



1.1 Assumptions and Report Organization

This Environmental Report discusses the environmental effects of renewing and of not renewing the right-of-way (ROW) for the Trans Alaska Pipeline System (TAPS). The purpose is to support applications for renewing the Federal Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline (Federal Grant) to continue operation of TAPS for an additional 30 years beyond expiration of the agreement in 2004. The Permittees also propose to renew the State Right-of-Way Lease (State Lease), which also expires in 2004, and this Environmental Report supports that application as well. This Environmental Report concentrates primarily on the Federal Grant, since most stipulations of the Federal Grant and State Lease are the same.

This report is organized and written according to the federal Council on Environmental Quality (CEQ) environmental impact statement guidelines contained in 40 CFR 1500-1517. In order to follow those guidelines, assumptions had to be made concerning the definition of the proposed action, the extent of the study areas considered, and the nature of direct, indirect, and cumulative effects. In addition, predictions of environmental effects are based on assumptions that include uncertainties related to potential technical enhancements, future exploration and development opportunities, disposition of existing and future gas reserves, and other considerations which might influence future operations of the pipeline and associated facilities. The primary assumptions upon which this report is based are summarized below.

1.1.1 Assumptions and Definitions

1.1.1.1 Alternatives Analyzed

The *proposed action* is renewal of the existing Federal Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline. The proposed action is compared with the *no-action alternative*: allowing the Federal Grant to expire in the year 2004.

With the proposed action, discussed in Section 2.1, the

pipeline and its appurtenances will stay in operation in essentially the same configuration as now. Some physical changes to TAPS are anticipated during the ROW renewal period in response to throughput decline, required maintenance and repairs, and future system upgrades.

The no-action alternative (Section 2.2) involves expiration of the Federal Grant in 2004. In this case, the pipeline system will have to be removed in accordance with the terms of the Federal Grant. Federal and state stipulations contain general provisions for “dismantling, removal, and restoration” (DR&R) of TAPS assets upon completion of use of the TAPS ROW.

Other alternatives considered but not included in the analysis are covered in Section 2.3. Similar alternatives were evaluated in the original TAPS environmental impact statement (EIS) and dismissed because of their impracticality. These included shipping oil through the Northwest Passage by tanker, trucking oil, and transporting by railroad. With TAPS already built and in operation, no practical or economically feasible alternative exists for transporting North Slope crude oil to market.

1.1.1.2 Federal Grant and State Lease

Both the Federal Grant and State Lease contain numerous provisions that identify mitigating measures and duties to abate/rehabilitate damages relevant to possible environmental impacts. For example, several sections of the Federal Grant require measures that limit, mitigate, or require rehabilitation of potentially adverse TAPS impacts. These include:

- Section 9, Construction Plans and Quality Assurance Program.
- Section 10, Compliance With Notices To Proceed.
- Section 13, Damage to United States Property; Repair, Replacement or Claim for Damages (including requirements to rehabilitate any natural resource that shall be seriously damaged or destroyed).
- Section 16, Laws and Regulations.
- Section 23, Port Valdez Terminal Facility (including



provisions to minimize environmental impacts).

- Section 24, Duty of Permittees To Abate.
- Section 29, Training of Alaska Natives.
- Section 30, Native and Other Subsistence.

Most stipulations are designed to prevent, mitigate, or rehabilitate potential impacts. Three categories of stipulations are included in the Federal Grant: *general*, *environmental*, and *technical*. Appendix E of this Environmental Report contains a complete copy of the Federal Grant, and relevant sections and stipulations are referenced in the text of this Environmental Report as appropriate.

1.1.1.3 Definition of Pipeline System

This Environmental Report focuses on all of TAPS, which is defined in Stipulation 1.1.1.22 of the Federal Grant to include

“...all facilities located in Alaska used by Permittees in connection with the construction, operation, maintenance or termination of the Pipeline. This includes, but is not limited to, the Pipeline, storage tanks, Access Roads, communications site, airfields, construction camps, materials sites, bridges, construction equipment and facilities at the origin station and at the Valdez terminal. This does not include facilities used in connection with production of oil or gathering systems, nor does it include such things as urban administrative offices and similar facilities which are only indirectly involved.”

Thus, Section 2.1 of this Environmental Report describes all of these elements of TAPS including facilities integral to TAPS but on fee-simple land and not part of the ROW [e.g., Valdez Marine Terminal (VMT), Pump Station 1] and other facilities used in operation such as access roads, the fuel gas pipeline, material sites, and the Dalton Highway (a state highway with its own right-of-way). For the reader’s convenience and for continuity, the discussion of the proposed action in Section 2.1 also includes the marine transportation link, which is not part of TAPS.

TAPS Configuration and Operation during the Renewal Period

It should be recognized that actual TAPS configurations could differ from the following assumptions because of uncertainty in North Slope oil production, development of new technology, or changes in operating efficiencies.

When the Federal Grant expires in 2004, the pipeline will most likely be operating with Pump Stations 1, 3, 4, 7, 9, and 12 (with PS 5 operating as a pressure relief station).

Pump Station 12 may operate intermittently in response to throughput variations and the economic balance between the cost of fuel and that of drag reducing agent (DRA). Pump Stations 7 and 12 will be ramped down as future throughputs decline and based on the economic balance between fuel and DRA costs. At the VMT, Berths 4 and 5, which have vapor-control systems, will provide primary loading capacity. Berths 1 and 3, which do not have vapor control, may be used in special situations. Either Berth 1 or 3 or both berths could be demobilized before 2034 if remaining loading capacity does not constrain TAPS throughput. Use of DRA will continue. It is also assumed that the pipeline system will continue to meet its obligations under the Federal Grant and State Lease over the renewal period. However, the potential for accidents and failures is recognized, and the environmental effects of those events are evaluated.

Other possible modifications are identified along with potential environmental impacts. Possible modifications are addressed in Section 4.1.1 and may include the following:

- Rework of some vertical support members.
- Rehabilitation of some buried pipe in areas of corrosion.
- Possible addition of crude-oil heaters or additives with lower crude-oil temperatures, which could affect pigging, wax control, and tank-roof snow-load maintenance.

Pipeline Oil and Throughput

The pipeline will continue to transport “oil” as defined in current agreements (“unrefined liquid hydrocarbons, including gas liquids”). If a gas-to-liquid (GTL) project is implemented and the pipeline liquids are transported by TAPS, the definition of fluids allowed to be transported would need to be modified as part of the GTL permitting process.

Appendix A of this report provides a detailed analysis of throughput assumptions for TAPS. This analysis adopts as its *baseline throughput assumption* the most recent U.S. Department of Energy projection (USDOE, 1998b). The USDOE projection published in the *Annual Energy Outlook 1999* forecasts Alaska oil production to decline at a rate of 4.1 percent per year from 1997 through 2020. The reference-case (most-probable) production rates are as follows: 2010, 0.78 million barrels per day (bbl/day); 2015, 0.61 million bbl/day; and 2020, 0.49 million bbl/day. It is then assumed that throughput remains constant at 0.49 million bbl/day from 2020 until 2034 — the end of the 30-year TAPS ROW renewal period.



North Slope Oil Field Development

Under the proposed action, it is assumed that North Slope oil fields currently developed will continue operating during the renewal period and that only the new fields identified in Section 4.5 of this report will be developed. Development of the Arctic National Wildlife Refuge is not included.

Dalton Highway

The Dalton Highway was originally built to support construction of TAPS, but it is now a state highway (Alaska State Route 11). Current use as a public highway will continue in both the proposed action and no-action alternative.

Tanker Utilization

The tanker fleet will be modified as necessary to accommodate the declining production rate, and double-hulled tankers will be phased into operations according to current U.S. Coast Guard regulations.

1.1.1.4 Affected Environment

Nearly all environmental assessments (EAs), environmental reports (ERs), and or environmental impact statements (EISs) are drafted before the project. This was the case for the original TAPS EIS, but for the TAPS renewal decision, the pipeline system has existed for over 20 years and is now part of the affected environment. The same is true for the ANS oil fields and marine transportation.

The affected environment as discussed in Section 3 includes the following three study areas (Figure 1.1-1):

- Alaska North Slope (ANS),
- The pipeline route from Prudhoe Bay to Valdez, and
- The Prince William Sound (PWS)/North Gulf Coast region.

Numerous EAs, ERs, and EISs have examined various portions of the study areas over the years. Relevant literature includes reports on Alpine (USACE, 1997); Northstar (USACE, 1999); NPR-A (BLM and MMS, 1998); Alaska Natural Gas Transportation System (BLM, 1976); Trans-Alaska Gas System (BLM and USACE, 1988; FERC, 1995); various Beaufort Sea oil and gas lease sale EISs, including Sale 97 (MMS, 1987a); Sale 124 (MMS, 1990); Sale 144 (MMS, 1996a); Sale 170 (MMS, 1998); various Alaska Chukchi Sea oil and gas lease sale EISs, including Sale 109 (MMS, 1987b); Sale 126 (MMS, 1991) and the original TAPS EIS prepared by the Federal Task Force on Alaskan Oil Development (BLM, 1972).

These documents fulfilled requirements of the National

Environmental Policy Act (NEPA), and along with permitting comment periods, have allowed public and agency review of these developments. In this report, relevant material in these and other reports is summarized and updated where appropriate and feasible, and pertinent new material is presented where appropriate.

1.1.1.5 Analysis of Effects

The three study areas are treated together in describing the affected environment, but impacts are analyzed separately in Section 4. Sections 4.3 and 4.4 discuss the direct and indirect effects of the proposed action and the no-action alternative on the pipeline route itself, while Section 4.5 analyzes the cumulative impacts. [Note that the CEQ guidelines consider the terms *effect* and *impact* to be synonymous (40 CFR 1508.8).] These analyses follow as closely as possible the definitions provided by the Council on Environmental Quality (CEQ):

- **Direct effects** are “caused by the action and occur at the same time and place” (40 CFR 1508.7).
- **Indirect effects** are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.7).
- **Cumulative impact** is “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

In accordance with these definitions, the direct effects are treated as those directly associated with TAPS as defined above, which includes the pipeline, pump stations, access roads, material sites, VMT, etc. Such effects include ground disturbance from maintenance actions, air emissions from pump stations, and wastewater discharges from ballast water treatment .

For this Environmental Report, the distinction between indirect effects and cumulative impacts is somewhat complex. It would be possible to consider the effects of the Alaska North Slope oil fields and the marine transportation

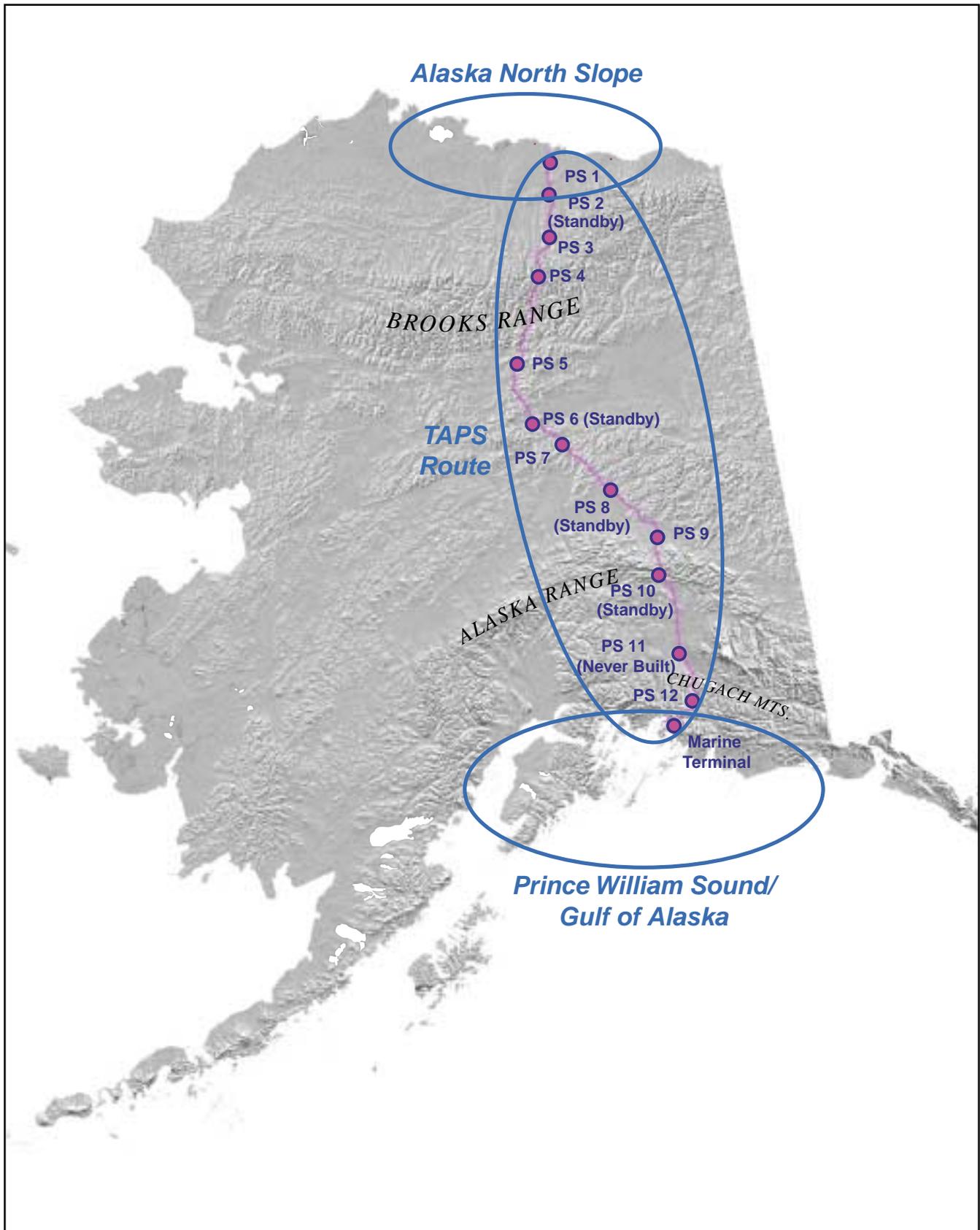


Figure 1.1-1. General study areas used in preparation of this Environmental Report.



link as indirect effects of TAPS ROW renewal. However, these are treated in the cumulative effects section for two reasons. First, developments on the North Slope require extensive permitting, have undergone NEPA reviews, and thus are considered separate actions from TAPS ROW renewal. The permitting for such developments usually includes an EA or EIS. Secondly, the marine transportation system, while integral to bringing ANS crude to market, is managed by a separate set of agencies and laws than TAPS itself. For example, the Oil Pollution Act of 1990 (OPA 90) and U.S. Coast Guard regulations mandate how tankers operate in Prince William Sound and the Gulf of Alaska. Alyeska Pipeline Service Company provides tanker escort and spill response support in accordance with OPA 90, but the tankers are not under Alyeska control or the control of the Joint Pipeline Office, which regulates TAPS operation.

As a result, development of Alaska North Slope oil fields and the marine transportation system are treated in Section 4.5 of this Environmental Report as separate actions from TAPS ROW renewal. It is somewhat academic to debate whether their effects are treated as indirect effects of TAPS because they would not exist without TAPS or as cumulative effects since they are separate actions. It is important to adequately assess both their separate and cumulative effects.

In general, Section 4.5 of this Environmental Report treats ANS and PWS effects as cumulative effects because these regions are not directly affected by TAPS as defined in Stipulation 1.1.1.22 of the Federal Grant. However, the specific approach for each technical discipline varies based on the requirements of the analysis. For example, the analysis of economic effects in Section 4.3 includes the effects of North Slope oil development and tanker transportation. The model used for this analysis considers the economics of the entire oil production and transportation system because they are inextricably tied together economically.

1.1.2 How to Use This Report

The body of this Environmental Report is divided into four major sections based on the guidelines of the Council on Environmental Quality. It is important to read these sections in order because each builds on the one before it.

- **Section 1** describes the *purpose of and need for the action* and gives background on the history of TAPS.
- **Section 2** describes the *proposed action* (renewal of the Federal Grant) and *the no-action alternative* (non-renewal). This section provides a detailed de-

scription of the facilities that make up TAPS and projected use during a 30-year renewal period, as well as activities required for the removal of the system that would ensue in the no-action alternative.

- **Section 3** describes the *physical, biological, and social features* of the affected environment to form the basis for the analysis of environmental consequences.
- **Section 4** analyzes the *environmental consequences* of the proposed action and the no-action alternative. First, however, the section describes the *ground-impacting maintenance actions* that would occur during the renewal period, as well as the *mitigation measures* that are built into TAPS design and operation. In addition, the section provides a discussion of oil spill potential, which is analyzed in detail in Appendix B. Section 4 also addresses the potential *cumulative effects* of the alternatives in relation to past, present, and reasonably foreseeable future actions.

The mechanical and organizational conventions followed in the report are summarized below:

- **Authors** of individual report sections are identified as bylines in the text and are compiled in **Section 5**. Where more than one author is identified in a byline, the first author listed is the principal author for the section. If a byline does not appear for any given section, the authors are the same as the section preceding it. An alphabetical listing of authors cross-referenced to sections to which they contributed is included in Section 5.
- Both metric and English *units of measurement* are used in this report, generally according to the custom of each technical discipline. Where appropriate for clarity, conversions are provided.
- An *alphabetical subject index* for the report is contained in **Section 6**. This index consists of key words and subjects and the most important pages on which they occur in the text.
- **Acronyms** are defined in the text the first time they occur in each major section (i.e., Sections 1, 2, 3, etc.). **Section 7** provides an alphabetical list with definitions for all acronyms used in the report.
- A complete list of *literature cited* for the text is contained in **Section 8**, while literature cited for each appendix is provided at the end of that appendix. Literature is arranged alphabetically by author last name and date of publication. Personal communications are treated in the same manner, with the author being the person consulted and the date the year of the contact.
- **Maps** are provided in the text showing important



place names along the pipeline route and in the state of Alaska. Refer to Appendix C for a set of 25 detailed maps of TAPS based on U.S. Geological Survey topographic data. These maps include the following information:

- TAPS pipeline and facilities, including pump stations, valves, access roads, and material sites.
- Land ownership of the right-of-way.
- Topography, place names and roads.
- Glaciers and water bodies.