. Page II-348 should be changed to reflect this information.

60. The last paragraph on page II-351 should be written as follows: "Each berth would be equipped with four berthing dolphins. Each dolphin will consist of a fender system, a powered capstan, and two quick release hooks to accommodate spring lines from the tanker."

Comment accepted. The word "each" should be inserted after "dolphins," in the first sentence of the last paragraph on Page II-351.

61. To correctly state El Paso's policy concerning acceptable cargo containment systems, the discussion of specific containment systems on page II-353 should read, "El Paso has stated that five cargo containment systems can be made acceptable for the LNG tanker fleet. They are the spherical tank designs of Kvaerner-Moss and Chicago Bridge and Iron, the prismatic freestanding design of Conch, and the membrane tank designs of Gaz Transport and Technigaz." The Kvaerner-Moss and CBI designs are similar in nature.

Comment accepted. The discussion of cargo containment on Page II-353 should be revised as suggested in this comment. However, it should be noted that in the LNG Safety Report, the CBI cargo containment system was not discussed as a viable system for use in El Paso's tankers.

62. The second sentence of the second paragraph on page II-355 should read, "Reinforced polyurethane foam would be used as insulation on the bottom and sides of the tank hold and fibrous glass insulation would be applied to the top of the tank hold."

Comment accepted. The change as suggested should be noted on Page II-355.

63. The last sentence of the first paragraph on page II-358 should be corrected to read: "The emergency diesel generator would provide power . . . ." The text incorrectly indicates the ship service diesel generator performs these emergency power functions.

Comment accepted. The change as suggested should be noted on Page II-358.

64. See Comment Number 1 on Volume I. Reference is made on page II-366 to a zone around compressor stations which would be avoided by sensitive wildlife species. Some attempt should be made to quantify the amount of habitat which might thus be lost to a given species.

The staff agrees that such quantification would be desirable, but no experimental studies have been conducted which would provide this information for all sensitive wildlife species. Such a study would require that each compressor site be surveyed as to local species type and that consideration be given to impact attenuation due to local topographical features. The results of individual species impact quantification may be of value but are beyond the scope of this report and would be difficult to estimate or support.

65. Sections F and G, pages II-368 through II-375, contain an imaginative, but subjective, analysis. The discussions of various matrix categories contain certain statements which do not appear to be justified. For example, Category A relates to short-term uses but includes an alleged decreased food supply for caribou. That argument is fallacious (see Comment Number 43 on Volume II), but if it were true, it would surely relate to long-term rather than short-term uses. Included in Category E is consideration of a recommended natural study area at Franklin Bluffs. If that recommendation were implemented after completion of construction, then there would be no disturbance.

Categories A and G tracked information on Pages II-287 and 288. A certain amount of redundancy, as in engineered systems, may be legitimate.

Category E identified the nearness of continuing activities by man as the problem.

Category G, relating to long-term productivity, repeats the allegation that caribou food supply would be degraded due to the effects of SO_2 on lichens. If this were a likely affect of the proposed

See Pages II-287 and 288.

project, it should not be double-counted, in both Categories A and G. Similarly, sediment produced by construction activities is treated as "reversible commitments" in Category A and as "irreversible commitments" in Category I.

Under Category M, it is difficult to relate the specific example cited to "irreversible commitments of socioeconomic resources which would curtail short-term uses." Commitment of materials to the Marine Terminal and ships is not irreversible. Moreover, destruction of those facilities by a catastrophic natural event would curtail long-term, not short-term uses. Further, El Paso does not agree with the conclusion as to the likelihood of marine terminal and ship destruction. The statement at Category M assumes destruction would be an expected occurrence.

66. Beginning on page II-376, the Staff DEIS addresses alternatives to the proposed action. Staff has adopted discussions of alternatives 4, 5, and 6 from the Department of Interior DEIS on Alaskan Natural Gas Transmission System. El Paso commented on that DEIS and believes that those comments should be incorporated. A copy is attached.

67. Analysis of the alternative pipeline routes, beginning on page II-367, is fairly consistent with El Paso's Application. However, Staff has added an alternative: from Prudhoe to Nikiski on the Cook Inlet (near the existing Phillips LNG installation). The reason for proposing this alternative is that the LNG plant site at Nikiski "has the advantage of exhibiting fewer environmental sensitivities and less potential for adverse environmental impacts than the Gravina site" (page II-493). This may be the only reason for the proposed alternative. El Paso has serious questions as to the feasibility of the pipeline route until additional field studies have been conducted.

68. Staff's proposed route through the Alaska Range, as described on pages II-390 and 391, may be feasible, but it would require a greater length of pipeline, possibly some tunnels, and would undoubtedly be very expensive. Beyond that, El Paso cannot attest to its feasibility without extensive on-site studies.

69. Describing the topography of the Alaska Range foothills on page II-406, the statement is made that, "Bedrock exposures in this section should permit secure foundation." No support can be found in the DEIS for that assertion.

70. On page II-407, topography in the Alaska Range is described as " . . . rugged glaciated ridges . . . ice-sheathed mountains . . . very rugged terrain is encountered with transverse placement slopes to 50 percent, but general presence of bedrock should assure secure anchoring." It is El Paso's firm belief that much more reconnaissance and study in the field is required before such a route can be seriously proposed.

65. Category A applies, generally; Category I dealt with a specific area (identified on Page II-262).

Category M considered the additional dollars and work effort needed, if destruction occurred, as an irreversible commitment.

69. With regard to bedrock exposures on steep slopes of pipeline route in the Northern Foothills Physiographic Province: from the entrance to the Totatlanika River Canyon southward to its junction with California Creek, and in the canyon of California Creek, two massive, east-west belts of schistose rock are crossed. The belts have a topographic expression as ridges in which the two canyons are cut. The major formation is the Totatlanika Schist, California Creek Member, exposed in the two cayons, which are traversed by the proposed route and are the locations of the steep slopes referred to on p. 3-25. (Ref. 1, pp. E-14, E-16; Ref. 1, Figure 2., "Generalized geologic map of the central Alaskan Range showing the distribution of the Schist Formations in the Fairbanks A-2, A-3, and A-4 quadrangles, and the Healy D-2, D-3, and D-4 quadrangles," Ref.2, p.23).

The Northern Foothills Province, especially its northern portion does contain extensive Cenozoic surface deposits of glacial origin which cover bedrock over large areas (see strip Map 3, Geological Conditions north of Healy Creek; also Ref. 1, Figure 2.).These deposits are principally gravels, and are most extensive in the foothill area east of Totatlanika River (Ref. 2, p.30, Ref. 1, Figure 2). These gravels do occur along the pipeline route within the Province, as, for example at Healy Creek, where they overlay the Birch Creek Schist in the lower elevations of the valley (Ref. 2, p.32, Ref.1, Figure 2). The gravels are mainly unsorted, ranging from small pebbles to cobbles, (Ref.2., p. 31). and would provide a generally stable foundation except on the steepest slopes. However, as indicated in the Totatlanika/California canyons and southward from Healy Creek; their utilization for foundation purposes is a question of precise route location from an engineering standpoint.

* This response is based on an FPC contracted study entitled Alternative Sites for LNG Facilities in the Cook Inlet/Kenai Peninsula, Alaska Area, Contract No. FP-1773, as well as the following references:

1. Wahrhaftig, Clyde, Schists of the Central Alaska Range, Distributor of Schists within the Fairbanks A-2, A-3, and A-4 Quadrangle and Healy D-2, D-3, and D-4 Quadrangles, U.S. Geological Survey Bulletin 1254-E, 1968.

2. Capps, Stephen R., The Bonnifield Region Alaska, U.S. Geological Survey Bulletin 501, 1912.

71. The statement on page II-438 that large vessels have no problem navigating in ice is in direct conflict with statements provided to the FPC by Rear Admiral J. B. Hayes, U. S. Coast Guard, Seventeenth Coast Guard District, dated November 14, 1975. A copy of Admiral Hayes' letter is attached.

The attached letter has been received by the environmental staff and placed in the Commission files.

72. A very strong statement is made on page II-457 to the effect that a large breeding population of bald eagles would probably be lost for the life of the project. However, on page II-298, a more credible statement is made to the effect that not more than three or four nesting pairs would probably be displaced. The statement on page II-457 should be corrected.

The environmental staff agrees with the Department of the Interior (see DOI comments, p. 4) that more eagles will be disturbed than the three or four pairs physically displaced by the proposed facilities.

73. With regard to LNG Plant site selection, Staff's evaluation, on page II-443, includes the following comment:

> "The general lack of large, solid masses of winter sea ice within the [Prince William Sound and Cook Inlet] region allows for year-round operation of all ports within the region, and would not be restrictive to LNG tanker operation . . . ."

This statement is at least arguable for the Cook Inlet subregion. As regards Cook Inlet, and more specifically the proposed LNG site as Nikiski, the data presented in the DEIS indicate a general presence of large, solid masses of winter sea ice which would be restrictive, though not prohibitive, to LNG tanker operation during the winter months. Sea ice would almost certainly restrict operation of a project requiring 309 trips per year.

Ice cakes 20 feet high, 30 feet wide and 60 feet long were observed grounded in Cook Inlet in 1964 (see page II-432). The Oceanographic Institute of Washington reports that ice floes in the inlet can be 1/2 mile wide with an average thickness of 4 to 5 feet during a normal winter and 6 to 8 feet during a severe winter (see page II-438). The East Foreland site, located approximately five miles north of the Nikiski site, was at least partially rejected because of "severe winter ice conditions which could adversely affect the operation of the Marine Terminal associated with the proposed project" (see page II-482). If it were not for the tidal actions and currents in Cook Inlet, a solid sheet of ice would form in the fall and remain unbroken until the spring; as it is, the ice is kept "in somewhat of a shattered condition" (see page II-487). Staff states that the ice conditions in Cook Inlet are "chronic in nature" (see page II-497). The above strongly suggest the presence of "large, solid masses of winter sea ice" within Cook Inlet.

Comment reflected in Section H-2 of Volume II of the FEIS.

The Oceanographic Institute of Washington admits that Nikiski occasionally has serious navigational ice problems (see page II-433). It is reported that on one occasion during the winter of 1971-72, the ice situation required five dockings in the course of a week to fill an LNG ship, an operation normally requiring 15 hours (see page II-441). Ice is an acknowledged "hazard to navigation and loading operations" in Cook Inlet; there are conflicting

opinions, however, as to the relative seriousness of the ice conditions to ships the size of the proposed LNG tankers (see page II-442). Smaller and older vessels have been damaged by ice in Cook Inlet (see pages II-433 and 434). Staff admits that "icing would be a serious consideration for the design of the berthing facility" at Nikiski (see page II-484). In light of the above, the statement cannot be made that ice conditions within Cook Inlet, and specifically at Nikiski, "would not be restrictive to LNG tanker operation." Staff has admitted that opinions are divided on this issue, and Staff's own consultant was unable to establish a parameter to evaluate ice conditions.

74. The Staff concludes on page II-497 that the sites at Nikiski and Gravina Point comply with the technical requirements of the proposed project. Staff argues that Nikiski represents a suitable marine terminal site for marine transportation of LNG in the El Paso project. El Paso strongly disagrees with this position.

El Paso considers the prime weakness in Staff's Nikiski position to be the failure to adequately evaluate the requisite technical feasibility of shipping operations in Cook Inlet. El Paso has consistently pursued the policy position that, first and foremost, the project operation must be reliable and safe.

El Paso rejected Cook Inlet sites because they did not meet the site selection criteria established to assure that its operations could be conducted in a reliable and safe manner. Operation in Cook Inlet would cause unneeded disruption and delay in the marine operation and scheduling of the fleet. This disruption and delay would be caused by unacceptable ice, current and marine traffic conditions. Further, disruption of marine terminal operations such as berthing and cargo loading would be caused by ice and current conditions.

See previous response.

The ice, current and traffic conditions all violate El Paso site selection criteria. As an example, El Paso specified that maximum current conditions at the terminal should not exceed two knots. Rear Admiral Hayes of the U. S. Coast Guard has reported that average currents are in excess of seven knots and velocities near eleven knots have been reported during large tides in Cook Inlet. El Paso submits that Staff cannot continue to support the Nikiski site when conditions at the site violate Staff's own technical requirements of maximum current conditions of four knots, as indicated on page II-471 of Staff's DEIS. Staff has given no indication or substantiation for the feasibility or reliability of a fleet required to make almost daily passage through these conditions. El Paso's project requires daily availability of the marine terminal in order that one or two ships can be at berth and loading at all times. Staff has given no indication that such an operation would be feasible at Nikiski. Instead, Staff recommends that El Paso find remedies for a site which has already been recognized as unacceptable and has been rejected.

The U. S. Coast Guard, responsible for shipping operations pursuant to the Ports and Waterways Safety Act of 1972, has stated in the attached letter (from Rear Admiral J. B. Hayes), , "The siting of any additional LNG terminals in the Nikiski area poses a significant hazard to the safety of life, property and the environment. From the standpoint of safety as compared with the proposed Gravina location in Prince William Sound or numerous other possible locations in South-Central Alaska, Nikiski is quite frankly, a poor choice. [It is] strongly recommend[ed] that cognizant officials of your agency visit Nikiski during winter conditions before any decision is made in this matter."

El Paso did not consider the Nikiski site or any other Cook Inlet site acceptable for the proposed project.

75. On page II-503, the text should indicate that El Paso has proposed a traffic safety lane. This traffic lane has been discussed with the U. S. Coast Guard and is presented in Exhibit EP-74.

See the response to El Paso's comment number 9 on Page II-2. The revised Figure 31 also shows the proposed traffic safety lane to Gravina Point.

76. Tables 37 and 38, Physical and Biological Comparisons of potential sites, pages II-501 through II-517, do not present information in easily comparable forms. El Paso recognizes that qualitative descriptions are necessary in many cases, but see Comment Number 1 on Volume I. When quantitative entries are used, they are sometimes not commensurate. For example, the wind characteristics at Gravina and Nikiski appear to favor Nikiski; yet, in Attachment 1 to Volume II, the mean wind speed used for Gravina is 4.9 mph, which would appear to make conditions more favorable there.

The environmental staff disagrees that the information is not presented in easily comparable forms. Attachment 1 has been replaced by an updated safety analysis.

77. Beginning on page II-521, Staff has presented a series of recommendations. Several of those recommendations, such as the location of borrow pits, have already been addressed in material filed with the FPC where El Paso has proposed to use only approved sites. Also, with regard to recommended seismic design criteria, see Comment Number 36 on Volume II. Others, such as specific amounts of fertilizer to be applied in restoration procedures, El Paso believes to be inadvisable at best. Fertilizer application rates should always be determined on a site specific basis. Several of the recommendations are premature in that they appear to relate to the early planning phases of the project while such detailed recommendations will only be appropriate as construction plans are finalized. El Paso expects, and has so stated, that stipulations somewhat similar to those developed for construction of the Trans-Alaska Pipeline system will be promulgated by the cognizant agency upon certification of the proposed project.

The environmental staff agrees that fertilizer application rates should be determined on a purely site-specific basis.

Volume III - Western LNG Point Conception Terminal

As was the case in Volumes I and II, Staff has overlooked a considerable amount of information filed with the FPC relative to the proposal. As a result, El Paso believes that the DEIS is a less than accurate representation of the proposed project. El Paso's specific comments on this Volume, however, will largely be restricted to environmental considerations.

1. In a description of future plans on page III-20, the peak throughput of the facility should be 5 billion cfd.

   Comment accepted.

2. On page III-111 it is stated that, "Streams which flow to the ocean contain anadromous fish, mainly steelhead trout."

   Information obtained from the California Department of Fish and Game indicates that steelhead trout populations are virtually nonexistent in these rivers. Dams, water diversion and decreased precipitation have depleted once substantial steelhead runs to mere fragments consisting of a few individuals which enter the lower portions of these rivers only during years of exceptional rainfall. The steelhead population does not constitute a recreational resource. Based upon this, steelhead trout should not be considered as a major part of the fish fauna of these rivers and should in no way be impacted by the pipeline.

   The environmental staff agrees that on water bodies crossed by the proposed pipeline, steelhead populations do not constitute a recreational (fishing) resource. See the additional discussion of impacts to freshwater species in the California portion of the FEIS.

3. It is stated on page III-236 that, "There would be significant impact on traffic in the Santa Barbara Channel . . . ." Information presented by El Paso for Docket CP75-96 *et al* in Exhibit Z-1, page 2F.5-2 indicates that 22 deep draft vessels pass through the Santa Barbara Channel daily. A total of 309 round trips per year will be required to transport the volumes of LNG associated with this project to Point Conception. The LNG vessel traffic would thus comprise less than a four percent increment to existing traffic. El Paso does not consider a four percent increment to be a "significant impact on traffic" as the DEIS indicates.

   Although El Paso contends that the addition of 309 roundtrips per year would represent less than a 4 percent increment over existing ship traffic in the channel, the staff considers this a significant impact since this increase would be generated by a single project.

4. Staff's site selection criteria, as discussed in Volume III beginning at Page 300, differ from those used by El Paso. The criteria utilized by Staff and by El Paso are set forth on Attachment A hereto. Based upon an evaluation of the respective criteria, Staff has chosen Oxnard as its primary site while El Paso has chosen Point Conception.

The major difference between the approaches of El Paso and Staff relates to El Paso's emphasis upon the proximity of project operations to population centers while Staff has considered overall hazards to the public. El Paso includes this proximity factor as a policy consideration in its site selection process. El Paso believes its selection of the Point Conception site is consistent with the California Coastal Zone Conservation Commission's draft coastal zone plan.

El Paso wishes to emphasize that it agrees with Staff's conclusion that LNG can be transported to any site within an acceptable risk level. Existing engineering techniques to significantly enhance safety for land facilities include diking and grading techniques and sophisticated monitoring and control systems for producing, storing and handling LNG. The U. S. Coast Guard, responsible for marine safety, will institute the appropriate safeguards to assure that LNG is transported under the safest conditions possible. El Paso has also presented in its application, testimony and exhibits and extensive discussion of design, construction and operational safety measures to be utilized by the fleet.

El Paso believes there are additional advantages to the Point Conception site.

The location of the marine terminal at Point Conception by comparison with other sites to the south results in a fleet of the smallest size possible for a marine transportation system into the Santa Barbara Channel area. This results in the most cost effective fleet to meet project deliverability requirements. Fleets necessary to serve on longer trade routes would result in higher transportation costs because of increased individual ship size. An additional cost penalty would also be incurred by the inherent delays caused by increased traffic congestion and less favorable weather conditions prevalent in the area to the south of Point Conception. By selecting the Point Conception site, the marine transportation cost component in the overall delivered cost to the consumer is minimized. This is particularly important because the fleet is the largest single cost in the overall project. Staff makes no mention nor provides any indication of the of the cost impact of alternative sites other than Point Conception.

Weather conditions, at times, may be somewhat less favorable further south of Point Conception in the coastal area of the Santa Barbara Channel. An occurrence of these conditions would cause additional restrictions on the cargo transfer operation. This is especially critical from the project reliability standpoint for a fleet required to make almost daily transits to the terminal. This consideration is directly related to project size. In other words, a large fleet operation requiring 300 round trips per year is more disrupted and delayed because of poor weather conditions than a fleet needing only 100 round trips to transport the volume associated with a smaller project. This situation is unique to the deliverability requirements of El Paso. This more stringent scheduling requirement would not apply to smaller projects or smaller fleets because they can tolerate more disruptions in schedule.

The Point Conception terminal has excellent marine access and approach. Large ship traffic is directed into the separation system located five miles south of the site. There are no traffic patterns or port areas near the site to cause traffic congestion and/or delays that would cause an increase in marine transportation cost as previously described.

The environmental staff is aware of El Paso's concerns, and is still of the opinion that Oxnard is the best site for the proposed project, either singularly or jointly with the other two stated projects proposed for California.

It should also be noted that El Paso's portrayal of FPC site selection criteria is misleading. There are many subdivision topics under each of the ones that El Paso lists as FPC criteria. For a proper perspective of FPC site selection criteria, the reader is directed to see Figure 79 and Table 37 and 38 of Volume II of the DEIS and Figure 46 and Table 40 of Volume III of the DEIS. In addition, the proximity of project operations to population centers is not the only major difference between the two sets of criteria.

5. Staff proposes on page III-355 to require that three LNG projects (El Paso Alaska - CP75-96, Pacific Alaska - CP75-140, and Pacific Indonesia - CP74-160) be handled by a single terminal operation. Such a marine terminal would be adequate to process "approximately 3.73 billion cubic feet of natural gas per day." Staff continues "Thus, it would appear that one importation terminal . . . would be adequate . . . ." El Paso strongly disagrees with this conclusion and submits that more than one terminal site is required. In specific terms, El Paso strongly believes that the Point Conception site is the best site for its project. In addition, sites proposed for the Pacific Indonesian and Pacific Alaska projects are equally suited to the concerns of their sponsors.

   Staff has ignored the problem of three different and unique projects utilizing one marine terminal facility. The experience of El Paso on other projects having smaller volumes and annual round trip requirements indicates that the incremental impact of several independent projects severely restricts the efficiency of each. The basis for this experience has been developed through computer simulation studies. The problem stems from the impracticality of centrally coordinating, controlling and satisfying the individual needs of several LNG plant operations, of several fleets operating on different trade routes with unique weather conditions, and of several customers concerns. The result is not the same as one large fleet operating into one marine terminal, where central scheduling and dispatching can be effectively instituted.

See previous response.

6. On page III-377-8 the following recommendation is made, "Prior to commencement of construction, qualified biologists should survey the proposed rights-of-way and access road routes to determine if any rare or endangered animal species are located within one mile of the proposed route."

   The designation of such an arbitrary distance may lack validity for several endangered species and for several areas of the route. It may not be possible to gain access to all areas within one mile of the pipeline in such areas as the Transverse Ranges in southern California. Certain areas of this two-mile wide band may simply be inaccessible for reasons of terrain or ownership constraints.

   Certain species which are located up to one mile from the pipeline may in no way be impacted. For example, populations of the southwestern toad, Tehachope slender salamander, or ensatina near the pipeline but in a different drainage, would not be impacted.

The environmental staff agrees with these points. Since the proposed pipeline route by Western is a "corridor" with boundaries of 1 mile to either side of the proposed centerline, the recommendation referred to the use of rare or endangered species as one of the criteria for determining the final route selection.

Qualified biologists in the field could decide how big the surveying radius should be, what animals to look for, and what areas should be avoided. The wording in the recommendation has been changed in the FEIS.

ATTACHMENT A

Comparison of Site Selection Criteria

EL PASO	FPC STAFF
Plant Site Criteria	
Size of Area Available	Topographic Conditions
Topography	Foundation Conditions
Distance from Plant to Shore	Seismic Considerations
Soil Characteristics	Atmospheric Conditions
Proximity of Fault Zones	Oceanographic Conditions
Proximity of Nearest Community	Distance to Deep Waters
Pipeline Accessibility	Navigational Suitability
	Anchorage Suitability
	Land Use Conflicts
	Seawater Exchange System
Marine Terminal Criteria	
Water Depth at Berth	
Distance from Marine Terminal to Shore	
Soil Characteristics	
Proximity to Fault Zones	
Marine Terminal Exposure	
Maneuvering Required	
Navigable Water Approach Criteria	
Size and Depth of Channel	
Channel Contours	
Vessel Traffic Patterns and Safety Systems	
Aids to Navigation	
Anchorage Area	
Ice Conditions	

Kenai Pipe Line Company
575 Market Street, San Francisco, CA 94105
Mail Address: P.O. Box 7643, San Francisco, CA 94120

January 28, 1976

Reference: BNG-SOD/EES
El Paso Gas Co.
Docket #CP75-96 et al.

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, DC 20426

Dear Sir:

It has come to my attention that a site in Nikiski on Cook Inlet has been recommended for the proposed El Paso Alaska Natural Gas Company LNG Terminal. This is referred to in the FPC Draft Environmental Impact Statement, Volume II, pages II-484 to 487.

Kenai Pipe Line Company operates a marine terminal at Nikiski, a short distance to the north of the proposed LNG site. This is shown on Figure 88, page II-486, of the Draft EIS as "Nikiski Wharf". As is apparent from above map, this is one of a series of existing wharves over which petroleum and petroleum products, liquefied natural gas, and bulk fertilizers and chemicals are loaded.

There is already some congestion of marine traffic in this area, and its volume is expected to increase. It has been necessary to form a Marine Terminal Safety Committee to deal with existing traffic problems and the additional volume that will be created in the near future when Pacific Alaska LNG facilities are completed.

The El Paso Terminal, as we understand it, would add approximately 350 ships per year to the vessel traffic in this area. This volume and the severe ice conditions in the winter would certainly result in significantly increasing the hazards to both shipping and to the wharves. It might well result in the requirement for stringent regulatory controls that would cause severe ship delays to all users of the Nikiski port area.

I strongly recommend that this factor be taken into consideration in the final recommendations to be made by the FPC.

Yours very truly,

D. D. Ostrom
President

Comment reflected in Section H-2 of Volume 2 of the FEIS.

LAW OFFICES
ROSS, MARSH & FOSTER
730 FIFTEENTH STREET, N.W.
WASHINGTON, D.C. 20005
(202) 628-2623

BERNARD A. FOSTER, JR. (1966)

510 PERPETUAL BUILDING
BETHESDA, MARYLAND

117 S. FAIRFAX STREET
ALEXANDRIA, VIRGINIA

BRADFORD ROSS
RICHARD S.T. MARSH*
SHERMAN S. POLAND
SAMUEL S. D. MARSH*
JAMES D. McKINNEY, JR.
JOHN THORPE RICHARDS▲
BERNARD A. FOSTER, III
CHARLES H. FLEISCHER
DANIEL F. COLLINS

WILLIAM L. BABCOCK, JR.▲
WILLIAM A. MOGEL*
RALPH C. OSER
NOORALI A. VELJI

* ALSO MEMBER OF MARYLAND BAR
▲ ALSO MEMBER OF VIRGINIA BAR

January 21, 1976

The Honorable Kenneth F. Plumb
Secretary
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D. C. 20426

Re: El Paso Alaska Company, et al.
Docket Nos. CP75-96, et al.

Dear Mr. Plumb:

Pursuant to your letter of November 28, 1975, and the Federal Power Commission's ("Commission") "Order Allowing Extension of Time to Comment on Draft Environmental Impact Statement" issued January 14, 1976, there are transmitted herewith for filing with the Commission, on behalf of Northern Border Pipeline Company ("Northern Border"), thirty (30) copies of the "Northern Border Pipeline Company Comments on Federal Power Commission Staff Draft Environmental Impact Statement on Alaska Natural Gas Transportation Systems".

As noted in the Comments, since the Staff has "accepted", in part, the portion of the Department of Interior's ("DOI") Draft Environmental Impact Statement ("DEIS") pertaining to Northern Border, Northern Border is incorporating herein by reference its comments on that document. Those comments previously were submitted to the Commission by letter dated December 8, 1975.

Pursuant to your letter, Northern Border is filing ten (10) copies of its Comments with the Council on Environmental Quality, Executive Office of the President, 722 Jackson Place, N.W., Washington, D. C. 20006. In addition, Northern Border is serving copies of its Comments upon all parties reflected on the Secretary's official service list.

Should you have any questions concerning the foregoing, kindly contact the undersigned or Mr. Daniel F. Collins.

Very truly yours,

NORTHERN BORDER PIPELINE COMPANY

By _____
James D. McKinney, Jr.
One of Counsel

Enclosures

cc: The Honorable Nahum Litt, Presiding
Administrative Law Judge
Brian J. Heisler, Staff Counsel
Michael J. Sotak, Bureau of Natural Gas
All Parties

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

EL PASO ALASKA COMPANY, et al.) Docket Nos. CP 75-96, et al.

NORTHERN BORDER PIPELINE COMPANY'S
COMMENTS ON FEDERAL POWER COMMISSION STAFF
DRAFT ENVIRONMENTAL IMPACT STATEMENT
ON ALASKA NATURAL GAS TRANSPORTATION SYSTEMS

SUMMARY

Northern Border Pipeline Company ("Northern Border"), pursuant to the letter of the Secretary of the Federal Power Commission ("Commission") dated November 28, 1975, submits herewith its comments on the Draft Environmental Impact Statement ("DEIS") prepared by the Commission Staff in the referenced proceedings.

The Secretary's letter dated November 28, 1975, provides in pertinent part that "{c}omments will be received not only on the material prepared by the Commission Staff but also on those portions of the Department of Interior's Draft Environmental Impact Statement which have been accepted by the Commission Staff." Pages I-3 and I-4 of Volume I of the DEIS set forth the particular portions of the United States Department of Interior's ("DOI") Draft Environmental Impact Statement (hereinafter referred to as "DOI-DEIS") "accepted" by the Staff, i.e., with certain exceptions discussed below, Part V pertaining to Northern Border. On October 24, 1975, Northern Border filed extensive comments on Part V of the DOI-DEIS and to the Aerospace Report No. ATR-75 (7496)-2 dated March 15, 1975. In addition, Northern Border filed joint comments with Alaskan Arctic Gas Pipeline Company ("Alaskan Arctic"), Interstate Transmission Associates (Arctic) ("ITA{A}") and Pacific Gas Transmission Company ("PGT") on Parts I and VI of the DOI-DEIS.)

By letter dated December 8, 1975, Mr. William W. Brackett, Vice Chairman of Alaskan Arctic, transmitted for filing with the Commission, among other things, Northern Border's comments on Part V of the DOI-DEIS. To the extent that the DOI-DEIS has been "accepted" by the Staff, Northern Border's comments on that document are incorporated herein and made a part hereof by reference. Therefore, the DOI-DEIS accepted by Staff should be corrected, modified, etc., in accordance with those specific comments. Moreover, we are transmitting herewith for filing

with the Commission in further support of these comments, Northern Border's response to the Aerospace Report No. ATR-75 (7496)-2. These comments are being filed in order to amplify upon the comments already submitted as well as directly respond to certain statements made in Volumes I and II of the DEIS.

Before responding in detail to various statements made in the DEIS, some general observations with respect to the document are in order. An environmental impact statement prepared by Staff is not an "action" document, i.e., it does not grant or deny any right or privilege. Rather, it is an "informational" document which is intended to form the basis for subsequent decision making, National Environmental Policy Act, 83 Stat. 852, January 1, 1970. In this case, the Applicants comprising the "Arctic Gas Project" desire to construct and operate a natural gas pipeline system in Alaska, Canada, and many of the contiguous 48 states, and have therefore applied to the Commission for a certificate of public convenience and necessity in order to construct and operate their respective pipelines and related facilities.

It is the decision of the Commission relative to such applications which constitutes the "action", based inter alia, upon the environmental impact statement prepared by the Staff, together with all of the other evidence of record. The purpose of a DEIS and a Final Environmental Impact Statement ("FEIS") is, therefore, to provide the decision maker (in this case the Commission) with an informed basis for rendering a judgment on environmental factors. It is not the purpose of an EIS to recommend: (1) one proposal over another, (2) one alternative over another, (3) conditions to be imposed upon a certificate which may be issued, or (4) a redesign of proposed facilities. The rationale for this is clear: the Commission must take into account a myriad of factors, i.e., gas supply, engineering, markets, economics, financing, as well as environmental considerations, in rendering the final judgment on whether a certificate should be issued and on what terms and conditions. Therefore, the EIS presented to the decision maker should present an unbiased and objective evaluation of all environmental considerations so that the document may effectively be utilized, together with all the other evidence, in rendering a decision.

The Staff is not precluded in these circumstances from offering witnesses who have a preference for one route over another, one proposal

over another, or to recommend conditions which it believes should be imposed upon any certificate which may be issued. Such witnesses may then be cross-examined on the basis of the environmental information contained in the EIS, as well as the other information of record, to determine precisely what they have taken into account in arriving at such conclusions. The Staff will have the opportunity to place witnesses on the stand to testify in this regard and will not be prejudiced in any fashion by proceeding in this manner. Northern Border, therefore, recommends that the FEIS refrain from drawing any conclusions or from making any recommendations.

If Staff is, however, unwilling to delete the recommendations and conclusions contained in its DEIS, then Northern Border submits that those recommendations and conclusions should be modified to conform to the overwhelming record evidence demonstrating that the Arctic Gas Project provides the most reliable, reasonably priced and environmentally desirable system of delivering the volumes of gas from the arctic regions of North America to the Lower 48 States of the United States and southern Canada.

The Arctic Gas Project has for the past five years, in Alaska and Canada alone, invested well over $15 million in extensive environmental research (biotic, abiotic, and socio-economic) to construct and operate the most environmentally desirable pipeline in order to bring the vast gas supplies in the arctic regions of North America to markets critically in need of such supplies in the Lower 48 of the United States and southern Canada. In the Lower 48, Northern Border alone has invested over $2.6 million in environmental studies. Such research was conducted by a group of highly respected independent scientists with extensive experience in environmental matters. These individuals, who have researched the literature and performed field and laboratory studies, have concluded that the Arctic Gas Project has taken appropriate steps to avoid or mitigate potential adverse environmental impacts and that if the Arctic Gas Project constructs, operates, and maintains the pipeline as proposed, it will not have a serious adverse impact on the environment. Massive application materials in the form of environmental statements (and other supplemental materials) have been submitted to the Commission to demonstrate this point. Numerous independent environmental consultants for the entire Project have been presented to the Commission to testify with respect to the extensive

studies undertaken by them, and to the conclusions arrived at as a result of those studies. Nowhere in the DEIS does the Staff question, much less refute, the substantial environmental evidence demonstrating that the Arctic Gas Project is the preferred means of delivering the Arctic Gas supplies to market.

In its DEIS, Staff recommends, with respect to the Arctic Gas Project, that Alaskan Arctic utilize the "Fairbanks Corridor"; that the western legs of the project be eliminated; that the proposed Northern Border Pipeline be located in the "Red River Corridor"; that the portion of such pipeline east of Kankakee, Illinois be eliminated; and that unknown, untested and unanalyzed exchange-displacement agreements be implemented for delivery of the gas in the Lower 48 of the United States. No reasons have been advanced by the Staff in support of this scheme. Although the DEIS provides that the Staff has made an "in-depth review of the applicants' environmental analysis and with information from other sources," its analysis does not appear in the DEIS, and the "information from other sources" has not been delineated. There is no analysis in the DOI-DEIS, relied upon by Staff, which would reasonably support, nor does the Staff state the basis for, its conclusion that its proposed alternative routes and means for delivery of the gas here involved should be preferred over the Arctic Gas Project. Accordingly, there is no basis for concluding that the Staff's alternatives are preferable. The Arctic Gas Project has considered such alternatives and instead adopted its proposed routing. The DEIS proposal does not serve the project objectives (delivery of both the Alaskan and Canadian reserves directly to designated markets), would be far more expensive, would be less desirable environmentally overall, or present no clear environmental advantages over the Arctic Gas Project's proposed route.

Alaskan Arctic will comment upon the portions of the Staff's recommendations pertaining to that company. Briefly, it is Northern Border's position that the "Fairbanks Corridor" is inferior to the prime route proposed by Arctic Gas from an environmental, engineering, cost and reliability standpoint. Moreover, the Fairbanks Corridor simply does not serve the project objectives since it makes no provision for obtaining the MacKenzie Delta reserves, and ignores the mutual benefits to the United States and Canada of assuring prompt access to those reserves. Finally, Northern Border submits that the Arctic Gas Project is preferable to the El Paso Alaska Company ("El Paso") project from environmental, cost,

engineering and reliability standpoints. Alaskan Arctic will comment on that portion of the DEIS concerning El Paso and those comments are incorporated herein by reference.

With particular reference to Northern Border, the DEIS recommends an alternative route, i.e., the "Red River Corridor," and alternative means for delivery of the gas, i.e., eliminating the portion of the Northern Border Pipeline east of Kankakee in order to use exchange-displacement agreements, without specifically stating the rationale underlying such recommendations, without specifically stating the reasons why such route and means of transportation are preferable to Northern Border's proposal from an environmental, engineering, cost, or any other standpoint, and therefore without giving any support for the recommendations. The DEIS position, however, appears to reflect a dominant preoccupation with two generalized concepts which, in view of the present state of the art and Commission experience, are largely theoretical in character. These are: (1) the "corridor concept", under which all uses of land for public utility, transport and communication purposes should be concentrated on common or adjacent rights-of-way, and (2) delivery of gas by displacement, wherein gas intended for a particular delivery point may actually be delivered to an entirely different pipeline system and, through a process of exchange transactions (alone or together with delivery from other sources), will be replaced in equivalent volumes at the designated receiving point.

Each of these factors will be discussed in detail below. Suffice it to state at this juncture that: (1) Exchange-displacement-reverse delivery arrangements are complicated, difficult and perhaps impossible to negotiate, require governmental approval, and often contain hidden costs. They must be fully designed, costed, analyzed and tested before thought can be given to their adoption. The DEIS advocacy of them, without such study, is also inconsistent with the project concept of direct delivery of the gas to the market areas via facilities which have been designed in order to assure minimum environmental impact and which have been shown to be economically feasible. (2) The utilization of the "corridor concept" is inappropriate where, as here, it has been shown that the construction of the pipeline along the proposed route will not have a significant adverse impact on the environment, and will gain important energy and economic benefits.

Given the fact that Northern Border and the other Applicants have devoted extensive resources to the analysis of the routes proposed and

that those routes accomplish the objectives for which the project was conceived with no significant adverse impact on the environment, namely to transport natural gas from the Prudhoe Bay area of the Alaskan North Slope and from the MacKenzie Delta area to markets in Canada and the Lower 48 States, it serves no purpose to propose arbitrarily that the Applicants select alternative routes and means for delivering the gas, particularly when those alternative routes and means do not accomplish the objective for which the project was conceived and would result in no net environmental benefits.

From pages I-207 through I-219, the DEIS lists the "environmental impacts" of the Arctic Gas Project. These so-called "environmental impacts" were drawn from the DOI-DEIS. This section creates the erroneous impression that the summary consists of proven, undisputable, supported facts, which simply is not the case. It does not take into account the mitigative measures proposed by Arctic Gas and that these predicted impacts were responded to in detail in the comments filed by Arctic Gas with the DOI. Either a more extended introduction, including revisions in accordance with Arctic Gas' comments to the DOI-DEIS should be prepared, or this section deleted in its entirety. In any event, the relative extent of the physical impact of the natural gas pipelines involved should be more clearly identified at the outset. The proposed pipeline will be buried in a ditch approximately six feet wide and, in general, the surface and any affected subsurface structures will be restored to essentially their pre-existing condition. The area along the right-of-way disturbed during construction will be revegetated, and only a narrow portion of the right-of-way will be kept clear of trees, tall shrubs and brush, the remainder reverting to its previous use or condition. In farm or grazing land, the entire right-of-way can revert to its previous usage. The compressor stations and other aboveground facilities will be located many miles apart and require very little land when compared to the area traversed and the broad area of the North American continent served by the project. Moreover, operation of the proposed facilities will comply with all requisite noise, air and water quality standards.

Hundreds of thousands of miles of major natural gas transmission systems have been constructed in the United States during the past 50 years.[1/] They lie unobtrusively beneath the ground, with a safety,

1/ There were approximately 263,000 miles of natural gas transmission pipeline constructed in the United States as of December 31, 1974 serviced by an additional 67,000 miles of natural gas gathering and field lines.

efficiency and environmental record unmatched by any other form of transportation. During these many years of experience in pipeline construction, methods have been developed to avoid or effectively mitigate any undesirable impact. To illustrate the minimal nature of the physical impact of a pipeline, it is necessary only to look at a map of the hundreds of thousands of miles of natural gas and other pipelines which honeycomb this country, and at the same time consider that the ordinary citizen is normally wholly unaware of their physical existence, although he should be manifestly aware that he can heat his home, cook his food, in many instances obtain steady employment, and enjoy a myriad of benefits from this clean burning, efficient, non-polluting and critically needed energy supply.

Finally, Northern Border submits that the DEIS is particularly deficient in that it does not recognize the critical necessity for prompt delivery of the Arctic Gas supplies to market or the critical role that Alaskan gas will play in fulfilling energy, environmental and economic requirements of the United States. This deficiency is inconsistent with both the comprehensive market showing of the Applicants of the Arctic Gas Project as well as the facts available to and enunciated by the Commission in numerous proceedings. The United States is presently faced with a critical gas supply shortage which will continue for the foreseeable future, and the Arctic Gas Project is the biggest single step that can be taken to alleviate it. Therefore, it is important to place any consideration of the environmental impact of the Arctic Gas Project in perspective to the substantial benefits it will bring to residential, commercial and high priority industrial consumers in a very large part of the United States. The essential point that must be recognized from the outset is that, even if all presently projected natural gas supplies from whatever source are in fact available from the inception of this project, all such supplies will be required just to meet residential, commercial and high priority industrial requirements. Even in that eventuality, there will be a substantial shortfall. For example, based upon Commission estimates, just to make up the projected decline to 1985 in natural gas production in the Lower 48 States, it would require over five projects of the magnitude here proposed, or approximately 100 standard sized coal gasification plants.

Without this project, the United States faces annual losses of many billions of dollars in gross national product and hundreds of thousands

of jobs with the attendant human suffering resulting therefrom. But the unemployed will not be the only ones affected. Residential consumers also would be curtailed in many areas and forced to bear the economic burden of conversion to other forms of energy which are not nearly as desirable, assuming other forms of energy are available and environmentally acceptable, an assumption for which there is no basis. Even then, that course would have a serious adverse impact on the total energy picture and unnecessarily increase dependence on foreign oil.

In these circumstances, the critical importance of promptly making the vast supplies of arctic gas available to the markets in the Lower 48 of the United States critically in need of such supplies must be emphasized. It should also be emphasized that of the two projects presently before the Commission the Arctic Gas Project will be the most efficient means of delivering this gas to market, which is important from an environmental and conservation standpoint.

Following are our detailed comments:

FPC-DEIS, VOLUME I

SECTION A - GENERAL

A.2 PARTS OF DOI-DEIS ACCEPTED BY THE FPC STAFF

Page I-4, Lines 1-13

NB Comment:

The Staff has partially accepted the DOI-DEIS. However, the Staff has rejected five specific sections of that document, two of which, on Page I-4, pertain to Northern Border and are summarized below.

1. Part V: Volume 1, pages V-003 through 007.

This section deals with the proven and potential natural gas reserves in Alaska and Canada, and the volume of these reserves which could become available to Northern Border companies. It also projects that 7.5 Tcf of gas from Canada might become available to Northern Border companies, depending largely on actions of the NEB.

Both the Alaskan and Canadian reserve estimates and the issue of Canadian exports have been modified and updated subsequent to the original DOI submission. Since the Staff gives no reason for its rejection of these sections, it is assumed that the Staff rejection is based on the availability of more recent information which is now a matter of record before the Commission and which Northern Border supports.

2. Part V: Volume I, pages V-013 through 020.

This section deals with the critical need for the project based on the supply-demand situation in the Northern Border market area through 1984. A projection is made of the Northern Border companies' total gas supply through 1984 (both with and without Arctic Gas deliveries), and the demand for this gas by Commission priority classification. It is shown that even if additional supplies of North Slope and Canadian gas do become available, supply deficiencies will affect priority two customers.

The section dealing with the supply, demand and deficiencies of gas in the Northern Border market area is integral in an environmental

A.2 (Cont.)

assessment. Again, no reason is given for the Staff's rejection, nor does the Staff offer any alternative projections. It is stated that the discussion is the "applicant's assertion and that any conclusions therein stated by USDI as to projected supply deficiencies of individual companies are rejected." This statement, along with the rejection of similar West Coast sections, seems to imply that the rejection is based on some FPC policy guidelines rather than a dissatisfaction with the actual projection.

The estimates in the rejected section were made with the most current and accurate information available at the time. (More recent events suggest that the projected gas deficiencies are probably even understated.) The projections set out in the DOI-DEIS were adopted from an in-depth study by a highly respected independent consulting firm with vast experience in the field of energy, which has been cross-examined at the Commission. This data is thus the best available evidence and should not be rejected.

* * *

A.3 FPC COMMENTS TO THE USDI ALASKA NATURAL GAS TRANSPORTATION SYSTEM DEIS

Page I-5, Lines 16-27, FPC-DEIS Statement:

"On page I-6, it is stated that 'the Prudhoe Bay Field has proven reserves of 26 trillion cubic feet' but with no source for these estimates. However, on page V-003 it is stated that this estimate was made by the American Petroleum Institute. Such reserve figures, when used, should always reference the source. It should also be noted that the applicant, Alaskan Arctic Gas Pipeline Company (Alaskan Arctic), hired the consulting firm of DeGolyer and McNaughton to determine an estimate of the proven reserves in Prudhoe Bay. Their report listed proven reserves at about 22.5 trillion cubic feet."

NB Comment:

The estimated proven reserves of 22,516,000 mmcf of 1060 Btu gas are equal to 23,867,000 mmcf of 1000 Btu gas.

* * *

A.3 (Cont.)

Pages I-5, Lines 28-34 and Page I-6, Lines 1 and 2, FPC-DEIS Statement:

"On Page I-6, the Richards Island and Parsons Lake areas are said to contain estimated reserves in the range of 13 trillion cubic feet. Based on the presentation of Alaskan Arctic by the consulting firm of DeGolyer and McNaughton, the McKenzie Delta region presently only contains proven reserves of 3,557,166 million cubic feet with an additional 556,257 and 2,239,645 million cubic feet of probable and possible reserves. Most of the data behind these estimates is confidential, which prevents public evaluation."

NB Comment:

It should also be noted that J.C. Sproule and Associates, Ltd., consultants to Canadian Arctic Gas Pipeline Ltd., have estimated before the National Energy Board of Canada, as of December, 1974, that the natural gas reserves for the MacKenzie Delta area are as follows:

Field	Proven	Probable	Possible	All Reserves
	MMCF	MMCF	MMCF	MMCF
Taglu	2,534,700	138,500	-	2,673,200
Parsons Lake	1,101,300	406,800	526,300	2,034,400
Other Areas	300,100	244,700	1,269,900	1,814,700
	3,936,100	790,000	1,796,200	6,522,300

Potential gas reserves for the onshore MacKenzie Delta region and the adjoining offshore areas of the Beaufort Sea to a water depth of 36 feet are expected to be in the order of 40 to 50 trillion cubic feet.

When the offshore area of the Beaufort Sea beyond a water depth of 36 feet is also taken into consideration, the potential of both areas should be well in excess of 50 trillion cubic feet.

This information reflects the filing of Canadian Arctic in its second supplement to its application before the National Energy Board of Canada dated January 23, 1975.

* * *

A.3 (Cont.)

Page I-6, Lines 3-8, FPC-DEIS Statement:

"On Page I-33, it is stated that the Northern Border Pipeline Company (Northern Border) line would cross oil and gas areas in several states. These areas are traversed by existing pipeline systems, and it is not expected that Northern Border would connect any of these reserves to its system because of its large diameter high-pressure line."

NB Comment:

The purpose of the Northern Border pipeline project is to deliver gas from the Canadian border to the points of delivery indicated in the application filed with the Federal Power Commission. The Northern Border pipeline and ancillary facilities have been sized to transport only those volumes of gas transported to it through the Canadian section of the total system.

The magnitude of the gas shortage is so great that other gas supplies will be utilized to their fullest extent with or without this project. If in the future the proposed Northern Border pipeline can be used or expanded to handle other sources of gas, this can only be considered as an overall benefit in meeting our country's future energy needs.

* * *

Page I-6, Lines 9-15, FPC-DEIS Statement:

"On page I-502, it is stated that 'The proposed pipeline during its construction phase would provide temporary, mostly unskilled jobs to a majority of employable males.' This statement is inaccurate since much of the construction activity will require the talent of many different types of skilled technicians such as welders, mechanics, surveyors, heavy equipment operators, pipefitters and others."

NB Comment:

As stated in response to FPC-DOI Question No. (34), dated December 12, 1974:

Pipeline, compressor station and microwave tower construction work requires skilled and unskilled workers of different levels of expertise.

A.3 (Cont.)

Pipeline construction crews not only include specialized workers experienced in the various sequential operations pertinent to pipeline work, but also unskilled workers. Because of the limited availability of skilled workers in the areas crossed by the pipeline, it is anticipated that most of the local workers hired for pipeline construction will be unskilled.

Some of the positions that may be filled from local work forces are as follows:

Position	
truck driver	mechanic
watchman	bus driver
power saw operator	helper
dozer operator	tractor operator

Compressor and microwave tower construction work basically requires craftsmen skilled in the building and mechanical trades. It is anticipated that local craftsmen, technicians and labor forces will be utilized to the maximum extent feasible. Some of the positions that may be filled from the local work forces are as follows:

Position	
carpenter	millwright
electrician	painter
plumber	electronic and instrumentation technicians
mason	equipment operators
ironworker	laborer
roofer	helper
glazer	sheetmetal worker

No permanent personnel will be assigned to compressor station or microwave tower sites during operation. Therefore, it is anticipated that the impact on local employment will be limited. Local workers could be employed for grounds maintenance and other maintenance tasks.

A.3 (Cont.)

Two division and seven district offices will be used for the operation and maintenance of the pipeline system. It is estimated that about 200 employees will be required to operate the entire system (see Section 1.6 of the Environmental Assessment). These offices will include typical office personnel which could be hired locally. Types of positions are as follows:

Position	
clerk	engineers
typist	maintenance personnel
stenographer	draftsmen
file clerk	technicians

* * *

Page I-16, Lines 11-18, FPC-DEIS Statement:

"The Wapsipinicon River is not classified as a Recreation River under the Federal Wild and Scenic River Act, nor was it selected as one of the rivers to be studied by the Act, as stated on page V-662 and in other locations in Part V. This river area was selected by the Secretaries of Interior and Agriculture in accordance with the requirements in Section 5(d) of the Wild and Scenic Rivers Act because it has natural values worthy of preservation."

NB Comment:

The presence of the proposed route will not affect the potential of the Wapsipinicon River for inclusion in the Federal Wild and Scenic Rivers System (ref., personal communication, Bureau of Outdoor Recreation).

Furthermore, the Wapsipinicon River crossings will be screen planted, as stated in response to FPC-DOI Question No. (35) of November 22, 1974 and the impact will be short-term.

At the western crossing of the river, the tree line on the banks is discontinuous, and the pipeline crosses through a break in the tree-lined eastern bank. Similarly, the floodplain forest on the south bank of the eastern crossing contains widely scattered trees. In addition,

A.3 (Cont.)

the existing setting has already been altered since the presence of man is evident as there are several roads and bridges along its course (NB-EIA, Volume 3, Section 2.4.3, page 92). As a consequence, the effect on the aesthetic quality of the site will be negligible.

* * *

Page I-16, Lines 19-30, FPC-DEIS Statement:

"Where the proposed route passes near Blackball Mine in Indiana (sic), as discussed on page V-1090, no mention is made of the fact that the mine, which contains five species of bats, including the endangered Indiana bat (Myotis sodalis), is old, in disrepair, and only 1,000 feet from the proposed pipeline route. In addition, bedrock in this area, which is at or near the surface, will require blasting in order to achieve the desired burial depth. This blasting could not only cause cave-ins within the mine, but if occurring between mid-October to March, would disturb the hibernating bats so that their fat reserves would be depleted. Repeated disturbances may cause death to many individuals."

NB Comment:

The Limestone Caverns (abandoned mine), which are in Illinois, are about 2000 feet away from the proposed route and disturbances due to blasting can be minimized by controlling blasting charges. The statements that disturbances by blasting would lead to depletion of fat reserves and death to many individuals is unsubstantiated in view of the limited disturbance caused by the project and especially in view of the fact that the annual visitation to the Starved Rock State Park Area was estimated at 600,000 people in the DOI-DEIS, that the Town of North Utica is close, and that there are current and proposed quarry operations with associated blasting in the vicinity of the mine.

* * *

Page I-17, Lines 4-18, FPC-DEIS Statement:

"An alternative to the fully developed Arctic Gas project exists

A.3 (Cont.)

which the staff believes should have been considered by Department of the Interior. Preliminary FPC staff investigations indicate that it is entirely possible that the new facilities required by the Arctic Gas all-land proposal need not extend beyond the Chicago area in the east, and that the two major laterals to the California market areas are not needed in the west. It appears that various combinations of displacement, reverse flow and modest additions of new facilities could be utilized to deliver North Slope Alaskan Gas to all major lower 48 market areas through existing natural gas transmission facilities. The environmental consequences of this substantially reduced Arctic Gas project should be considered in the Department of the Interior's Final EIS."

NB Comment:

The purpose of the Arctic Gas project has been twofold: to transport reserves from the two major producing areas of the arctic coastal regions of Alaska and Canada and to directly deliver natural gas to five critical market areas (the western, midwestern and eastern portions of the Lower 48, as well as central and eastern Canada) by a single system with a minimum amount of environmental impact and yet achieving the maximum economy of pipeline mileage and related facilities. Only by such a multi-purpose system could the economies of scale be realized by both the U.S. and Canadian gas consumers.

Nearly two years after the Arctic Gas applications have been filed, the FPC Staff suggests what is tantamount to an entirely different project concept from that proposed. The revised project serves only one of the resource areas involved. It significantly increases unit costs over the route applied for and makes no provision for delivery to a majority of the points contemplated by the joint applications.

Staff's recommendation combines two alternative routings which the Applicants considered and described in the environmental assessments submitted with the applications - a so-called Fairbanks Corridor in Alaska and an alignment in Canada from the Liard River through Wolf Lake to a point on the Red River junction of Manitoba, Minnesota, and North Dakota. Although the DEIS refers to the latter alternative as being "proposed" by the Applicants (p. III-1672 of DOI-DEIS and elsewhere),

A.3 (Cont.)

it is clear that the Applicants have considered and rejected those routings for numerous compelling reasons, including environmental impact, resource accessibility, and unit cost of transportation (see Environmental Report of Alaskan Arctic Gas Pipeline Company, Chapter V, Parts 1.4 and 1.6, submitted as part of and to support application filed March 1974).

As discussed elsewhere herein, the DEIS does not put forward any compelling reasons why the suggested alternative is preferable from an environmental, engineering, etc. standpoint to the project filed by the Arctic Gas consortium. Indeed, Arctic Gas has expended over the past 5 years many millions of dollars in environmental and engineering studies demonstrating that its project is preferable from an environmental, engineering, cost and reliability standpoint to all other routes and modes of transportation of the vast supplies of natural gas in the arctic regions of North America.

Nor does the DEIS indicate how "various combinations of displacement, etc." could feasibly accomplish what the Arctic Gas project has been specifically designed to accomplish, i.e. direct, reliable delivery of gas to the market areas of the Lower 48 and Canada at the lowest reasonable price and with minimum environmental impact.

* * *

A.4 NORTHERN BORDER PIPELINE COMPANY'S SYSTEM MODIFICATION

Page I-20, Lines 24 and 25, FPC-DEIS Statement:

Purchaser	Seller
...	...
Natural Gas Pipeline Company of America	Exxon Company, USA (20% of reserves)

NB Comment:

Natural Gas Pipeline Company of America has cancelled its letter of intent with Exxon Company, U.S.A.

* * *

SECTION B - ECONOMIC ANALYSIS

B.1 ANALYSIS OF NET NATIONAL ECONOMIC BENEFITS

In its comments on the DEIS, Arctic Gas has analyzed the section of the document dealing with net national economic benefit. Northern Border incorporates that analysis herein by reference in response to that section of the DEIS.

* * *

B.2 PROJECTED SOCIO-ECONOMIC IMPACTS OF END-USE IN THE LOWER 48 STATES

Pages I-40 through I-64

NB Comment:

Within the section entitled "Projected Socio-Economic Impacts of End-Use in Lower 48 States", Staff downgrades the importance of bringing Alaskan gas to the Lower 48 States. Moreover, Staff asserts without substantiation that this gas will be consumed by the industrial sector of the economy. This is clearly inappropriate in light of Applicants' supply-demand analysis demonstrating that such gas will be utilized by the highest priority consumers.

At page I-40 it is stated:

> "The socio-economic impacts of Alaskan Gas delivery to the contiguous states will clearly be marginal. The volume of gas...will constitute from 4% to 7% of U.S. consumption of natural gas in the 1980-1990 time frame, and less than 1% of total fuel consumption.
>
> "In the case of such long-run variations, always assuming reasonable planning horizons, a difference of 1% in total fuel or 5% in gas availability does not have a qualitatively different effect on economic aggregates than a change of 1% or 5% in the production of such other 'necessities' as wheat or automobiles" (lines 2-12).

B.2 (Cont.)

As a practical matter, the delivery of Alaskan gas to the Lower 48 involves the largest (measured in dollars and volume) certificate case ever brought before the Commission. Characterizing the impact of this project as marginal is therefore without foundation. A 4% to 7% increase in the U.S. gas supply will have a significant economic and environmental (reducing sulfur emissions) effect. A 1% to 5% food or energy shortage could have a catastrophic effect.

Indeed, for the Northern Border sponsor companies, the gas to be received as a result of this application would represent over 10% of their totally contracted gas supplies in 1984. This is hardly a marginal impact.

At page I-41, Staff states its key assumption with respect to the socio-economic impact analysis - "It is assumed throughout this analysis that the issue of energy availability is one of price, rather than of quantity" (lines 16-17). Staff is assuming unlimited energy availability and interchangeability with gas. Such assumptions are unfounded if one is to believe virtually every agency of the U.S. Government concerned with energy, including the Commission.

The staff assumed some, but not infinite, suitability. See response to similar comments by Department of Commerce.

At pages I-42 to I-44 Staff further suggests that, as a result of environmental legislation in the early 1970's, U.S. demand for energy will be 25% to 35% lower between 1980-1990 than was projected prior to 1973. There is no empirical support for this observation.

Staff then goes on to limit its analysis of Alaskan gas to the industrial sector (page I-45). No support or study is noted which would justify this assumption, and it is particularly inappropriate in light of Applicants' studies (rejected by Staff) which show that the gas will be required by the highest priority consumers.

Staff's assumptions seem to be predicated on some price elasticity study which is not designated. However, Staff is implicitly assuming very high price elasticity for energy. If Staff has prepared or relied upon some elasticity study, that study should be shown. Based upon analyses made by the National Gas Survey, the price elasticity of demand for gas is very low.

The remainder of the section (pages I-47 to I-51), which purports to describe a model of socio-economic impacts and conclusions to be

B.2 (Cont.)

drawn therefrom, is not clear at all. Certainly the reader does not garner the impression that Alaskan gas will bring about any socio-economic benefits to the Lower 48 States.

Pages I-40 through I-64, which deal with the socio-economic impacts to the Lower 48, are unclear. Assumptions are often not justified (if set out at all), the overall methodology is puzzling, and conclusions are hard to find. The delivery of Alaskan gas to the Lower 48 is critical to the nation. The overall impression of the section is that the impact of Alaskan gas deliveries will be "clearly marginal." Applicant is convinced that both this conclusion, and the means of arriving at this conclusion, are erroneous and should be revised in accordance with the market analysis of the Northern Border project.

* * *

B.3 PROJECTED SOCIO-ECONOMIC IMPACTS IN STATE OF ALASKA

In its comments, Arctic Gas has analyzed this section of the DEIS. Northern Border incorporates that analysis herein, by reference.

* * *

SECTION C - COMPARATIVE ASSESSMENT

C.B ARCTIC GAS SYSTEM

Page I-207, Lines 17-19, FPC-DEIS Statement:

"The following is a summary of the more significant impacts of the Arctic Gas System pipeline on the existing environment:..."

Note modification of statement in FEIS.

NB Comment:

The statement creates the incorrect impression that the summary which follows (taken from the DOI-DEIS) consists of proven, indisputable, supported facts, which is simply not the case. It fails to take into account the mitigative measures proposed by the Applicants and that the same statements were responded to in detail in the comments filed by the Arctic Gas project with the Department of the Interior. Either a more extended introduction, including qualifications of the data, should be developed; or this section should be deleted in its entirety.

* * *

Page I-208, Lines 2-5, FPC-DEIS Statement:

"Construction of the proposed pipeline system would change the character of the terrain in certain local instances, modifying its contours and dimensions."

Note modification of statement in FEIS.

NB Comment:

No significant impact on topography will result from the proposed project. As stated in the response to FPC/DOI Question No. (53) of November 22, 1974,

> "The impact on topography will be limited to occasional cuts in those areas where the physiography is such that not all cliffs, steep slopes and crests can be avoided. These areas have been identified in Section 3.1 of the

C.B (Cont.)

Northern Border Environmental Impact Assessment.

"Steep cliffs and slopes are impractical for a large diameter gas pipeline and have been avoided where possible. Terraces, levees, and water courses will be restored to pre-construction conditions (EIA, Page 1-51)."

The pipeline route has been selected to avoid highly erosive slopes and areas of significant mass movement where possible. Restoration measures will be incorporated to control erosion, sedimentation, slides and floodplain scours. As a result, no significant impact on topography is expected from the acceleration of natural processes.

* * *

Page I-208, Lines 6-9, FPC-DEIS Statement:

"Wind erosion of disturbed soils and gully erosion following construction would change the pipeline right-of-way topography and also cause secondary impacts by transporting the soil to other locations."

Note modification of statement in FEIS.

NB Comment:

The soil erosion impact is addressed and areas of particular erosion hazard identified in the Northern Border Environmental Impact Assessment (NB-EIA) (Section 2.1.4, page 2.1.4-1; Section 3.1.1-B.1, page 3.1.1-59; Section 3.1.1-B.2, page 3.1.1-61; Section 3.1.1-B.3, page 3.1.1-63). The response to FPC/DOI Question No. (37) of November 22, 1974 discusses the system of dams, drains, and sandbags which will be used as runoff checks. The response to FPC/DOI Question No. (54) of November 22, 1974 discusses the prevention of slides and flows while the response to FPC/DOI Question No. (22) of December 12, 1974 describes revegetation. Rangeland and wetland restoration plans are being developed to append to the construction procedures for control of soil loss in those critical regions.

Since much of the proposed route crosses agricultural lands, it should be noted that wind erosion losses from pipeline construction practices are similar to those which would be experienced by normal

C.B (Cont.)

cultivation of a comparable strip of land. Dust and soil control measures will be applied as part of the construction practices to reduce the wind erosion hazard during the period of construction. These measures will be in accordance with all Federal and state regulations, or the landowner's wishes.

Northern Border will prepare an erosion control plan for the entire line prior to the start of construction, with special emphasis on those critical areas where the erosion potential is greatest. This plan will consider measures for both construction and restoration. As described in the NB-EIA the length of time between clearing and the initiation of restoration procedures can be as short as four weeks. As a result of the nature of construction activity, the line would only be subject to accelerated erosion for limited periods of time. Additionally, little ground will be broken during the spring period of high wind.

Mechanical and/or vegetative wind barriers will be used where wind erosion prohibits effective soil stabilization and/or interferes with operations along the right-of-way. Vegetative barriers such as hedges or shelterbelts may be required in certain situations. Shelterbelts can provide long-term protection of pipeline installations such as compressor station sites, which could be affected by wind erosion originating away from the actual construction area. Similarly, slat fences and picket fences can be used as windbreaks where temporary protection is required.

Revegetation constitutes the most desirable and effective method of soil stabilization and erosion control. However, at certain sites, revegetation will not be possible without some wind erosion control measures to reduce surface wind velocities and preserve soil characteristics while establishing a new cover. Several methods described below provide both types of control. The method used will depend upon the specific conditions encountered.

A mulch will be the most frequent and most effective wind erosion control measure used along the proposed route. It may involve the application of a layer of plant residue or other material (straw, hay, brush, jute, etc.) on the surface of the soil. Revegetation of the right-of-way could proceed concurrently to stabilize the area before the

C.B (Cont.)

mulch deteriorates. On slopes, it may be necessary to construct trap-ridges at appropriate intervals. Other practices include tilling at right angles to the direction of the prevailing winds and restoring the topsoil, whose content of undecomposed organic matter helps bind the soil particles. In agricultural areas, the stubble left along the right-of-way and the planting of drought-resistant species such as rye or sorghum can supply temporary control as a cover crop for grass establishment. A variety of native grasses is also very effective in binding the soil with root growth and in reducing wind velocities at the soil surface.

* * *

Page I-208, Lines 14-16, FPC-DEIS Statement:

"...Grassland landscapes would be impacted by the presence of compressor stations and towers."

Statement deleted in FEIS.

NB Comment:

Widely spaced compressor stations and communication towers will have a minor local impact. The crown of spoil over the trench backfill is intentionally placed there to compensate for natural subsidence of backfill material. It will quickly produce a level surface over the trench.

* * *

Page I-208, Lines 17-23, FPC-DEIS Statement:

"The installation of the pipeline and its associated airfields, roads, and communications network...may be a stimulus to the development of coal deposits for possible gasification in Montana and North Dakota."

NB Comment:

The purpose of the Northern Border pipeline project is to convey gas from the Canadian Border to the points of delivery indicated in the application filed with the Commission. The Northern Border pipeline and

C.B (Cont.)

ancillary facilities have been sized to transport only those volumes of gas currently under contract from Prudhoe Bay. The project does not involve the transport of coal gas.

It has been previously stated that the magnitude of the gas shortage is so great that other gas supplies including those from coal gasification will be utilized to their fullest extent with or without this project. In this regard, coal gasification is expected to develop independent of this project. If in the future the proposed Northern Border pipeline can be used or expanded to handle coal gas, this availability can only be considered as an overall benefit in meeting our country's future energy needs.

* * *

Page I-209, Lines 1-6, FPC-DEIS Statement:

"Landslides might be induced at many places along the routes if slopes were undercut while the pipeline ditch was being excavated. The slides could cause immediate damage and/or loss of life or they could occur at a later time and possibly rupture the pipeline."

NB Comment:

The proposed route has avoided the toe slopes of all landslide-prone areas by route selection. The slumping hazard from a cross-toe slope trench will be mitigated by aligning the pipeline perpendicular to topographic contours in steep areas. Overall, site selection and construction techniques will be used to minimize or avoid landslides.

The NB-EIA, Section 1.5.2-C, describes the trenching process in general. The response to FPC/DOI Question No. (38) of November 22, 1974 describes the short length of time, that the trench will be open (on the average 10 days), and indicates that areas of rapid erosion will have shorter times. The response to FPC/DOI Question No. (37) of November 22, 1974 discusses methods which may be used to control slides.

* * *

C.B (Cont.)

Page I-209, Lines 11-17, FPC-DEIS Statement:

"Disturbance and mixing of the soil profile would alter its structural characteristics, microbiological activity, and the soil-climate relationships. This mixing of subsoil on the surface of the backfilled ditch would retard the full restoration of the site and cause a long-term loss of soil productivity affecting crop growth and grazing capacity."

NB Comment:

It is axiomatic that topsoil normally is the most productive horizon of a soil profile in its natural state. However, when subjected to the varied cultural and management practices associated with modern farming methods, topsoil, as an entity, ceases to exist. It becomes a soil medium manipulated by man to meet the specific requirements of selected cultivated crops. Backfilling operations will continue mixing of the surface soil throughout the subsoil.

On much of the glaciated portions of the pipeline route, topsoil no longer exists as an identifiable horizon, and agricultural production is actually occurring on the subsoil or "B" horizon. This is caused by wind and water erosion of topsoil, mixing of shallow topsoil layers with subsoil by plowing, and land-leveling operations. By inference, the DEIS statement suggests that all farming operations are conducted on topsoils, and conversely, that farming operations cannot be conducted on subsoils.

Soil management practices of the modern farmer and the nature of the agricultural soils are sufficient to overcome the possibility of a reduction of soil productivity in the right-of-way. The greatest impact on farmlands will be the temporary disruption of a negligible amount of farming operations. The DEIS statement does not take into account the mitigative provision designed by Northern Border to restore vegetational cover using native species wherever possible and appropriate in natural, non-agricultural areas.

* * *

C.B (Cont.)

Page I-209, Lines 18-22, FPC-DEIS Statement:

"Wind erosion of exposed soils along the ditch could be a major impact where detached fine silt and clay particles were exposed. Water erosion would form gullies and increase sediment yield from the disturbed soil on all routes."

Note change in text of FEIS.

NB Comment:

Since much of the proposed route crosses agricultural lands, it should be noted that wind erosion losses from pipeline construction practices are similar to those which would be experienced by normal cultivation of a comparable strip of land. Dust and soil control measures will be applied as part of the construction practices to reduce the wind erosion hazard during the period of construction. These measures will be in accordance with all Federal and state regulations, or landowner's wishes.

Northern Border will prepare an erosion control plan for the entire line prior to the start of construction, with special emphasis on those critical areas where the erosion potential is greatest. This plan will consider measures for both construction and restoration. As described in the NB-EIA, the length of time between clearing and the initiation of restoration procedures can be as short as four weeks. As a result of the nature of construction activity, the line would only be subjected to accelerated erosion for limited periods of time. Additionally, little ground will be broken during the spring period of high wind.

As stated in response to FPC/DOI Question (24) of December 12, 1974:

> "Where possible, unfavorable strata such as alkaline soils, fragmented bedrock, clays, etc. will be returned to the bottom of the trench to expedite restoration and revegetation."

Restoration and erosion control practice, as well as the landowner's ability to manage the clay soils, are also key factors affecting the level of erosion resulting from the proposed construction. Erosion will be minimal even in areas of sloping terrain. Revegetation constitutes the most desirable and effective method of soil stabilization and erosion control. However, at certain sites, revegetation will not be possible

C.B (Cont.)

without some wind erosion control measures to reduce surface wind velocities and preserve soil characteristics while establishing a new cover. Several methods described below provide both types of control. The method used will depend upon the specific conditions encountered.

Mechanical and/or vegetative wind barriers will be used where wind erosion prohibits effective soil stabilization and/or interferes with operations along the right-of-way.

Vegetative barriers such as hedges or shelterbelts may be required in certain situations. Shelterbelts can provide long-term protection of pipeline installations such as compressor station sites, which could be affected by wind erosion originating away from the actual construction area. Similarly, slat fences and picket fences can be used as windbreaks where temporary protection is required.

A mulch will be the most frequent and most effective wind erosion control measure used along the proposed route. It may involve the application of a layer of plant residue or other material (straw, hay, brush, jute, etc.) on the surface of the soil. Revegetation of the right-of-way could proceed concurrently to stabilize the area before the mulch deteriorates. On slopes, it may be necessary to construct trap-ridges at appropriate intervals. Other practices include tilling at right angles to the direction of the prevailing winds and restoring the topsoil, whose content of undecomposed organic matter helps bind the soil particles. In agricultural areas, the stubble left along the right-of-way and the planting of drought-resistant species such as rye or sorghum can supply temporary control as a cover crop for grass establishment. A variety of native grasses is also very effective in binding the soil with root growth and in reducing wind velocities at the soil surface.

The soil erosion impact is addressed and areas of particular erosion hazards identified in the NB-EIA (Section 2.1.4, page 2.1.4-1; Section 3.1.1-B.1, page 3.1.1-59; Section 3.1.1-B.2, page 3.1.1-61; Section 3.1.1-B.3, page 3.1.1-63). The response to FPC/DOI Question No. (37) of November 22, 1974 discusses the system of dams, drains, and sandbags which will be used as runoff checks. The response to FPC/DOI Question No. (54) of November 22, 1974 discusses the prevention of slides and

C.B (Cont.)

flows, while the response to FPC/DOI Question No. (22) of December 12, 1974 describes revegetation.

* * *

Page I-209, Lines 23-28, FPC-DEIS Statement:

"Wind erosion potential is also high along the 650 miles of the Northern Border route across the spring wheat region of Montana and North Dakota. Soil losses could be considerable and could cause severe seedling damage and make revegetation of the right-of-way very difficult."

NB Comment:

Northern Border has identified those soil associations made up of soils with high wind erosion potential. These amount to 5 miles in Montana, 45 miles in North Dakota, and 16 miles in South Dakota making a total of 66 miles of the 650 miles referred to. These areas will be mulched in accordance with NB-EIA Section 4.0.3-G and the response to FPC/DOI Question No. (34), dated November 22, 1974.

There are other soils that could blow under summer fallow conditions where they are tilled four to six times during the summer to prevent vegetational growth and a stubble mulch has not been maintained by the farmer. These conditions will not be present on the pipeline right-of-way because the land will be disturbed only once and susceptible areas will be mulched.

* * *

Page I-209, Lines 29-35, FPC-DEIS Statement:

"The Northern Border route would cross three irrigation projects in Montana and North Dakota. The ditch and gas pipeline would interfere with sub-surface and surface irrigation drains. Construction equipment causing compaction would disturb the soil density and slope and interfere with gravity flow irrigation."

Note appropriate change in statement in FEIS.

C.B (Cont.)

NB Comment:

The Northern Border pipeline will cross only one existing irrigation project. During the construction of the pipeline, both the surface and subsurface irrigation ditches and drains will be maintained and/or restored, and the impact will be similar to the crossing of agricultural land. The pipeline system is compatible with the planned irrigation projects, and Northern Border will consult with the Bureau of Reclamation prior to the final design of the line through these areas. The existence of the pipeline is compatible with the irrigation projects, and no impact is anticipated.

In addition, the following procedures will be incorporated into the construction specifications. All necessary precautions will be taken to minimize interruption of irrigation by providing flumes for irrigation canals and crossovers for equipment used in surface irrigation. In addition, as stated in Section 1.5.2-K, page 1-55 of the NB-EIA, flow will be maintained during the crossings of streams and irrigation canals.

Pipeline crossings will be marked at each location, and disturbed areas will be restored as near as is practical to their preconstruction condition.

* * *

Page I-210, Lines 1-6, FPC-DEIS Statement:

"From North Dakota east to Pennsylvania, the proposed gas pipeline would transect thousands of miles of farms with drainage tile systems. Pipeline ditching would cut these drains, introduce sediments that may pollute the receiving streams, and decrease the drainage effectiveness of tile fields crossed."

Statement eliminated in FEIS.

NB Comment:

Ninety-two percent of the 1619 mile Northern Border Pipeline will be through agricultural land, not all of which employs drainage fields.

Northern Border has stated that construction and restoration plans will maintain the function of drain tile fields (NB-EIA, page 3.1.1-61).

C.B (Cont.)

Water will not be allowed to accumulate or back up in shallow fields, and tiles damaged by heavy equipment will be replaced.

The Northern Border construction schedule has been revised and provides for construction during the period May through November. As a result, the higher volumes of water associated with spring conditions will not be encountered. It is also pointed out that the purpose of the drain tile system is to lower the groundwater table, and this will have the effect of reducing the volume of water entering the trench.

The problems associated with seasonal high water tables, sediment and pH control have been addressed in both the NB-EIA (Section 1.5.2-C) and in response to FPC/DOI Questions Nos. (49) and (61) dated November 22, 1974. This material shows that the trench will be dewatered by various means depending on the circumstances. In soils with high permeability, well points will be used to drain off water from adjacent areas, and in most other cases direct pumping from the trench will be employed. Sediment from dewatering operations can be controlled by filtration or by settling basins. Discharge to dry streams will be controlled so that discharge rates will be no greater than those of the normal flow period. The control of pH can be effected by neutralization with material such as limestone. The effects of acid ground waters in receiving streams should be the same as that associated with normal operation of the tile drainage systems. These systems also intercept and discharge groundwaters directly to water courses. No significant pH problems have been encountered or noted in streams.

* * *

Page I-210, Lines 8-13, FPC-DEIS Statement:

"Construction and operation of the proposed natural gas pipeline system would present potential water resource impacts at each stream crossing resulting from interruption of streamflow, erosion and sedimentation, and introduction of industrial chemicals and pollutants."

Note appropriate changes in text of FEIS.

C.B (Cont.)

NB Comment:

Minor, short-term impacts on water quality will result from changes in the amount of sediment load caused by both increased erosion and construction activities. Changes in the amount of dissolved solids due to alterations in the water environment will be minor because of the small amount of stream which will be impacted by this project compared to the total drainage area. Northern Border recognizes the problems associated with erosion, and will incorporate erosion and sedimentation controls in the construction specifications. Erosion control measures will be implemented during construction as an integral part of the construction procedures.

Stream channel changes due to altered stream environments will be mitigated following construction by the Applicant's restoration program. This calls for restoration of the bed and banks of all streams to approximately pre-existing conditions.

Changes in the amount of dissolved solids due to operation and maintenance procedures along the right-of-way will be minor. Other impacts, resulting from the spills of fuels in the application of chemicals along and adjacent to the right-of-way, will be minor. Applicant will maintain fuel storage in controlled areas with dikes.

* * *

Page I-210, Lines 14-17, FPC-DEIS Statement:

"Hydrostatic testing of the completed pipeline would require huge volumes of water, and the indiscriminate use of surface waters for test fluids could reduce local flows and water quality."

Note change in wording in FEIS.

NB Comment:

This point has been addressed in response to FPC/DOI Question No. (39) of November 22, 1974, which states that water withdrawals will be controlled to prevent any significant changes in water level, water flow and/or water quality. Water withdrawals and discharges will be done in accordance with all applicable regulations. Where possible, withdrawals from flowing streams will be limited to approximately 10 percent of the

C.B (Cont.)

stream flow rate, and the drawdown of standing bodies of water will be controlled to prevent a significant impact.

* * *

Page I-210, Lines 18-21, FPC-DEIS Statement:

"Release of large volumes of test water into dry stream channels on the western routes could cause streambed scour, erosion, and increased sediment yields."

NB Comment:

Discharge of hydrostatic test waters will be controlled, and any localized turbidity which may result at the discharge point will be minor in extent and duration. This controlled rate of discharge will also minimize streambed scour and erosion.

* * *

Page I-210, Lines 28-32, FPC-DEIS Statement:

"Erosion resulting from construction site activity would cause a temporary reduction in downstream water quality as would the use of large volumes of domestic water and discharge of sewage at each construction camp."

Note change in text in FEIS.

NB Comment:

As indicated in the comment to page I-210, lines 14-17, above, water withdrawals will be controlled to prevent significant changes in the quality or flow of the source stream. The effects of additional sediments on water supplies have already been addressed in the comments to page I-210, lines 8-13, and elsewhere.

Northern Border has also provided, in the response to the FPC/DOI questions, a discussion of procedures to be used for both instream construction and restoration of floodplain areas and stream banks. Instream construction will result in increased sediment loads in the immediate vicinity of the crossing site; however, the effects will be

C.B (Cont.)

short-term, minor, and will not extend for significant distances downstream.

Sewage treatment discharge will be handled in accordance with all applicable federal and state regulations, and temporary portable sanitary facilities will be installed during construction.

* * *

Page I-210, Lines 33-36, FPC-DEIS Statement:

"Fuel and lubricant spills from construction machinery, compressor stations, construction camps, etc. would pollute surface water and possibly groundwater supplies."

Note appropriate change in text of FEIS.

NB Comment:

The proposed construction will affect only minor portions of aquifers or recharge areas. The impact of the proposed project on both groundwater quality and quantity will be insignificant.

Spillage of gasoline and diesel fuels will be minimized by care in handling. Any accidental occurrences will be minor and be managed by cleanup procedures. Effects on microorganisms from inadvertent spillage of petroleum products of the light fractions used as fuels will be short-lived because of the rapid recovery rate and growth of these organisms.

* * *

Page I-211, Lines 2-6, FPC-DEIS Statement:

"Vegetation and terrain surface integrity would be destroyed along the pipeline right-of-way and at construction camps. At landing sites, towers, permanent roads, and other permanent facilities, the impact would be long-term."

NB Comment:

The statement does not reflect either the limited area of disturbance required for the construction activities or the restoration

C.B (Cont.)

program and mitigative measures proposed by the Applicant.

The impact of the proposed construction activity on vegetation will be minor and short-term. Vegetation and surface integrity will be restored upon completion of the proposed construction activities except at the location of permanent facilities, which have minor land requirements.

* * *

Page I-211, Lines 7-12, FPC-DEIS Statement:

"Vegetation would be destroyed and/or altered by one or more of the following: construction of winter roads; the alteration of associated drainage patterns; forest, grass and tundra fires; fuel and methanol spillage; sulfur dioxide emissions; and off-road vehicle use for pipeline emergency repairs."

NB Comment:

The Staff statement has only partial applicability to the Northern Border pipeline; the main thrust is directed toward the arctic region. However, those elements which might apply to Northern Border can be dismissed as insignificant because of the mitigative procedures inherent in the restoration plan.

The surface drainage pattern will be restored by recontouring and by repairing all natural and man-made watercourses. Erosion control and revegetation programs will also be implemented to ensure surficial integrity.

In the drier western portion of the proposed route, grass fires may pose a hazard during summertime construction. However, the Applicant will abide by all appropriate regulations developed by the Office of Pipeline Safety, by OSHA, or by local government agencies. Where required, the Applicant will have necessary firefighting equipment on site at construction locations.

Spillage of gasoline and diesel fuels will be minimized by care in handling. Any occurrences will be minor and be managed by cleanup procedures.

C.B (Cont.)

Sulfur dioxide emissions will not present a problem because the concentration of sulfur compounds in the gas used for compressor fuel is negligible.

Similarly, off-road vehicle use for pipeline repairs will not constitute a serious impact to vegetation along the Northern Border route since existing access roads and the maintained portion of the right-of-way will be used exclusively. Such vegetational disruption as might occur on the right-of-way during repair operations would be mitigated by topographic restoration and revegetation and would therefore be minor and short-term.

In summary, the concerns expressed in the DEIS over vegetational disruption are not justified in view of Northern Border's mitigative procedures and restoration program.

* * *

Page I-211, Lines 13-16, FPC-DEIS Statement:

"A number of proposed ecological preserve sites would be paralleled or crossed, thereby greatly reducing, if not destroying, the purpose for which they were set aside."

Note changes in text of FEIS.

NB Comment:

Northern Border has considered both existing and proposed multiple use public lands. In Volume 3 of the NB-EIA, page 2.2.5-45, specific mention is made of a proposed state wildlife management area on the Wapsipinicon River and of proposed floodplain management areas in Iowa (Union Slough Ditch, the West Fork of the Blue Earth River, Beaver Dam Creek, Cold Water Creek and parts of the Shell, Rock and Wapsipinicon Rivers). Similarly, on page 2.2.5-49, there are references to proposed strip parks (on the Rock River, Little Vermilion River and Tomahawk Creek) and to access areas on the Mississippi River in Illinois.

These areas do not necessarily qualify as "ecological preserve sites," nor have they yet been "set aside". Two exceptions are areas along the Pecumsaugan Creek and the Illinois River in Illinois which

C.B (Cont.)

have recently been acquired by the Illinois National Preserves Commission. Northern Border will consult with the appropriate agency prior to finalization of the alignment through these public areas.

There is no basis for asserting that pipeline construction would reduce or destroy the purpose of "proposed ecological preserve sites" in the absence of some definitive statement by the DEIS as to the purpose of each "ecological preserve site" to which it has reference. Indeed, pipeline construction and operation should not significantly diminish the multiple use values of the areas which might later be set aside as ecological preserve sites.

* * *

Page I-211, Lines 17-19, FPC-DEIS Statement:

"Invasion by weedy plant species would be expected to occur in the denuded areas, particularly on land managed for wildlife or forests."

Statement eliminated in FEIS.

NB Comment:

Sensitive habitat and unique areas have been avoided wherever possible by the proposed route. The traversing of such areas and their rehabilitation will be subject to the recommendations of the regulatory agencies at the time of right-of-way acquisition. These special areas have also been the reason for considering alternatives and incorporating deviations. On land managed for wildlife and/or forests, revegetation plans will be subject to the recommendations of the appropriate managing agency.

* * *

Page I-211, Lines 20-22, FPC-DEIS Statement:

"The incidence of fire would probably increase in the forested, tundra, and grassland sections, especially during summer construction activities."

C.B (Cont.)

NB Comment:

In the drier western portion of the proposed route, grass fires may pose a hazard during summertime construction. However, the Applicant will abide by all applicable regulations developed by the Office of Pipeline Safety, by OSHA, or by local governmental agencies. Where required, the Applicant will have necessary firefighting equipment on site at construction locations. While the incidence of fire may increase, the ability to detect and fight fires would increase concurrently due to the presence of men and equipment in the area.

* * *

Page I-211, Lines 23-27, FPC-DEIS Statement:

"Where the pipeline would cross forests or woodlands, there would be a permanent change in vegetation, because in no case would forest or woodland vegetation be allowed to grow directly over the pipeline."

NB Comment:

As described in the NB-EIA, this impact will be long-term but minor in view of the limited amount of woodlands that will be affected and the proposed measures to mitigate aesthetic impacts.

The total area of woodlands affected by construction is approximately 1,000 acres, about 400 of which will be included in the maintained portion of the right-of-way (see NB-EIA, Volume 4, Section 3.1.1, page 3.1.1-3/4, Table 3.1.1-1). As stated in the response to FPC/DOI Question No. (33) of November 22, 1974, the intent is to maintain a grass-covered right-of-way which will include shrubs and other low-growing vegetation as long as it does not affect the integrity of the pipeline and greatly interfere with pipeline maintenance practices. In some places, this right-of-way will have a beneficial effect on wildlife.

As stated in the NB-EIA, Section 3.1.1, page 3.1.1-5, lines 16 to 23, woodlands are a predominant natural feature in only the eastern third of the ten state area, which includes Ohio, West Virginia, Pennsylvania and parts of Indiana. These states contain about 71 of the 73 miles of woodlands crossed by the pipeline. In these areas the

C.B (Cont.)

primary use of woodland is for recreational purposes, not commercial forestry. Construction of the pipeline through this type of land will result in the transformation of the right-of-way into an open space corridor with potential for multiple use.

* * *

Page I-211, Lines 28-31, FPC-DEIS Statement:

"Cropland production loss on the right-of-way would be considerable while construction was underway, but would be back to near normal levels within a few years."

NB Comment:

Although 92 percent of the pipeline will be constructed through agricultural land, the project will have a minor, short-term impact on agricultural production, as described in Sections 3.1.2 and 3.1.3 of the NB-EIA. The foreclosure on this land is only for the period of construction and will cause the loss of surface use of the right-of-way for this period.

Full productivity on agricultural portions of the right-of-way should be re-established within one to two growing seasons with the use of fertilizer and soil treatment where necessary. Moreover, the amount of agricultural land to be disturbed represents a very minor amount (.006 percent) of the total land in agriculture in the ten states crossed by the proposed route. Similarly, the loss of agricultural production is extremely minor when compared to the very large volume of farm production in the ten states. For these reasons, the impacts on agriculture will be minor and short-term.

* * *

Page I-212, Lines 20-26, FPC-DEIS Statement:

"If project disturbance would force an animal from a critical portion of its range or change its habitat, population numbers could be reduced. Disturbance factors would include noise from construction,

C.B (Cont.)

maintenance and operation machinery; aircraft used in line inspection; and increased numbers of people in the area."

NB Comment:

Section 3.1.2-A of the NB-EIA discusses the impact of construction on the reproductivity of birds and mammals. The impact on population numbers will be minor in relation to the size of the total area affected and the influence of other factors which normally affect populations, such as routine agricultural activities and the effects of weather, disease, predators, and food availability. Also, any impact will be confined to the immediate vicinity of the right-of-way.

* * *

Page I-212, Lines 27-31, FPC-DEIS Statement:

"Project caused disturbance would drive birds from their nesting and resting areas and, in the case of waterfowl, could affect the molting and fall staging periods resulting in a possible drop in population numbers."

NB Comment:

Disturbance to birds caused by Northern Border construction activities will be temporary and confined to the immediate vicinity of the right-of-way.

The alignment was selected to avoid wetland areas and thus reduce impacts to waterfowl. A limited number of wetlands are crossed, though these are described as dry during many years or marginal with limited wildlife value. The impact of construction through these areas is described in Section 3.1.2 of the NB-EIA.

* * *

Note change in statement in FEIS.

Page I-212, Lines 32-35, FPC-DEIS Statement:

"Bird populations could also be adversely affected by habitat destruction resulting from water quality degradation through pollution and increased silt loading as well as vegetative changes or destruction."

C.B (Cont.)

NB Comment:

The only impact to water quality will be minor, short-term sedimentation during stream crossing operations. This impact is not expected to affect bird populations. Applicant will adhere to all applicable water quality regulations and will ensure, as a part of its overall restoration program, that drainage patterns are not altered by construction.

* * *

Page I-213, Lines 1-4, FPC-DEIS Statement:

"Increased turbidity and sedimentation from upstream erosion due to pipeline stream crossing activities would also be a major cause of fish and associated aquatic organism losses."

Note change in statement in FEIS.

NB Comment:

As stated in the NB-EIA, Volume 4, pages 3.1.2-106, 3.1.2-107 and 3.1.2-111, turbidity and siltation will inhibit stream uses for a limited distance downstream during construction. Incremental silt loads will not exceed those experienced during high flow episodes except immediately downstream of the crossing site. The anticipated impact on the aquatic species in permanent creeks and rivers will be limited to the reach immediately below the crossing site and result in a minor, short-term reduction in overall productivity.

The stabilization of the stream crossing sites is an integral part of the restoration program of the proposed project (NB-EIA, Volume 4, Section 4.0.3-E, page 4-19). In the NB-EIA, Volume 1, Section 1.5.2, page 1-56 and Volume 4, Section 4.0.2-H, page 4-17, it is stated that streambeds will be restored as near as practicable to their former elevation and grades and that all streams will be stabilized with suitable material to prevent the subsequent erosion of the crossing. Streambanks will be stabilized by the use of such techniques as revetments or rip rap, as described in response to FPC/DOI Question No. (37) of November 22, 1974. In addition, all stream crossings will be conducted in accordance with the regulations of the Corps of Engineers and

C.B (Cont.)

the local or state authorities having jurisdiction over the individual stream or river crossing (FPC/DOI Question No. (25) of December 12, 1974 and NB-EIA Section 4.0.3-E, page 4-19.).

* * *

Page I-213, Lines 5-11, FPC-DEIS Statement:

"Pollutants such as construction camp sewage plant effluents, spills of petroleum products, methanol spills, and pesticides; blasting near fish spawning areas where eggs are present; and increased or decreased water temperatures resulting from vegetative changes or pipeline operation would also adversely affect fish populations."

NB Comment:

All construction camp sewage will be received by temporary portable facilities, and the disposal will be according to the stipulations and regulations of government agencies.

The Applicant will comply with all applicable Federal, state and local regulations and guidelines with respect to the storage of petroleum products such as fuel and lubricants. Thus, the potential for large-scale pollution of surface or groundwater from fuel spills will be virtually nil. Small local spills may accidentally occur, but planned clean-up procedures will prevent significant effects on surface or groundwater.

The use of pesticides will be in accordance with the manufacturer's E.P.A.-required recommendations. Blasting programs will be outlined with the interest of the aquatic biota in mind. Modifications of the thermal characteristics of streams will be virtually undetectable due to the small area involved in the pipeline crossings and will therefore not affect the aquatic biota.

Instream pollution will be mitigated since the Applicant will comply with all applicable Federal, state and local regulations concerning water quality. Thus, significant impacts to fish will not result from pipeline construction.

* * *

C.B (Cont.)

Page I-213, Lines 13-18, FPC-DEIS Statement:

"The disturbance of the organic cover protecting soils from erosion, and the mixing of topsoils with subsurface materials during construction would adversely affect the functioning of terrestrial ecosystems along the route and result in reduced productivity."

Statement eliminated in FEIS.

NB Comment:

It is axiomatic that topsoil normally is the most productive horizon of a soil profile in its natural state. However, when subjected to the varied cultural and management practices associated with modern farming methods, topsoil, as an entity, ceases to exist. It becomes a soil medium manipulated by man to meet the specific requirements of selected cultivated crops.

On much of the glaciated portions of the pipeline route, topsoil no longer exists as an identifiable horizon and agricultural production is actually occurring on the subsoil or "B" horizon. This is caused by wind and water erosion of topsoil, mixing by plowing of shallow topsoil layers with subsoil, and land leveling operations. By inference, the Staff statement suggests that all farming operations are conducted on topsoil, and that farming operations cannot be conducted on subsoils.

Backfilling operations will continue mixing of the surface soil throughout the subsoil rather than burying it in a zone several feet under the surface.

Soil management practices of the modern farmer and the nature of the agricultural soils are sufficient to overcome the possibility of a reduction in crop production, and in terms of farmlands the greatest impact will be the temporary disruption of a negligible amount of farming operations. The statement does not take into account the mitigative provisions designed by Northern Border to retard erosion, maintain topographic relief, and restore vegetational cover using native species wherever possible and appropriate in natural, non-agricultural areas.

The right-of-way does not correspond to an ecosystem. The soil community within the disturbed right-of-way will not cease to function and will re-establish itself by recruitment from adjacent land and reintegration through natural mechanisms. The right-of-way in agricultural

C.B (Cont.)

lands will be returned to its pre-existing use and level of productivity. In areas of natural habitat the presence of the right-of-way may result in a shift in the wildlife value. However, no significant change in the ecosystems will occur although the level of productivity and habitat availability may be different within the right-of-way.

* * *

Page I-213, Lines 19-24, FPC-DEIS Statement:

"Destruction of each additional increment of the few remaining 'natural areas' found scattered throughout largely cultivated areas along the pipeline route would further reduce the diversity and abundance of wildlife remaining in the settled areas of the country."

Statement eliminated in FEIS.

NB Comment:

One of the environmental criteria used in the selection of the proposed route was the minimization of the interaction of the pipeline with these areas. The construction of the pipeline will result in a small incremental loss of these scattered natural areas. The effect on wildlife will be a small reduction of local habitat and displacement to adjacent habitats. No reduction in diversity is anticipated.

* * *

Page I-213, Lines 25-32, FPC-DEIS Statement:

"The prairie potholes region contains a very special ecosystem which provides the cover and nutrition required by many waterfowl and shorebirds at critical periods in their life history. Pipeline system intrusion on this ecosystem, already impacted by agricultural drainage, could affect migratory bird populations covered by international treaties with Canada and Mexico."

Statement eliminated in FEIS.

NB Comment:

The impact of pipeline construction on the prairie pothole region will be highly localized and temporary. The proposed route avoids the

C.B (Cont.)

heart of the pothole region, and all affected potholes will be restored according to 18 CFR 2.69 and landowner requirements. The potential impact on migratory bird populations will be minor, temporary and insignificant in comparison to naturally induced fluctuations. The construction of the pipeline will not inhibit bird migration nor significantly affect international bird populations.

Mitigative procedures are outlined in Volume 4 of the NB-EIA, page 3.1.2-6, and the responses to FPC/DOI Questions (29), (50) and (71), dated November 22, 1974; and Question No. (27), dated December 12, 1974. These documents outline the means by which the Applicant will comply with 18 CFR 2.69 in restoring wetlands in terms of the pre-construction water levels and flow characteristics, if such re-establishment is consistent with landowner requirements.

* * *

Page I-213, Lines 33-35, FPC-DEIS Statement:

"Some reduction in the diversity of native plants and animals would result from an increase in the number of 'weed' species in the area."

Statement eliminated in FEIS.

NB Comment:

Because of the limited area of disturbance, the construction of the pipeline will not significantly affect diversity. The introduction of weed species will be effectively controlled by means outlined in vegetation plans as discussed in response to FPC/DOI Question No. (32) dated November 22, 1974.

* * *

Page I-214, Lines 1-6, FPC-DEIS Statement:

"Complexities of processes and interactions within ecosystems make it difficult to predict the impact of the proposed pipeline system on the many ecosystems involved. Experience has shown, however, that the indirect consequences are potentially more significant than the direct and more obvious ones."

Statement eliminated in FEIS.

C.B (Cont.)

NB Comment:

Because the pipeline involves only a narrow strip of disturbance through the major ecosystems, anticipated impacts will be insignificant. In addition, the statement that "experience has shown, however, that the indirect consequences are potentially more significant than the direct and more obvious ones" lacks substantiation. Pipelines have been built in this country for the past 75 years and there are no "significant indirect consequences" that have been identified to date.

* * *

Page I-214, Lines 12-18, FPC-DEIS Statement:

"Property taxes on the pipeline, compressor stations, and resultant project improvements would be the primary tax benefits to the governments through whose jurisdiction the pipeline would pass. New housing and business expansions resulting from the needs of new permanent employees would add to the local property tax base."

NB Comment:

The Northern Border pipeline project will increase the local tax base all along the route. As stated in Section 3.1.3 of the NB-EIA, this will create a long-term beneficial impact, especially since the system will require very few public services during the operation and maintenance stage.

New housing and business expansions resulting from the needs of new permanent employees will be limited and will result in only minor additions to the local property tax base. About 200 workers will be required to operate the completed system and most will be hired locally.

* * *

Page I-214, Lines 22-26, FPC-DEIS Statement:

"Adverse impacts would come about because of short-term surges of demand for housing; demand for Federal, state, and community services; and increased competition for recreation, education, transportation, and entertainment."

C.B (Cont.)

NB Comment:

The sociological effects of the pipeline will be relatively light and short-term. Northern Border presently plans to utilize construction camps to house nonlocal personnel in Montana, North Dakota and in northern South Dakota thereby minimizing burden on small communities. It is anticipated that there will be no serious competition for housing from the temporary construction work force anywhere along the route, and no permanent housing will be needed by the construction personnel. Existing vacancy rates indicate sufficient surpluses to take up any slack in the housing needs and still provide for housing mobility for non-pipeline people, as discussed in response to FPC/DOI Question No. (32) of December 12, 1974.

Construction camps which would be located in Montana, North Dakota and northern South Dakota will provide many of the temporary service needs, thereby relieving service requirements by local governments and agencies. Local services (within a 50 mile commuting distance) are normally sufficient to deal with influxes of non-residents and are accustomed to dealing with the needs of tourists, hunters, visitors, so the impact on local services is expected to be minor. Small communities along the route can expect beneficial economic impacts in the commercial area, i.e., restaurants, entertainment facilities, recreation facilities, etc.

Impacts on local school districts are expected to be very light, if they occur at all. There will be no winter construction, and hence, workers accompanied by families during the summer months can be expected to have their families return to their permanent residences prior to the start of school sessions.

Impacts on recreational, cultural and related services will be greater than those on school services. The major impact on these services may occur mostly on weekends.

It can be expected that there will be no increase in demand for law enforcement services other than what can be expected by normal influxes of tourists and other migrant populations.

C.B (Cont.)

Any increase in demands for medical services will be minor and short-term. Contractors will also supply water, power, sewage facilities, etc. on site.

Welfare rolls are anticipated to be decreased in those areas receiving beneficial economic impacts since new job opportunities can help to remove some of the people presently on welfare and assist with unemployment. Some short-term upward economic mobility can be expected by those permanent employees residing in the area, thus opening job opportunities for those having lesser skills.

It is expected that no new capital investments will be required by local public and semi-public agencies to service the added temporary population associated with the pipeline construction project. Therefore, there will be no need to anticipate increases in operation and maintenance personnel costs.

* * *

Page I-214, Lines 27-32, FPC-DEIS Statements:

"During construction, production would be destroyed in agricultural and forest lands throughout much of the route. Some of the land would be out of production for only a short time, but other lands would be out of production for the life of the project."

NB Comment:

Soil productivity will be altered in the trenched area only (about 6 feet wide). Although production may be reduced during a two-year period, the area over the trench will return to production the season after construction. It should be pointed out that the landowners would be compensated for crops not produced during the construction period. The loss of agricultural production at compressor stations, microwave tower sites, and measuring stations will be very minor.

The amount of agricultural land to be disturbed represents a very minor when compared to the very large volume of farm production in the 10 states. For these reasons, the impacts on agriculture will be minor and short-term.

C.B (Cont.)

The total area of woodlands affected by construction is approximately 1,000 acres, about 400 of which will be included in the maintained portion of the right-of-way (NB-EIA, Volume 4, Section 3.1.1, page 3.1.1-3/4, Table 3.1.1-1).

As stated in the NB-EIA, Section 3.1.1, page 3.1.1-5, lines 16 to 23, woodlands are a predominant natural feature in only the eastern third of the ten state area, which includes Ohio, West Virginia, Pennsylvania and parts of Indiana. These states contain about 71 of the 73 miles of woodlands crossed by the pipeline. In these areas the primary use of woodland is for recreational purposes, not commercial forestry. Construction of the pipeline through this type of land will result in the transformation of the route into an open space corridor with potential for multiple use.

* * *

Page I-215, Lines 2-9, FPC-DEIS Statement:

"In areas where the proposed pipeline right-of-way would cross substantial portions of agricultural land the impact during the construction period would be significant. Those agricultural lands required for use as compressor stations, new roads, and other permanent facilities needed for the operation phase of the project would be lost to agricultural use for the life of the project."

Statement eliminated in FEIS.

NB Comment:

In the NB-EIA it was concluded that construction during the growing season will cause the loss of crop production on the right-of-way for that year and that the land may be returned to agricultural use the following growing season. The trench area may not return immediately to full crop production because of soil disruption. However, in most areas this reduction in productivity will be relatively minor and should dissipate completely within a few years (NB-EIA, Volume 4, Section 3.1.1-A, page 3.1.1-5, lines 4 to 12). This reduction in productivity will be relatively minor since the agricultural land impacted by the route (about .006 percent of the agricultural land in the 10 state area)

C.B (Cont.)

is small in relation to the total agricultural land base of the Study Area (NB-EIA, Volume 4, Section 3.1.1-A, page 3.1.1-1, lines 4 to 15).

As discussed in Section 3.1.1-A of the NB-EIA, all agricultural lands used for construction of the pipeline will be returned to agricultural use following construction except for the approximately 572 acres required for the construction of ancillary facilities. This land will be committed to use by the proposed project for the life of the project but can be returned to agricultural use at termination. The loss of agricultural production on land required for compressor stations, microwave tower sites, and measuring station sites will be very minor.

* * *

Page I-215, Lines 10-13, FPC-DEIS Statement:

"Soil disturbance could have long-range impacts upon the productivity of some types of farmlands, but use for pipeline purposes would not preclude use for agriculture."

NB Comment:

No significant adverse impacts will be imposed upon the soil resource by the construction and operation of the proposed project. All disturbed areas will be restored and revegetated, and mitigative measures will control both water and wind erosion of the soil. After many years of intensive farming, subjection to erosion forces and mixing by cultural treatment, topsoil as a horizon has ceased to exist on much of the route, and the farming operations themselves are actually being conducted on the subsoil. In terms of fertility and toxicity, the subsoil is not markedly inferior to surface layers in many areas, and good management practices such as fertilization or cultural treatment will overcome any agricultural deficiences resulting from mixing of the subsoils with the surface layers.

Northern Border has proposed restoration programs in both the EIA and in response to the joint FPC/DOI questions. Site-specific information would be developed upon completion of final design of the project and will be incorporated into the construction specifications. Special

C.B (Cont.)

restoration programs are being developed for both rangelands and badlands and for pothole areas. These programs will be incorporated into the construction specifications. Restoration of critical areas defined by state and Federal authorities will be in accordance with applicable recommendations of those agencies.

* * *

Page I-215, Lines 14-17, FPC-DEIS Statement:

"In areas where irrigation is used in conjunction with agriculture, there would be additional problems of interference with irrigation and drainage tiles and ditches."

NB Comment:

All drainage tiles "will be replaced such that their function will be restored," as stated in the NB-EIA, Section 1.5.2-K, page 1-53. This requirement will be made a part of the construction specifications to minimize the disruption of field drainage systems by the trenching operation.

Construction across irrigated areas such as parts of the Buford-Trenton Project in North Dakota will not interfere with irrigation operations. In addition, the following procedures will be incorporated into the construction specifications. All necessary precautions will be taken to minimize interruption of irrigation by providing flumes for irrigation canals and cross-overs for equipment used in surface irrigation. In addition, as stated in Section 1.5.2-K, page 1-55 of the NB-EIA, "flow will be maintained during the crossings of streams and irrigation canals."

Pipeline crossings will be marked and disturbed areas will be restored as near as is practical to their preconstruction condition.

* * *

Page I-215, Lines 18-20, FPC-DEIS Statement:

"In areas where the pipeline would cross large areas of commercial

C.B (Cont.)

forested lands, there would be long-term loss of timber production along the right-of-way."

NB Comment:

The expected minor impact of the Northern Border pipeline is discussed in detail in response to the statement on Page I-211, Lines 23-27.

* * *

Page I-215, Lines 24-26, FPC-DEIS Statement:

"Residential, commercial, and industrial land uses would be precluded from the pipeline right-of-way and from sites of related facilities."

NB Comment:

The DEIS statement fails to point out that the amount of land required for the pipeline right-of-way is minor when compared to overall availability of land in the region (see NB-EIA, Volume 4, Section 3.1.1-A. page 3.1.1-6, lines 5 to 8).

Land restrictions imposed by construction and operation of the proposed facilities are negligible, consistent with existing land usage and future land use plans, and will not restrict future options and needs.

* * *

Page I-215, Lines 27-33, FPC-DEIS Statement:

"The existence of a pipeline transportation system would stimulate an increase in the further exploration and possible development of the coal fields in Montana and other parts of the United States. The impacts from this consequence could be major and of national significance."

NB Comment:

The purpose of the Northern Border pipeline project is to transport and deliver gas from the Canadian Border to the points of delivery

C.B (Cont.)

indicated in the application filed with the Commission. The Northern Border pipeline and ancillary facilities have been sized to transport those volumes of gas anticipated to be made available from Prudhoe Bay.

As indicated in the Foster Associates, Inc. report of December, 1974, filed as a supplement to the Northern Border EIA, the magnitude of the gas shortage is so large that other sources of natural gas including coal gas will be used to the fullest extent with or without the proposed project. If in the future the proposed Northern Border pipeline can be used or expanded to handle coal gas, this availability can only be considered as an overall benefit in meeting our country's future energy needs.

For these reasons, development which may result from coal gasification should not be treated as part of the proposed project.

* * *

Page I-216, Lines 1-6, FPC-DEIS Statement:

"The proposed project would cross a wide variety of existing transportation and communication facilities. Major highways, secondary roads, railroads, navigable rivers, canals, power transmission lines and other pipelines would all be crossed or closely paralleled in places along the prime route."

Statement eliminated in FEIS.

NB Comment:

For the following reasons this impact will be minor and short-term in nature. Pipeline crossings of major roads and freeways are routinely handled. Construction procedures for these crossings have been developed from many years of experience. The boring techniques included in the construction specifications will eliminate voids from around the casing which could lead to settling of the roadway.

No detours of traffic are planned or contemplated. All permit requirements, including traffic control regulations, will be met by the construction contractor.

Pipeline crossings of secondary roads are also routinely handled. Construction procedures for these crossings have been developed from

C.B (Cont.)

many years of experience. State and/or local permits are required for making these crossings, as stated in the NB-EIA. These permits provide for, among other things, traffic control during the construction operations. Detours will not be required; however, local officials are notified in advance of construction in order that they may plan for temporary routes for emergency vehicles.

All damages to roads, bridges and culverts will be repaired to equal or better than original condition at Northern Border's expense thus imposing no economic burdens upon the local government agency.

Pipeline crossings of railroad tracks are routinely handled. Construction procedures for these crossings have been developed from many years of experience. The boring techniques included in the construction specifications will eliminate voids from around the casing which could lead to settling of the railroad tracks.

The mitigative methods proposed by Northern Border for waterway crossings are summarized below. These methods will be detailed and placed in the construction specifications.

Submerged crossings, such as rivers, streams, gullies and creeks, shall be installed and restored in accordance with the applicable construction drawings, with permit requirements, and with the requirements of all statutory authorities including those concerned with water supply, irrigation, water pollution, navigation and fisheries.

All waterway crossings shall be restored to as near original contours as possible including filling of excavation and bank cuts, and removing surplus excavated materials from streambeds.

The banks of all streams and rivers shall be properly riprapped with sacks filled with either earth or sand mixed with cement or riprapped with other approved material.

As nearly as possible, the beds of all streams and rivers will be restored to their former elevations and grade. Spoil, debris, piling, coffer dams, false work, excavation, construction materials and obstructions resulting from construction of the pipeline will be removed from the crossing to prevent interference with normal water flow and interference with any normal use of such streams and rivers and will be disposed of in a manner and at a location satisfactory to the governing agencies.

C.B (Cont.)

All streambanks and additional work space required for construction will be revegetated to approximate pre-existing conditions. Banks will be properly seeded to avoid erosion before consolidation.

The larger rivers along the proposed route accommodate commercial barge traffic. There may be periodic interruptions of this traffic during those times when the drag sections of the pipeline are being installed and during some stages of the dredging operation. These interruptions are not expected to be longer than a few hours (see NB-EIA, Volume 4, Section 3.1.2-B, page 3.1.2-110, lines 3 to 9). A description of impacts resulting from the construction of the proposed project on the navigational waters of each of the 10 states is presented in Section 3.1.2-B.1 through Section 3.1.2-B.10.

As discussed in response to FPC/DOI Question No. (14) of November 22, 1974, boring would be the preferred method of construction, but the actual method would depend on the results of field survey. Regardless of the method of construction "canals, their levees, and the adjacent terrain would be restored to their original topography and structural integrity."

Where transportation and communication facilities closely parallel or cross the prime route, all underground facilities will be located and marked prior to grading and trenching. Safe construction procedures will be used at all times, including those when transmission facilities are encountered, as explained in the NB-EIA. Reasonable precautions will be taken to ensure that services supplied by the transmission facilities will not be interrupted.

* * *

Page I-216, Lines 8-19, FPC-DEIS Statement:

"The nature of the proposed project construction is such that if certain precautions are not observed, any cultural resource sites in the path of the pipeline, access roads, compressor stations or other facilities could be damaged or destroyed. In most cases, the damage would be a direct consequence of site disruption and excavation by man and machine without knowledge of the paleontological or archaeological

C.B (Cont.)

values present, but in other cases the impact would come as a consequence of increased access and vandalism to unprotected historic sites."

NB Comment:

The Applicant has stated that several precautions will be observed in an effort to protect cultural resources within the pipeline right-of-way. Upon receipt of certification to construct the proposed pipeline, a survey of the route will be made where necessary. Where possible, paleontological, archaeological, and historical sites will be avoided. If such a site cannot be avoided, it will be salvaged.

Prior to construction, a set of guidelines will be provided to the Northern Border inspectors and the contractors to use in assisting in the identification of a site or significant artifacts. Pipeline construction may result in discovery of previously unknown cultural resources and may therefore provide a positive benefit.

* * *

Page I-217, Lines 10-13, FPC-DEIS Statement:

"Visual impacts would be most apparent in forested areas and in open range or desert country, while the visual impacts in agricultural and industrial areas would be much less."

NB Comment:

As stated in the NB-EIA, visual impacts due to tunnel views will be avoided by modifying the alignment to restrict the length of view of the observer and by orienting shrubbery to shield the right-of-way from view. Both techniques will aid in maintaining the appearance of an undisturbed environment.

Northern Border is also preparing a rangeland restoration program. Since this part of the proposed route will be restored to pre-existing conditions, no visual impact will result. No desert is traversed by the Northern Border proposed route.

C.B (Cont.)

Moreover, the spacing of compressor stations and microwave towers will result in minimum and localized impact.

* * *

Page I-217, Lines 14-17, FPC-DEIS Statement:

"The loss of old trees, straight-line cuts through mature forests, and pipelines ascending steep bluffs and cliffs would all constitute aesthetic impacts of long duration."

Statement eliminated in FEIS.

NB Comment:

Although cutting of trees is an unavoidable effect, several techniques will be used to mitigate aesthetic impact. These include:

1) minor bends in the alignment of the pipeline to avoid straight-line cuts and tunnel views at wooded stream and highway crossings.
2) feathering of the right-of-way where necessary to blend it with the surrounding area.
3) plantings to shield the right-of-way from view at stream and highway crossings.
4) as previously mentioned in the response to the statement on page I-211, lines 23-27, only about 400 acres of wooded land will be impacted by the permanent right-of-way.

Upon termination and abandonment of the project, the right-of-way can return to its previous natural wooded state.

In selection of the proposed routes, steep bluffs and cliffs were avoided where possible. However, some steep areas are encountered in the Appalachian plateau region, the North Dakota Badlands, and certain river crossings. Restoration of topographic relief will mitigate aesthetic impacts. Furthermore, in the Appalachian plateau, man's influence has already affected the existing aesthetic character and the presence of the proposed route will not further affect the aesthetic values.

* * *

C.B (Cont.)

Page I-217, Lines 18-20, FPC-DEIS Statement:

"Pipeline construction access roads would provide public vehicular access in previously inaccessible areas."

NB Comment:

Temporary access roads utilized for construction of the Northern Border pipeline will be restored to pre-existing grade and revegetated or left in a stabilized condition subject to the requirements of the landowner, upon completion of their use. The utilization of such roads will be restricted subject to the requirements of the landowner.

* * *

Page I-217, Lines 22-24, FPC-DEIS Statement:

"The only continuous long-term impacts on air quality would be from the operation of the compressor stations along the gas pipeline system."

NB Comment:

The statement is true; however, it gives no indication of the insignificant magnitude of the impact. Extensive work was done on modelling the dispersion of pollutants around the compressor stations, as described in the NB-EIA, Volume 4, pages 3.2.4-1 to 3.2.4-30. It was pointed out there that the emissions would comply with all federal regulations.

* * *

Page I-218, Lines 1-4, FPC-DEIS Statement:

"Concentrations of construction equipment at some sites could cause nitrogen dioxide concentrations that exceed National Ambient Air Standards under certain meteorological conditions."

Statement eliminated in FEIS.

NB Comment:

The nitrogen oxides concentrations that result from construction at the river crossings or along the proposed route will not exceed the

C.B (Cont.)

National Ambient Air Quality Standards. The National Standards are set for an annual average time period with no short-term standard being promulgated for nitrogen oxides. As was stated in the NB-EIA, Volume 4, page 3.2.4-8, lines 13-15, the data on health effects set forth in the Federal air quality criteria document indicated that short-term standards were not required for nitrogen oxides. Moreover, the DEIS does not state the "certain meteorological conditions" to which it has reference.

* * *

Page I-218, Lines 5-8, FPC-DEIS Statement:

"Dust from construction activities, especially in the arid soils of the western states, would also create short-term adverse impacts on air quality and visibility."

NB Comment:

The proposed construction will result in limited movement of excavated earth and debris, and the emissions will be localized and similar to those resulting from a typical farming operation in the area.

Areas where fugitive dust problems are expected from the exposed right-of-way occur in the badland areas of Montana, North Dakota and South Dakota and are limited to about 66 miles. Dust and soil control measures will be applied as part of the construction practice, and wind erosion will be taken into account during the revegetation program.

* * *

Page I-218, Lines 10-13, FPC-DEIS Statement:

"Ambient noise levels along much of the proposed 5,551-mile pipeline system are now very low and any pipe hauling, pipeline construction, or operating noises would be noticeable."

NB Comment:

Construction-related noises will be short-term and localized.

C.B (Cont.)

Northern Border has agreed to design operating equipment to meet all applicable Federal, state and local noise standards.

* * *

Page I-218, Lines 14-16, FPC-DEIS Statement:

"Compressor station operating noises would be long term. Compressor noise emissions could be audible for a radius of 6,000 to 7,000 feet."

NB Comment:

Compressor station operating noises would be long term. However, the operational noise from compressor stations with built-in silencers will be 66 to 71 db(A) at the compressor station site boundary, and will range between 56 and 61 db(A) at approximately 800 feet from the boundary.

* * *

Page I-218, Lines 27-29, FPC-DEIS Statement:

"Natural gas is easily flammable, becomes explosive when confined, and when purified is odorless and can act as an asphyxiant."

Note appropriate changes in FEIS.

NB Comment:

Natural gas is flammable in concentrations from 5 to 15 percent by volume in air. The ignition temperature for such mixtures is 1300°F, higher than for many other petrochemical products. The normal flame speed for natural gas at atmospheric pressure is relatively low, about 15 to 30 feet per second. When confined in a closed container and ignited, flammable natural gas vapors are explosive. No such phenomenon occurs in unconfined space.

The asphyxiation of wildlife by natural gas released by a ruptured pipeline is extremely unlikely. Such a phenomenon would require a cloud of 50% or greater concentration to persist over a large area for several minutes, and would, in addition, require the wildlife to remain in the area. A physical mathematical analysis concludes that the release of

C.B (Cont.)

natural gas from a ruptured pipeline does not result in the presence of a ground-hugging cloud. The conditions required to asphyxiate wildlife or people thus do not occur. No known cases of natural gas pipeline transmission ruptures have resulted in such consequences.

* * *

Page I-219, Lines 1-4, FPC-DEIS Statement:

"Damage by outside forces, a construction defect, or a material failure could all cause a failure in the pipeline system resulting in a loss of gas and requiring emergency repairs."

Note appropriate changes in FEIS.

NB Comment:

In recognition of the above-mentioned possibilities the pipeline system will be designed, constructed, tested, operated, maintained and monitored to minimize the likelihood of failure. Quoting from Volume 1 of the Northern Border EIA, "Operation and maintenance plans and schedules will be implemented to monitor and ensure safe operation. Periodic aerial surveys will be made of the line to check for activities which might encroach on the right-of-way and endanger the pipeline. Periodic over-the-ground surveys will be made...The pipeline route will be checked annually for changes in population density and encroachments" (page 1-73, lines 8-18). "The pipeline will be monitored for corrosion control" (page 1-73, line 24). "An emergency plan outlining steps to be taken in the event of system malfunctions or other emergencies will be incorporated in the operations or maintenance manuals. Immediately upon the occurrence of a malfunction or failure, that part, piece of equipment, or section of line will be isolated" (page 1-74, lines 1-5).

Therefore, while a failure in the line is not anticipated, detailed operation and maintenance plans will nonetheless be implemented to ensure that emergency repairs, should they be needed, will be undertaken in a prompt, safe, and efficient manner.

* * *

C.B (Cont.)

C.D. FPC ENVIRONMENTAL STAFF CONCLUSIONS

Pages I-225 and I-255

NB Comment:

On page I-225, the DEIS discusses, among other things, the Red River route, which would begin at the United States-Canadian Border near St. Vincent, Minnesota, and would follow the Midwestern Gas Transmission Company pipeline to the vicinity of Ada, Minnesota. From Ada, this route would extend southeast to Benson, Minnesota, where it would join the "Northern Corridor" (see pages I-224 and I-225 for a description of this route), which would then meet the proposed Northern Border route near Waterloo, Iowa.

On page I-255 the DEIS provides that the Northern Border system "should be routed along the Red River Corridor alternative route proposed by USDI." In this regard, the DEIS recommends that the pipeline should terminate at Kankakee, Illinois and "utilize existing facilities together with exchange agreements to distribute the gas until such time as additional volumes of natural gas become available which would warrant further extension of the facilities."

The DEIS does not provide any explicit basis for recommending this route, but it appears from a review of that document that four factors may have entered into the Staff's conclusions: (1) the Red River route would be somewhat shorter in length than the proposed route of Northern Border; (2) the Red River route would, in part, follow existing pipeline routes, i.e., the "corridor concept"; (3) there is an apparent belief that the volumes of gas to be purchased by the Northern Border companies will not justify the construction of the proposed facilities east of Kankakee at this time; and (4) that such volumes can be handled by "existing facilities together with exchange agreements."

In order to fully respond to Staff's recommendation, it is necessary to reemphasize the background and purpose of the Arctic Gas project. The Arctic Gas project is responsive to the critical gas supply shortage facing the Nation. More than five years of unprecedented research have been undertaken by the Arctic Gas companies at a cost of many millions of

C.B and C.D (Cont.)

dollars in order to design and to plan for the construction and operation of an environmentally acceptable pipeline which will ensure direct delivery of the Arctic Gas supplies to markets critically in need of such supplies in the Lower 48 of the United States in a reliable, efficient, and economical fashion. The applications presently before the Commission represent the result of this research and prove beyond any doubt that the Arctic Gas project has chosen the most viable route and means of delivering the Arctic Gas supplies to market. It is important to note that the DEIS does not take issue with this fundamental point. Now, nearly two years after the applications have been filed, the Staff recommends a different route for Northern Border and substitutes a different concept for the ultimate delivery of the gas to the market areas to be served.

The Red River route appears to have been studied to a lesser degree than the proposed route of Northern Border, and, therefore, a detailed comparison of the two routes is not possible on the basis of the information contained in the DEIS and the NB-EIA. It is important to recognize, however, that the DEIS does not assert that the Red River route is environmentally preferable to Northern Border's proposed route. In view of the foregoing, it serves no purpose to arbitrarily propose a different route when the route proposed by Northern Border has been shown to be environmentally acceptable and the route proposed by Staff has not been alleged or shown to be environmentally preferable to this route.

In any event, it should be emphasized that while Staff has recommended the Fairbanks Corridor in Alaska and the Red River Corridor in the Lower 48, it has failed to consider the necessary connecting system in Canada. The DEIS discusses only one proposed routing - the "Liard River-Wolf Lake"-"Emerson-Red River" corridors - which would enter the Lower 48 States near St. Vincent, Minnesota. But the "Liard" Corridor does not run to the point on the border between Alaska and the Yukon at which the "Fairbanks route" leaves Alaska. Nor does any other Canadian "corridor" discussed by the DEIS. Thus, the DEIS routing discussion is not complete and, therefore, obviously not completely examined or justified, see, e.g., especially the portion of the route between Scottie Creek and the Wolf Lake Junction.

C.B and C.D (Cont.)

Accordingly, the DEIS alternative proposal is not clear or complete. In any event, Arctic Gas has demonstrated in its comments that the Fairbanks Corridor is not a viable alternative from an environmental, engineering, cost or reliability standpoint and does not serve the project objective since it does not make provision for transporting the MacKenzie Delta supplies. Moreover, Arctic Gas has reviewed the utilization of other routes in Canada and has determined that such routes did not have environmental advantages over the proposed prime route. Indeed, the DOI-DEIS provides that "facilities along the Wolf Lake and Fairbanks Corridor would have substantially greater impacts, in Canada, than those along the Prime Route" (Vol. 3, Part III, Page III-1786).

Regarding the comparative lengths of the proposed route versus the Red River route, it should be noted that the 345 miles difference in the length of the Northern Border proposed route as compared to the Red River route applies only to the pipeline located within the Lower 48 states and does not take into account the additional miles of pipeline required for the entire system in Canada. As such, the apparent 345 miles saving in pipeline length is misleading.

With respect to the "corridor concept", it is clear that there has been no demonstration in the DEIS that the creation of a "corridor" for a portion of the length of the route here involved would be preferable to the construction of the Northern Border pipeline along its proposed route. The "corridor concept" has been the subject of debate among respected environmentalists, and clearly no definitive resolution has been forthcoming to be able to determine whether it is a preferable method of locating utilities. This is especially true in the circumstances of this case where extensive environmental studies have concluded that the route proposed by Northern Border is environmentally acceptable.

With respect to the "displacement concept" advanced by the DEIS, it is clear that Staff has offered no basis for how this portion of its proposal could be accomplished, or whether it is feasible from an engineering, technical or economic basis. Reliance on displacement as a universal solution to difficult delivery problems simply ignores the conditions which much exist to make that concept work. Where exchange and displacement have operated successfully in the past, the following characteristics

C.B and C.D (Cont.)

have obtained:

(1) a restricted number of involved parties;
(2) a community of interest and compatible facility design;
(3) extended and complex negotiations to resolve such critical details as supply commitments, delivery of equivalent volumes volumes of gas, facilities construction, passage of title to gas, and numerous financial arrangements.

None of these characteristics has been shown to exist to support the generalized concept advanced in the DEIS. The parties necessarily involved, as evidenced by the Arctic Gas and supporting delivery systems in the contiguous states, have agreed upon a wholly different concept for the marketing of North Slope gas on the basis of the markets to be served. The material contained in the DEIS provides no assurance that the unknown "displacement-exchange" agreements proposed by Staff would be able to accomplish the delivery of the gas as reliably, efficiently, and economically as the direct delivery proposed by Northern Border.

Finally, Staff states that the portion of the Northern Border pipeline east of Kankakee should not be constructed at this time until additional volumes of gas are available to the Northern Border companies. This is not an environmental comment, nor does it show analysis of the economics of such a step. The short and dispositive answer to this assertion at this point in time is that the Northern Border facilities have been designed to transport the volumes of gas anticipated to be available and have been demonstrated to be able to economically deliver those volumes with engineering integrity and a minimum environmental impact. Direct deliveries can only be considered for replacement by fully designed, analyzed, and costed exchange-displacement arrangements, studied relative to their results on all parties concerned, and over lengthy periods. The DEIS recommendation has not been shown to be based on such studies.

* * *

GENERAL COMMENTS ON

VOLUME II

Alaskan Arctic will respond to Volume II of the DEIS and Northern Border incorporates those comments by reference herein. However, at pages II-521 through II-526 Staff has made certain recommendations, and to the extent they may be said to apply to Northern Border, they are commented upon below.

FPC-DEIS, VOLUME II

SECTION I - RECOMMENDATIONS

Page II-521, Lines 29-32, FPC-DEIS Statement:

"In order to minimize the disturbances caused by construction noise, no single piece of equipment or tool should generate noise levels in excess of 90 dB(A) when measured 10 feet from the source."

NB Comment:

Applicable Federal noise standards will be met by Northern Border. Procedures regarding noise standards will be outlined for the contractor in the construction specifications. The noise impact of operation of the construction equipment will be short-term and minor.

* * *

Page II-521, Line 33-34, FPC-DEIS Statement:

"Borrow pits should not be located at areas of topographic prominence or at other highly visible sites."

NB Comment:

Sand and gravel will be obtained only from approved borrow pits. Borrow material will be obtained from commercial sources. If commercial sources are unavailable, negotiations will be made with local landowners for the required material. Restoration of these sites will be in accordance with the landowners' wishes.

* * *

Page II-522, Lines 1-3, FPC-DEIS Statement:

"In order to reduce siltation, streams with silt bottoms should not be excavated until immediately prior to pipelaying."

NB Comment:

Northern Border has stated that "to minimize the time required for

the stream crossing, the right-of-way will be prepared on each side of the stream crossing prior to the construction of the crossing" (NB-EIA, Section 1.5.2-K).

The impact of sediments resulting from in-stream construction activities will in most cases be short-term and minor. As a result of the low level of impact, additional mitigation measures are not warranted. In those areas where impact would be of higher significance, Northern Border will conform with all requirements of the applicable agency.

* * *

Page II-522, Lines 4-10, FPC-DEIS Statement:

"The contract for construction should include provisions to protect the completed erosion control measures from damage due to equipment and pedestrian traffic, concentrated runoff and other controllable causes. Contractors should be required to repair any such damage which may occur while the contractor is in areas where revegetation is in process."

NB Comment:

Northern Border will outline in the construction specifications the Erosion Control Plan to be followed by the contractor. These specifications will include the requirement that the contractor shall maintain all temporary and permanent erosion control structures until final acceptance of the work by the company. This requirement will include protection and repair of any damage, including those items discussed above.

Northern Border has also described its operations and maintenance procedures in Sections 1.6 and 4.1 of the NB-EIA. These plans include periodic inspection and maintenance to protect against erosion and to ensure the integrity of the pipeline.

* * *

Page II-522, Lines 11-15, FPC-DEIS Statement:

"The recommendations concerning water resources made in the U.S. Department of the Interior Draft Environmental Impact Statement for the proposed Arctic Alaska Pipeline Project (which are relevant to the El Paso proposal) should be adopted."

NB Comment:

Northern Border has submitted comments to the proposed recommendations made in the DOI-DEIS in its response to Part V of the DOI-DEIS, pages 4-26 through 4-30, submitted on October 24, 1975. In these comments it was pointed out that many of the recommended mitigating procedures were either proposed by Northern Border in the Environmental Assessment or in the response to the FPC/DOI Questions of November 22, 1974 or December 12, 1974, or were required by applicable regulations. Those cases where additional mitigating action was not warranted were also discussed.

* * *

Page II-522, Lines 16-38 and Page II-523, Lines 1-4, FPC-DEIS Statement:

"A detailed plan for mitigating adverse affects on the historical and archaeological resources of Alaska should be drawn up in cooperation with the Department of the Interior, the State of Alaska, the Advisory Council on Historic Preservation and the Federal Power Commission. The details of such a plan should require:

a) The applicant should make available funds for the complete survey of the pipeline corridor including access roads, construction camps and other ancillary facilities for historical and archaeological sites.
b) The survey should be completed prior to determination of the final alignment of the pipeline so that certain sites could be avoided.
c) Such surveys be performed by teams of competent historians and archaeologists in cooperation with the appropriate state and Federal agencies.
d) The applicant should set aside funds so that in the event that realignment of the pipeline away from archaeological sites is not practicable, funds would be available for the excavation and salvage of archaeological remains.
e) Funds should be made available for laboratory analysis of recovered remains and for the publication and dissemination of reports on the findings of the study."

NB Comment:

Northern Border, in the planning of the proposed pipeline, has incorporated many measures for mitigating adverse effects on historical and archaeological resources along the proposed route.

In the NB-EIA (page 3.1.1-107) it is stated that sites of archaeological and historical value have been avoided in evaluating the proposed route. The location of archaeological sites will be determined during land acquisition and avoided by route alteration to the extent practical in order to mitigate any impact on these sites.

Prior to construction, a set of guidelines will be provided to the Northern Border inspectors and the contractors to use in assisting in the identification of a site or significant artifacts. In addition, the Northern Border inspectors and contractors will be provided the names of persons or agencies to contact in the event that a site is uncovered.

Northern Border is committed to conducting a reasonable archaeological program as outlined in its Environmental Assessment. It is Northern Border's position that such a program adequately protects cultural resources which may be encountered along the route.

* * *

Environmental staff's recommendations have been revised.

While Northern Border has done a commendable job in identifying known historical and archeological sites, nevertheless on-ground archeological surveys will be required to identify heretofore unknown sites.

January 20, 1976

Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Dear Mr. Plumb:

Enclosed please find ten (10) copies of the comments of PGT/PGandE and ITA(A) on the Staff's Draft Environmental Impact Statement on the Alaskan Natural Gas Transportation System. You will note that as part of our comments, we are both attaching our previous comments on the Draft Environmental Impact Statement of the Department of Interior. Ten (10) copies of this entire package are being sent to the Council on Environmental Quality as well.

We are also serving our comments on the Staff's Draft EIS on all parties on the Restricted Service List in Docket No. CP75-96, et al., El Paso Alaska Company, et al. However, we are not serving said parties with our comments on the Department of Interior's Draft EIS as they have been available for some time to persons interested in seeing them.

Very truly yours,

PACIFIC GAS TRANSMISSION COMPANY

Daniel E. Gibson, General Counsel

INTERSTATE TRANSMISSION ASSOCIATES
(ARCTIC)

Jane C. L. Goichman, Attorney

JCLG:jcc
Enclosures
cc Mr. Michael J. Sotak
Bureau of Natural Gas

PACIFIC GAS TRANSMISSION COMPANY
245 MARKET STREET
SAN FRANCISCO, CALIFORNIA
(415) 781-0474

DANIEL E. GIBSON
GENERAL COUNSEL

PETER W. HANSCHEN
ATTORNEY

January 28, 1976

Mr. Kenneth F. Plumb, Secretary
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Dear Mr. Plumb:

It has come to our attention that Mr. Michael J. Sotak of the Bureau of Natural Gas has requested thirty (30) additional copies of our comments on the FPC Staff's Draft Environmental Impact Statement on the Alaskan Natural Gas Transportation System. In response to this request, we enclose herewith thirty (30) additional copies of the PGT/PGandE and ITA(A) comments on the Staff's draft. We have not included additional copies of our respective comments on the Draft Environmental Impact Statement of the Department of the Interior, which is submitted as an attachment, as a number of copies have been previously supplied to the FPC Staff. However, we would be happy to supply additional copies if the Staff so desires.

Very truly yours,

PETER W. HANSCHEN

PWH:nw
encs.

cc: (w/enc.)
Mr. Michael J. Sotak
Bureau of Natural Gas

January 20, 1976

Mr. Kenneth F. Plumb
Secretary
Federal Power Commission
825 North Capitol Street, N. E.
Washington, D. C. 20426

Dear Mr. Plumb:

Enclosed please find ten (10) copies of the comments of PGT/PGandE and ITA(A) on the Staff's Draft Environmental Impact Statement on the Alaskan Natural Gas Transportation System. You will note that as part of our comments, we are both attaching our previous comments on the Draft Environmental Impact Statement of the Department of Interior. Ten (10) copies of this entire package are being sent to the Council on Environmental Quality as well.

We are also serving our comments on the Staff's Draft EIS on all parties on the Restricted Service List in Docket No. CP75-96, et al., El Paso Alaska Company, et al. However, we are not serving said parties with our comments on the Department of Interior's Draft EIS as they have been available for some time to persons interested in seeing them.

Very truly yours,

PACIFIC GAS TRANSMISSION COMPANY

/s/ Daniel E. Gibson
Daniel E. Gibson, General Counsel

INTERSTATE TRANSMISSION ASSOCIATES
(ARCTIC)

/s/ Jane C. L. Goichman
Jane C. L. Goichman, Attorney

JCLG:jcc
Enclosures
cc Mr. Michael J. Sotak
Bureau of Natural Gas

UNITED STATES OF AMERICA
FEDERAL POWER COMMISSION

El Paso Alaska Company, et al.) Docket Nos. CP75-96, et al.

COMMENTS OF
PACIFIC GAS TRANSMISSION,
PACIFIC GAS AND ELECTRIC AND
INTERSTATE TRANSMISSION ASSOCIATES (ARCTIC)
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
OF THE FEDERAL POWER COMMISSION ON THE
ALASKAN NATURAL GAS TRANSPORTATION SYSTEM

Comments of
Pacific Gas Transmission,
Pacific Gas and Electric and
Interstate Transmission Associates (Arctic)
On The Draft Environmental Impact Statement
Of The Federal Power Commission on the
Alaskan Natural Gas Transportation System

Introduction

Pacific Gas Transmission (PGT), Pacific Gas and Electric (PGandE) and Interstate Transmission Associates (Arctic) (ITA(A)) hereby submit their comments on the Draft Environmental Impact Statement (DEIS) issued by the Federal Power Commission (FPC) on the Alaskan Natural Gas Transportation System. We believe the FPC Staff acted appropriately in accepting the Department of Interior's (DOI) voluminous and rather complete Environmental Statement. In so doing, the FPC Staff has recognized that the Gas Arctic project, generally, and, more particularly, the West Coast leg of that project in the Lower 48, will have only minimal environmental impacts. However, PGT/PGandE and ITA(A) take exception to the FPC Staff's seeming failure to utilize said document and its own socio-economic supplement in reaching its conclusions.

General

As the FPC's DEIS incorporates all but Volume I (Overview) and a few pages of the other volumes of the DEIS issued by the DOI on the same subject, we are including for your consideration our respective comments on the DOI document. The FPC Staff's incorporation of DOI's DEIS has raised some

unanswered questions. Does the FPC Staff's decision of October 16, 1975, reiterated at Page I-3 of its DEIS, "...to partially accept..." the DEIS of the DOI mean that the Staff is putting forth said document as its own to be commented upon by public agencies and private individuals, which comments will be considered by the FPC Staff prior to the issuance of its final EIS, or does the FPC Staff, in so accepting the DEIS, intend to utilize said document as a lead agency document? If the FPC Staff's intent is to follow the latter alternative, its final EIS will have to adopt the final EIS prepared by the DOI. As was stated in Alice Henry v. Federal Power Commission, 513 F.2d 395 (D.C. Cir. 1975), "It can rely on the statement prepared by the lead agency....It may do this accepting, rejecting, or modifying the analysis of the lead agency. There may be matters as to which it has particular expertise, and corresponding reactions of analysis". It is clear that the lead agency statement referred to by the court is the final statement, not a draft statement. Hence, only the final environmental impact statement of the DOI can serve as a lead agency statement. See Aberdeen & Rockfish R. Co. v. SCRAP, 45 L.Ed. 2d 191 (1975).

In reviewing the FPC Staff's supplemental socio-economic analysis which is put forward in Volume I of its three-volume DEIS, PGT/PGandE and ITA(A) have noted several points upon which we must comment. First, the Staff's failure to describe and analyze both the physical and socio-economic

environmental impact of the displacement alternative it advocates at Pages I-255-256 results in an inadequate DEIS. The sum total of description and analysis of this alternative is found at Pages I-226-227 and the short paragraph found on Page I-256:

> "A possible alternative proposed by the Staff of the Federal Power Commission suggests that initially, neither of the West Coast lines be constructed. This proposal suggests that all the Prudhoe Bay gas be delivered into the Northern Border system and volumes destined for the western United States be delivered by displacement to California through existing unused capacity of both El Paso and Transwestern Pipeline Company systems. With the approach, it could be recommended that the Permian Basin reserves, and to some extent the Hugoton-Anadarko supplies, be diverted for use on the West Coast while equivalent volumes of Alaskan Natural gas are delivered to the Midwest via Northern Border."
>
> And further:
>
> "The PGT/PGandE and ITA(A) routes should not be constructed at this time since the volumes of Alaskan natural gas which would be committed to these companies could be handled by means of exchange of gas agreements. These three routes and their impacts are more fully described in the USDI Draft Environmental Impact Statement." FPC DEIS at I-256.

A review of the DOI DEIS also fails to reveal any description of this proposal or any environmental analysis of it. Certainly, no recognition is given to the problem of how to achieve a displacement plan. Not all gas pipeline companies, whose lines would be necessary to displace gas nationwide, have an interest in Alaskan gas. Hence, the facile assumption that all such companies would readily enter displacement agreements

may well be erroneous. Likewise, the concept of delivering all Alaskan gas to the West Coast by pipeline and then moving necessary quantities to the east by displacement, an alternative briefly mentioned at Page I-39 of the FPC Staff's DEIS, is dismissed without any further description of said alternative or any environmental analysis of it. The FPC's Rules for the Implementation of NEPA (18 CFR §2.80) require inter alia, "the statement shall also fully deal with alternative causes of action to the proposal and, to the maximum extent practicable, the environmental effects of each alternative." (Emphasis added). The courts have also held that environmental impact statements must contain a discussion of the environmental impacts of alternatives presented. Natural Resources Defense Council Inc. v. Morton, 458 F.2d 827, 834 (D.C. Cir. 1972). Needless to say, in view of the aforementioned rule, the Staff's cursory discussion of these alternatives is clearly legally deficient. If these alternatives are to be retained in the final EIS, the FPC Staff must vastly expand its current discussion of said alternatives. Among the topics which should be included in such an expanded analysis is a sufficient description of the pipeline route through Alaska and Canada (current maps in the DEIS do not depict the Alaskan and Canadian alternatives as connecting), a description of any facilities needed to implement a displacement alternative, an identification of construction schedules and techniques to be utilized, a detailed analysis of the existing natural and human environment

along the pipeline route proposed by the FPC Staff, and a prediction of the environmental impacts which would be engendered by construction of the proposed pipeline and displacement project. The analysis must also include a discussion of economic and environmental impacts which will result from regulatory delays which may be encountered in adopting the displacement alternative. It should be noted by the Staff that their cursory discussion of these alternatives to the proposed Gas Arctic project, one of which the Staff recommends as being a preferred project, stands in bold contrast to the detailed analysis of alternatives to El Paso's proposed project found in Volume II of the FPC DEIS.

PGT/PGandE and ITA(A) also question the propriety of the FPC Staff making specific recommendations as to which of many alternatives is, on balance, preferable. Among the purposes of an environmental impact statement under NEPA is that of an informational document, Cape Henry Bird Club v. Laurel, 359 F.Supp 404 (W.D. Virginia 1973), affirmed 484 F.2d 453; Environmental Defense Fund v. Froehlke, 473 F.2d 346 (8th Cir. 1972), to aid the decision-maker in reaching a reasoned choice among alternatives so far as environmental factors are concerned. Natural Resources Defense Council Inc. v. Morton, supra. If the purpose of such a statement is to set out the facts, leaving the choice to the decision-maker, the inclusion of policy recommendations in an EIS is misplaced.

Even assuming for purposes of argument that Staff's inclusion of its recommendations is proper, the Staff's recommendations, with respect to the routing of the Gas Arctic pipeline, are founded on an evident disregard of the analysis performed by the DOI and the supplement to said analysis issued by the FPC Staff. First, the recommendation is made that the Fairbanks Corridor alternative be pursued in Alaska. FPC DEIS at Page I-255. No explanation for this recommendation is given. It should be noted, however, that the DOI's summary of the various Alaskan and Canadian alternative routes states, "The analysis generally showed that no one alternative route showed the most favorable combination of all of the features considered desirable and choice of route would have to depend on which factors were considered of most importance." DOI DEIS at Page I-557. Furthermore, in the DOI's section entitled "Comparison of Impacts for All Alternatives", found in Volume 3 of Part III of the DOI DEIS, it is stated, "Thus, facilities along the Wolf Lake and Fairbanks Corridor would have substantially greater impacts, in Canada, than those along the prime route;" Page III-1786. Moreover, the FPC's supplemental socio-economic analysis repeatedly concludes that utilization of the Fairbanks Corridor would result in substantially greater socio-economic impact on the State of Alaska than would the prime route proposed by Gas Arctic. See, particularly, FPC DEIS at Pages I-165 and I-173. The DOI study also stated that construction along the Fairbanks Corridor rather than the prime route proposed by Gas Arctic

would result in decreased Mackenzie Delta production due to the lengthy laterals necessary to bring the Mackenzie gas down to the main pipeline. DOI DEIS at Page III-1513 and III-1613. It should be noted that the FPC socio-economic study discounts the likelihood of Prudhoe gas ever being utilized in Alaska, even if the Gas Arctic project followed the Fairbanks Corridor, due to the high cost of Prudhoe gas in contrast to the cost of Cook Inlet gas. See FPC DEIS at I-156. Finally, the Staff has not addressed the issue whether the Fairbanks alternative is preferable in view of the fact that it will cost an additional $3 billion to construct.

In this regard, the Staff's recommendation, at Page I-255 of its DEIS, that the Red River Corridor alternative route be utilized by Northern Border, and its further recommendation, at Page I-256, that neither the PGT/PGandE nor the ITA(A) legs of the project be constructed at this time, requires further elaboration. Surely, If 2.2 bcfd of Prudhoe gas is flowing to the Lower 48, construction of the western leg of the project would obviously be in the public interest. This is particularly true when one reviews the gas volumes to which the West Coast has options. A chart depicting gas volumes anticipated by the various companies is found below. It is taken from United States Department of Interior, Alaska Natural Gas Transportation Systems, A Report to the Congress Pursuant to Public Law 93-153, December 1975 at Page 162. It shows

Pacific Gas and Electric has an option to 2.4 tcf. Northwest Pipeline also has an option for .2 tcf not shown on the chart because this option has only recently been signed. Pacific Lighting has terminated its funding agreement with ARCO but will aggressively be seeking to purchase a substantial quantity of Prudhoe Bay gas.

Table 26.—*Consolidated internal cash flow for current sponsoring companies for fiscal year 1974*[a]

	TCF	Percent of Optioned Gas
1. *Pacific Lighting Company* of Southern California; serves Southern California	4.8	22.3
2. *Northern Natural Gas Company;* serves Colorado, Illinois, Iowa, Kansas, Missouri, Nebraska, Oklahoma, Texas, and South Dakota	4.0	18.6
3. *Columbia Gas Transmission Company;* serves the District of Columbia, Kentucky, Maryland, New York, Ohio, Pennsylvania, Virginia, and West Virginia	3.5	16.3
4. *Pacific Gas and Electric Company;* serves Northern California	2.4	11.2
5. *Michigan-Wisconsin Pipe Line Company;* serves Illionis, Indiana, Iowa, Kansas, Michigan, Missouri, Ohio, Tennessee and Wisconsin	2.0	9.3
6. *Natural Gas Pipeline Company of America;* serves Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, Oklahoma, Texas, and Wisconsin	1.6	7.4
7. *Panhandle Eastern Pipe Line Company;* serves Illinois, Indiana, Kansas, Michigan, Missouri and Ohio	1.6	7.4
8. *Texas Eastern Transmission Company;* serves Alabama, Arkansas, Illinois, Indiana, Kentucky, Louisiana, Mississippi, Missouri, New Jersey, New York, Ohio, Pennsylvania, Tennessee and Texas	1.2	5.6
9. *Trans-Western Pipe Line Company;* (a subsidiary to Texas Eastern Transmission Company)	0.4	1.9
TOTAL OPTIONED GAS	21.5	100.0

Note: The options noted in the above table cover 83 percent of the proven Alaskan natural gas reserves. The remaining reserves are made up of the State of Alaska's 12½ percent royalty gas and 4–5 percent of reserves held by oil companies having small gas holdings. The precise amount of gas going to some companies cannot be determined until oil starts to be produced.

Moreover, The Staff's recommendation to cut off the western leg of the Gas Arctic project and to route the remainder of the project directly to the Midwest would effectively preclude the possibility of future exchange agreements should Canada permit U. S. importation of gas from the proposed Polar Gas project. Such a short-sighted perspective certainly is not in the public interest. Since it is almost certain that there will be increased volumes of gas transported from Alaska to the Lower 48, the Red River Corridor alternative is unacceptable. If this corridor were followed, it is unlikely that any western leg could ever be constructed due to the additional pipeline mileage and concomitant additional sums of money which would be necessary to connect the West Coast of the United States to the Red River pipeline.

In considering the Staff's recommendation to reroute the project across Southern Canada, it must be recalled that the thesis underlying the Gas Arctic project is that large oil and gas reserves are present in the Alaskan and Canadian Arctic. The costs of bringing this gas to market are enormous, but clearly become relatively lower as increasing volumes of gas are transported. To the extent that two sources, the U. S. and Canadian Arctic, and two markets, Southern Canada and the Lower 48, are envisioned by the Gas Arctic project, the transportation system, albeit expensive, is manageable. To the extent, however, that the routing is changed, and, thereby, effectively eliminates one of the sources (Mackenzie Delta), the project's economics are

greatly affected. Due consideration is not given in the DEIS to this factor. Moreover, although there is some authority supporting the propriety of the Staff's evaluation of environmental alternatives outside the jurisdictional United States, as well as within it, it is highly inappropriate for the Staff to make a recommendation on an international project of this sort which ignores the energy needs of Canada and ignores the fact that an agency of that sovereignty, not of this one, has the power to determine pipeline routing through its own jurisdiction.

Nowhere in its DEIS has the Staff indicated why it disagrees with the supply deficiency estimates contained in the DOI DEIS. It appears from a statement of Staff in its own DEIS that its disagreement is predicated, at least in part, on its assumption of the availability of other sources of supply to the West Coast. Of interest is the fact that the DOI's California offshore oil lease bids opened on December 11, 1975, apparently came in far short of the Department's expectations, suggesting that the producers are not as optimistic as the FPC Staff concerning California offshore prospects. The Staff must fully explain its rejection of the supply deficiency estimates iterated in the DEIS of the DOI.

Finally, the economic analysis presented in the FPC's DEIS uses material, conclusions, and figures taken from the Aerospace Corporation's Economic and Risk Analysis for the Alaskan Natural Gas Transportation Systems, which analysis used

costs for a Canadian pipeline configuration routed through the Mackenzie Delta to Chicago and also considers transport of Canadian gas. No analysis has been presented by the Staff for its recommended alternative of a pipeline to Fairbanks and thence to Chicago which is more costly and also would not have the cost benefits of scale involved in transporting Canadian gas. Since the economic analysis neither compares the system proposed by the applicants nor the system recommended by the FPC Staff, it is difficult to determine the relevancy of said analysis. If this socio-economic analysis is to be of any use, a comparative net economic benefit analysis of both the applicant's system and the Fairbanks alternative must be made part of the Environmental Impact Statement.

Specific

There are several specific statements found in Volume I of the Staff's DEIS to which we are addressing the following remarks.

1. FPC Statement - Page I-8

"a) On page IV-4, there is a discussion of the gas which could be available for Pacific Gas and Electric Company (PGandE). Exxon Company, USA (Exxon) had entered into a letter of intent with PGandE, which would give PGT the right to negotiate a gas purchase contract for 30 percent of Exxon's interests in Prudhoe Bay."

Comment

The portion of the above statement is incorrect which states: "would give PGT the right to negotiate." The statement should read "would give PGandE the right to negotiate".

2. FPC Statements - Page I-9

"b) Provide the source of information for the estimated annual volumes of additional gas supplies to PGandE from Alberta, and Mackenzie Delta, Canada, and Alaska listed in Figure 1.1.4.1-1 on page IV-5."

"c) Page IV-5 - see comment a) for Part I Overview."

Comment.

The estimated annual volumes of additional gas supplies shown in Figure 1.1.4.1-1 on page IV-5 of the DOI DEIS are obsolete.

Information on additional gas supplies is contained in Section I(2)(b) and I(2)(b)Alt. of PGT's Amended Application for a Certificate of Public Convenience and Necessity in Docket No. CP74-241 and the Application of PGandE for authority to adjust its rates as necessary to provide funds to make the payments required under a certain Funding Agreement related to Northern Alaska Natural Gas, California Public Utilities Commission Application No. 55661, dated May 1, 1975.

3. FPC Statement - Page I-9

"f) Page IV-61, the second complete paragraph, line 5 states, 'However, it is planned to construct the new pipeline in stages.' This contradicts page IV-43, paragraph 4, line 1 which states that 'Construction is planned to be completed in one stage...' This contradiction should be resolved. Our understanding is that the statement on page IV-43 is correct."

Page I-205

"Most companies propose to start construction approximately 1 year after approvals are received. Construction would be conducted concurrently on all pipelines with the longest projected construction period being 8 years for the Antioch leg. Timing of approval and construction of the Canadian segment, however, is critical to any overall project of delivery."

Note appropriate changes in FEIS.

Page I-206

"An 8 year construction period would be required to complete the pipeline from Kingsgate, British Columbia to Antioch, California."

Comment

PGT/PGandE have not decided on a firm construction schedule to date. Such a schedule is dependent on the selection of a final pipeline design. This design cannot be selected until the actual daily gas volumes available for import are known and the build-up of those volumes is determined.

The general plan will be to start construction after approvals are received and at a time scheduled from 18 months to 24 months prior to initial flow of Arctic gas. The initial stage of construction will provide only those additional facilities required for the actual daily gas volumes available for import.

4. FPC Statement - Page I-10

"i) On Page IV-767 a mention is made that relocation around the Moyie River Valley would greatly reduce impact on this river but no details are given for a proposed route relocation. The alternative route should be identified and the benefits of relocation should be discussed."

Comment

PGT does not agree that a route relocation around the Moyie River Valley is necessary or beneficial.

PGT has proposed the installation of eight new crossings of the Moyie River that would be located parallel and adjacent to its existing pipeline and within the existing right of way that was cleared in 1960. It is PGT's opinion that this parallel route is the most direct route with the least

environmental impact and has the additional benefit that it would allow use of some 11 miles of existing parallel pipeline.

By installing a parallel pipeline in the existing right of way at each river crossing, there would not be any downgrading of river classification since the "recreation" classification has already been identified for this 17.5 mile section.

PGT presently has a 100-foot right of way on private lands in the Moyie River area with rights to install a parallel pipeline on private lands. During 1972, easements with 100-foot widths were granted to PGT by the Idaho Department of Lands for five of the eight parallel pipeline crossings (high water to high water) of the Moyie River. Permits were also issued by the Idaho Department of Water Administration for these same crossings, with special stipulations for construction techniques and timing. Applications were not processed for parallel crossings of Moyie 6, 7, and 8 since the pipeline expansion program for 1972 did not require such crossings.

DOI has not identified a particular route for PGT to consider that would reduce impacts in the Moyie River Valley by relocating portions of the new line to utilize only two river crossings. It is presumed that the practicality of the parallel route in the existing right of way is acceptable from the Canadian Border (M.P. 0.0) to Compressor Station No. 3 (M.P. 2.5) and that Moyie River Crossings 1 and 2 are considered acceptable. It then appears that DOI's proposal for a relocated route applies to the alignment south of Compressor Station No. 3.

PGT has reviewed alternative routes to avoid the Moyie River Valley south of Station No. 3. Two alternatives have been examined. In both instances, these routes start at Compressor Valve 3-1 (M.P. 20.9). If return to the existing pipeline right of way is not made at MLV 3-1, then the existing 11.0 miles of parallel pipeline installed by PGT in 1970 between MLV 3-1 and MLV 3-2, including the Kootenai River Crossing, would not be beneficially used in the proposed parallel pipeline.

This first alternate (Alternate I) would follow a western route from Station No. 3 by following Highway 95 across the Round Prairie to a point in Section 34, T65N, R11E and thence on a southern route following the Camp Nine Road and thence the Meadow Creek cutoff road, crossing Meadow Creek, and passing west of Dawson Lake and thence following Fry Creek to the North Bench, and thence to Mainline Valve 3-1.

This Alternate I would be 23.3 miles in length as compared to 18.4 miles for the existing pipeline between the same two points. Evaluation of Alternate I routing shows the following objectionable features:

(1) A complete new right of way would have to be acquired and cleared. Clearing would involve cutting trees on some 18 to 20 miles of right of way (163 to 182 acres). Most of this clearing would be within the Kaniksu National Forest. Such clearing would have a high visible impact, both during the construction and operations phases from Highway 95 as well as from Camp Nine Road and Meadow Creek Road.

(2) Due to the increased length (4.9 miles), there would be an increased cost of pipe, installation and cost of an extra mainline valve between Station No. 3 and MLV 3-1. There would also be an increased operating cost because of increased pressure loss in the longer Alternate I loop which would increase compressor station fuel requirements. These costs would increase the price of the gas to the consumer.

(3) Such an alternate route would have to be aligned to avoid conflict with the State of Idaho's proposed rerouting of Highway 95 from the Canadian Border to the present junction of Highway 95 and Highway I near Copeland.

(4) A pipeline on the Alternate I route would be difficult to patrol and maintain in the wintertime because of poor quality roads and deep snows in the higher elevation portion of this alignment.

A second alternate (Alternate II) further to the west of Alternate I was also reviewed by PGT. Alternate II would begin at Station No. 3, proceed west across Round Prairie and then follow Highway 95 south at the eastern edge of the Kootenai River Valley to a point where it would turn east on the North Bench and intersect MLV 3-1.

This Alternate II would be about 28 miles in length as compared to 18.4 miles for the existing pipeline between the same two points. Evaluation of Alternate II routing reveals the following objectionable features:

(1) increased pipeline construction and operations cost;

(2) cutting of new timber to obtain a right of way;

(3) disruption of productive farm land in the Kootenai River Valley;

(4) possible conflict with Highway 95 realignment.

The FPC Staff now has before it ITA(A)'s Exhibit 2-1 as revised, October 15, 1975, which contains additional environmental information pertaining to the Kootenai alternative.

5. FPC Statement - Page I-11

"The number and locations of all proposed hydrostatic test water discharge areas should be identified. The statement on page IV-547 leaves one with the impression that there is only one discharge point, the one located at Lake Britton."

Comment

A hydrostatic test plan cannot be prepared until the final scope of the project and its construction schedule are determined. This cannot be decided until the actual volumes of gas available for import are known and a final pipeline design is selected. However, such a plan will include withdrawal and discharge points, mitigation measures to reduce interference with aquatic life and reduce erosion potential, metering and filtering facilities, criteria for specifications for holding ponds, and detailed safety procedures to protect workers.

6. FPC Statement - Page I-11

"The land to be cleared alongside the existing right of way is estimated to be 50 feet wide on page IV-561. However, the applicant states on page I-8 of the original PGT/PGandE application, 'that an additional strip from 20 to 30 feet wide would be required in private lands and strips from 25 to 40 feet wide would be required in public lands'."

Comment

A. Private Lands

In constructing PGT/PGandE's existing Alberta-California pipeline in 1959-1960, PGT/PGandE purchased and acquired from private land owners the following:

(1) the right to install, replace, maintain, use and remove the existing 36-inch pipeline;

(2) the right to install, replace, maintain, use and remove a future parallel pipeline. In the limited instances where eminent domain was exercised, this right was not obtained;

(3) a right of way easement, to contain the above pipeline or pipelines, 100 feet in width;

(4) the right to use adjacent lands as may be reasonably necessary in connection with the installation, repair and removal of such pipeline or pipelines; i.e., the temporary construction work area;

(5) the right of ingress and egress to the right of way easement.

PGT/PGandE will install the parallel pipeline that is the subject of the DEIS within the 100-foot right of way as originally granted. The only deviation in route will be for security reasons in the John Day River Area.

Based on the foregoing, it should be noted and clarified that PGT/PGandE do not require, in most cases, a new right of way on private lands. This was previously acquired and reserved when the original pipeline was constructed.

B. Federal Lands

PGT/PGandE originally were granted a permanent right of way in accordance with the provisions of Federal Regulations which specified a nominal 50-foot width for a single pipeline. The pipe was located in the center of the strip. PGT/PGandE were also granted a special use permit which allowed them to occupy and use an adjacent strip for temporary work room.

PGT/PGandE will install the proposed pipeline on a 20 to 30 foot parallel offset from the existing pipeline. PGT/PGandE submitted, on December 13, 1974, an Application to DOI for a complete new right of way on Federal lands in accordance with Section 28 of the Mineral Leasing Act of 1920, as amended, 30 USC 185, and other provisions of law. No attempt was made in this filing to factor out the situation of overlapping rights of way between the existing pipeline and the proposed pipeline. For example, with a 20-foot offset between the existing and the proposed pipeline, PGT/PGandE have requested a complete new permanent right of way, 53.5 feet in width (50 feet plus 42-inch pipeline diameter) for each 1 mile of length (6.48 acres). Such a right of way would overlap the existing federally granted right of way by some 30 to 33 feet. If the overlap is subtracted, the actual permanent right of way needed is only 20 feet in width or 2.42 acres for a given mile. PGT/PGandE have also requested an additional temporary work strip adjacent to the permanent right or way. Thus, PGT/PGandE will permanently operate and maintain two parallel pipelines within

a 75 to 85-foot right of way on Federal lands. Construction will require an additional 25 to 40-foot temporary work area adjacent to the permanent right of way.

7. FPC Statement - Page I-11

"Lake Britton in Shasta County, California, is presently part of a licensed hydroelectric project of PGandE. Therefore, PGandE must apply to the FPC for a change of land rights permit for the land to be used as a right of way for the proposed Lake Britton crossing."

Comment

On December 11, 1975, PGandE applied to the FPC for non-project use of Lake Britton project lands. (Project No. 233)

8. FPC Statement - Page I-201

"As presently proposed, the combined delivery capacity of the pipelines in the 48 conterminous states would be 2.95 billion cfd. The Northern Border leg to Delmont, Pennsylvania would have an estimated capacity of 1.50 billion cfd; the PGT and PGandE leg to Antioch, California would have an estimated capacity of 0.85 billion cfd; and the estimated capacity of the ITA(A) pipeline to Rye Valley, Oregon would be 0.60 billion cfd."

Note appropriate changes in text of FEIS.

Comment

The above statement is correct if one is considering PGT/PGandE's 36-inch, 1830 MMcfd pipeline design. However, PGT presently has four alternative pipeline designs on file with the FPC. Each design proposal is considered a viable alternative. A summary of the pipeline designs is as follows:

PROPOSED DESIGNS AS FILED WITH

THE FEDERAL POWER COMMISSION BY PGT

Pipeline Size	Designed Flow Rate For Combined Existing & Proposed Systems (MMcfd)	MAOP psig	PGT/PGandE Pipeline To Be Installed Miles	PGT/PGandE Compressor Station Additions No. of Units	Flow Capacity (MMcfd)
42"	2180	1440/1250/1040	917.0	4	1,200
36"	1830	1440/1250/1040	917.0	4	850
36"	1180	911/975	458.4	None	200
36"	1580	911/1040/975	873.5	None	600
36"*	2080	911/1040/975	873.5	32	1,100

*This design was provided to the FPC for information only to illustrate the ultimate capacity of a 36" - 911 psig design.

The FPC Staff statement regarding the capacity of the proposed ITA(A) 30-inch pipeline from the U.S.-Canadian border to Rye Valley, Oregon is also correct, but there are a number of viable alternatives which have been filed by ITA(A) that illustrate the flexibility of the high pressure system approach advocated by ITA(A).

PROPOSED DESIGNS AS FILED WITH

THE FEDERAL POWER COMMISSION BY ITA(A)

Pipeline Size	Pipeline Miles To Be Installed	Pressure psig	Compressor Stations	Flow Capacity (MMcfd)
42"	372	1680	11	1,909
36"	505			
36"	284	1680	10	1,199
30"	593			
30"*	390	1440	None	600
30"**	918	1440	12	1,100

* Applicant ITA(A) elected to seek Commission approval of this proposal in its Fourth Supplement based on initially anticipated volumes, compatibility with the delivery pressure of the Canadian Arctic pipeline system at Kingsgate, and the use of augmented existing pipeline system for delivery of the gas to California.

**Proposal included in Exhibit Z-II (Fourth Supplement) for information purposes for delivery of 1.1 billion cfd to the California border by ITA(A).

9. FPC Statement - Page I-204

"Table I.C.1, Estimated Overall Land Requirements".

Land requirement figures have been modified.

Comment

Those land requirements shown in Table I.C.1 for PGT and PGandE are incorrect. The table should read as follows:

Table 1.OV.4-1
Overall Land Requirements (Revised)

Segment	Right of Way - Miles			Land Requirements - Acres				
				Permanent -1				
	Federal	Non-Federal	Total	Federal	Non-Federal	Total Perm.	Temporary	Total Land Permanent and Temporary
Alaskan Arctic	133	62	195	2,635	1,085	3,720	910	4,630
Canadian Arctic	NA	NA	2,430[4]	NA	NA	NA	NA	41,610[4]
Northern Border	91	1,528	1,619	650	11,090	11,740	9,510	21,250
Pac. Gas Trans.	103	19 (1a)	122	672 (1b)	230 (1a)	902	320	1,220
Pac. Gas and Elec.	48	0 (1a)	48	299 (1b)	0 (1a)	299	224	523
Interstate Trans.	471	406	877	5,775[2]	2,375[2]	8,150[2]	5,900[2]	14,050[2]
Southern Cal.	120	122	242	725[3]	NA	NA	NA	NA
Total	967	2,137	5,533	10,756	14,780	24,811	16,864	83,283

NA - Information not available FOOTNOTE 1 - Deleted *
[2]Data is for entire Kingsgate-Los Angeles (Cajon) Leg
[3]Figures not included in Totals
[4]Only gross totals available for Canada

*(1a) Length shown is for John Day Relocation only. PGT/PGand E have an existing 100-foot right of way which is presently occupied by its 36-inch pipeline and has provisions for accommodating the proposed Arctic Gas parallel pipeline.

(1b) Acreage shown does not take into account overlap of existing right of way. Actual land encumbered would be less than shown.

For further information on PGT/PGandE land requirements, please refer to Comment No. 6.

10. FPC Statement - Page I-207

"The proposed Arctic Gas System pipeline would involve some 5,551 miles of steel pipe originating on the Arctic coast of Alaska and extending to northern Oregon, southern California, and western Pennsylvania. It would cross the Arctic tundra,..."

Comment

The reference to "northern Oregon" is incorrect. It should read "extending to northern California...".

11. FPC Statement - Page I-209

"IV. Areas of intense flash flooding and high seismicity on the Antioch pipeline route could cause severe damage to pipeline installed in these areas."

Environmental staff agrees to the extent of removing the word "severe".

Comment

PGT/PGandE are aware of potential flooding and seismic activity along the route of the Antioch pipeline route. However, experience with modern arc welded natural gas pipelines in areas subject to these conditions indicates that the probability of failure of such a pipeline is low.

These conclusions are supported and discussed in three detailed articles from Pacific Coast Gas Association Proceedings, Volume 43, 1952, and Volume 45, 1954, titled "Earthquake of July 21, 1952", "Earthquake Effect on A Gas Pipeline", and "Pipelines Ride the Shock Waves". In addition, a study performed on the Antioch Pipeline Route by Earth Sciences Associates came to a similar conclusion. Copies of these articles are contained in PGT/PGandE's Comments to the Department of Interior on their Draft Environmental Impact Statement.

Information relevant to flooding is contained in PGT/PGandE's Environmental Report, Page I-13,2, Pipeline Facilities; Page I-21, h River Crossings; Page IV-4,4.g, Safety; and XI, Appendix B, "Putting a Pipeline Back to Bed".

12. FPC Statement - Page I-225

"Because the route proposed by PGT and PGandE would follow along existing rights of way for its entire length with the exception of a 21.4-mile relocation in the John Day River area of Oregon and a deviation in the Moyie River area of northern Idaho, no major route alternatives have been proposed by the applicant."

Note appropriate change in FEIS.

Comment

This statement is incorrect insofar as it discusses a deviation of route in the Moyie River area. PGT has never proposed such a deviation and believes such a deviation is unwarranted. For further information on this matter please refer to Comment No. 4.

13. FPC Statement - Page I-206

"(d) A time estimate on the construction schedule for the 390+ mile ITA(A) leg is presently unknown."

Note appropriate revision in text of FEIS.

Comment

Section 1.5.2, Schedule of Pipeline Construction, in ITA(A)'s FPC Exhibit 2-I, v.2, as revised October 15, 1975, describes the timing of construction.

14. FPC Statement - Page I-225

"PGT has proposed two pipeline design alternatives which could be used to carry minimum volumes of natural gas. One design would consist of the installation of 319.6 miles of 36-inch pipeline loop along their existing line which extends from Kingsgate, British Columbia to Malin, Oregon. (The

Note appropriate changes in text of FEIS.

pipeline from Malin to Antioch, California is owned and operat by PGandE). This looping design would allow the transport and delivery of 200 MMcfd of gas in addition to what is presently being delivered to PGandE at the Oregon-California border in the existing 36-inch PGT system.

A second alternative design proposed by PGT would consist of the complete looping of their existing pipeline facilities. This system could transport 600 MMcfd of gas in addition to the volumes presently being transported by the existing system. Either of these two systems would permit the transport of additional minimum volumes of gas without the need of installing additional compressors.

A third alternative design proposed by PGT would transport large volumes of gas should they become available. Such a system would involve the construction of a 36-inch pipeline parallel to the existing route along with the construction of 24 additional compressors at existing compressor sites. Such a system would allow for the delivery of 1,200 MMcfd of gas to the PGandE pipeline."

Comment

The FPC statement inaccurately describes PGT's pipeline design alternatives. Please refer to Comment No. 8 for a complete summary of the alternative designs proposed by PGT.

15. FPC Statement - Page I-226

"In view of the fact that ITA(A) has amended their application to propose a 390-mile route from Kingsgate, British Columbia to Rye Valley, Oregon, the originally proposed east and west alternatives of the applicant and the combined PGT/PGandE/ITA(A)-SoCal route alternative proposed by DOI do not appear to be viable alternatives."

Note appropriate changes in FEIS.

Comment

The Staff's comment is without basis. Staff has failed to describe and analyze or to give any justification, whatsoever, for this conclusion. As such, the Staff's opinion on this matter is legally deficient. Without the inclusion of

the underlying analysis for this conclusion, the statement as to the viability of a combined route must be deleted from the final EIS.

Summary

In summary, PGT/PGandE and ITA(A) contend that inclusion of general Staff recommendations in an EIS is improper. Even assuming such recommendation is proper, it must be founded on the analysis preceding it. In the instant case, the underlying analysis is inconsistent with the Staff's recommendation and, therefore, the recommendation is unjustified. The Staff must expand its inadequate description and analysis of alternatives identified in its report. Finally, the final EIS must correct the specific mistakes in the DEIS to which we have addressed ourselves.

Respectfully submitted,

PACIFIC GAS TRANSMISSION COMPANY

Daniel E. Gibson, General Counsel

INTERSTATE TRANSMISSION ASSOCIATES
(ARCTIC)

Jane C. L. Goichman, Attorney

PACIFIC GAS TRANSMISSION COMPANY

245 MARKET STREET
SAN FRANCISCO, CALIFORNIA 94105
(415) 781-0474

DANIEL E. GIBSON
GENERAL COUNSEL

PETER W. HANSCHEN
ATTORNEY

February 3, 1976

Mr. Kenneth F. Plumb, Secretary
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D.C. 20426

Re: El Paso Alaska Company, et al.
Docket No. CP 75-96, et al.

Dear Mr. Plumb:

Enclosed for filing in the above referenced proceeding are the original and nineteen copies of Comments of Pacific Gas and Electric Company and Pacific Gas Transmission Company on Presiding Administrative Law Judge's Report to the Commission on Status of Proceedings.

Please indicate receipt of the above by so indicating on the enclosed copy of this letter and return it to me.

Very truly yours,

DANIEL E. GIBSON

nw
encs.

UNITED STATES OF AMERICA
Before the
FEDERAL POWER COMMISSION

El Paso Alaska Company, et al.) Docket No. CP75-96, et al.

COMMENTS OF PACIFIC GAS AND ELECTRIC COMPANY
AND PACIFIC GAS TRANSMISSION COMPANY
ON PRESIDING ADMINISTRATIVE LAW JUDGE'S
REPORT TO THE COMMISSION ON STATUS OF
PROCEEDINGS

To The Honorable Richard L. Dunham, Chairman, and Members of the Commission:

As parties vitally interested in the speedy and just resolution of the above-entitled proceedings regarding the transportation of natural gas from Arctic regions to markets in the lower 48 United States, Pacific Gas and Electric Company and Pacific Gas Transmission Company respectfully submit these comments on the Presiding Administrative Law Judge's January 21, 1976 "Report to the Commission on Status of Proceedings."

Early commencement of deliveries of Arctic gas is essential to this nation's health, safety and economic well-being. This is especially true in California where natural gas has been, and continues to be, the major basic energy source upon which millions of people depend for heating in their homes, schools, churches and hospitals and for energy at their places of employment. Thus, it is imperative that these competitive hearings be moved as rapidly as possible toward a conclusion, and the Presiding Administrative Law Judge should be commended for his ceaseless efforts toward that end. The Presiding Judge's January 21 Report to this Commission will, we believe, aid in this effort by pointing out a serious pitfall which the Commission can, and should, avoid if it desires to expedite the commencement of deliveries of Arctic gas.

At page 3 of his Report, the Presiding Judge observes that, on the basis of certain broad language contained in its December 31, 1975 Order on Remand in the Advance Payments proceeding, some may draw the inference that this Commission intends to transform the present Arctic gas delivery hearings into a forum for a novel and unprecedented attempt to "allocate" new natural gas supplies among

all of the various market areas throughout this nation. Such a course of action would be a disastrous mistake.

An attempt to make nationwide "allocations" of Arctic gas heedless of contractual commitments now or hereafter made will spell doom to any hope for early commencement of the delivery of this badly needed Arctic gas. The Presiding Judge was, if anything, understating the dimensions of the problem when he observed that if the Commission embarks on this course "... a long drawn-out gas supply allocation hearing extending well through 1977 would have to be held--an incredibly time consuming matter...."

The concept of nation-wide allocation of any gas supplies--new or existing--is entirely foreign to the Natural Gas Act, is completely untried, and is a highly-charged emotional and political issue which would be productive of incredibly divisive sectional antagonism. Thus, an allocation proceeding would be bitter and prolonged, and would certainly lead to one of the most complex and time-consuming judicial review proceedings in the history of this Commission's regulation of the natural gas industry.

Pursuing the chimera of "nationwide allocation" in this proceeding will deny these critically needed new gas supplies to any and all markets for an indeterminate period. The recognized absence of Commission authority to allocate gas between pipelines portends lengthy court appeals from any such attempted allocation in this proceeding. However, even more profound questions are involved, reaching far beyond the confines of this proceeding:

> --If national allocation of Alaskan supplies is attempted here is it not logically necessary to expand this proceeding to consider and determine the allocation of all new domestic gas supplies, such as those from the Gulf Coast, and would not this doctrine then be applicable to any new gas supply project?
>
> --If this is the shape of things to come, can the Commission reasonably expect natural gas companies to commit private capital in the amounts necessary to develop critically needed new gas supply projects when there is substantial risk that their incremental gas supplies--or even some portion of their existing gas supply--will be "allocated" away from them and their customers?

The very foundation of the natural gas industry has been and continues to be the proposition that each pipeline is responsible for supplying its own customers under long-term agreements. A scheme of nationwide allocation of new gas

supplies would substantially destroy the willingness of pipelines to risk additional capital in the planning and design of new supply ventures. The industry's role would be transformed to one of passive waiting for ever-dwindling supplies of new gas to be rationed out by Commission edict. Allocation is a policy born of shortage, tending to perpetuate shortage. It inhibits, rather than encourages, new supply initiatives. What is needed is a policy that supports, encourages, and expedites the development of new supply projects, such as those proposed in this proceeding. If the natural gas industry is expected to continue its vigorous search for new ways and means of alleviating the nation's growing energy shortage, the Commission must refuse to be led down the blind alley of "national allocation" in this proceeding.

Respectfully submitted,

PACIFIC GAS AND ELECTRIC COMPANY

By Malcolm H. Furbush

Malcolm H. Furbush

PACIFIC GAS TRANSMISSION COMPANY

By Daniel E. Gibson

Daniel E. Gibson

February 3, 1976

CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated at San Francisco, California this 4th day of February, 1976.

DANIEL E. GIBSON

Standard Oil Company of California,
Western Operations, Inc.
575 Market Street, San Francisco, CA 94105
Mail Address: P.O. Box 7643, San Francisco, CA 94120

Manufacturing Department
R. S. Proctor
General Manager
R. R. Bowles
I. H. Gilman
Assistant General Managers

February 3, 1976

Alaska Natural Gas Transportation Systems
Draft Environmental Impact Statement

Mr. Kenneth F. Plumb
Federal Power Commission
Washington, D. C. 20426

Reference: BNG - SOD/EES
El Paso Gas Company
Docket # CP75-96 et al.

Dear Mr. Plumb:

Volume II of the Environmental Impact Statement for a natural gas transport system in Alaska discusses some alternate sites for the southern terminus of the pipeline in Alaska. We understand the facilities at the southern terminus are proposed to include liquefaction equipment and an LNG marine terminal. We feel that it is inadvisable to significantly increase the marine traffic in the Nikiski Area of Cook Inlet for the following reasons:

1. The Nikiski Area of Cook Inlet is already experiencing marine traffic problems. The additional traffic required by the El Paso Gas proposal (approximately 350 ships/year) would double the current five year traffic forecast. Substantial economic penalties to all of the area marine terminals as well as to downstream and upstream facilities would result from the inevitable delays at the marine terminals.

   Comment reflected in Section H-2 of Volume II of the FEIS.

2. In winter ice conditions, the above traffic problem is compounded by additional safety precautions. Even with the current traffic volume, the USCG Captain of the Port is considering permitting only one ship at a time at the Nikiski terminals during winter ice conditions.

   See number 1.

3. Additional traffic would also increase the risk of accidents both to the vessels and to the terminals resulting in environmental and economic hazards.

   See number 1.

Please consider these reservations before adopting a final impact statement.

Very truly yours,

R. S. Proctor

TEXAS EASTERN Transmission Corporation
9 2 1 MAIN AT McKINNEY P. O. BOX 2521 HOUSTON, TEXAS 77001

RECEIVED

JOSEPH F. WEILER
ATTORNEY

FEB 5 8 10 AM '76

FEDERAL POWER COMMISSION

February 2, 1976

Honorable Kenneth F. Plumb,
Secretary
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D. C. 20426

Re: El Paso Alaska Company, et al.
Docket Nos. CP75-96, et al.

Dear Mr. Plumb:

Enclosed are ten copies of the Comments of Texas Eastern Transmission Corporation and Transwestern Pipeline Company on Staff's Draft Environmental Impact Statement on the Alaskan Natural Gas Transportation Systems.

Ten copies of our Comments are being mailed to the Council on Environment Quality. We are also serving our Comments on all parties on the Restricted Service List in the captioned dockets.

We were unable to file our Comments by January 30, 1976, and respectfully request that they be fully considered.

Very truly yours,

TEXAS EASTERN TRANSMISSION CORPORATION
TRANSWESTERN PIPELINE COMPANY

By Joseph F. Weiler
Joseph F. Weiler

JFW/bh
Encl.

OFFICIAL FILE COPY

TO	INIT.	DATE
DOCKET		
CENTRAL FILES		

UNITED STATES OF AMERICA
BEFORE THE FEDERAL POWER COMMISSION

El Paso Alaska Company, et al.) Docket Nos. CP75-96,et al.

COMMENTS OF
TEXAS EASTERN TRANSMISSION CORPORATION
AND
TRANSWESTERN PIPELINE COMPANY
ON THE DRAFT ENVIRONMENTAL IMPACT STATEMENT
OF THE FEDERAL POWER COMMISSION STAFF ON THE
ALASKAN NATURAL GAS TRANSPORTATION SYSTEMS.

Texas Eastern Transmission Corporation and Transwestern Pipeline Company hereby submit their comments on the Draft Environmental Impact Statement (DEIS) issued by the Staff of the Federal Power Commission (Staff) on the Alaskan Natural Gas Transportation Systems.

General

The prime purpose of the Alaskan Arctic Gas Pipeline certificate application is the transport of Alaskan and Mackenzie Delta area gas resources to energy-deficient market areas in the lower 48 states and southern Canada to help meet the social and economic needs of these populous areas. The Staff DEIS fails to recognize the critical role Alaskan gas will have in fulfilling these energy, environmental, and economic requirements. This is inconsistent with both the comprehensive market showing of the applicants as well as the facts available to and enunciated by the Federal Power Commission.

Energy is a natural resource upon which the United States relies for economic well-being and the comfort and welfare of the citizenry. In the likely energy-deficient future, additional supplies of gas will be translated into employment and quality of life. Since supply-demand and deficiencies of gas in the applicants' market areas are integral in an environmental assessment, rejection of such facts by Staff should be supported by documented facts. In Part V, Northern Border, Volume 1, pages V-013 through 020 of the DOI-DEIS, the supply-demand situation in the Northern Border market area through 1984 is addressed. A projection of the Northern Border companies' total gas supply through 1984 is made, and the demand for this gas by the Federal Power Commission priority classification is shown. No reason is given for the Staff rejection

of this data nor does the Staff proffer any alternative projections. It is merely stated that the discussion is the "applicants' assertion and that any conclusions therein stated by USDOI as to projected supply deficiencies of individual companies are rejected."

Attention is invited to the fact that the estimates in the rejected section were made with the most current and accurate information available at the time. The projections made in the DOI-DEIS were derived from an in-depth study by an independent counsulting firm which has been cross-examined by the Staff. This data thus reflects accepted expertise and is the best available. It should not be summarily rejected.

In the section "Projected Socio-Economic Impacts of End-Use in Lower 48 States," pages I-50 to I-64 of the FPC-DEIS, Staff erroneously mitigates the importance of Alaskan gas to the lower 48 states. At page I-40, it is stated "The socio-economic impacts of Alaskan gas delivery to the contiguous states will clearly be marginal. The volume of gas, roughly 2.5 Bcfd, will constitute from 4% to 7% of U.S. consumption of natural gas in the 1980-1990 time frame, and less than 1% of the total fuel consumption."

"In the case of such long-run variations, always assuming reasonable planning horizons, a difference of 1% in total fuel or 5% in gas availability does not have a quantitatively different effect on economic aggregates than a change of 1% or 5% in the production of such other "necessities" as wheat or automobiles."

The foregoing arithmetic exercise reflects a serious lack of realism. It ignores the urgent public interest need for this substantial gas supply in the lower 48 states. As an aid to prespective, attention is invited to the fact that the delivery of Alaskan gas to the lower 48 involves the largest certificate case ever before the Federal Power Commission.

At page I-41, Staff is seen identifying its basic rationale with respect to the socio-economic impact analysis stating "it is assumed throughout this analysis that the issue of energy availability is one of price, rather than of quantity." This statement implies unlimited energy availability and interchangeability with gas. Such assumption is contrary to virtually every agency of the U.S. government working with energy including the Federal Power Commission.

On pages I-40 to I-44, Staff further states that as a result of environmental legislation and price controls in the early 1970s, U.S. demand for energy will be 25% to 35% lower between 1980-1990 than projections made prior to 1973. Empirical or statistical data to support this projection is not cited.

Staff analysis of gas demand utilizing a concept of price elasticity of demand for gas in their socio-economic model and concluding on pages I-44 that "conservation will not be disastrous to

See response to comments on Pages 18 and 19 of Northern Border Pipeline Company.

See response to comments on Pages 18 and 19 of Northern Border Pipeline Company.

any industry" ignores facts such as the already documented double digit unemployment in the vital glass industry of South New Jersey. The adverse impact of higher priced alternate fuels together with technological problems with product quality control with alternate fuels has established long-term unemployment with the attendant adverse socio-economic impacts. The overall impression of the section on "Projected Socio-Economic Impacts of End-Use in the Lower 48 States," pages I-40 through I-64, is that the impact of Alaskan gas on the lower 48 will be clearly marginal. This conclusion and the rationale utilized in reaching the conclusion are clearly erroneous.

The precedent setting action of Staff in their DEIS of proposing a project with alternate routing and an objective different from that brought before the Federal Power Commission is believed at variance with the purpose of the DEIS, namely to assess the environmental aspects of the project proposed.

The application filed by the Alaskan Arctic Gas Pipeline to transport gas from the Alaskan North Slope and the Mackenzie Delta of Canada was supported by environmental, engineering, and socio-economic studies costing in excess of $48 million. Upon completion of its corridor studies, Arctic Gas determined that the coastal corridor was the environmentally superior route and offered the most net advantages.

The environmental report filed with the Federal Power Commission summarized the specific reasons for the "prime" routing across the Arctic National Wildlife range into the Yukon Territory of Canada and up the Mackenzie River Valley into Alberta and assessed it to be environmentally perferable to the other possible route selected by Arctic Gas other than the utilization of a common corridor. In Alaska, this corridor was chosen to accommodate an above-ground hot oil line, and its suitability for a buried chilled gas line raises many questions. In the case of the Northern Border corridor alternate, environmental benefits are likewise nebulous in that the chosen route traverses primarily (93 percent) agricultural lands under intensive cultivation and hence annually disturbed. Here nothing is to be gained by the adoption of an alternative route to utilize an existing pipeline corridor. The added expense to evaluate the route is unjustified particularly when the route does not efficiently serve the purpose for which the project was conceived.

The prime route for the Alaskan Arctic Gas System is not only considered environmentally superior to all other routes with respect to the needs of the present project, but its alignment lies within the last major explored sedimentary basin of the North American continent. Continued exploration of this promising area seems inevitable in view of the anticipated energy needs of both Canada and the United States. Any alignment outside the Alaskan coastal corridor will necessarily bypass the sedimentary basins and preclude an early and efficient outlet for such additional gas reserves. The interconnection of these future reserves to the Arctic Gas "prime route" will minimize future environmental and economic

This is both true and false. We cannot, and do not pretend to, account for local dislocations, troubling though they are for there are far too many such for any group of people to pretend to manage from Washington. This is the reason why so many decisions have prudently been left to state and local discretion, including the end-use allocations of curtailments. (While one-fourth of all the 1971 employees in industry 322, "Glass and Glassware, pressed or blown," are employed in New Jersey, they still represent less than 2% of New Jersey's employment.)

On the other hand, this industry is either unwilling to outbid other industries for gas, or public authorities on the scene have decided this industry should have a lower priority. In the latter case, there must be special circumstances we don't know about. In the former case, the industry feels that if it pays higher prices (for instance, high enough to buy propane itself or to buy displacement gas away from firms which can themselves use propane more easily) it will not be competitive in its markets. But this is precisely the kind of case we are modeling -- higher fuel prices lead to higher product prices and lower sales, greater fuel availability leads to lower fuel prices, lower product prices, higher sales and earnings.

Thus while we cannot claim an infinite amount of detail, we certainly cannot be said to "ignore" such effects -- they are central to the entire analysis.

With respect to the "overall impression" see response to similar comments filed by Northern Border.

impacts. It is also to be noted the "prime" route of the Arctic Gas Pipeline follows the treeless Arctic coastal plain into Canada and then follows the wide Mackenzie River Valley and the Mackenzie Valley Highway corridor to Alberta. This route crosses gentle rolling land cut by shallow valleys through Alaska and Northern Canada. The Staff route through the Fairbanks corridor and the Brooks Mountain range would require the removal of more trees, construction through miles of muskeg areas across deeply in incised river valleys up to several hundred feet deep, thence along narrow, steep river valleys, some averaging only 100 feet wide and through the Grand Canyon of the Liard River.

A noticeable and important shortcoming of Staff's DEIS is the failure of the draft to pull together a comprehensive analysis of the overall Alaskan energy prospects for the future. The DEIS must explore the impacts of the future transportation and utilization in the lower 48 states of the large potential gas reserves in both the Southern Gulf and North Slope regions of Alaska. Since the impacts of large future expansions of the two transportation systems proposed are quite different, it is important to include in this analysis the planned utilization of these large potential gas reserves present in Alaska. In addition, this analysis should include a more thorough study of the potential future benefits to be gained by cooperating to provide Canada with a transportation system enabling early access to her large potential frontier gas reserves.

Staff has concluded in the DEIS that, "The Alaskan Arctic route of the Arctic Gas System should be constructed along the proposed Fairbanks Corridor alternate route." However, no evidence is given which supports the environmental, technical, or economic superiority of the Fairbanks Corridor over the applicants case.

The environmental staff has accepted the U.S. Department of the Interior discussion of the Fairbanks Corridor route.

To support their case Staff must present data detailing not only with the relative local impacts in Alaska, but also the overall results impacts to the applicants case and the nations ultimate gas consumer.

A summary of the more significant impacts of the Arctic Gas System pipeline on the existing environment are presented by the Staff in Pages I-207 - I-219.

Quantification and details of impacts can be found in respective volumes of the DOI and FPC FEIS's.

Most of the impacts listed are either short term or involve such a small percentage of the area when compared to the whole as to render them inconsequential. Staff should quantify the expected impacts to put them in perspective.

Specific Comments

Specific comments concerning some of the proposed impacts included in the draft are:

Page 208, Paragraph b) I

> Construction of the proposed pipeline system would change the character of the terraine in certain local instances, modifying its contours and dimensions.

Response

Any changes in topography would be of a very minor nature. Steep slopes and other hazardous areas will be avoided in most instances. Surfaces will be restored to their general original contour. The pipeline route has been selected to avoid areas of high erosion potential and mass movement characteristics.

Page I-208, Paragraph b) II

> Wind erosion of distrubed soils and gully erosion following construction would change the pipeline right-of-way topography and also cause secondary impacts by transporting the soil to other locations.

Response

Through the use of revegetation with grasses and terracing of slopes, wind erosion and gully formation will be controlled.

Page I-208, Paragraph b) III

> In the open tundra of the Arctic, the pipeline ditch berm, gravel roads, airfield embankments, and various buildings and towers would create new elevations and a new horizon alien to the natural topography. Grassland landscapes would be impacted by the presence of compressor stations and towers.

Response

The pipeline ditch berm will be of a temporary nature, subsiding within a year or two to yield a level surface. Buildings and towers will be widely separated and have little impact on the overall appearance of the areas involved.

Page I-209, Paragraph c) III

> Landslides might be induced at many places along the routes if slopes were undercut while the pipeline ditch was being excavated. The slides could cause immediate damage and/or loss of life, or they could occur at a later time and possibly rupture the pipeline.

Response

Avoidance of such areas by careful route selection will, along with perpendicular alignment with any such areas that cannot be avoided, greatly reduce the possibility of landslides. This is an area in which the applicants have a large backlog of experience

to draw from for engineering remedies.

Page I-209, Paragraph d) I

> Disturbance and mixing of the soil profile would alter its structural characteristics, microbiological activity, and soil-climate relations. This mixing of subsoil on the surface of the backfilled ditch would retard the full restoration of the site and cause long-term loss of soil productivity affecting crop growth and grazing capacity.

Response

The disturbed area would only be a narrow trench, and the contents of the trench would contain a mixture of surface and subsurface soil. It should also be pointed out that topsoil no longer exists as such in most of the agricultural areas crossed due to mixing from cultivation work. Further mixing should therefore have little or no affect in most areas.

Page I-209, Paragraph d) II

> Wind erosion of exposed soils along the ditch could be a major impact where detached fine silt and clay particles were exposed. Water erosion would form gullies and increase sediment yield from the disturbed soil on all routes.

Response

Erosion potential will be comparable to that from farming operations on the agricultural lands crossed. Wind erosion will be of an insignificant nature because revegetation efforts along with other erosion control methods will prevent significant gullying and sediment transport.

Page I-209, Paragraph d) III

> Wind erosion potential is also high along the 650 miles of the Northern Border route across the spring wheat region of Montana and North Dakota. Soil losses could be considerable and could cause severe seedling damage and make revegetation of the right-of-way very difficult.

Response

Erosion potential will be comparable to that from farming operations on the agricultural lands crossed. Wind erosion will be of an insignificant nature because revegetation efforts along with other erosion control methods will prevent significant gullying and sediment transport.

Page I-208, Paragraph d) IV

> . . . The ditch and gas pipeline would interfere with subsurface and surface irrigation drains . . . disturb soil density and slope and interfere with gravity flow irrigation.

Response

The applicants have the experience and know-how to restore and drainage systems crossed and will restore all such structures to equal or better condition than existed before the pipeline crossed the area. Surface contours will be restored to their original grade in all such areas.

Page I-210, Paragraph d) V

> . . . Pipeline ditching would cut these drains, introduce sediments that may pollute the receiving streams, and decrease the drainage effectiveness of title fields crossing.

Response

Drainage fields will be restored by the applicant to a state equal or better than when cut by the ditching operation. Sediments will not be allowed to enter the system while the ditch is open, and also by reason of the short time it will be open, there should be little exposure to such sediment run off. Normal agricultural activities would induce far greater quantities of sediment.

Page I-210, Paragraph e) I

> Construction and operation of the proposed natural gas pipeline system would present potential water resource impacts at each stream crossing resulting from interruption of stream flow, erosion and sedimentation, and introduction of industrial chemicals and pollutants.

Response

Effects at stream crossing will be minimal with the majority of impact resulting from cutting a channel in stream beds for the pipeline. This will be generally of short duration and induce higher turbidity for a correspondingly short period. Erosion and sedimentation control measures will be implemented during construction as an integral part of the construction procedures. Only minor amounts of herbicide will be used to control vegetation around block valve settings. Pollution from spills at storage facilities will be prevented by containment dikes.

Page I-210, Paragraph e) II

> Hydrostatic testing . . . the indiscriminate use of surface waters for test fluids could reduce local flows and water quality.

Response

There will not be indiscriminate use of surface water. Careful evaluation of water availability will determine from where and how much water can be safely removed from streams or standing bodies of water.

Page I-210, Paragraph e) III

> Release of large volumes of test water into dry stream channels on the western routes could cause streambed scour, erosion and increased sediment yields.

Response

Any releases of test water will be conducted in a controlled manner to avoid significant scour, erosion and sediment loading.

Page 210, Paragraph e) IV

> Indiscriminate withdrawal of water from springs and lakes in the Arctic . . .

Response

There will be no indiscriminate withdrawals of water as pointed out in response to Paragraph e) II above.

Page I-210, Paragraph e) V

> Erosion resulting from construction site activity . . . reduction in water quality . . . use of large volumes of domestic water and discharge of sewage at each construction camp.

Response

Erosion will be controlled and kept to a minimum resulting in minor downstream quality changes. Water withdrawals will be carefully controlled to avoid damage to the sources. Sewage will be treated to comply with all required standards before discharge will be allowed. In Arctic areas, effluent will be stored until the spring run off occurs thereby greatly diluting the effluent discharged and minimizing any environmental impacts.

Page I-210, Paragraph e) VI

> Fuel and lubricant spills from construction machinery, compressor stations, construction camps, etc. would pollute surface water and possibly ground water supplies.

Response

Every effort will be made to assure careful and proper handling of all fuels and lubricants to avoid spills. In the event of a spill, it will be contained and cleaned up as quickly and completely as possible. All personnel will be aware of the need for a minimum of environmental impact.

Page I-211, Paragraph f) II

> Vegetation would be destroyed and/or altered by one or more of the following: . . . sulfur dioxide emissions:. . .

Response

Sulfur oxide emissions will not present a problem to vegetation due to the extremely low concentration in the gas utilized to power the compressor turbines.

Page I-211, Paragraph f) III

> A number of proposed ecological preserve sites would be paralleled or crossed, thereby greatly reducing, if not destroying, the purpose for which they were set aside.

Response

The proposed areas do not necessarily qualify as "ecological preserve sites" nor have they yet been "set aside."

There are no facts showing that pipeline construction would reduce or destroy the purpose of "proposed ecological preserve sites" in the absence of the stated purposes of such sites.

Pipeline construction and operation should not significantly diminish the multiple use values of the areas which might later be set aside as ecological preserve sites.

Page I-211, Paragraph f) IV

> Invasion by weedy plant species would be expected to occur in the denuded areas, particularly on land managed for wildlife or forests.

Response

The appearance of weedy plants is the first stage of natural plant succession. The plants that first appear in a denuded area are considered to be a pioneer community. These are generally plants that can tolerate more extreme conditions but cannot compete with other plants. These plants are introduced from the surrounding area and will eventually be displaced by more permanent species. If these

plants were capable of taking over the denuded area permanently, they would also have the capability of taking over the surrounding area which they have not.

Page I-211, Paragraph f) VII

> Cropland production loss on the right-of-way would be considerable while construction was underway, but would be back to near normal levels within a few years.

Response

It is probable that the majority of the right-of-way would be back to full production within one year or at the most, two years. With current farming techniques, actual soil condition has little bearing on productivity. The amount of agricultural land disturbed represents a very minor amount of the total land in agricultural use in the ten states crossed.

Page I-212, Paragraph g) III

> If project disturbance would force an animal from a critical portion of its range or change its habitat, population numbers could be reduced. Disturbance factors would include noise from construction, maintenance and operation machinery, aircraft used in line inspection, and increased numbers of people in the area.

Response

It will probably be found that animal life along the proposed route is much more adaptable than many people realize. The pipeline construction will be of short duration in any one area and should have little affect on wildlife because of the small size of the area affected.

Page I-212, Paragraph g) IV

> Project-caused disturbances would drive birds from their nesting and resting areas . . . resulting in a possible drop in population numbers.

Response

Major pipeline construction in northern areas would be restricted to periods of the winter, when most bird life is not present in the area. Furthermore, construction will proceed at a rapid pace and will affect any given spot for only a short period of time. Most activity will be restricted to a narrow strip of land and should not have an adverse impact to the general area surrounding the right-of-way. The pipeline right-of-way was selected to avoid wetland areas and thereby minimize impacts on waterfowl.

Page I-212, Paragraph g) V

> Bird populations could also be adversely affected by habitat destruction resulting from water quality degradation through pollution and increased silt loading as well as vegetative changes or destruction.

Response

With careful engineering and construction practices, such occurrences will be minimal and be of a temporary nature on the right-of-way.

Page I-213, Paragraph g) VI

> Increased turbidity and sedimentation . . . would also be a major cause of fish and associated organism losses.

Response

The small amount of turbidity and sedimentation resulting from water crossings will be minimal and of short time duration. During the spring thaw, turbidity levels are naturally high and the small additional load will not cause a major change in normal conditions.

Page I-213, Paragraph h) I

> The disturbance of the organic cover protecting soils from erosion, and the mixing of topsoils with subsurface materials during construction would adversely affect the functioning of terrestrial ecosystems along the route and result in reduced productivity.

Response

In Arctic areas, the organic mat will be separated and saved for reapplication after backfilling. Impact will therefore be kept at a minimum. The tundra is not as tender and delicate as some persons make it appear. In the temperate zone, approximately 90% of the right-of-way will be through agricultural areas which will suffer very minor, if any, permanent effects. Farmland as such should not be considered in the same frame as natural ecosystems.

Page I-213, Paragraph h) III

> The prairie potholes region contains a very special ecosystem which provides the cover and nutrition required by many waterfowl and shorebirds at critical periods in their life

history. Pipeline system intrusion on this ecosystem, already impacted by agricultural drainage, could affect migratory bird populations covered by international treaties with Canada and Mexico.

Response

Impact on the prairie pothole reagion will be minimal due to avoidance of most of such areas. In those areas where potholes must be crossed, they will be restored after construction.

Page I-213, Paragraph h) IV

Some reduction in the diversity of native plants and animals would result from an increase in the number of "weed" species in the area.

Response

This is an inappropriate statement. Diversity would only be affected on the disturbed right-of-way. This area is small compared to the area traversed, hence the diversity impact will be negligible. Species diversity is normally considered for larger areas than pipeline right-of-ways.

Page I-214, Paragraph i) V

During construction, production would be destroyed in agricultural and forest lands throughout much of the route. Some of the land would be out of production for only a short time, but other lands would be out of production for the life of the project.

Response

The affected productivity would be very small with only a small amount of land for compressor stations, communication towers, and meter stations taken out of useful production for the life of the project. Farmland would otherwise return to use the following season. The quantity of agricultural land to be disturbed represents approximately .006% of the total land in agricultural use in the 10 states crossed. The impacts on agriculture will be minor and short term.

The total area of woodlands affected by construction is approximately 1,000 acres, about 400 of which will be included in the maintained portion of the right-of-way.

Woodlands are a predominant feature only in the eastern one-third of the 10 state area. Of 73 miles of woodlands crossed, 71 miles are in Ohio, West Virginia, Pennsylvania, and Indiana.

In these areas the woodlands are primarily for recreational purposes in which a pipeline right-of-way could serve as an open space corridor with potential for multiple use.

Page I-215, Paragraph j) I, II, III

I In areas where the proposed pipeline right-of-way would cross substantial portions of agricultural land, the impact during the construction period would be significant.

II Soil disturbances could have long-range impacts upon the productivity of some types of farmlands, but use for pipeline purposes would not preclude use for agriculture.

III . . . there would be additional problems of interference with irrigation and drainage tiles and ditches.

Response

The area of farmland crossed out of the total area of farmland is very small, would only be disturbed for one season, would return to production the following season, and as already stated would suffer no permanent loss of productivity with proper restoration efforts. Pipelines have been crossing drainage and irrigation systems for years. Restoration efforts have successfully restored them to original or better conditions.

Page I-216, Paragraph j) VII

The proposed project would cross a varity of existing transportation and communication facilities.

Response

This is a normal occurrence in pipeline construction and is handled in a routine and safe manner. This is not a new problem.

Page I-216, Paragraph k) I

Paleontological, Archaeological, and Historical. . .if certain precautions are not observed . . . could be damaged or destroyed . . . but in other cases the impact would come as a consequence of increased access and vandalism to unprotected historic sites.

Response

Upon receipt of certification to construct the proposed pipeline, an archaelogical survey will be made of the route where necessary. Paleontological, archaeological, and historical sites will be avoided where possible. Where such sites cannot be avoided,

they will be salvaged. Any archaeological or historical finds discovered during construction will be reported to the appropriate authorities. Discovery of unknown cultural resources may provide a positive benefit. The construction of the pipeline will not result in increased access to the right-of-way. Trespassers of private property could face prosecution by local law enforcement agencies.

Page I-217, Paragraph 1) IV and V

IV Visual impacts would be most apparent in forested areas and in open range or desert country, while the visual impacts in agricultural and industrial areas would be much less.

V The loss of old trees, straight-line cuts through mature forest, and pipelines ascending steep bluffs and cliffs would all constitute aesthetic impacts of long duration.

Response

Revegetation efforts, planting of tree screens along the right-of-way, variation in route direction, and the avoidance of steep terrain will eliminate most of these problems as such. Access roads will not be open to public use.

Page I-218, Paragraph m) III

Concentration of construction equipment at some sites could cause nitrogen dioxide concentrations that exceed National Ambient Air Standards under certain meteorological conditions.

Response

Such equipment concentrations are extremely unlikely to ever occur, and if such conditions ever developed, construction could be haltered. This just should not occur under actual conditions.

Projected Socio-Economic Impacts of End-Use in Lower 48 States

Due to some of the basic assumptions used and the method of analysis, pursued by the Staff, the DEIS leaves the impression that the connection of this vital source of domestically produced energy to the nations energy consuming areas is of little merit or consequence. The assumptions used concerning energy availability and interchangeability, price and demand patterns, and U.S. energy self-sufficiency are contrary to the worsening energy crisis being suffered by the lower 48 states.

Respectfully submitted,

TEXAS EASTERN TRANSMISSION CORPORATION
TRANSWESTERN PIPELINE COMPANY

By Joseph F. Weiler
Joseph F. Weiler
Attorney

Western LNG Terminal Company

720 West Eighth Street Los Angeles, California, U.S.A. 90017 Cable PAC LIGHT TWX 910-321-3946 (213) 689-2345

January 29, 1976

Mr. Kenneth Plumb
Secretary
Federal Power Commission
825 North Capitol Street, N.E.
Washington, D. C. 20426

Re: El Paso Alaska Company, et al.
Docket Nos. CP75-96, et al.

Dear Mr. Plumb:

Transmitted herewith are our comments on the Draft Environmental Impact Statement prepared and issued by the Commission's Staff on November 28, 1975, in connection with proposals to bring Arctic gas from the Prudhoe Bay field in Alaska to market areas in the lower 48 states.

Copies of the above-described material are being served upon each party on the restricted service list compiled by the secretary in this proceeding. Ten copies are also being transmitted to the Council on Environmental Quality as requested.

Very truly yours,

E. R. Island, Attorney

ERI:dao
Enclosure

cc: The Honorable Nahum Litt (W/enclosures)
Council on Environmental Quality (W/enclosures)

EL PASO ALASKA COMPANY, ET AL.
Western LNG Terminal Company
Point Conception Supplement No. 1
Docket Nos. CP75-96, et al.

Comments on the Draft Environmental
Impact Statement

Comments on FPC-DEIS, Volume III — Docket CP75-96

Page III - 1 - El Paso has filed an alternative, showing reduced average daily volume to be delivered to Point Conception of 2.1 Bcfd.

This is mentioned in the alternative section of the FEIS concerning the Point Conception terminal.

Page III - 2 - Paragraph 3 - Reference point for all elevations given should be mean lower low water (MLLW) instead of mean sea level.

Comment accepted. The reference to mean sea level on Page III-2, paragraph 3 should be changed to MLLW.

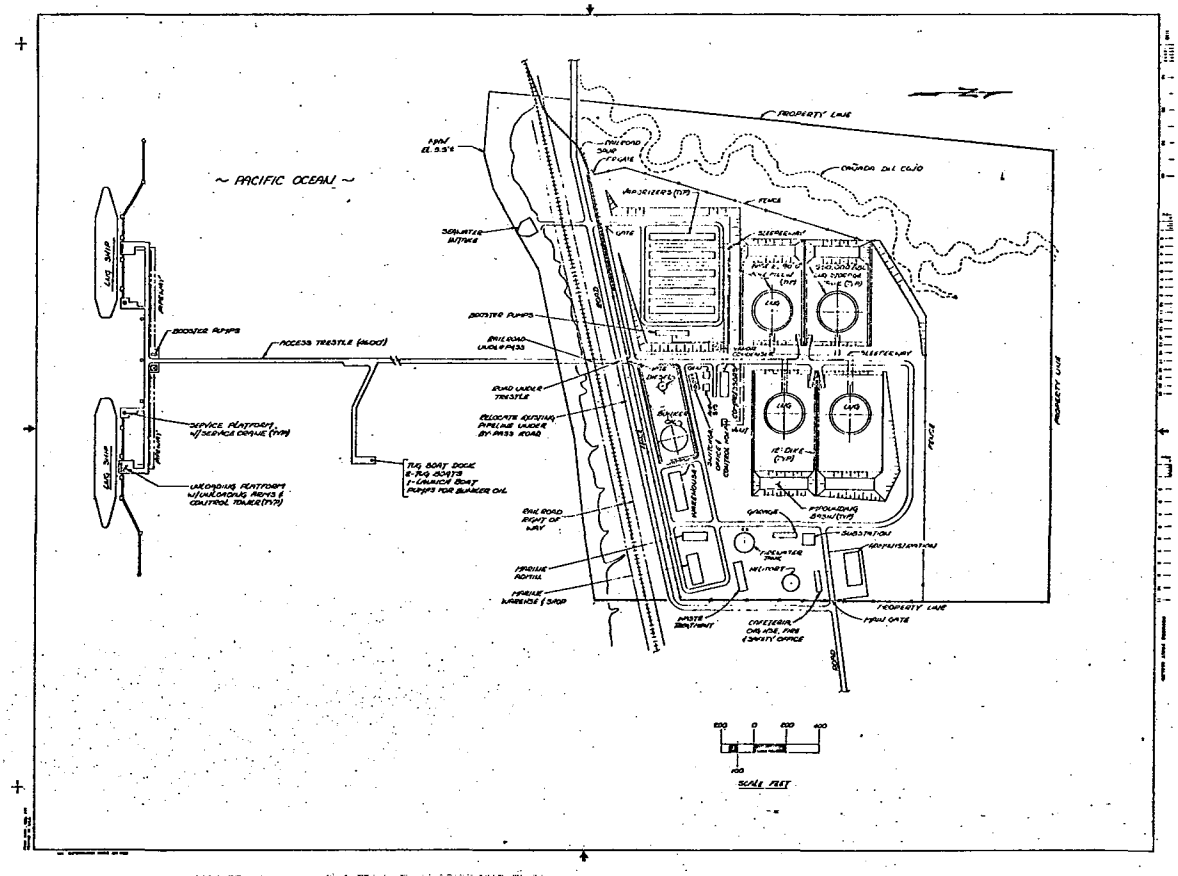
Page III - 4 - Plot plan shown was revised by Applicant's response #1 to Environmental Interrogatory, submitted in April, 1975. Attached is a copy of the plot plan.

Comment accepted. The plot plan shown on the next page should be substituted for Figure 2 in Volume III of the DEIS.

Page III-4, Figure 2; page 8 line 35-37; page 20 lines 31-32; page 206 lines 14-17; page 220 lines 31-32 and page 247 line 29-31 - The desalinization plant has been eliminated from project plans as a source for meeting project water requirements. References to the plant should, therefore, be deleted from the Draft EIS.

Comment accepted. All references to the desalination unit have been eliminated. See the response on Page 9 of the California Coastal Zone Conservation Commission comment.

Onsite wells may be constructed to provide water for the LNG facilities. Field work has not been completed to determine if there is usable water on the site. The alternative to onsite wells is to bring water to the site via pipeline.


~ PACIFIC OCEAN ~
PROPERTY LINE
CAÑADA DEL CAJO
FENCE
GATE
SCALE FEET

Page III - 8, line 23 - The gas-fired vaporizers will be used as required to accelerate the unloading of the LNG storage tanks and minimize shipping delays that might be caused by irregular ship arrivals or when the seawater vaporizers require maintenance. They are expected to be used at a 50 percent load factor, as indicated in the prepared direct testimony of M. E. Fuller, Exhibit No. WL-6 (MEF-2) submitted March, 1975. This will be more than 9 times the 480 hours per year indicated in the DEIS.	Comment accepted. On Page III-8, Paragraph 3, delete sentence beginning, "Three standby submerged-combustion ..." replace with "Three submerged-combustion gas-fired-vaporizers would be used as required to accelerate the unloading of the LNG storage tanks and minimize shipping delays that might be caused by irregular ship arrivals or when the seawater vaporizers require maintenance. They would provide an additional peaking capacity of 300 million cubic feet per day and are expected to be used at a 50 percent load factor.
Page III - 8, line 9 and page III-257, line 31 - The required dike depth is 12' deep; however, the effective containment will be 15' by virtue of plant roadway construction and the nature topography.	
Page III - 12, line 12 - The Arvin metering station will contain 6 not 11 orifice meters tubes.	Comment accepted. On Page III-12, Line 12, delete "Eleven" and replace with "six."
Page III-18, line 24 - Delete "...and in the insulation of the storage tanks..." Low temperature sensors will not be located in the insulation of the storage tanks.	Comment accepted. On Page III-18, Line 24, delete "... and in the insulation of the storage tanks ..."
Page III - 73 - Attached is a corrected version of Figure 20, Wave Roses.	Comment accepted. The following revised Figure 20 should replace Figure 20 in Volume III of the DEIS.

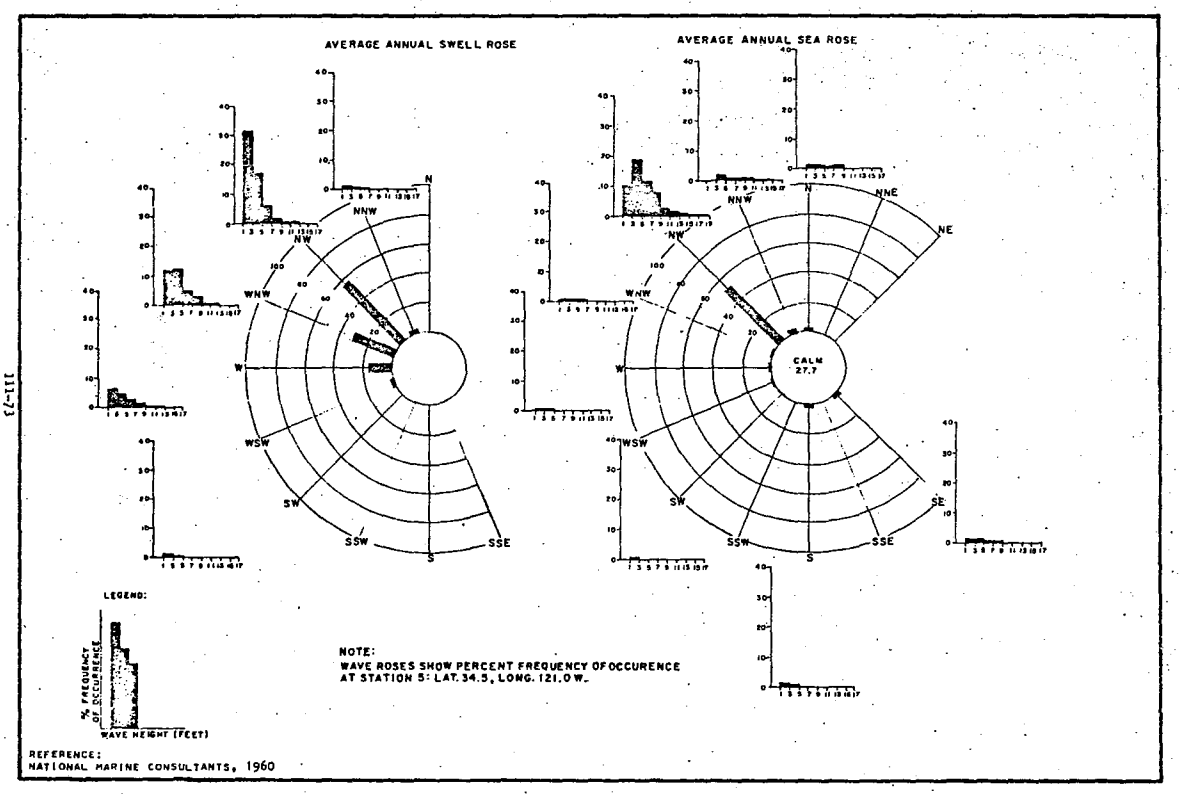


Figure 20. Wave Roses-Offshore Point Conception Station 5

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 137, Line 45-46

Current employment trends within Santa Barbara County indicate that a reversal has occurred and the overall picture is improving. In November 1975 the seasonally adjusted unemployment rate dropped to 6.9 percent, down from 7.9 percent in October 1975, and down from 7.0 percent in November 1974. This is the first year-to-year decrease in over a year and indicates to the State of California Employment Development Department that economic conditions are changing and the unemployment trend is downward (Kirchgessler, 1975). During this one year period, the number of unemployed persons has decreased from 7,850 (November 1974) to 7,650 (November 1975), with intervening peaks of 9,300 unemployed in February 1975 and 9,000 in September 1975 (State of California, 1975).

The Santa Barbara County economic base is divided principally between two regions--southern Santa Barbara County, whose economy relies heavily upon tourism; and, northern Santa Barbara County, whose economy is oriented primarily to agriculture and food processing. During the recent recession, the tourism industry, and consequently the southern region, suffered the greatest, while the northern region was affected to a much lesser degree. The recovery is evidenced in the more favorable outlook for tourism and other economic sectors in the county, and it appears as though 1976 will be a recovery year.

The slow growth posture of the county does not portend further unemployment beyond that which has already been created. Similarly, there are no other visible trends that would tend to increase county unemployment. On the contrary, an improved employment climate is expected over the short term future.

On Page 137 line 45 the word "increase" should be changed to "decrease".

References

Kirchgessler, J.R., 1975, Labor Market Analyst, State of California Employment Development Department, personal communication, December.

State of California, Employment Development Department, 1975, Santa Barbara County Labor Market Bulletins, April-November 1975.

Page III - 175 Lines 9-13 - The proposed pipeline system will require crossing two permanent streams, the Santa Ynez River and the Sisquoc River. The Santa Ynez River would not be significantly affected because the river normally carries moderate sediment loads; any increase due to construction would be insignificant. Sediment that might be added to the Sisquoc River would be deposited within a relatively short distance because of the easy flow gradient. However, during periods of high water, sediment could be transported farther downstream and could increase sedimentation in several gravel pit operations. There should be no major deleterious effects at either stream crossing.

Comment reflected in Section C.2 of the FEIS.

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 176 through 177 - The acceleration value of 0.7g is an unreasonably high figure to apply to all portions of the pipeline route, except perhaps for the near-field of the San Andreas fault. For example, 0.7g is greater than any values accepted by the U.S.G.S. for the Alaska pipeline. Acceptable maximum effective ground surface accelerations were 0.45g in zones susceptible to a Magnitude 7.5 earthquake, and 0.6g in zones susceptible to a Magnitude 8.0 event (Newmark and Hall, 1973). In Southern California, only the San Andreas fault is believed capable of a Magnitude 8= event; therefore, it is unreasonable to expect effective accelerations to even approach 0.7g anywhere but in the near-field of the San Andreas fault.

The acceleration value of 0.7g is nowhere implied to be applicable to all of the pipeline route.

The DEIS indicates maximum bedrock accelerations as stated, not effective ground surface accelerations as interpreted by the applicant. Earthquakes of magnitude less than 7.0 are unquestionably capable of producing accelerations of over 0.7g.

Although the proposed pipeline route crosses a number of active or potentially active fault zones, many of these faults should not pose a significant threat of rupture. The proposed pipeline when operated at maximum allowable pressure would accommodate 1 foot ground displacement in 120 feet of length without loading the pipe beyond the design stress permitted under DOT Part 192. Ground movement in the 1' to 3' range could probably be accommodated without rupture because of displacement of backfill and by the ability of the pipe to absorb stresses greater than allowable design stresses.

In the applicant's response to question number 176 of the FPC data request dated April 25, 1975 it is stated that, when installed in a properly shaped trench, the pipeline could accommodate approximately 1 foot of ground displacement in 120 feet of pipeline length before the design stress would be exceeded. In this comment the applicant notes that 1 to 3 feet of displacement could probably be accommodated without rupture of the pipeline. There are several faults along the proposed route where 3 feet in 120 feet could be exceeded. See Section C.2, 3, 4. of the FEIS on the Point Conception LNG terminal for a more complete discussion.

REFERENCE

Newmark, N.M., and Hall, W.J., 1973, Seismic Design Spectra for Trans-Alaska Pipeline, Fifth World Conference on Earthquake Engineering, Rome.

Comments on FPC-DEIS, Volume III Docket CP75-96

Page III - 177, line 7 - The Mirage Valley fault is parallel and adjacent to the proposed Arvin to Cajon pipeline corridor between mileposts 81-83. The pipeline would not cross the Mirage Valley fault.

The discussion of geologic impacts in the FEIS has been expanded in response to this comment.

Page III - 206, Paragraph 4 - The amount of fresh water required for each of the three peaking vaporizer has now been estimate to be 6000 gallons per vaporizer.

Vaporizers will not be emptied of water between periods of use.

Comment reflected in Volume III, Section C.7.c of the FEIS.

Page III - 222, last 4 lines and first paragraph page 223 - A revised estimate indicates that approximately 75% of the pipeline construction force will be recruited from outside of Kern, San Luis Obispo and San Bernardino counties where pipeline construction will take place.

Comment accepted, see Section C.8.c of the FEIS concerning the Point Conception LNG terminal.

Page III - 224, last paragraph and following page - Additional prepared testimony of R. J. Hohne, Exhibit No. WL-35 (RJH-2) supplement No. 1, shows the revised estimate for the Pt. Conception to Arvin line to be $258 million as compared to the $217 million stated in the DEIS and property taxes based on $248 million as compared to the $209 million stated in the DEIS. The current estimate for the Arvin to Cajon line is now $86.9 million compared to the $72.7 million stated in the DEIS and property taxes should be based on $83.6 million rather than the $69.8 million as stated in the DEIS.

These revised estimates have been incorporated into Section 8.d and in Tables 31 and 32 of the FEIS.

Page III - 235, Lines 15 - 18 - The implication that the proposed LNG plant will necessarily induce additional industrial development in the immediate site vicinity is not correct. There is no evidence to indicate that the proposed LNG plant will induce the development of new industry either adjacent to the site or in the general Point Conception region. Examples may be drawn from similar situations throughout the United States which demonstrate that the mere development or presence of a major utility installation does not attract other industries to locate nearby. New utility installations along the California coast at San Onofre and Diablo Canyon, for example, have not induced industrial development in their immediate vicinity, nor even in the general region of the plants. Neither does the"pressure" exist to create such new development in the future.

In viewing the site alternatives from a user standpoint, land costs must be interpreted according to the cost of development. The major costs encountered in developing industrial acreage, at the very least, would include the cost of grading, providing access roads, water (domestic and processing), sewage disposal, and railroad spur lines. Analyzed in this manner, the cost of the industrial site, including the raw land cost and the cost of development, may be higher then the cost of developed sites in more central locations. In addition, the central locations are usually more accessible to market areas, a larger labor supply, better served by the various modes of transportation, closer to raw material suppliers, and better served by police and fire departments.

With respect to the Point Conception location, there are very few industries which would find such a remote, inaccessible location attractive. The foremost user candidate is the utility firm which requires the use of ocean water for equipment cooling or transportation, and utilizes only a very small labor complement (thus minimizing the importance of the area labor pool). Unlike other heavy industries, the utility does not place a great deal of importance on conventional transportation modes, inasmuch as its "product" is delivered by specialized means.

Comments on FPC-DEIS, Volume III — Docket CP75-96

Page III - 248, Last Line - 2,068 million MCF should read CF only, delete "M".

Comment accepted. The number 2,068 million Mcf should be changed to 2.068 million Mcf.

Page III - 249 - Applicant strongly urges inclusion of the compreshensive Science Applications Incorporated (SAI) studies as the basis for site risk analysis in the final EIS. The final sections of the SAI studies were filed with the commission on January 26, 1976 in response to staff interrogatories dated April 25, 1975. Additional copies are available.

The environmental staff has reviewed those portions of the study submitted to the FPC and will utilize these studies as appropriate in forming the staff's own independent analysis of the safety issues.

Page III - 255 Para 5 - The liquid levels in the LNG tanks would be monitored by two float-type level gauges and a differential pressure level transmitter in each tank. One of the float-type level gauges would act as a standby unit in case of malfunction of the other. The differential pressure level transmitter would be connected between a standpipe and the tank vapor space. The difference in pressure measured at the bottom of the standpipe and the vapor space would be used to determine the liquid level in the tank.

Comment accepted. The paragraph noted should be revised as suggested.

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 256, Line 7 - Delete "continously" so that the sentence will read as follows:

"In order to prevent layering and potential rollover problems with the LNG, Western would monitor the composition and temperature of incoming LNG."

Comment accepted. Western would not monitor the composition and temperature of incoming LNG continuously.

Page III - 260, lines 19, 20, 21 - Delete the sentence which reads: "Temperature rise sensors would be used in conjunction with the flame detectors throughout the process area and at the LNG storage tanks."

Ultraviolet (UV) flame detectors are superior for these applications and will therefor be used.

Comment accepted. That sentence should be deleted.

Page III - 263 - Last sentence thru first sentence Page III - 264: Sentence should read:

"The effluent would then be pumped to a holding pond before being discharged through the plants seawater discharge system which would empty into the Pacific Ocean."

Comment accepted. "Canada del Cojo" in Line 3 of Page III-264 should be changed to read "Pacific Ocean."

Page III - 266 - Para. Four - "To withstand winds of 29 mph" should be changed to read"98"mph as stated in response to FPC Environmental Interrogatory #159, submitted in April, 1975.

The 29-mph wind speed referred to on Page III-266 is the maximum wind speed, as identified by the applicant, which the marine trestle could withstand while an LNG is berthed. However, it should be noted on Page III-266 that while no tankers are at berth the design wind speed without damage to the unloading arms would be 98 mph (100 year recurrence interval).

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 321 and III - 323

The Los Angeles Harbor site was rejected by the FPC staff from consideration as a viable alternative site solely because it is within the Palos Verdes Hills fault zone. The rejection of the Los Angeles Harbor site is not warranted. Extensive studies have established reasonable maximum seismic design requirements and those requirements can be satisfied with materials and construction methods currently available. Further, this conclusion by the staff is at variance with the findings of the site selection studies conducted by Intersea Research, the independent consultant contracted by the Federal Power Commission staff, that were presented in the EIS. As a result of Intersea Research's initial investigation of 48 potential sites, Los Angeles Harbor was selected as an alternative for further studies (Table 45, page III-314). Further studies of six alternative sites indicated that Los Angeles Harbor was the number one preferred alternate based on an unweighted ranking of major project factors that could result in impacts (Table 47, page III-318). The rankings were then adjusted to reflect weighting values assigned to the major factors. The new system resulted in Los Angeles Harbor being rated as the number three preferred alternate, although very close in the weighted summary to San Onofre (number one) and Oxnard (number two) (Table 48, page III-320). Thus Intersea Research's findings do not support the rejection of Los Angeles Harbor as a viable alternate site. The following information is provided as a basis for evaluation of the Los Angeles Harbor alternate site.

As to the relationship of the Palos Verdes Hills fault zone to the Los Angeles Harbor site, this high-angle reverse fault bounds the northeast side of the Palos Verdes Hills, but shows no fault tract (surface expression) in the vicinity of the site. Geophysical studies conducted adjacent to the site (Dames & Moore, 1974) have shown several subsurface dislocations over a zone about a mile wide. The site is located near the eastern margin of this zone, but the geophysical studies indicate that the primary dislocation occurs at the western edge of the zone.

Historical observations of the fault rupture indicate movement generally occurs along select existing fractures exhibiting the most recent movement within the zone. Therefore, the location of a structure within a fault zone does not, by itself, expose the structure to fault rupture.

The findings of Intersea Research were based on criteria developed by that organization independent of input by the FPC staff. Surprisingly, Intersea Research made no mention of the seismic and fault-related hazards obviously associated with the proposed Los Angeles site in their initial comparison of sites. Their findings were not included in order to support the rejection, or inclusion, of any site.

The environmental report tendered by the applicant for the Los Angeles site shows (Plate 2.1.2-10) that most of the site is within the Palos Verdes Hills fault zone. The major trace passes beneath the end of the proposed docking area and a significant fault break may be projected to the surface less than 500 feet east of the proposed LNG tanks. It would appear from Plates 2.1.2-9 and 2.1.2-10 that the "primary dislocation" is not located at the western edge, but at the center of the zone, and is the major trace at the end of the dock.

According to published sources, there are no more than five "disconnected fault segments of similar trend." These trends are not only parallel in direction, but their extensions coincide. Moreover, if the information provided in Plate 2.1.2-10 is included with published data, the number of independent segments is reduced by one and the distance between the ends of each of the remaining segments is less than 1.2 miles.

The environmental staff is aware that it is difficult to associate specific earth tremors and faults; however, in this case there areno other likely candidate faults.

The applicant has incorrectly interpreted the USGS estimate of the last movement on the fault. The correct assessment is that the last movement has occurred since the time period mentioned. In other words, the span 11,000 to 300,000 before the present is an upper bound on the age of last movement. Therefore, the "good exposures" do not support the contention that the fault has not moved more recently than 11,000 years before the present.

The geophysical studies of Dames and Moore, as presented in the Los Angeles DEIS, show that the major dislocations extend to within 100 feet of the sea floor. This is at odds with the assertion in the comment.

The environmental staff does not agree with the assertion that 6.5 represents the "maximum credible earthquake" on the Palos Verdes Hills fault. On the basis of fault length, the maximum credible event could exceed magnitude 7.9. In addition, it should be noted that reverse faults, such as the Palos Verdes Hills fault, are generally capable of higher magnitude events than those determined strictly from length vs. magnitude plots for all faults.

(cont. on next page)

Pages III - 321 and III - 323 (Continued)

It has been stated that the fault is 56 miles long (Dames & Moore, 1974). However, this length is only obtained by adding together a number of short, disconnected fault segments of similar trend and is therefore a conservative estimate.

It should be noted that the seismic monitoring of the Palos Verdes Hills fault is being conducted by Dr. Ta Liang Teng of USC. Dames & Moore recently discussed with Dr. Teng the results of his seismic monitoring. In summary, Dr. Teng noted that earthquakes have occurred near the fault (not on, as stated in the DEIS) and therefore he indicated that the events were probably associated with the Palos Verdes Hills fault zone. However, due to possible errors in determining epicentral location and focal depth of small earthquakes and the large number of faults in southern California, it is extremely difficult to associate a particular event with a particular fault unless that event is accompanied by surface faulting.

The FPC draft EIS omits any discussion of the date of the most recent surface displacement near the site. USGS investigations have estimated this last displacement based on onshore observations where good exposures exist at 11,000 to 300,000 years before present; i.e., Pleistocene, although Holocene movement has been proposed on a short fault segment south of the site (Ziony, et al., 1974). The geophysical studies conducted by Dames & Moore do not allow a precise determination of age, but subsurface dislocations in the vicinity of the site do not commence until about 200 to 300 feet below the surface which indicates a significant passage of time.

Notwithstanding the above, and because some uncertainty regarding the activity of the fault remains and indeed might well remain even after more exhaustive studies, critical facilities at the site will be designed assuming that the Palos Verdes Hills fault may be active (Dames & Moore, 1973). Further, the recommended design parameters are based on studies indicating a "maximum credible earthquake" of Magnitude 6.5 occurring adjacent to the site. In addition, the vertical component of fault rupture is not expected to exceed 4.0 feet in a horizontal distance (across the zone of fault rupture) on the order of 1,000 feet. The 4.0 feet of displacement approximates the upper bound of vertical movement proposed by Yerkes, et al., (1974) for a Magnitude 6.5 event. The larger displacement numbers of 6.5 feet of vertical and over 10 feet of total movement, stated by the FPC, are related to peak upper bound displacement measurements for a Magnitude 7.0 earthquake (Yerkes, et al., 1974).

Finally, it should be noted that use of the existence of fault zones as a "no go" criterion for LNG plants, although subscribed to by the FPC environmental staff, is not unique to the environmental staff. The Alaskan LNG site selection study prepared by Fluor Ocean Services, Inc., aided by personnel from El Paso Natural Gas Company and Dames and Moore states, "The plant site should not be located on or adjacent to an area in which any active fault zones exist."

The "Surface Displacement Evaluation..." prepared for the Los Angeles site by Dames and Moore (Job No. 0011-135-02, January 20, 1975) on Page 6 states, "Based on the available data, Dr. Teng concludes that the Palos Verdes Hills fault is active...." The FPC staff agrees that all available evidence indicates that this fault is active.

As stated above, Dames & Moore studies indicate that a Magnitude 6.5 event is the maximum credible earthquake for the fault. Therefore, 6.5 feet and 10 feet of displacement represent unreasonable values for the Palos Verdes Hills fault.

In general, seismic design parameters are based on statistical analysis of extreme events (i.e., peak acceleration, or maximum fault displacement). This reliance on extreme events adds conservatism to the design. However, the implications of this extreme conservatism on design are not always adequately understood. For example, the fault rupture versus magnitude estimates of Yerkes, et al. (1974) are based on the upper bound of extreme measurements. The measured displacements occurred at only one point on a rupture that may have extended for tens to hundreds of miles.

The above information strongly indicates that the possibility of an event occurring that exceeds LNG tank seismic design criteria for tilting or strong ground motion due to movement along the Palos Verdes Hills fault is negligible.

Beyond this, it is important to keep in mind that each LNG tank at Los Angeles Harbor will be set on a concrete foundation and enclosed by a concrete dike capable of containing the entire contents of the tank. Fluor Engineers and Constructors have concluded that even a twelve foot differential vertical displacement across the tank foundation accompanied by the spill of the entire tank contents within the dike would result in lateral forces on the concrete containment wall that are much smaller than those produced by the design earthquake itself which the concrete containment wall will be designed to withstand.

Risks associated with operation of an LNG terminal at Los Angeles Harbor have been assessed in a study by Science Applications Incorporated (SAI), and the report indicates the probability of rupture for a land-based tank wall and dike simultaneously at the Los Angeles Harbor site as 1.0×10^{-14} per year.

Further structural damage will occur at any site if design earthquake conditions are exceeded. These do not represent undue hazards to the public, and their probability of occurrence is extremely low as already noted. The sole exposure is out-of-service time and repair cost regardless of the site.

In the light of the information provided or referenced above, Los Angeles Harbor should be retained as an alternate site to Point Conception.

REFERENCES

Dames & Moore, 1973 Report of foundation investigation and seismic studies concerning proposed LNG vaporization plant, Terminal Island, Los Angeles, California, for Pacific Lighting Corporation. Dames & Moore Report 0011-126-02.

Dames & Moore, 1974, Detailed environmental analysis concerning proposed LNG facilities and associated gas transmission pipelines, for Western LNG Terminal Company Volume I, Los Angeles Harbor, California

Teng, T.L., 1976, Personal communication, January.

Yerkes, R.F., et al., 1974, Geologic environment of the Van Norman Reservoir area, U. S. Gelogical Survey Circular 691-A.

Ziony, J.I., et al., 1974, Preliminary map showing recency of faulting in coastal Southern California, U.S. Geological Survey, MF-585.

Science Applications, Inc. 1975, Final Draft, LNG Terminal Risk Assessment Study for Los Angeles, California.

Page III - 339 through 352 - In order to transport 3100 M^2cfd peaking rate from an LNG port to locations whence the volumes could be absorbed and delivered in existing pipeline facilities, additional pipeline facilities would be needed beyond those exhibited in various places in this section. For example, page III-350 understates pipeline lengths as follows:

> "The Point Conception and Drake potential sites would require the longest connecting pipelines, each being about 140 miles in length. The length of pipelines required to connect the San Onofre, Mandalay Beach and Oxnard sites would be 47.5 miles, 50 miles, and 53.3 miles."

Additional pipeline facilities would be needed if the 3100 M^2cfd El Paso Alaska volumes were to be brought into the proposed terminal locations at Oxnard and Los Angeles or to alternate locations. For an Oxnard terminal site, wherein pipeline facilities to Quigley Station were filed, an additional 125 miles of pipeline and a large compressor station would be needed to deliver the El Paso Alaska volumes. For a Los Angeles Harbor Terminal, with 37 miles of twin lines to Yorba Station, 97 miles of added pipeline and a large compressor station would be needed beyond Yorba Station. This would apply also to a San Onofre Terminal site which would need 48 miles of twin pipeline to deliver the volume to Yorba Station with the 97 mile pipeline between Yorba and Hinkley.

Summary of Pipeline Requirements for 3100 MMcfd

Potential site/route	Total pipeline miles
Point Conception (to Arvin 142.3 twin less 9 miles) (Arvin to Cajon - 109 miles)	385
Oxnard (to Quigley - 53 miles, twin) (Quigley to Hinkley - 125 miles)	231
San Onofre (to Yorba - 48 miles, twin) (Yorba to Hinkley - 97 miles)	193
Los Angeles (to Yorba Station - 37 miles, twin) (Yorba to Hinkley - 97 miles)	171

Page III - 354, paragraph 2 - states:

> "The Oxnard site similarly exhibits several environmental advantages that would permit project development with a minimal amount of environmental disruption. A seawater exchange system could be developed with the Ormond Beach Generating Station, which would mitigate the effects of a cold water outfall plume. Land use in the vicinity of the site is directed toward industrial development, so the placement of the LNG facility at the Oxnard site would be compatible with existing and planned land uses."

Although the Los Angeles Harbor site does not exhibit a potential for development of a direct seawater exchange system in conjunction with an existing power generating station, it will be possible to develop such a system utilizing waste heat from the nearby Terminal Island Treatment Plant. Heated effluent from the treatment plant is presently discharged directly into Los Angeles Harbor and imposes a heat load on the harbor. Operation of the proposed LNG facility would involve commingling cooled seawater from the LNG vaporizers with the warm treatment plant effluent prior to final discharge into the harbor.

The Los Angeles Harbor site is located in an area already committed to industrial and commercial uses. The site itself has been zoned for heavy industrial use by the City of Los Angeles. Dredging and landfill considerations associated with site development are compatible with the Port of Los Angeles Plan for overall harbor development. The site thus compares favorably with the Oxnard site in these characteristics and is superior to the San Onofre, Mandalay Beach, Drake, and Point Conception sites.

Due to the large population and local urban development in the Los Angeles-Long Beach area, the impacts on housing and community services associated with the influx of the construction and LNG facility crews and their families would be slight for the Los Angeles Harbor site. This compares favorably with the Oxnard, Mandalay Beach, San Onofre, Drake, and Point Conception alternates.

The environmental staff disagrees that the Los Angeles Harbor site is a viable alternative LNG site, even if a seawater exchange system could be developed (which is somewhat questionable and certainly a recent realization on the applicant's part). The site was rejected by the FPC environmental staff for seismic reasons. Nothing in this comment has changed the fact that the site would be located on a fault with known activity and that there is a potential for the generation of large vertical and horizontal displacements, and that the occurrence of such an event could threaten the structural integrity of the proposed Los Angeles facility. This site has been correctly rejected by the environmental staff for these reasons. To build an LNG site on a fault with known activity would not, in the environmental staff's opinion, be in the public interest and certainly not in the interest of public safety, particularly when viable alternatives exist which do not have this inherent seismic problem.

With regard to the study conducted by Intersea Research, for the FPC, it did not use the criteria, as did the FPC environmental staff in its own independent analysis, that "the plant site should not be located on or adjacent to any active fault zones which could jeopardize the structural integrity of the facility through ground movement or other related events which could accompany a major seismic disturbance." Had this criteria been utilized by Intersea Research, it is highly probable that it would have rejected the Los Angeles site. It is simply an excellent example that two different staffs doing independent analysis, utilizing different criteria, yielded different answers.

The preceding information indicates that the Los Angeles Harbor site generally compares favorably with or is superior to the other alternative sites on the basis of technical feasibility and environmental considerations. This is consistent with the analyses provided to the Federal Power Commission staff by Intersea Research, and supports the conclusion that Los Angeles Harbor is a viable alternative LNG site.

Page III - 356, last 5 lines - state:

> "In summary, it is the staff's conclusion that one LNG terminal be constructed and operated at Oxnard, California for the three volumes of gas associated with the aforementioned projects and that such a terminal could be operated in a safe and efficient manner without posing a significant hazard to the surrounding populace"

The comprehensive site risk analysis prepared by Science Applications, Incorporated support the safety aspects of the staff's conclusion. However a single LNG terminal facility to revaporize all the LNG volumes presently proposed for delivery to Western LNG Company facilities should drastically impair the reliability of service to firm customers without compensating benefits.

The total volumes from all projects is considerably greater than the amount of gas now consumed daily in southern California. The consequences of interruption of such large supplies, for even limited periods of time, are almost beyond comprehension.

Applicant is preparing a definitive response to an FPC staff interrogatory related to Docket No. CP75-96 et al. (El Paso Alaska, et al.). The response will address the operating, environmental and economic consequences in the event the three volumes of gas (or combinations to two volumes) were to be delivered to a single terminal.

Page III - 357, Figure 46 - Seismic considerations for Los Angeles can be mitigated with adequate design. See comment to page III-321.

The aspect of a single LNG terminal would be nothing more than the 4 Bcf per day project proposed by the applicant without knowing the exact end use of the gas. Now knowing who the customers are, does not, in the environmental staff's opinion, create any unique problems that are beyond comprehension.

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 376, Procedure #2, Lines 18-23
A repeated horizontal acceleration of 0.6g is probably not a justifiable structural design value for Point Conception. Dames & Moore believes that following completion of the required studies, a lower design acceleration can be established for Point Conception. The DEIS should recognize this.

In 1973, the USGS accepted for design values of acceleration considerably less than 0.6g for major structures in Alaska and the Santa Barbara Channel. For example, the USGS adopted values of 0.25g to prevent structural damage and 0.5g to prevent collapse of an offshore drilling platform to be constructed in the Santa Barbara Channel for Exxon.

In Alaska, the USGS approved design accelerations developed by Newmark and Hall (1973) for the Alaska pipeline and associated above-ground structures. For an earthquake of Magnitude 7.5 (which is the same size as the design earthquake recommended by the FPC for Point Conception), Newmark and Hall recommended a maximum effective ground surface acceleration of 0.45g. However, for actual design, 0.22g or about one-half the surface acceleration was adopted.

The value of 0.6g recommended by the FPC corresponds to a maximum effective ground surface acceleration for a Magnitude 8.0 earthquake proposed by Newmark and Hall for Alaska. The corresponding structural design acceleration is again nearly one-half the ground surface acceleration, or 0.33g.

It should be emphasized that, in general, southern Alaska is seismically more active and tectonically has a greater probability of producing larger earthquakes than are expected to occur in the Santa Barbara Channel.

Structures, piping, equipment, and support facilities for the proposed Point Conception LNG site can all be designed to maintain their integrity by using state-of-the-art seismic design methods, as expressed by design acceleration.

A single design value of 0.6g is not appropriate for all the terminal facilities. However, an expectation of this level of shaking at bedrock level is justified. Recommendation number 2 has been rewritten to reflect this fact. A more complete discussion may be found in Section C.2-3.-4. of the FEIS on the Point Conception LNG terminal.

REFERENCES

Newmark, N. M., and Hall, W. J., 1973, Seismic Design Spectra for Trans-Alaska Pipeline, Fifth World Conference on Earthquake Engineering, Rome.

U. S. Geological Survey, 1974, Final Environmental Statement, Proposed Plan of Development, Santa Ynez Unit, Santa Barbara Channel, Off California, U. S. Department of Interior, FES-74-20, Washington D.C.

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 376, Procedure #3 - states:

> "Western should provide sectioned-off trenches under all LNG transfer lines which would contain the maximum postulated LNG spill which could occur due to potential ruptures of those lines."

Such trenches are not required and would serve no real purpose. All of the LNG transfer lines proposed by Western LNG Terminal Company will be designed, fabricated, inspected, installed and tested to the highest standards of quality. The lines will be fully welded, eliminating flanged connections and possible leakage. All shop and field welds will be 100% radiographed and dye penetrant tested both internally and externally over all accessible welds. At the Oxnard and Point Conception terminals special attention has been given to the long straight runs on the trestle. Special double-walled expansion joints are being designed which will be fully welded to the LNG pipe, virtually eliminating the possibility of leakage. At the Los Angeles Harbor LNG Terminal, no expansion joints will be required since expansion will be provided within the inherent flexibility present in the offset design.

At the Oxnard and Point Conception sites, the bulk of the LNG transfer system between the dock and the tanks is located over water or over beach or other areas open to the public. A containment system around the piping located on a trestle over water or over the beach areas could not resist an aircraft or other outside impact that was sufficient to destroy the pipeline itself. For purposes of protecting the safety of our employees as well as minimizing risks to the public, installation of the transfer system without general containment appears fully satisfactory. As is pointed out in the Oxnard SAI Study, page 8.6-28, "there is a real possibility that the contribution of the postulated internal failure of the pipes and isolation valve to the fatality probability in the no-immediate-ignition category is essentially nil. The reason is that the postulated ruptures may actually be preceded by initial leaking, providing ample warning time to shut off the ship pumps and reduce the operating pressures before rupture can occur, then drain the pipes and repair the leak."

In accordance with 49 CFR Part 192 - "Transportation of Natural Gas and Other Gas By Pipeline - Minimum Federal Safety Standards," LNG facilities must be operated in accordance with NFPA Standard 59A (1971 edition). In Chapter 2 of NFPA 59A (1971) in Part 2101 it state, "The process, vaporization, and LNG transfer equipment areas shall be graded and drained in a manner that will minimize the possibility of accidental discharge of LNG endangering other equipment or adjoining property or from reaching waterways."

Therefore, it is required that grading and drainage provision, not necessarily sectioned-off trenches, be included into the design of the LNG terminal's LNG transfer equipment, including pipelines, such that compliance with the minimum Federal safety standards is achieved.

The recommendation has been reworded in the FEIS.

Page III - 376, Procedure #3, (Continued)

The SAI study, to be conservative, was done ignoring this possibility. Even so, the results of that conservative analysis, as stated on pages 8.6-25 through 8.6-29 of the Oxnard analysis is ample indication that no further design steps are needed.

SAI has included similar analyses in its completed Point Conception and Nikiski reports.

At the Los Angeles Harbor site, this issue is discussed in the SAI report on page 8.6-4, the final paragraph.

Page III - 376 Procedure #4 - All of the operating equipment of the LNG terminal will be designed to prevent any single unit from generating noise levels in excess of 90 db(A) @ 10 feet. However, the current state of the art of construction equipment is such that the recommended sound levels cannot be met by all pieces of equipment. For example, pile drivers inherently produce sound levels significantly above 90 db (A) @ 10 feet.

OSHA requirements for the protection of all construction workers will be met. All construction operations will be scheduled to provide minimum sound levels in occupied areas adjacent to the construction.

Noise level 90 db (A) @ 10 feet, can not be met by conventional pipeline construction equipment such as backhoes, clams, #583 sideboom tractors, dozers, and pipe hauling trucks.

Comment accepted. The recommendation was in error in that the environmental staff agrees that the 90 dB(A) noise level maximum cannot be achieved during construction by many pieces of equipment. However, noise levels from construction and operational equipment should be kept to the minimum practical levels through the application of the prevailing state-of-art in noise control and through diligent equipment maintenance.

Page III - 378, Procedure 18 - Years of safe transmission pipeline operation in southern California fault zones validate the normal spacing of block valves. No additional block valves are required to protect the public. Each block valve shall be equipped to shut off automatically in the event of line rupture.

The normal spacing of transmission line bloc1 valves, as required by 49 CFR Part 192, applies to all geographic areas in the United States within the limits of the outer continental shelf, regardless of the seismic conditions which prevail in any given area. In the interest of the safety of the proposed pipelines, insofar as they cross seismically active areas such as the San Andreas and Garlock faults, it is certainly within the bounds of prudent engineering practice to give serious consideration to additional bloc1 value installation over and above that required by the minimum Federal safety standards. Such a recommendation has been included in the FEIS.

Comments on FPC - DEIS, Volume III Docket CP75-96

Page III - 379 Procedure #20e - Publication of research findings is a normal function of the University system and should not require special funding support from the Applicant.

Page III - 379 Procedure #20f - Applicant will make archaeological surveys consistent with 20 a, b, c, and d but, feels that archaeologists need only be in attendance during selected periods rather than during the entire construction period.

Page III - 381 Procedure #27 - The hydrostatic test water will be discharged consistent with the requirements of regulatory agencies such as the Regional Water Quality Control Board and the Environmental Protection Agency. Fixing a requirement at this time to use a settling pond does not appear warranted.

The environmental staff agrees.

Page III - 380, Procedure #23 - Preliminary grading plans are being reviewed with the objective of reducing and balancing the amount of cut and fill so that no excess soil need be disposed off the plant site.

If the revision of grading plans, to balance out the amount of cut-and-fill at the LNG terminal site, results in significantly higher overall elevations of the LNG tanks, then Western Western's proposed plans for visual screening would become less effective and aesthetic impacts would be increased.

ALASKA MINERS ASSOCIATION, INC.

FAIRBANKS BRANCH

PRESIDENT
Mark B. Ringstad
P. O. Box 604
Fairbanks, Alaska 99707

VICE PRESIDENT
Carl Heflinger
409 Clara Street
Fairbanks, Alaska 99701

SECRETARY
Douglas Colp
1101 Gilliam Way
Fairbanks, Alaska 99701

TREASURER
Donald R. Stein
105 Dunbar St. HA
Fairbanks, Alaska 99701

270 Illinois Street
Fairbanks, Alaska 99701
Phone: 456-5005

February 4, 1976

Congressman Don Young
U. S. House of Representatives
Washington, D. C. 20510

Dear Don:

I just now learned of the Federal Power Commission Draft Environmental Impact Statement which suggests the El Paso Natural Gas route be diverted from the Alyeska Pipeline Corridor at Livengood South into the Fault Zone Canyon at Healy thence South East into the Dangerous Ice Flows of Cook Inlet. This is the most ridiculous routing possible. If the FPC is successful in routing the El Paso Gas Line through that Fault Zone and into the Cook Inlet Ice Pack someone should be held personally responsible because as sure as I'm writing you this letter it will have numerous problems - No Doubt It.

Sincerely,

Mark B. Ringstad

cc: Senator Ted Stevens
Federal Power Commission
Fairbanks Daily News Miner

ALLEN & ASSOCIATES WHOLESALE BROKERS
COMMERCIAL — RESIDENTIAL
CARPET — FURNITURE — DRAPERIES
2626 Thorndyke Avenue West Seattle, Washington 98199 (206) 285-3660

Jan. 28, 1976

Federal Power Commission
825 N. Capital Street N.W.
Washington, D. C. 20426

Gentlemen:

I am a Seattle, Washington business man and often do business in Alaska. After reading facts (pro & con) on the future gas pipeline, I believe it would be in the best interest of our country to build the gas pipeline via the Alaska route, rather than a Trans-Canada route.

In this way the Trans-Alaska gas pipeline will be under the control of the United States, creating many jobs with the least intervention and problems from Canada. It is also the quickest route.

I support the Trans-Alaska Gas pipeline route.

Sincerely,

Robt. H. Allen

AMERICAN WATER RESOURCES ASSOCIATION

4289 North 38th Street
Arlington, Virginia 22207
January 13, 1976

Secretary
Federal Power Commission
Washington, D. C. 20426
(Attn: ENG-SOD-ALASKA)

Dear Sir:

I have reviewed the Draft Environmental Impact Statement for the Alaska Natural Gas Transportation Systems. It is obvious that the EIS represents a monumental effort and you are commended on the quantity and quality of information contained therein. I have one suggestion that may require some changes in the final EIS. I found no mention of potential problems that might be created for the pipeline, metering or pressure stations, or terminal for the Western leg of the LUG pipeline as a result of land subsidence. For years, many areas of California have been subject to considerable land subsidence due to ground-water withdrawal. The Tulare-Wasco and Arvin-Maricopa areas of the San Joaquin Valley have had around 12 ft. and 10 ft. of subsidence, respectively. The Lancaster area in Antelope Valley has had about 3 ft. of subsidence. Most of this is deep subsidence covering several thousands of square miles. Some shallow subsidence has been even greater in amount, although existing generally in smaller areas. This subsidence has caused difficulties in the past in construction of highways, canals, and pipelines.

Several reports available on the subsidence in the above-mentioned areas are as follows:

(1) Bull, W.B., 1964, Alluvial Fans and Near-Surface Subsidence in Western Fresno, California: U.S. Geological Survey Prof. Paper 437-A.

(2) Johnson, A. I., Moston, R. P., and Morris, D. A., 1967, Physical and hydrologia Properties of Water-bearing Deposits in Subsiding Areas of Central California: U.S. Geol. Survey Prof. Paper 497-A.

(3) Lofgren, B. E., 1975, Land Subsidence Due to Ground-Water Withdrawal, Arvin-Maricopa Area, California: U.S. Geol. Survey Prof. Paper 437-D.

(4) Lofgren, B. E., and Klausing, R. L., 1969, Land Subsidence due to Ground-Water Withdrawal, Tulare-Wasco Area, California: U.S. Geol. Survey Prof. Paper 437-B.

Subsidence due to groundwater withdrawal would not be a significant problem for the facilities proposed. The subsidence which has been troublesome to construction activities is mainly due to hydro-compaction of collapsible soils. This phenomenon is discussed in the FEIS in Section C.2,3,4.

(5) Poland, J. F., 1973, Subsidence in United States Due to Ground-Water Overdraft—a Review: Proc. Amer. Soc. Civil Engin. Spec. Conf., Fort Collins, Colo.

For more details concerning land subsidence problems in California, I recommend you contact Mr. Joseph F. Poland, Office of the Regional Hydrologist, U. S. Geological Survey, Room W-2528, Federal Building, Sacramento, California 95825.

Thank you for the opportunity to review the EIS volumes.

Sincerely yours,

Arnold I. Johnson
AWRA Representative,
Renewable Natural Resources Foundation

AIJ/blj
cc: Council on Envir. Quality
President, AWRA
J. F. Poland

THE ALASKA CHAPTER
ASSOCIATED GENERAL CONTRACTORS
OF AMERICA, INC.

SKILL
RESPONSIBILITY
INTEGRITY

BOX 4-2500 • ANCHORAGE, ALASKA 99509
TELEPHONE (907) 272-3417

3201 SPENARD ROAD
ANCHORAGE
GEORGE ED. SMITH
MANAGER

January 30, 1976

SPECIAL DELIVERY
CERTIFIED MAIL
Return Receipt Requested

Secretary
Federal Power Commission
Washington, D.C. 20426

Attn: BNG-SOD-Alaska

Ref: Draft Environmental Impact Statement Alaska Natural Gas Transportation Systems

The Alaska Chapter A.G.C. of America, Inc. objects strenuously to the allegation we have been made aware of that indicates that the Federal Power Commission does not intend to hold public hearings throughout the U.S. (especially Alaska) such as the Department of Interior did, in the case of its DEIS covering the Trans-Canadian routing. If this is in fact true, it also appears that the only opportunity for our input to the DEIS on the Trans-Alaska route will be by comment which we also understand must be filed by the end of January 1976. Inasmuch as we have just learned of all of these facts, we hereby request that our detailed comments may be forwarded to you within the next 30 days so that they may be included in your final EIS.

Our entire membership of over 380 Contracting and Associated membership are very strongly in favor of an Alaskan route for any proposed gas pipeline. Generally this at present coincides with that route proposed by the El Paso Alaska Company.

Furthermore, we are absolutely sure that considerable interest and similar attitude exists in Alaska especially wherein the utilization of the State of Alaska's 12½% royalty share of the Prudhoe Bay Natural Gas within and for our state is concerned.

Our entire State wishes to be considered and our economic well-being and progress are certainly subject to this very important consideration.

Please allow our comments and let us know if our input would be considered.

Very respectfully,

ALASKA CHAPTER
ASSOCIATED GENERAL CONTRACTORS

E. W. Casper, by H. E. Smith mgr.

E. W. Casper
President

EWC/HG/dc

THE ALASKA CHAPTER
ASSOCIATED GENERAL CONTRACTORS
OF AMERICA, INC.
SKILL
RESPONSIBILITY
INTEGRITY
BOX 4-2500 • ANCHORAGE, ALASKA 99509
TELEPHONE (907) 272-3417
3201 SPENARD ROAD
ANCHORAGE
GEORGE ED. SMITH
MANAGER

February 24, 1976

The Honorable Kenneth F. Plumb
Secretary, Federal Power Commission
Washington, D.C. 20426

REFERENCE: El Paso Alaska Company, et al., Docket Nos. CP 75-96, et al.

Dear Mr. Plumb:

The Alaska Chapter, Associated General Contractors of America, Inc., in response to the Draft Environmental Impact Statement on Alaska Natural Gas Transportation Systems, wishes to comment on matters on which it feels qualified to speak. On behalf of the entire Alaska Chapter, please accept our thanks for allowing us an extension of time in which to present our written testimony.

The Alaska Chapter of AGC consists of approximately a hundred large general contractors, 200 subcontractors and 200 suppliers, as well as union locals operating in the state. Its members are responsible for 80% of construction work done in Alaska. In the construction portion of the Trans-Alaska oil pipeline, AGC prime contractors were responsible for 100% of the work.

AGC believes there is value to relating certain of its experiences with construction of the Alyeska oil line to construction of natural gas pipelines. In many instances, AGC feels particular subjects were thoroughly analyzed and therefore makes no comment. Subjects addressed in this report are:

1. CONSTRUCTION CONSIDERATIONS
   - A. Weather
   - B. Timing
   - C. Arctic Gas Pipe Requirements
   - D. Arctic Snow and Ice Roads
   - E. Air Strips in the Arctic
   - F. Transportation Systems
     - (1) Alaska's Experience
     - (2) Existing Facilities

2. LABOR CONSIDERATIONS
   - A. Canada
   - B. Alaska
   - C. United States

3. CANADIAN DEVELOPMENTS
   - A. Native Land Claims
   - B. Treaty and Other Concerns

4. ECONOMIC CONSIDERATIONS
   A. United States - Canada
   B. Canada
   C. Alaska

It is AGC's sincere wish that its comments be reviewed and incorporated in the Final Environmental Impact Statement on the Alaska Natural Gas Transportation Systems.

Sincerely,

ALASKA CHAPTER
ASSOCIATED GENERAL CONTRACTORS

E. W. Casper
President

EWC/dc

Encs.

CONSTRUCTION CONSIDERATIONS

A. WEATHER

Experiences of Alaskan contractors dealing with Arctic conditions in connection with the Alyeska oil line revealed, for example, that temperatures often ranging between -30 and -50 degrees greatly inhibited the proper functioning of manpower and equipment. Severe malfunctioning of equipment such as frozen lubricants, cracking of the equipment itself, broken tires and axles, etc., was commonplace and the repair process costly, difficult and time-consuming. On many occasions it was necessary to shut down the project until weather conditions improved.

Experience and familiarity with the most successful techniques for dealing with extreme weather conditions and the problems caused by them are, through trial and error, an inestimable asset to contractors responsible for Arctic construction. It is AGC's opinion that the value of this experience should be highly regarded in weighing the desirability of either the Arctic Gas or El Paso proposal.

AGC is confident that, through testimony to the Federal Power Commission by the applicants, the State of Alaska and others, the FPC is well aware of the unique aspects of Arctic construction. It asks the FPC to bear in mind the important fact that the Arctic Gas project entails more than twice the amount of construction north of the Arctic Circle where the most serious weather conditions exist, than does the El Paso project. AGC requests that the FPC environmental staff further evaluate the Arctic Gas timetable for completion of pipeline sections north of the 60th parallel and consider the results of that evaluation in its review of the projects.

B. TIMING

AGC contractors experienced in construction of the Alyeska oil line cite the unavailability of ancillary facilities during the early stages of the project as seriously restraining its timely mobilization. In spite of extensive coordination efforts, serious delays resulted, at times two to four times greater than were projected. AGC is confident, based on this experience, that Arctic Gas has underestimated the time necessary to mobilize its project to a much greater extent than has El Paso, particularly in the Canadian portion of the Arctic Gas route. By the same token, AGC is of the opinion that El Paso has underestimated opposition by environmental groups to its LNG facilities in California which could, of course, delay that portion of its proposal.

With regard to the probable use by El Paso of $300 to $500 million worth of equipment and materials available after completion of the Alyeska oil line project, it is felt El Paso would have significant timing advantages not available to Arctic Gas by using those resources. As has been stated to the FPC, support facilities including construction camps, work pads, access roads, staging sites, communication facilities, airports and landing strips, etc., are already in place on the Alyeska corridor and could be made available to varying extents for construction of the gas pipeline in Alaska. Construction of ancillary facilities took more than a year to complete.

C. A. Champion, Pipeline Coordinator for the State of Alaska, testified before the Federal Power Commission in February 1976 that:

> "There are problems enough associated with transportation of materials for Alyeska construction, as I have testified, but these would be magnified if any other route were used for a gas pipeline. Further, much equipment is already stored along the trans-Alaska pipeline route and could be mobilized quite economically. Use of the Alyeska facilities and equipment has obvious economic advantages by extending the life of the construction facilities, reducing the overall cost of the pipeline and the subsequent cost of the gas itself."

William W. Brackett, Vice Chairman of Alaskan Arctic Gas, in his September 30, 1975 progress report to the Department of Interior, stated:

> "The construction plan is based on each spread having sufficient equipment, supplies and construction labor to achieve a production rate of one mile per working day of winter construction and about one and one-quarter miles per working day of summer construction."

Because of the higher level of possible construction delays inherent in the Arctic Gas project design, AGC does not believe this project should be relied upon.

C. ARCTIC GAS PIPE REQUIREMENTS

Canadian Arctic Gas has testified to the National Energy Board in Ottawa that 77% of its 48-inch diameter pipe would be supplied by Steel Co. of Canada Ltd. (Stelco) of Toronto and the balance probably from offshore mills. As reported by the Toronto Globe and Mail on January 28, 1976,

> "Arctic Gas' technical witnesses agreed that only a few companies have facilities to make 48-inch diameter pipe. The witnesses agreed with a Foothills contention that despite test runs, no company has yet produced any of the pipe to Arctic Gas' specifications. And to date, Stelco has not produced any 48-inch pipe in a commercial run."

In cross-examination, Arctic witnesses said "all the steel companies approached by the consortium to date have asked it to modify the carbon content of the pipe - a change that would make the thick-walled pipe harder to weld in the field."

The Globe further reported that this change would require Arctic gas to have to preheat the pipe before welding and would have to use both manual and automatic welders. Arctic Gas agreed it could have problems getting enough trained welders, especially if special crack propagation collars had to be used at regular intervals along the pipe. "The witnesses also agreed with a Foothills contention that the bottleneck in producing enough of the special pipe would be in obtaining the necessary steel plate" presently produced only by Stelco, said the Globe.

D. ARCTIC SNOW AND ICE ROADS

AGC commends the Arctic Gas Consortium for its concern regarding damage to the environment that could be caused by placement of a gravel road through the Arctic National Wildlife Range and other wilderness areas in Canada. Should the FPC analyze the projected costs per mile of snow roads compared to gravel roads ($50,000 vs. $500,000 cost), it would agree with Arctic Gas that the snow road technique was certainly more economical.

Alaskan contractors do not attest to the feasibility of snow/ice roads as proposed by Arctic Gas. The consensus is, without question, that "When Arctic Gas finds out how much the snow roads will cost in the long run, they might as well go to a gravel road in the first place." AGC points out that the risks involved in successful construction and maintenance of snow roads must be measured in determining their overall cost. For example, project delay of six, eight or twelve months attributed to non-traversibility of haul roads must be considered when evaluating construction-per-mile costs for those roads. These costs would, of course, be passed on to consumers, and timing of gas delivery delayed. The value of building the line through an existing corridor with access to haul roads and work pads cannot be underestimated.

E. AIR STRIPS IN THE ARCTIC

According to the Arctic Gas proposal, 2600 foot air strips are included in its design; three of those would be situated in the Arctic National Wildlife Range. AGC feels it will be necessary for Arctic Gas to upgrade its air strips in most instances to 5000 feet, as was necessary on the Alyeska oil line to accommodate the much-used Hercules aircraft for hauling freight to construction sites. There is a great fear by Alaskans and Canadians as well that, should the Arctic project be redesigned to provide the 5000 foot runways, particularly in the Wildlife Range, it would open up that valuable mineral region to future development.

F. TRANSPORTATION SYSTEMS

(1) Alaska's Experience

Out of sixty barges slated for Prudhoe Bay in the summer of 1975, only half of them were able to reach their destination, and of that half, some were unable to dock. It was necessary for the barges to return to Seward where the freight was unloaded, reloaded and hauled by truck to Prudhoe, causing serious delays. Although AGC has done no study of the costs involved as a result of barges being unable to navigate, ARCO reported cost of the incident to be $25-$30 million dollars.

Some heavier items still will not reach the sites until the summer of 1976 which will necessitate considerable project rescheduling and will require compressing greater workloads into tight summer schedules. This situation is cited here to point out the fact that when delays such as this occur, it is not simply a matter of doubling the manpower or work hours at particular sites to make up lost time. Most of the Alyeska construction sites operate at full capacity with regard to housing, water, sewage treatment facilities, etc., making it impossible (both physically and due to government regulations) to add the necessary manpower. The El Paso proposal, with its plan to use existing all-weather roads and landing strips, would experience many of the problems Alyeska did with regard to transportation of materials; however, it plans no barge shipments north of the 60th parallel, thereby greatly facilitating its project. The Arctic Gas proposal involves heavy reliance on the use of waterways for transport of pipe and materials to Canadian construction sites. Much of the Canadian route is in remote territory, accessible primarily via the Mackenzie River and Beaufort Sea, and then only during periods of open water.

(2) Existing Transportation Facilities

Barge, rail, airline and trucking firms on the West Coast of the United States spent billions of dollars upgrading equipment and facilities to handle increased tonnage to Alaska due to the oil line and other development in the state. This expansion was not accomplished in a short time, however, and Alaskans suffered considerable inconvenience and delays in receiving commercial and personal freight during that period. Although the situation has been resolved for some time, Alaskans and AGC in particular, recognize its impact on communities attempting to serve as transportation sources

to any northern region, whether it be Alaska or Canada. AGC contends that transportation systems both within Canada and serving Canada are far less able to handle shipment of billions of dollars worth of material and equipment than are those on the West Coast and in Alaska.

LABOR CONSIDERATIONS

A. CANADA

The February 9, 1976 issue of Newsweek, in an article entitled "Labor Outlook Darkens in Canada," reported:

> "Canada won the dubious distinction last year of having more strikes than any other country except Italy and Finland -- and observers in Ottawa are predicting an even worse wave of strikes this year. With most major industries in the country facing contract bargaining in the coming months, a record 1.7 million Canadians - nearly 20 percent of the labor force - may be involved in wage disputes. Labor leaders who have raised the threat of confrontation are upset by the government's wage control program, which limits wage increases to 10 percent. The government so far refuses to be ruffled by union intimidations and claims that the unions will not have to reckon only with employers but with the nation's Anti-Inflation Board as well."

According to the Statistical Branch of the International Labor Office, Geneva, Switzerland, the average incidence of labor disputes per 10,000 workers (for work stoppages over ten days) in the Canadian construction industry was 2.8 times higher than the United States in 1973. In 1974 and 1975 these rates jumped considerably.

It should be made pointedly clear that the effect of labor problems on multi-billion-dollar construction projects can be no less than disastrous. AGC feels confident that incidences of labor unrest or shortages would have greater impact on the Arctic Gas system because of its single-component nature, whereas labor problems during El Paso's construction would have greater likelihood of affecting only one component at a specific time, thus enabling the project to proceed in other areas. It is logical to assume that the instability of Canada's labor market can have only adverse effects on the Canadian portion of the Arctic Gas project, thereby greatly increasing its overall costs.

The Yukon Indian News in October 1975 said:

> "Two international unions came out in support of land claims and warned against moving ahead on the Mackenzie Valley pipeline. United Steelworkers of America appeared before the Berger Inquiry to express 'alarm at the staggering social costs' it sees of the pipeline project.

"The Steelworkers are supportive of a smaller-scale pipeline over a longer period of time to reduce structural disruption in Canadian industry and increase Canadian content. It also prefers a Canadian pipeline built to serve Canadian needs and financed by Canadian money.

"Oil, Chemical and Atomic Workers International Union of Toronto also called for settlement of land claims to satisfaction of natives of the north. Union also passed a resolution that future development of the north must meet full endorsement of all native people, especially where the environment and social rights of natives are concerned."

Jeff Carruthers, Parliamentary Staff member of The Ottawa Journal, reported in September 1975 that the 1.9 million organized member Canadian Labor Congress planned to challenge the contention by Canadian Arctic Gas Pipeline Ltd. that a joint Canada-U.S. Mackenzie Valley natural gas pipeline would be in the Canadian national interest. Mr. Carruthers quoted the Canadian Labor Congress as follows: "The CLC says no adequate information exists to date concerning potential reserves in other areas of Canada and that a full consideration of the substitutability of other forms of production remains to be made." "The credibility of the case made by Canadian Arctic Gas is considerably reduced." "It is our position that before we can make full sense of the Arctic Gas proposal, we must first work toward a clearly defined energy strategy for Canada since it is only in this context that the Arctic Gas proposal can be evaluated." And finally, "With the staggering level of expenditures now forecast for the construction of the pipeline, it may well be that these funds could be better spent elsewhere."

B. ALASKA

Attached as Attachment 1 is the Alaska Pipeline Service Company "Project Agreement" which was the result of more than a year of negotiations. It can be noted that the existing Associated General Contractor/Union Agreements and the National Electrical Contractors Association/Electrician and the Pipeline Association/Union Agreements are respectively used as the Schedule "A's" with regard to additional working arrangements and salaries. All these agreements in existence require considerable negotiation, time, effort and resources.

Existing contracts between union and management organizations in Alaska exhibit a great deal of stability. As they were used with Alyeska as their Schedule A's, they could be used as Schedule A's for another project agreement without additional requirements. In fact, the gas pipeline through Alaska could conceivably be built without negotiating any additional project agreements by utilizing existing construction and/or pipeline association agreements which are now in effect.

Each craft in Alaska provides training/apprenticeship programs explicitly designed to enable Alaskans, particularly native and other minorities, to become gainfully employed within the state. The programs have been utilized during Alyeska construction with augmentation by both Alyeska Pipeline and the contractors to provide for increased minority employment. They could and should be used for any other project contemplated in Alaska. No new programs are necessary and, in fact, should be discouraged to avoid duplication and excess cost. Programs are jointly funded by union and management.

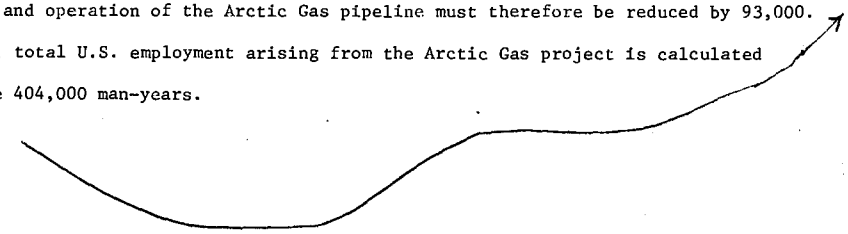
Startup time required for new training programs is a year or more. Generally the training costs from $5,000 to $6,000 per year for trainees and up to $30,000 to $40,000 per year for skills such as operating engineers or other technical crafts, depending upon the extent of equipment, machinery and facilities needed.

C. UNITED STATES

AGC contends that the FPC environmental staff should, in its Analysis of Net National Economic Benefits Section, pursue the matter of projected employment for U.S. citizens in both proposals. Figures provided by the applicants indicate three times as many Alaskans would be employed on the trans-Alaska project as would be on the Arctic Gas project. AGC cannot take a provincial view on this issue, however, since the timely provision of natural gas to consumers is a great national concern. In looking at the national impact of one project over the other, it can only assume that a project providing more than twice as many jobs for U.S. workers is of immeasurable benefit to this country. This, of course, does not include the many thousands of Americans employed in industries serving the projects in an indirect employment capacity.

In prepared direct testimony submitted to the FPC by Robert Nathan, one of the nation's leading independent consulting economists, he stated: "Employment in the United States arising from the El Paso Alaska project will be about 85 percent greater than from the Arctic Gas Project. This represents a difference of approximately 345,000 man-years over the life of the alternative projects." Nathan estimates U.S. employment, both primary and secondary, to be 207,000 man-years for El Paso and about 151,000 for Arctic Gas during the construction phases of the projects. Secondary employment includes workers engaged in supplying goods and services that will be purchased to build the systems. Employment resulting directly from project operations is 35,000 for El Paso and almost 14,000 for Arctic Gas.

Induced employment, that which results from changes in U.S. income and therefore consumption expenditures due to the project investments, is estimated to be 333,000 man-years for the Arctic Gas system. In arriving at a total figure for the project, however, Nathan states that the negative effect on U.S. employment of the unfavorable export balance that would result from the project must also be considered. Over its operating life, the Arctic Gas pipeline will cause an outflow of transmission payments from the U.S. to Canada which will be considerably higher than the induced exports, and dividend and interest payments to U.S. investors. This will result in a net loss of approximately 93,000 man-years of employment. Total primary, secondary and induced U.S. employment generated by construction and operation of the Arctic Gas pipeline must therefore be reduced by 93,000. Thus, total U.S. employment arising from the Arctic Gas project is calculated to be 404,000 man-years.



Nathan estimates induced employment for the El Paso system to be 507,000, bringing the total U.S. employment resulting from the trans-Alaska project to 749,000 man-years. In previous testimony submitted to the FPC, Nathan stated that the El Paso project would provide almost twice as much governmental revenues in the United States as the Arctic Gas project. He also analyzed the impact of both proposals on the U.S. balance of payments, concluding that the Arctic Gas system would result in a $10 billion dollar deficit, while the El Paso project would have a zero impact.

CANADIAN DEVELOPMENTS

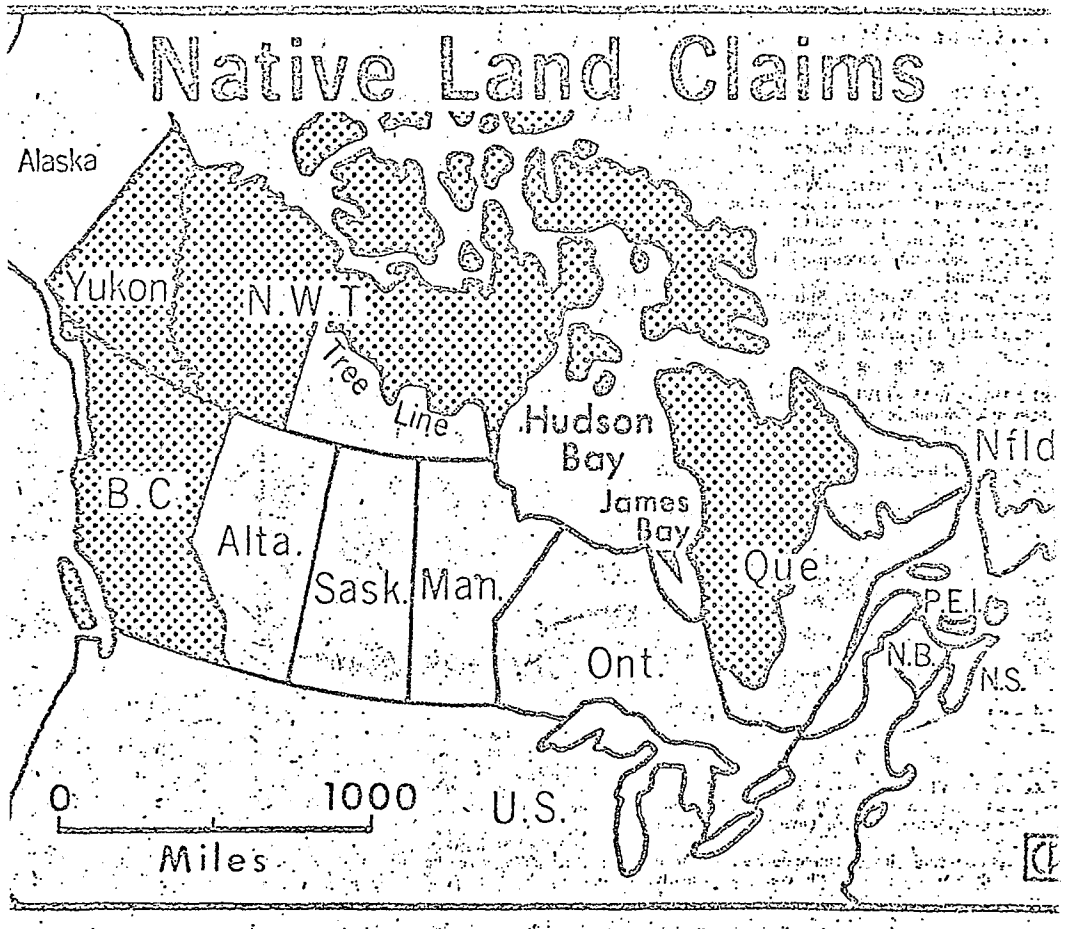
A. NATIVE LAND CLAIMS

Dr. Robert Page, Past National Chairman for The Committee for Independent Canada, in an address to the House of Commons standing Committee on Natural Resources and Public Works on February 5, 1976, told the committee:

> "The native land claims issue is a complex and emotional one, for some of the land the natives wish for their exclusive use or control is on the right of way desired for the pipeline. All parties agree it would be preferable to complete the land settlement negotiations prior to construction of the pipeline.
>
> "Mr. Robert Blair has indicated that Foothills would be prepared to delay their project to facilitate their negotiations and his partner Mr. Kelly Gibson recently stressed that the settlement must be 'a proper, not just a legal arrangement.'
>
> "Canadian Arctic Gas, however, because of their need for swift construction to win approval in Washington, have taken a hard line that construction should proceed with or without a settlement. The Government of Canada has adopted the CAG position. As the Americans held up building the Alaskan oil pipeline until a native land settlement was completed, it seems only right for Canada to follow the same approach. In addition, without a settlement there will be a variety of legal challenges and the practical problems of security for a 2500 mile pipeline. From a legal, moral and practical point of view, the government should guarantee no construction prior to a land settlement in return for a commitment from the native groups for a specific timetable for the negotiations."

According to Jim Poling, reporting for the Windsor Star (Windsor, Ontario), "A figure of $150 million has been mentioned for the Yukon (settlement), and the N.W.T. natives are not expected to accept less than their Yukon cousins. One unofficial estimate of settlement costs in the N.W.T. is $3 to $5 billion." When one looks at the structure of the Arctic Gas project, it can easily be seen that U.S. citizens will pay the lion's share of the cost of those claims.

As it took years to settle Alaska's native land claims, it is reasonable to assume that several years will be involved in settling Canadian claims, and apparently the Canadian government has neither the resources nor a dedicated inclination to resolve the issues satisfactorily. AGC therefore requests that the Federal Power Commission examine more thoroughly the adverse effect such delay would cause in completing the Arctic Gas project.



ATIVE LAND CLAIMS — More than ears after the first treaties were signed, va has admitted that the natives still valid claims to vast tracts of land and lation of those claims has begun. The native people of Canada are claiming more than 1.8 million square miles, almost one-half the total area of Canada, and much of it immensely rich in resources. Involved are five basic areas: northern Quebec, on which agreement has been reached; the east si the Northwest Territories, claimed by Inuit (Eskimo); the N.W.T. west side, c ed by the Indians; the Yukon; and areas of British Columbia.

B. TREATY AND OTHER CONCERNS

With further reference to Dr. Robert Page's testimony in the House of Commons, he states:

> "Canada and the United States have recently concluded negotiations for a treaty on pipelines. It is primarily designed to overcome some of the political opposition to CAG currently being fostered by El Paso in Washington. Under the treaty when signed, Canada will renounce the right to levy a throughput tax on oil or natural gas carried by pipelines through Canada.
>
> "On the surface this seems like a fair and reasonable agreement to both parties. However, it opens a number of serious long-term issues which Canadians must consider:
>
> (a) At least one province has protested to Ottawa that the agreement curbs provincial fiscal initiatives covering pipelines
>
> (b) Long-term environmental costs are impossible to estimate and will never be covered properly in the rate base. A throughput tax imposed at a later date would help to cover costs which emerged such as the Columbia River Treaty. Otherwise the Canadian public will pay these extra costs of shipping the Alaskan gas
>
> (c) A throughput tax was a potential means of revenue to the native people if and when a land settlement was reached.
>
> "A treaty will not be made public until after the revolutionary proceedings have been completed so that no controversy will slow approval of the project.
>
> "In assessing the degree of Canadian control of the project, it is important to monitor what Canadian Arctic Gas/Alaskan Arctic Gas are presenting in Washington to the Federal Power Commission. Brackett is testifying for Arctic Gas refused to admit that 51% equity ownership would mean Canadian "control" of the company. He also denied that 51% equity ownership was the policy of the Canadian government. Hargrove as counsel summarized the project as being 'designed to serve the people of the United States.' As well there were hints in the hearings that the large American financial institutions which were arranging the debt capital would exercise an influence on the management of the project."

While structure of the trans-Alaska project and U.S. government procedures would enable the El Paso line to proceed upon granting of certification, this is not likely with a trans-Canadian project. It must first await a determination by the National Energy Board as to whether Canada's energy needs are such that any Canadian gas might be available for export. Further, it faces within Canada the comparative hearing before the National Energy Board with the Maple Leaf Project, a mutually exclusive application initiated by Foothills Pipe Lines, Ltd. The Maple Leaf Project would provide the means to bring Mackenzie Delta gas to Canadian markets at much lower capital costs. The certification of Foothills' proposal would, of course, render moot the present application as proposed by Arctic Gas.

Other developments in Canada, such as greater interest in development of the Polar Gas fields, the Marshall Crowe bias case which, after having halted the NEB hearings until March 27, 1976, may result in a decision that will delay the

hearings another six months to a year, and possible lawsuits by environmental groups opposing Arctic's plan to traverse the Arctic National Wildlife Range, all compound the complexities of the timing issue for a trans-Canadian line.

AGC is fearful that the United States would be taking unnecessary risks in providing its citizens with sorely-needed natural gas if it considers these issues insignificant and proceeds to certify the Arctic Gas route.

ECONOMIC CONSIDERATIONS

A. UNITED STATES - CANADA

Arctic Gas has asked for an examination by the federal government of the possibility of financing guarantees; it has made the same request in Canada. Using figures of the Department of the Interior (from its Report to Congress), in first quarter 1975 dollars the Arctic gas line is projected at $7.1 billion. All of the Arctic Gas project is devoted to transporting gas from the Arctic in a pipeline, and the major outlay of the Arctic gas facilities is on the pipeline itself. This means that if future finds in the Mackenzie Delta are not as expected, there will be an over-designed pipeline in operation, with U.S. taxpayers supporting the burden of costs even if the pipeline does not run at full capacity or cannot be completed.

By contrast, a transportation system which includes several separate components, such as the proposed El Paso system, offers a flexibility in using the components which should preclude government guarantees for the financing sector. As projected in the Department of Interior Report to Congress, the capital cost of the project will be (again in 1st quarter 1975 dollars) $7.023 billion. Of this $2.159 billion is projected as the cost of the Alaska pipeline section. Liquefaction facilities are projected at $2.040 billion. LNG tankers are projected at $1.687 billion. Regasification is projected at $328 million. Pipelines in California and Texas are projected at $217 million and $592 million respectively.

Because of the "mix" of components in the El Paso system, AGC believes it is flexible enough to accommodate almost any volume for transportation without the danger of excess capacity.

B. CANADA

Dr. Robert Page, quoted previously in this response to FPC, addressed the economic concerns of Canada in reviewing the pipeline proposals. He states:

> "The financial aspects of this project are also filled with many possible dangers because of the sheer size of the capital requirements. The cost estimates of CAG are $7 to $8 billion, but they are two years old and in constant dollars. The Alyeska line under construction in Alaska estimated its cost last month as $7 billion; the CAG line is 2½ times as long. It is reasonable to assume that the total bill will be in excess of $12 billion by the time it is constructed.
>
> "With a debt/equity ratio of 3:1 it means $9 billion debt and $3 billion equity. Not only has Canada never raised money of this order but neither has any corporation in the history of the New York money market. It will require close to $1 billion per year to carry this debt and it will be floated at the same time as James Bay Development Corporation and other Canadian offerings.
>
> "Most of the debt capital will be floated abroad and will result in a heavy capital inflow during the construction phase. This inflow will create upward pressure on the level of the Canadian dollar and hurt our competitive position for exports. After the construction phase there will be the $1 billion per year to pay to the bond holders, bankers, etc., to service the debt. Any balance of payments advantages from the pipeline profits will be more than lost in servicing the international debt. CAG is also proposing to raise 51% of the equity in Canada which is larger than the total new equity offerings in Canada last year.

New Equity Offerings in Canada (IDA Figures)

	Common	Preferred	Total
1975	$330 m.	$670 m.	$1,000 m.
1974	260	475	735
1973	480	130	610

> "If they succeed they will be diverting scarce capital from other projects, many of them labour intensive such as secondary manufacturing or housing. Currently on the drawing boards in Canada there are energy projects with a total capital cost of over $125 billion and many of them are essential to Canada's future. There is no way this country can finance them all and I find it impossible to justify this project which contributes so little energy to Canada while absorbing so much capital.
>
> "In addition, the real economic rents or returns from this project will go to the producers in Alaska and Canada, all of them foreign oil companies. Yet none of these companies will be taking important equity position nor guaranteeing any of the bonds. One certainly must wonder why.
>
> "In order to raise the $8 or $9 billion in debt capital which the CAG project will require, there will have to be government guarantees on the bonds at least for the overruns. This will mean that the people of Canada will assume an important liability for the completion of the project. Also there remains some chance that a "syncrude" type rescue operation might have to be mounted if private funds were not sufficient to complete the project. The liability for the gas purchaser will also be great because the pipeline tariff will be under an "all events cost recovery system" never used before in Canada. Those who purchase gas will pay irrespective of whether they receive the gas. Only if this type of guaranteed payment is in place will the bonds be purchased.
>
> "Government reports have warned that the normal economic forces of the country would be distorted during the construction phase. Capital inflows tend to be inflationary; the nature and dimensions of this project would hit western Canada and the construction industry particularly hard. Interest rates and prices would rise generally. The greater the Cana-

> dian content and the higher the level of economic activity in the country at the time, the greater will be the inflationary impact. If we build the CAG pipeline we may bring on even tighter wages and price controls than we have at present."

Robert R. Richards, Vice President and Economist for the National Bank of Alaska, reviewed in detail the report prepared by Hiram C. Caroom, Professor of Finance, Loyola University, for the Department of the Interior. The report, entitled "Financial Problems Associated with Development of Transportation Systems for Arctic Gas," analyzed the financial factors and problems associated with development and construction of transportation systems for Arctic Gas. Of the three routes examined in Canada and the two through Alaska, Professor Caroom concluded that a route similar to that proposed by El Paso was superior.

Professor Caroom's report appears to conclude clearly that both the magnitude of the funds requirements and the ability of the capital markets to satisfy those requirements are more attractive for the Alaska project than for the Canada project. He points out: (1) that upon completion of the Canada project, Canada's life insurance industry is estimated to have "a very high 1.3% of its total assets invested in this project's bonds," while upon completion of the trans-Alaska project, the U.S. life insurance industry would have 1.0% of its total assets in this project's bonds, and (2) Over the six years of 1976-1981, the projected costs of the Alaska project would approximate 6.5% of total United States utility security sales, while the projected costs of the Canada project would approximate 7.25% of total U.S. utilities securities sales.

The Federal Power Commission's reference table does not include mention of the Caroom report. AGC wonders if it was in fact evaluated and incorporated in the Analysis of Net National Economic Benefits Section of the EIS as it was in the Department of Interior study. If no evaluation has been accomplished by the environmental staff, AGC requests that it be done prior to completion of the final EIS on the pipeline systems.

C. ALASKA

Marple's Business Newsletter (February 1976) reported savings and loan associations gained more than 20% in the states of Washington, Oregon and Montana in 1975.

Additional figures for the State of Alaska are as follows:

	INCREASE			
	1975		1974	
	Millions	Percent	Millions	Percent
Mutual savings banks	$25.3	21.3	$ 5.3	7.6
State commercial banks	33.6	33.3	5.8	10.0
National banks	81.8	37.2	46.5	27.4
Savings and loan associations	30.4	24.2	12.4	10.6

The year 1975 was also a record-setting year in homebuilding activity in the state according to the Federal Department of Housing and Urban Development.

A release by that department states:

> "For the eight larger cities (in Alaska) from which building permit data have been obtained since 1970, total authorizations were 5,697, an increase of 1,831 (47.4%) over 1974. Over two-thirds of the volume was in the Anchorage area (4,008 units) and over one-sixth in the Fairbanks area (1,035 units), with both far exceeding any previous year's activity. In several localities modular units and mobile homes were a significant share of the total.
>
> "Whereas single-family homes comprised about two-thirds of the total in 1974, this ratio dropped to just half in 1975 as land and construction costs rose rapidly in the two big housing markets of Anchorage and Fairbanks, thereby encouraging apartments and condominiums."

HUD also predicted that in 1976 there would be a decline in homebuilding activity as a result of employment growth slowdown, the sale of unsold inventories, and because of increasing vacancy rates, particularly in Anchorage and Fairbanks.

Reference was also made to the fact that "beginning in May 1975, Alaska's unemployment rate for the first time in memory dropped below the U.S. rate and continued lower until the winter season with its much higher rates." Even with the "much higher rates," the winter employment rate was lower than Alaska's usual winter rate. This in itself is important in view of the attrition of thousands of out-of-state workers to Alaska's labor force.

BELUGA COAL COMPANY

March 4, 1976

Mr. Kenneth F. Plumb, Secretary
Federal Power Commission
Washington, D.C. 20426

Re: D.E.I.S. - Docket No. CP 75-96

Dear Mr. Plumb,

The enclosed communication is sent in response to the referenced Draft Environmental Impact Statement of the Federal Power Commission because of the concern of Belgua Coal Company (and its parent company, Placer Amex Incorporated) that comments expressed in this D.E.I.S. could affect marine shipping, a matter of vital importance to the transportation of Alaskan coal.

As indicated herein, Beluga Coal Company has no desire to become involved in the site selection for a proposed L.N.G. liquefaction plant and adjacent shiploading facility in Alaska, but as our findings are at variance with certain portions of the D.E.I.S. and a subsequent communication from the U.S. Coast Guard, we take this opportunity to make the pertinent conclusions of our own studies known to your staff and to other interested parties. These studies were directed towards the design of facilities to accomodate 100,000 DWT coal carriers fully loaded at low tide or fully loaded 130,000 DWT coal carriers at mid tide.

Very truly yours,

Noel W. Kirshenbaum

NWK:vs

Encl.

ONE CALIFORNIA BUILDING • SUITE 2500 • SAN FRANCISCO • CALIFORNIA 94111 • (415) 986-0740

BELUGA COAL COMPANY

March 3, 1976

Federal Power Commission
Washington, D.C. 20426
Attention: Mr. Kenneth F. Plumb, Secretary

Subject: DEIS - Docket No. CP 75-96

Gentlemen:

We recently became aware of the Federal Power Commission's Draft Environmental Impact Statement (Docket No. CP 75-96 et al.) under date of November, 1975. We are communicating with you because we feel that comments expressed in this report could indirectly affect activities of Beluga Coal Company which are being planned for the Cook Inlet region in Alaska.

We first wish to emphasize that Beluga Coal Company has no interest in nor desire to become involved in selection of possible sites for an L.N.G. liquefaction plant and the adjacent shiploading facility to serve vessels which are proposed to carry L.N.G. from Alaska to receiving terminals in California. Rather, the sole reason for this communication to the Federal Power Commission is to rectify possible adverse effects of statements relating to navigation in Cook Inlet which appeared in Volume II of the aforementioned D.E.I.S.

Beluga Coal Company has specific interest in Cook Inlet navigation because of the need to have dependable marine shipping to transport coal from a port to be constructed in Upper Cook Inlet. In order to assure that the costly investment required to develop this coal property

ONE CALIFORNIA BUILDING • SUITE 2500 • SAN FRANCISCO • CALIFORNIA 94111 • (415) 986-0740

is economically feasible, this company has taken thorough steps to verify the practicability of year-round shipping from the proposed port site. It is for this reason that an internationally-known and experienced port engineering firm, Soros Associates of New York, was engaged to make a study of Cook Inlet to select a site for the coal-loading terminal and to determine, on the basis of on-location analysis conducted during the winter of 1974-75, whether or not shipments could be made on a year-round basis Because of our recognition of the potential problems which could be caused by ice, an independent consultant with expertise in navigating and berthing in ice was engaged to assist and supplement the studies of Soros Associates. The credentials of this consultant, Captain J. Bruce Garvie of Port Coquitlam, British Columbia, are appended hereto.

The report prepared by Soros Associates (Preliminary Design Report for Coal Loading Marine Facilities at Cook Inlet, Alaska, June 1975) concluded that "During winter, operations can continue with only occasional delays due to ice conditions. With vessels specifically designed for this service, such delay cound be even less frequent".

The conclusions of both Captain Garvie and Soros Associates with respect to year-round navigation to and from Upper Cook Inlet are reassuring to us. Nevertheless, we are concerned with remarks contained in portions of the following two documents:

1) "Study of Alternative Sites for Alaskan-Related L.N.G. Facilities in the Cook Inlet/Kenai Peninsula, Alaska

Area". Report of the Oceanographic Institute of Washington to the Federal Power Commission, October 2, 1975 (Contract No. FP-1773). Excerpts of this O.I.W. report are contained in Volume II of the FPC's D.E.I.S.

2) Comments of the U.S. Coast Guard under date of 14 November 1975 in reply to your letter of 10 October 1975.

Pages II-431 to 442 of the D.E.I.S. comprise an excerpt of the O.I.W. report concerning marine ice conditions. The list of "Ice Casualty Incidents" which is included therein could appear ominous until one reflects upon the fact that the most serious of these incidents appears to be the spillage of approximately ten barrels of petroleum. No indication is given of damage sustained, if any, to the vessels concerned. Certainly the routine voyage, approximately three times per week, of container-ships all the way to the head of navigation at Anchorage, through those portions of Cook Inlet most heavily covered with ice during winter months, reduces the significance of the comment "collided with ice", frequently mentioned on page II-435. Captain Garvie advances one of the most potent arguments favoring the winter navigability of Cook Inlet in stating that the operation of non ice-strengthened ships into Anchorage "has, in the past, and will in the future, convince a number of ship owners and insurance underwriters that ice, alone, is not a hazard in Cook Inlet."

It is noted in the O.I.W. study (page 2-100) that the North Foreland area of Cook Inlet was not suitable for the proposed L.N.G. terminal because of "ice conditions too severe". Inasmuch as a proposed

site for Beluga Coal Company's port is North Foreland, the undersigned recently visited the O.I.W. Study Manager and also spoke with the O.I.W. Investigator of Marine Safety Analysis. It was learned that the O.I.W. study team spent a one to two week period in the Anchorage-Kenai Peninsula area during the summer of 1975. The survey of winter navigation that was conducted by Soros Associates and Captain Garvie during January-February 1975, included sailing through ice-covered waters in both ocean-going vessels and in smaller craft employed to service the offshore oil platforms in the Inlet; also, numerous meetings were conducted with operating personnel having many years of marine experience in Cook Inlet waters. We are therefore confident that the judgement of Captain Garvie and Soros Associates has far greater significance than the interpretation given by the O.I.W. study team member who stated that the reasons (undocumented in the O.I.W. report) for disqualifying North Foreland as a port site for an L.N.G. terminal were based upon the feeling of untranscribed interviews obtained during the time O.I.W. spent in the Anchorage area. (1)

---

(1) It is pertinent to refer to the fact that the O.I.W. report itself acknowledges that "there are conflicting opinions as to the relative seriuosness of the ice conditions in Cook Inlet". Moreover, it is recognized that five companies serving the Nikiski-area operations "do not feel that the hazards are insurmountable". Finally, the "more hazardous" ice conditions at the Drift River petroleum-loading facility are also noted as are the "more severe ice conditions north of the Forelands" through which year-round marine traffic operates.

With respect to the comments of the Coast Guard, it appears to us that Rear Admiral Hayes is concerned with specific problems which could be sustained in the siting of an L.N.G. terminal in the Nikiski area of Cook Inlet. Although the hazardous nature of L.N.G. is a factor to consider in connection with the safety of existing facilities at Nikiski, we wish to have it stated for the record that such problems as mentioned in the referenced Coast Guard letter would not apply to other port sites in Cook Inlet. The Coast Guard's comments should have no bearing on coal-carrying vessels serving any uncongested Cook Inlet port located a considerable distance from the Nikiski area.

Should any interested party be interested in reviewing the reports of Soros Associates and Captain Garvie which pertain to Cook Inlet navigation, we shall be pleased to make such information available.

Noel W. Kirshenbaum

NWK:vs

J.B. GARVIE

Brief Vital Statistics of J.B. Garvie

Born in New Westminster B.C. on December 1st 1920.

Education

High School	- Duke of Connaught in New Westminster.
University	- University of British Columbia - graduated in 1951 with a BSc. in Chemistry.
Marine	- University of Southhampton -Nautical College- Warash, England. 1955 Master Mariner Foreign Going and Extra Master.
	- American University, Washington D.C. Graduate Studies in Ocean Transportation and logistics.
	- Massachusettes Institute of Technology(MIT) Graduate studies in Business Administration.

Arctic Experiences

Summer seasons of 1938,1939,1940 and 1941 on the MacKenzie River and the Western Arctic.
First 2 years as a deck hand and apprentice pilot. Last 2 years with Eskimo schooners from Kittagajet to Spence Bay and other settlements along the coast.
- summer/fall 1968,1969,1971,1972 in the Eastern Arctic with Federal Commerce and Navigation. Position held, in total charge of all vessels (including loading/discharging and during the voyage) which varied from 5 to 15 vessels depending on the annual tonnage. Designed and supervised the construction of all barges, motorized ice boats and a small 16 ton ice breaker which broke fast ice in Mokka Fjord, Axel Heigburg Island in 1972, the ice thickness varied from 2 to 4 feet in thickness.
All of the Arctic destinations, with the exception of Resolute, were areas which vessels have never landed before, infact, most areas were never surveyed until we arrived. These included Freeman Cove Bathurst Island, Riddle Point, Little Cornwallis Island, Griffin Island, Devon Island and in Mokka Fjord etc.
Average tonnage to these areas per annum was about 22,000 tons.

Business Experience

Self Employed - Arctic Marine Consultant (1972-present)

1963	- Chicago, Federal Marine Terminals -General Manager
1965	- Detroit, Federal Marine Terminals- General Manager
1968/69	- Anchorage/Houston - Trans Alaska Pipeline, Responsible for the submission of a 'turnkey' proposal to the,then, Trans Alaska Pipeline Inc. in 1969. Along with 5 others, surveyed the route/ arranged for the options of all storage areas/ detailed the logistical requirements for ocean and inland transportation.

1971/72 - Vancouver/Resolute - Engaged as a consultant to Bechtel Inc. and Cominco Ltd., for the Arvik Mine complex in Little Cornwallis Island in the Arctic Islands which included designing transportation systems for deliveries from proposed lead/zinc mines in the Eastern Arctic to Europe.

1972/75 - Consultant to CPR/CNR in the preparation of the Logistics Planning of the Canadian Arctic Gas Pipeline - Prudhoe Bay and MacKenzie Delta to North American markets.

- Incan Marine/Inchcape Canada of Montreal engaged as a labour negotiator for crew and officer contracts on all owned vessels, also advisor to their off-shore supply vessel fleet requirements for possible ice navigation.

1973/74 - Recently completed a transportation survey of the Bathurst Inlet and Western Arctic areas for Cominco/Bathurst Mines for deliveries of lead/zinc concentrates from a number of sources to Japan and Western U.S. and Canada.

1974/75 - Consultant to Beluga Coal Inc. - Placer Amex Inc., Responsible for phases of planning coal loading complex and ocean delivery systems. Coal mine located west side of Cook Inlet, Alaska.

1975 - Consultant to Stillings of Tulsa and Pan Canadian of Calgary. Planning loading facilities and townsite in the Orkney Islands for LPG and LNG tankers. Presently preparing basis for negotiating contracts.

1975 - Consultant and Advisor to Marine Insurance Underwriters for Arctic Waters.

1976 - Consultant to Saudi Arabian Government and Gray MacKenzie and Co., in Port of Jeddah, Saudi Arabia.

Cordova District Fisheries Union

Headquarters: Box 939, Cordova, Alaska

~~Seattle Office: 84 Union Street~~

January 27, 1976

To: Secretary
Federal Power Commission
Washington, D.C. 20426
Attn: BNG-SOD-ALASKA

From: Pete Isleib, Chairman
Marine Pollution Control Committee
Cordova District Fisheries Union
Box 939
Cordova, Alaska 99574

Subject: Draft Environment Impact Statement
CP 75-96,et al. Alaska Natural Gas Transportation Systems

Dear Secretary:

The Cordova District Fisheries Union representing the majority of the commercial fishermen in the Prince William Sound area (approx. 500 and their families), has only recently been able to obtain a copy of the DEIS for review. We have reviewed those portions of the statement pertinent to the proposed pipeline, LNG terminal facility and tanker route. We regret that we did not have sufficient time to substitute information which would provide a more adequate evaluation of fisheries and wildlife resources in the Prince William Sound area. However, we would like to offer the following general comments and ask for clarification of some questions.

Vol II H,2.d. (1) Site Assessments: Gravina
We concur with your selection of possible proposed LNG sites within Prince William Sound. The Gravina site is the most logical site of the three eastern Prince William Sound sites under serious consideration.

Vol II H,2.f. (2) Comparative Analysis Nikiski vs. Gravina
We have concurred with your criteria on site selection. Nikiski would be a more environmentally sound choice of terminal sites. Our position is that the Gravina selection would have even greater biological and socioeconomic impacts than you have eluded to.

Vol II C 5,6, (3) Impact on Water Resources/
Impact on Aquatic Biota
We believe you have addressed these sections correctly, 1
however, considerable more baseline data is needed for analysis.
(a) Winter construction activities in this maritime climate, in shallow glacial soils, will contribute to considerable higher erosion and siltation problems than you have indicated.
We have not found a list of the anadromous fish streams crossed in the Port Gravina and Port Fidalgo areas. The numbers of salmon utilizing these streams and intertidal areas and specific means by which adverse impacts will be avoided.

Vol II C,7 We hope no permanent road, either to Valdez or 2
to Cordova, is projected for this proposed industrial activity.

Vol II C,6.e. We are greatly concerned with the proposed atmospheric and effluent discharges from the proposed Gravina LNG site.
(1) Is 658,000 g.p.m. of cooling water intake the 3
average volumn for four trains, ½ plant capacity or is it average volumn for all eight trains?
(2) What are the atmospheric discharges and the long term environmental impacts of these discharges? 4
How much N_2, CO_2, etc and their affects on a pristine region?
(3) How many (if any) compressor pump stations are between Lowe River and the proposed Gravina terminal? Are these sites to be manned, what are their impacts 5
on wildlife resources?
(4) Considerable concern is placed on the presently proposed cooling systems intakes and outfalls. Your mention of a cholorine injection system as a biocide is startling news. We have tried to work with El Paso Gas for the past two years (to date, to no avail) in attempts to influence use of the heated water discharges in aquaculture. We agree with your assessment that considerable environmental hazards exist with the saltwater intake and outfall system--discharges of toxic substances and heated effluent. We have urged that the atmospheric and effluent discharges be early-on engineered to make the utmost utilization of potential waste energys and reduce environmental degradation.
(5) In the proposed impacted area, recreational activities 6
in the form of hunting, camping and sport fishing has to present, been low and the ecosystems have survived mostly intact for generations. It is worth noteing that industrial disturbances and more than doubling the existing human population in eastern Prince William Sound will place considerable impacts on wildlife resources.
(6) Direct commercial fisheries impacts
You are correct that losses in King and Tanner Crab 7
fishing area and salmon seine area in the area of LNG tanker traffic lanes and LNG terminal site are permanent displacement actions. Special care should be required

1 The environmental staff is concerned with this problem and has recommended that a study be made by the applicant prior to construction and submitted to the FPC.

2 No permanent road either to Valdez or Cordova has been proposed.

3 The applicant in prepared direct testimony and proposed bearing exhibits dated September 29, 1975, has indicated that the design flow for the seawater cooling system was lowered from 1,147,370 gallons per minute (gpm) to 658,670 gpm. This is due primarily to the elimination of the ethane compressor steam condensers. The lower value would be the average volume for all eight trains.

4 Quantities of various pollutants emitted from the LNG facility have been listed in a response to the Environmental Protection Agency. The long-term environmental effects of these discharges should be insignificant. Nitrogen and carbon dioxide are not air pollutants. They are constituents of the earth's atmosphere, of which nitrogen comprises 78 percent and carbon dioxide approximately 0.5 percent.

5 No compressor stations are planned between the Lowe River (MP#764.2) and the proposed Gravina terminal.

6 See Volume II, C.13, "Recreation and Aesthetics."

7 The environmental staff agrees with the first portion of this comment. Regarding construction tug and barge activities, the staff has recommended in the FEIS that the applicant, in cooperation with local fishing concerns, designate construction barge channels and anchorage locations.

to place tanker lanes in areas little used by commercial fishing activities. Construction stages of the pipeline and LNG facility will require considerable tug and barge activity in these waters-without proper notice and early-on traffic control, short-term (construction stages) losses of crab gear would be prohibitively high.

But, beyond these economic losses, which we fully expect to occur, our analysis discloses problems which are certain to strain every aspect of life in Cordova-Prince William Sound region--the social,the cultural, the environmental, the very quality of our existences.

We wish you success in a reasoned effort to assist solving our national energy shortages without further disrupting Prince William Sound's renewable marine food resources, wildlife resources and impacting our communities.

Sincerely,

Pete Isleib

Pete Isleib, Chairman
CDFU Marine Pollution Control Committee

ENGINEERED EQUIPMENT COMPANY

OF ALASKA

INDUSTRIAL PRODUCTS REPRESENTATIVES

[redacted] 2227 SPENARD ROAD

ANCHORAGE. ALASKA 99503

TELEPHONE (907) 277-7924

Richard W. Spils, P.E.
Owner
H.M. Clopton
Associate

January 26, 1976

Federal Power Commission
825 N. Capital Street, N.W.
Washington, D.C. 20426

Subject: Alaskan/U.S. Natural Gas Line

Gentlemen:

Please register our interest in seeing our natural gas resources transported by All-United States pipelines to the exclusion of consideration of a Canadian route.

Besides the obvious economic benefits of maintaining this development within our country, our current experiences with resources within the control of foreign governments should be ample warning of the problems that can and will develop with a Canadian route.

Very truly yours,

R.W. Spils

Richard W. Spils

RWS/mm

International Brotherhood of
BOILERMAKERS · IRON SHIP BUILDERS BLACKSMITHS · FORGERS & HELPERS

LOCAL LODGE NO. 104

JACK SLOAN
BUSINESS MANAGER

1829 BOREN AVENUE
SEATTLE, WASHINGTON 98101
OFFICE 623-2013

January 27, 1976

Secretary
Federal Power Commission
Washington, D. C. 20426

ATTN: BNG-SOD-ALASKA

Dear Sir:

It has come to the attention of the International Brotherhood of Boilermakers, Iron Ship Builders, Blacksmiths, Forgers and Helpers, Local #104 that there is a move on to put a gasline through Canada from the Alaska Pipeline.

I have written, as Business Manager of the Local Union, which has jurisdiction in seventeen counties in the State of Washington and the entire State of Alaska, to all Senators and Congressmen to direct their energies against any pipeline or gasline going through Canada.

I urge that you support a pipeline going through Alaska.

Sincerely yours,

BOILERMAKERS LOCAL #104

Jack Sloan

Jack Sloan
Business Manager

JS:ame
opeiu#8afl-cio

Iroquois Research Institute

SUITE 215 6201 LEESBURG PIKE FALLS CHURCH, VIRGINIA 22044
TEL: 703 - 534-8200

24 December 1975

Secretary
Federal Power Commission
Washington, D. C. 20426

ATTN: BNG-SOD-ALASKA

Subject: Comments on the DEIS, Docket CP75-96, et al.

Gentlemen:

We would like to bring to your attention a deficiency in the treatment of archaeological and historical implications. While the Staff's comments are obviously based in large part on our own report, Volume One, on this subject, we believe that our objections to one of the proposed route segments should have been noted and acknowledged: [Volume One, page 256]

> "On the qualitative basis, and on ecoanthropological grounds alone, "we would recommend against the Anaktuvuk Pass alternative because "of the very adverse probable impact on the villagers residing in "the area and their dependence on subsistence and on migratory "patterns of wildlife which may already be threatened by the crude "oil line."

We recommend that your final EIS contain no less than the entire section on Mitigating Procedures and Technical Conclusions from Volume Two [pages 201 to 223]. In addition, the final EIS should describe in clear terms the authoritative role of the Advisory Council on Historic Preservation and not leave to chance the compliance schedule required by Federal Law, equal in importance to environmental regulations.

The competitive applications for gas pipelines in Alaska is a unique situation. The archaeological and historical implications are also so rare and unique in Alaska that we urge inclusion of Volumes One and Two, entitled "Archaeology and History Along Alaskan Natural Gas Routes", in your distribution of the FEIS. Otherwise I fear FPC will receive many notices of deficiency and risk the project's authorization to time-consuming litigation needlessly.

Sincerely yours,
Iroquois Research Institute

Bernard W. Poirier
Director

OCI OPI OGC SECY BNG/

AN OPERATING UNIT OF
THE ARCTIC COMPANY, LTD.

See revised Vol. II, Section F.11.

Staff is currently cooperating with B.L.M. and the Office of Archaeology and Historic Preservation to develop mitigating procedures.

Copies have been made available on request to interested parties and through the Office of Public Information.

MARITIME TRADES DEPARTMENT

AFL-CIO

815 SIXTEENTH STREET, N.W., SUITE 510
WASHINGTON, D.C. 20006 (202) 628-6300

PAUL HALL, PRESIDENT JACK McDONALD, VICE-PRESIDENT O. WILLIAM MOODY, JR., ADMINISTRATOR

January 30, 1976

The Honorable Kenneth F. Plumb, Secretary
Federal Power Commission
825 North Capitol Street
Washington, DC 20426

FILED
OFFICE OF THE SECRETARY
JAN 30 4 53 PM '76
FEDERAL POWER COMMISSION

Re: El Paso Alaska Company
Docket No. CP 75-96

Attention: DNG-SOD-Alaska

Dear Mr. Plumb:

The AFL-CIO Maritime Trades Department, a constitutional arm of the AFL-CIO representing 43 international unions and 8 million American workers, has strongly endorsed by convention action on September 29-30, 1975, the El Paso "All-America" proposal to transport Alaskan liquified natural gas to the lower 48 states. Enclosed is the resolution unanimously adopted at our 1975 Biennial Convention, and we request that this letter and the resolution be made part of the official record of the Federal Power Commission proceedings on this very important matter.

We also understand that comments are being accepted by the Commission on its Draft Environmental Impact Statement (DEIS). We would like to address certain portions of the Commission's DEIS which we feel suggest modifications that would have an adverse affect on the "All-America" proposal and American workers.

The DEIS recommendations that 48" pipe be used over 42" pipe would in effect dictate that foreign over U.S. pipe would be used. Currently no U.S. steel manufacturer can produce 48" pipe without costly retooling and it has not been assured that they will do this. Pipe rolled in the U.S. and hauled by U.S. vessels to Alaska means no loss of American jobs to foreign workers and no dollar outflow for foreign goods and services. This in turn contributes to the nation's balance of payments.

Information concerning this matter has already been presented in the current hearings concerning this case.

Some alternative proposals in the DEIS suggest the use of terminals other than Gravina Point. We feel that the Vessel Traffic System presently being set up in Prince William Sound will greatly insure the safe movement of LNG tankers. The proposal for the pipeline terminus at Nikiski on Cook Inlet does not take into account that this area has some of the strongest tides in the world. Also, varying ice conditions in the winter compounded with greatly increased vessel traffic in the area make this proposed site not as adequate as the Gravina Point location.

Comment reflected in Section H. Alternatives.

The use of U.S.-flag LNG tankers as part of the "All-America" proposal would be an enormous boost to the American merchant marine. The construction of the vessels would employ over 12,000 American workers at peak production and create 624 permanent jobs for American seamen. Annual drydocking for surveys and repairs would have a favorable impact on West Coast shipyards that are now sorely in need of work.

Great concern has been taken to insure total safety for the seamen and the environment. The LNG tankers in existence today have the most enviable safety record of any type ship afloat. The Coast Guard has taken great precautions in drawing up regulations to control LNG tanker movement and, LNG tanker schools are producing highly trained American seamen. Together, these factors insure that the current safety record will continue.

The DEIS also suggests changes in the existing routing plan for the pipeline. We feel, however, that the planned All-America routing, which would largely use the same existing corridor as the Alaskan oil pipeline, is more environmentally sound. Most of the construction camps and the work pad from the oil pipeline could be used, avoiding the costly scarring of virgin land. This adds immeasurably to the protection and preservation of the environment.

We feel that this project, which would help alleviate the high unemployment currently plaguing many American workers, should be given top priority. Only the "All-America" proposal guarantees jobs for American workers, and provides for total U.S. ownership and control over the pipeline itself as well as the LNG which it will transport. No pipeline through a foreign nation provides as much.

Respectfully,

Paul Hall
President

Maritime Trades AFL-CIO DEPARTMENT

Resolution No. 29

ALASKA GAS PIPELINE

The huge reserves of natural gas on Alaska's North Slope present the United States with an immediate opportunity to reduce the serious gas shortage in the lower 48 states that has closed factories, laid-off workers, and led to a moratorium on new gas customers in all parts of the nation. The nation's gas shortage is currently our most severe energy problem, and if the gas deposits in Alaska can be brought to production, the natural gas shortfall would be substantially reduced.

The means by which this gas would be brought to the lower 48 states would be a pipeline similar to the one now being built to carry Alaska oil reserves. However, there are two competing proposals as to the route the gas pipeline will take. One proposal calls for a gas line running parallel to the Alaska oil line to the port of Valdez in Alaska where the gas would be liquified and put aboard ships and carried to the U.S. West Coast for regasification. The competing route proposal calls for moving the gas entirely by pipeline across Alaska and Canada to the U.S. Midwest. Both routes offer the United States significant advantages in the form of additional gas supplies, reduced foreign

energy dependency, new jobs and industrial output, and balance of payments assistance.

However in terms of overall benefits to the United States, the Alaska gas pipeline, employing vessels to carry the gas to the West Coast, is the most beneficial to the nation's economy and security. Among the advantages of the Alaska gas line are:

- The line would be totally under U.S. control.

- The Alaska gas line would provide natural gas not only to the West Coast but also the Midwest, through redistribution of U.S. gas reserves in the Southwest and increased shipments from these fields to the Midwest. LNG vessels could even move the Alaska gas to the East, if needed.

- All of the job benefits of the Alaska gas line would go to U.S. workers such as construction workers, shipbuilders, and seamen. A U.S.-Canadian gas line would involve a high percentage of Canadian labor.

For these reasons and many others the United States should build the Alaska gas line. This line provides the only assurance that the United States will obtain the maximum security and economic benefits from the gas pipeline.

Therefore, be it

RESOLVED: That the AFL-CIO Maritime Trades Department strongly supports the immediate construction of the Alaska gas pipeline that would move Alaska natural gas by U.S. pipeline and ship to the U.S. West Coast, and urges that legislation be enacted by Congress to speed the approval of the Alaska pipeline route.

PRINCE WILLIAM SOUND AQUACULTURE CORPORATION

A regional non-profit organization for the enhancement of fisheries.

Wallace H. Noerenberg
Executive Director

P.O. Box 1110
Cordova, Alaska 99574
(907) 424-3411

January 28, 1976

Secretary
Federal Power Commission
Washington, D.C. 20426

Attention: BNG-SOD-ALASKA

Dear Mr. Secretary:

This is a public comment on the Draft Environmental Impact Statement on Transportation of Arctic Natural Gas, recently published by the F.P.C. staff. Only a portion of the document, i.e. ppII-457 to 461 and pp.II-491 to II-524, were made available to us for review, thus most of our specific comments deal with the above sections.

Prince William Sound Aquaculture Corporation is a non-profit regional corporation for fisheries enhancement, with a Board of Directors composed of four native corporations, two city governments(Cordova and Valdez), the State government, seven fish processing firms and a large organized fisherman association (over 400 commercial fishermen). Among other activities, our corporation has constantly reviewed the various aspects of the El Paso Alaska proposal to build a LNG plant in Prince William Sound. Several meetings with El Paso have occurred; purpose was to discuss aquaculture aspects of the project.

Our review of the DEIS prepared by the FPC staff leads us to the general conclusion that there was a pre-conceived desire to recommend the Nikiski site, which has led to many omissions of critical points of discussion, exaggeration of minor factors to discount the Prince William Sound termini and general failure to spell out the several serious extra costs in gas transmission to the continental U.S. should the FPC insist on the Cook Inlet terminus. Our specific comments are as follows:

1. The El Paso plan for pipeline routing and liquefaction plant construction at Point Gravina would have very minimal input on the specific elements of the biota which the FPC staff makes so much emphasis.

a) The eagle population at the Point Gravina area is a minute portion of the total Prince William Sound population; the area is anything but a concentration zone; hundreds of miles of good eagle habitat ad-

jacent to the LNG site will remain untouched by the El Paso project.

b). There are 500 salmon spawning streams in Prince William Sound. The gas pipeline routing to Port Gravina will have a serious impact on only one important stream, Beartrap River, and minor and temporary (perpendicular buried crossings) impact on one other major and four minor streams. Considering size of the project, this minimization of impact on salmon is a remarkable feature of the El Paso proposed routing.

c.) The major deer population of the Sound is on the large islands of the southern Sound, i.e. Montague, Hinchinbrook, and Hawkins, where over-wintering of the herds is barely possible. Since these animals were planted here in 1927-1930, the mainland zones have consistently been a minor habitat, since winter conditions on the mainland cause constant, high mortalities. Thus there is nothing critical regarding deer at Point Gravina.

d.) The very large black and moderate brown bear populations of the Sound are primarily distributed in major salmon run watersheds. Point Gravina is not of this character and bear are not a significant problem at this site.

e.) Sea Otters are in the process of expanding into the mainland waters; practically none were present at Point Gravina or other mainland locations prior to 1960. The Southern islands and straits are the key Sound habitat and the insignificant portion of the new range occupied by El Paso dock structures will not be important to Sea Otter survival.

2. The physical displacement of king and tanner crab fishermen by Coast Guard regulations establishing tanker routes, anchoring zones, turn-around zones, etc. and in which fishing fixed crab gear will no longer be legal or practical practices has for many months been established as the most significant fish or wildlife aspect of the El Paso Point Gravina project. It is unbelieveable that the FPC staff has failed to elaborate on this point.

3. Nearly all of Alaska, including much of the land adjacent to the North Kenai road near Nikiski, must be classified as remote and undisturbed. In view of the above, to reject Point Gravina for this reason is absurd. The entire oil and gas development in Alaska would have to be rejected as undesirable if this criteria is consistently applied.

4. There is no doubt that Cordova's 2,500 (not 1,164) population will be disturbed by the construction phase. But contrary to the statements of the FPC staff, this will be just as true at the relatively small (less than 5,000) City of Kenai (Nikiski). Further, in order to establish a second industry (beyond fishing only) to the town's economic

The fact that the Gravina Point "is located in the part of Prince William Sound where the desert nesting concentrations of bald eagles occurs" is verified in the Department of the Interior's comment on the staff's DEIS. Good nesting habitats for displaced eagles would probably not be available adjacent to the LNG site because of this concentration.

The staff does not consider the impacts to any salmon spawning streams minimized by the fact that there are many other streams that would not be affected.

As you have described, over-wintering of the deer herds is barely possible. The mainland habitat zones are minor in area, but critical in their importance to the deer's continued existence at Gravina.

The Chugach Forest Service has identified the entire coastal zone of the Gravina peninsula as a bear concentration area. One large concentration is evident each year in the vicinity of the proposed pipeline where it crosses the Beartrap River.

As indicated in the "Alternatives" section the existence of a concentration of animals in a particular area is indicative of that area's importance as a habitat.

This was discussed on Page II-282 of the DEIS.

Point Gravina was not rejected for this reason. However, in comparison to Nikiski, Point Gravina is more remote and undisturbed.

Comment reflected in Section H-2 of Volume 2 of the FEIS. The city of Kenai differs from Cordova in having a broader economic base derived largely from the petroleum and petrochemical industries and in possessing ready road access to the plant site at Nikiski and to the rest of Alaska. Cordova has yet to establish heavy industries, and it lacks any

base, the city government and city Chamber of Commerce has long since gone on record as favoring the Point Gravina development, knowing full well the intermediate consequences.

5. Regarding iceberg problems near the Point Gravina site, anyone with any local knowledge in the Sound knows that the existing saltwater current patterns carry Columbia Glacier ice and icebergs primarily to the West and Southwest. There are minor incidents of bergs in the Alyeska tanker corridor in Valdez Arm, but no observations in Orca Bay where the El Paso Point Gravina tankers are to operate. The FPC discussion on this is entirely erroneous.

6. The FPC proposal to force 417 miles of new pipeline corridor, Livengood to Nikiski, into this project, instead of using the existing Alyeska corridor, Prudhoe Bay to Valdez, is the most callous treatment of Alaska's environment that anyone could conceive. We fail to find any justification for this proposed action in the DEIS. FPC recommendations on page II-521 call for maximum use of the in place Aleyeska routing for natural gas transmission and then FPC takes away most of this great advantage by demanding that over half of the Alyeska routing not be used.

7. The matter of aquaculture potential, including both fish and shellfish, is not adequately dealt with in the FPC report. With 2500 cfs.of unpolluted saltwater in the LNG process, the potential for mitigation of whatever fish and wildlife losses might occur at Point Gravina is clearly evident. Further, the FPC and others associated with this project have consistantly failed to recognize an important factor, i.e. State water standards, insisted upon by federal action in the late 1960's, specifically deny the possibility to release water that has been heated 15° or 16° F directly back to saltwater. The heated water at Point Gravina will have to be ponded for cooling prior to release. This factor favors aquaculture possibilities and makes academic much of the conceptual designs and discussion by FPC regarding effect of release of the heated water directly into Orca Bay.

8. Another key factor not discussed, as far as we can tell, is that location of the terminal at Nikiski, rather than Prince William Sound, will cause El Paso to build either 2 or 4 extra tankers because of the simple fact the Los Angeles - Cook Inlet run is between one and two days longer than that to Gravina Point. The undesirable cost factor is obvious.

9. The great emphasis by FPC staff recommendations on avoiding distraction of historical and archaeological resources would be almost unnecessary if the Alyeska routing were used throughout its length, since all preliminary and most permanent action in this regard has already been accomplished.

highway system linking it to the plant site at Gravina or the rest of the state. The socioeconomic pictures at the two sites are therefore less similar than simple population estimates indicate.

The staff made no reference to existing icebergs in Orca Bay. The staff's concern is that the retreat of Columbia Glacier could result in a dramatic increase in the number of icebergs calved by that glacier, thereby creating ice hazards substantially greater in scope and area than those presently seen in Prince William Sound.

The staff is fully aware of the State of Alaska's coastal thermal discharge regulations. (See Section C.6.e.) However, the staff has addressed itself to the applicant's proposal regarding the released of the heated water and impacts resulting from this discharge. Several recommendations have been made concerning the proposed discharge including one that the applicant submit a mariculture plan.

Prince William Sound Aquaculture Corporation should note that because the applicant has indicated that the discharge would contain residual chlorine concentrations of less than or equal to 1 ppm, the use of the phrase unpolluted saltwater" is questionable.

It is indeed questionable whether two to four extra tankers would be necessaty, particularly because reduced supplies of natural gas are now proposed by El Paso. Also, the project has never been proposed for delivery to Los Angeles.

Thank you for the opportunity to comment on this matter. We hope our comments will be fairly considered in the final FPC decision.

Very truly yours,

Wallace H. Noerenberg

Wallace H. Noerenberg
Vice-President - Biological Consultant

WHN:sk

cc: Council on Environmental Quality (10 cc.)

UTAH MINING ASSOCIATION
INCORPORATED
KEARNS BUILDING
SALT LAKE CITY, UTAH 84101
TELEPHONE (801) 364-1874

December 23, 1975

Secretary
Federal Power Commission
Washington, D.C. 20426

Ref: OGC
El Paso Alaska Co., et al
Docket Nos. CP75-96, et al

Dear Sir:

This will acknowledge receipt of a copy of the draft Environmental Impact Statement prepared by your staff, covering the Alaska Natural Gas Transportation System. I presume that this document was forwarded to me as a member of the National Advisory Board to the Bureau of Land Management. You will appreciate that the Alaska Gas Transportation systems are not of current direct concern to the mining industry in Utah.

While the membership of this Association in Utah and I have little to offer in the way of useful comment specifically on the Alaska gas transportation proposition, I do feel compelled to repeat to you comments previously made on the concepts and content of Environmental Impact Statements in general -- any and all of them.

Few informed people in today's society would quarrel with the concept that something in the nature of an EIS is desirable for major projects undertaken, supported or facilitated by government. On the other hand, any such major project can, in the absolute sense, involve endless impacts of a scope and detail that boggle the mind and are beyond human ability to fully identify, quantify and accurately assess. However, the major impacts and relationships involved in a large project will usually be subject to an assessment that can be understood by the majority of the people concerned. Such assessment should be useful to a wide variety of decision makers, public and private, in arriving at courses of action to be taken.

Many of the Environmental Impact Statements that I have had occasion to review during past months, fail horribly in at least the following areas:

1. No initial overview of the project -- call it a summary -- is accurately provided as an introduction to the EIS. The reader is forced to study the report at length, mentally weighing and sorting enormous extraneous detail, to reach an understanding of what the project involves and the probable nature of the major impacts.

2. Environmental Impact Statements rarely include an overview of market demands, economics, technological development and logistics that suggest the need for the project or reasons for its possible viability.

OPI
OGC
SECY
BNG/

3. Volumes of minute detail of secondary or minor importance are intermeshed with discussions on major elements so as to confuse and frustrate a balanced understanding of the presentation. Often the presentation of this minute detail is sufficiently out of perspective as to be factually misleading in the context used.

4. It would seem that the preparers of Environmental Impact Statements, in their zeal to include "everything" and detail after detail, in face of deadline pressures, have failed to assure factual accuracy in many of the statements made, thus undermining creditability of the entire process. Quality is often sacrificed for quantity, with a resultant major waste of human, physical and economic resources.

Now, it is recognized that agencies responsible for EIS preparation are often bound by what is thought to be law or court decision or administrative interpretation or regulation, so that they may consider themselves required to turn out the current monstrosities that are called Environmental Impact Statements. Indeed, such a process may well satisfy those misguided souls whose primary objective is to delay or prevent any development at the expense of the taxpayer, as opposed to those who favor intelligent, reasonable development. But, somehow a point must be reached where a quality EIS can be prepared on a project in a timely manner that will lead to a balanced understanding of its probable major impacts and benefits -- a statement that can usually be read and digested in a single sitting. Failure in this regard can result in enormous waste and ultimate collapse of the entire impact review process.

So that you may understand our attitude in such matters, I must tell you that our members believe that as a society we have no -- repeat no -- alternative to the development of the resources available to us, if our standard of living and international status in the world community of nations is to be maintained at anything like the levels we have come to accept. And, because minerals are where you find them, we have few alternatives as to where such developments take place. Similarly, we as a people have very limited alternatives as to the timing of development, which will and should be largely governed by demand and the market place. We may, within limits of economic and practical feasibility, have alternatives as to how such developments are undertaken. The minerals industry and its counterparts in manufacturing are committed to courses of action that will minimize adverse impact on the quality of life in operating areas.

We encourage you in the development of a menaingful EIS for the Alaska Transportation project.

Cordially yours,

Paul S. Rattle

cc: UMA Officers

COMMENTS FROM COUNCIL ON ENVIRONMENTAL QUALITY, January 30, 1976

Comment: The risk assessment in App. C, Vol. III does not present the kind of meaningful analysis necessary for informed decisionmaking by the FPC.

Response: The environmental staff disagrees, although additional development of the probability model has been undertaken for the FEIS. Risk assessment of LNG hazards is a continuously developing subject.

Comment: In the Alaska NGTS EIS, we believe the potential or possible effects of accidents must be fully revealed for each alternative-- not only for the two principal transportation methods being analyzed, but for each of the three alternative terminal sites in California.

Response: The environmental staff agrees and has presented such an analysis in App.C, Vol.III.

Comment: The DEIS should also recite the more serious consequences which result from less likely events.

Response: The environmental staff does not wish to place too much emphasis on low-probability, high-consequence accidents, nor on high-probability, low-consequence accidents either. The important factor is the product of spill probability times severity, and this product is largest in mid-range rather than at either extreme. Such a factor has been included in the additional work given in the FEIS. The probability of high-consequence events is so small that staff would be doing a disservice to the public to unduly emphasize them.

Comment: It is also important to know something of the population beyond the hypothetical boundary (where ignition of methane gas would be most certain), in case ignition occurs later, after additional dispersion of the gas.

Response: The boundary is the limit of flammability so additional dispersion would make the gas cloud non-flammable, and ignition will not occur later.

Comment: The environmental staff analysis concludes that the risk to the public is comparable at the three proposed LNG sites, yet nowhere in the analysis are the different populations considered.

Response: The conclusion is changed based on additional model development that is given in the FEIS. However, the population at risk is still given in Table 4 of App. C. The important parameter is not the number of persons at risk, but is the probability of fatality per person per year and whether this result is within acceptable limits for a new project.

Comment: We believe it would be highly useful for the FPC to supplement its analysis with a worst-case type of analysis.

Response: The environmental staff does not wish to place undue emphasis on low-probability, high-consequence events, as discussed above. However, we do not wish to exclude such consideration, either. The environmental staff believes it has presented a balanced analysis.

Comment: Other assumptions (e.g., limiting the land area which could be covered by a vapor cloud and hence the number of people exposed) which understate accident consequences should be relied on cautiously or not at all.

Response: If vapor-cloud ignition behavior of LPG and LNG is similar, then limiting the land area covered when LNG ignition occurs is a fact, not an assumption (see Ref. 6, App. C, FEIS). Thus the environmental staff disagrees that the consequences have been understated.

Comment: In the present analysis, no secondary sources (of hazards) are even considered.

Response: The only LNG fire experience was the Cleveland disaster in 1944, and the casualties from that big fire have been used as an "experimental point." Thus any secondary hazards have been included.

Comment: In summation, we believe the worst case type of analysis we have recommended would greatly improve the analysis.

Response: The environmental staff disagrees because such an analysis would be misleading and mask the higher probability accidents that produce more casualties per year rather than more per event.