United States Department of the Interior

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November 26, 2002

Dear Reader,

I am pleased to present the *Final Environmental Impact Statement: Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way*. This Final Environmental Impact Statement (EIS) provides analysis critical to the Bureau of Land Management's decision on renewal of the Right-of-Way (ROW) for the Trans-Alaska Pipeline System (TAPS).

This document reflects the work of many people in the Bureau of Land Management (BLM) and its contractor, the Department of Energy's Argonne National Laboratory, as well as experts from other federal and state agencies both inside and outside the Joint Pipeline Office. It also reflects the comments we received from the public on the Draft EIS. I especially want to thank those who spoke at public hearings and those who submitted comments for helping us make the Final EIS as factual and inclusive as possible. By presenting your views, knowledge, and insights, you have added much to the final product.

The BLM conducted its renewal analysis in close partnership with the Alaska Department of Natural Resources (DNR). The DNR is conducting its own independent analysis as part of its responsibility for renewing the part of TAPS that crosses state land. Information on the DNR process and its analysis is available at http://www.tapsrenewal.jpo.doi.gov.

If you have any questions about the renewal process or this document, please contact Rob McWhorter (907-257-1355).

Sincerely,

Henri R. Bisson
State Director

BLM/AK/PT-03/005+2880+990

Final Environmental Impact Statement

Renewal of the Federal Grant for the Trans-Alaska Pipeline System Right-of-Way

Volume 1: Executive Summary

U.S. Department of the Interior
Bureau of Land Management

November 2002

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The following is a list of acronyms and abbreviations used in this Executive Summary. Certain abbreviations used only as reference callouts are not included here but are defined in the reference list.

ACMP	Alaska Coastal Management Plan
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
ADT	Alaska Daylight Time
ANUA	Alaska Native Utilization Agreement
ANWR	Arctic National Wildlife Refuge
APSC	Alyeska Pipeline Service Company
AQRV	air-quality-related value
AST	Alaska Standard Time
BLM	Bureau of Land Management (U.S. Department of the Interior)
BWTF	Ballast Water Treatment Facility
CFR	Code of Federal Regulations
CMP	coastal management program
CO	carbon monoxide
CO_2	carbon dioxide
DEIS	draft environmental impact statement
DOI	U.S. Department of the Interior
DOT	U.S. Department of Transportation
DOT/OPS	U.S. Department of Transportation, Office of Pipeline Safety
EIS	environmental impact statement
EMS	earthquake monitoring system
EPA	U.S. Environmental Protection Agency
ERV	escort response vessel
FDA	U.S. Food and Drug Administration
FEIS	final environmental impact statement
GSP	gross state product
JPO	Joint Pipeline Office
LVB	line volume balance
MAP	Man in the Arctic Program
MLA	Mineral Leasing Act
MP	milepost
NEPA	National Environmental Policy Act
NMDS	National Missile Defense System
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NORM	naturally occurring radioactive material

NPDES	National Pollutant Discharge Elimination System
NPP	national park and preserve
OCC	Operations Control Center
OMS	operational material site
OPS	Office of Pipeline Safety (U.S. Department of Transportation)
OSHTF	(Alaska) Oil Spill Health Task Force
PA	Programmatic Agreement
PAH	polycyclic aromatic hydrocarbon
PBT	persistent, bioaccumulative, and toxic
PCB	polychlorinated biphenyl
POTW	publicly owned treatment works
PS	pump station
RCAC	Regional Citizens' Advisory Council
RGV	remote gate valve
ROW	right-of-way
SERVS	Ship Escort/Response Vessel System
SHPO	State Historic Preservation Officer
TAPAA	Trans-Alaska Pipeline Authorization Act
TAPS	Trans-Alaska Pipeline System
TSDF	treatment, storage, and disposal facility
TVB	transient volume balance
USC	United States Code
VOC	volatile organic compound
VSM	vertical support member

Executive Summary

INTRODUCTION

The Trans-Alaska Pipeline System (TAPS) was constructed in 1974-1977 through the central portion of Alaska on right-of-way (ROW) granted by federal, state, and private landowners. The Agreement and Grant of Right-of-Way for the Trans-Alaska Pipeline (Federal Grant) was issued on January 23, 1974, and the State Right-of-Way Lease (State Lease) was issued on May 3, 1974. The Federal Grant covers the TAPS ROW as well as related facilities.

Congress enacted the Trans-Alaska Pipeline Authorization Act (TAPAA) on November 16, 1973, authorizing federal oversight of all TAPS activities and allowing modification of operating conditions at any time. The TAPAA remains in full force and effect, and the U.S Department of the Interior's (DOI's) Bureau of Land Management (BLM) is the lead federal agency for monitoring the TAPS operations. The BLM is a member of the Joint Pipeline Office (JPO) comprised of 13 federal and state agencies that oversee TAPS operations.

The current owners of the TAPS (TAPS Owners) are BP Pipeline (Alaska), Inc. (46.9263% share); Phillips Trans Alaska, Inc. (26.7953%); ExxonMobil Pipeline Company (20.3378%); Williams Alaska Pipeline Co. (3.0845%); Amerada Hess Pipeline Corp. (1.5000%); and Unocal Pipeline Company (1.3561%). The pipeline is operated for the TAPS Owners by the Alyeska Pipeline Service Company (APSC).

Because the Mineral Leasing Act (MLA) limits ROWs to no more than 30 years, the Federal Grant will expire in January 2004. The State Lease, also issued for 30 years, expires in May 2004. On May 2, 2001, the BLM received an application from the TAPS Owners to renew the Federal Grant for 30 years beyond the current expiration date. The BLM determined that the proposed action (renewal of the Federal Grant for 30 years) was a major federal action under the National Environmental Policy Act (NEPA), thus requiring issuance of an environmental impact statement (EIS). BLM is undertaking this EIS process to assess the environmental, social, and economic impacts associated with the proposed renewal of the Federal Grant.

SCOPE OF THE DECISION AND ANALYSIS

The TAPAA provides the Secretary of the Interior with the authority and obligation to oversee the construction, maintenance, operation, and termination of the entire pipeline system. The TAPAA provides more specific flexibility and authority for regulating the TAPS, inclusive of and beyond the usual requirements of Section 28 of the MLA. The BLM can impose new or supplementary requirements on the TAPS permittees at any time, not just at the time of ROW renewal. Even though some portions of the pipeline system – including Pump Station (PS) 1, 8, and 9 and the Valdez Marine Terminal – are on land owned by the TAPS Owners, the TAPAA and Federal Grant provide that all TAPS operations (even those on state and private lands as well as federal lands) are subject to BLM systemwide oversight and decisions. The Federal Grant specifies many of the federal responsibilities. Thus, this EIS evaluates alternative decisions, analyzes impacts, and considers mitigation measures applicable to all parts, and any part, of the TAPS, regardless of the underlying land ownership. The State of Alaska also has specific authorities over state lands that relate to its oversight of the TAPS. As a practical matter, the State of Alaska and the BLM coordinate on major oversight actions.

The TAPS Owners have applied for renewal of an array of uses, ranging from the main-line ROW to oil spill contingency plan sites. The

scope of the BLM decision and analysis encompasses the array of renewal considerations found in the TAPS Owner's application.

NEPA regulations require federal agencies to analyze the totality of the affected environment associated with a federal action, including cumulative impacts (*Code of Federal Regulations*, Title 40, Part 1508, Section 25 [40 CFR 1508.25]). In the case of the TAPS, indirect and cumulative impacts may include past, present, and reasonably foreseeable future actions that would affect the (1) same resources and lands as those that are affected by the pipeline system itself, (2) North Slope oil fields that depend on the pipeline to deliver oil to market, and (3) tanker traffic associated with transporting oil from the Valdez Marine Terminal to market. The TAPS is distinct from the North Slope oil fields and tanker traffic, relating to them as follows:

- TAPS/North Slope oil fields: The upstream end of the TAPS begins at the foot of the workpad at PS 1.
- TAPS/tanker traffic: The downstream end of the TAPS extends to the end of the loading arms for crude oil located at the tanker loading berths in the Valdez Marine Terminal; vapor control and ballast water treatment systems are considered part of the TAPS.

TAPS DESCRIPTION

The TAPS, as defined in the Federal Grant, includes "all facilities located in Alaska used by Permitees in connection with the construction, operation, maintenance or termination of the pipeline." Oil flows through the pipeline from PS 1 near the Prudhoe Bay oil field to the Valdez Marine Terminal on Port Valdez through an 800-mile-long, 48-inch-diameter hot oil pipeline (Figure ES-1). Approximately half the pipeline is buried. To prevent thawing of permafrost, about 420 miles of the pipeline is aboveground, mounted on approximately 78,000 vertical support members (VSMs) located about every 60 feet, and some buried sections are insulated or refrigerated and insulated. Anchor structures approximately every 800 to 1,800 feet hold the aboveground pipe in position. Eleven pump stations were built to move the oil through the pipeline. (Four of these are now on standby.) The marine terminal at Valdez has storage facilities for over 9 million barrels of oil and loading berths that can accommodate four tankers at once, although only two of these berths have vapor control systems and will provide primary loading capacity in the future.

Valves are strategically placed along the pipeline to isolate sections of the pipeline and to minimize the size of potential spills in the event of a pipe rupture. Most of the gate or ball valves can be controlled from the Operations Control Center (OCC) at the Valdez Marine Terminal or from the pump stations. All valves can be operated manually for maintenance of the line or for spill isolation, if necessary.

The six operating pump stations (PS 1, 3, 4, 7, 9, and 12) propel oil through the pipeline. One additional pump station (PS 5 on the southern slope of the Brooks Range) operates only to relieve pressure in the line. As a result of the decline in throughput in the 1990s, four other pump stations (2, 6, 8, and 10) were placed on standby in 1996 and 1997. Natural gas powers the turbines at PS 1, 3, and 4; farther south, liquid fuel turns the turbines. The pump stations include valves, pipe, tanks, and control equipment designed to relieve excessive pressures on the pipeline when the pipeline or a pump station shuts down.

The Valdez Marine Terminal is a 1,000-acre facility on land owned by the TAPS Owners on the southern shore of Port Valdez, across from the town of Valdez. The Valdez Marine Terminal performs two major functions: it stores and loads oil onto tankers for shipment to market and it houses the OCC.

ALTERNATIVES

Alternatives Analyzed in Detail

On the basis of information provided by the TAPS Owners in their renewal application and

FIGURE ES-1 Location of the Trans-Alaska Pipeline System

input received during the scoping process, three alternatives were identified for analysis in the EIS:

- **Proposed Action:** Renew the Federal Grant and essential rights for 30 years, which is the BLM's preferred alternative. Under this alternative, current operations would be authorized to continue for 30 more years. However, changes to the system's configuration and operation would continue to evolve to meet changing oil throughput, respond to changes in environmental conditions, and take advantage of new technologies for pipeline operations.
- **Renew Federal Grant for Less Than 30 Years:** Renew the Federal Grant for less than 30 years. Under this alternative, current operations would be authorized to continue for some period less than 30 years.
- **No-Action Alternative:** Do not renew the Federal Grant. Under this alternative, TAPS operations would cease at the end of the current Federal Grant (January 22, 2004). The BLM would require the TAPS Owners to remove the TAPS and restore the ROW to a condition specified by the BLM. If this alternative were selected, an additional NEPA review would be conducted to examine options related to the extent of TAPS removal and ROW restoration and to the process to be used to conduct those activities.

These alternatives cover the full spectrum of future options for the TAPS, ranging from continued operation for an additional 30 years (the maximum period allowed under current regulations) to termination of operations, removal of the TAPS, and restoration of the ROW. All are analyzed in detail in the EIS.

Alternatives Not Analyzed in Detail

During the scoping process conducted for this EIS, members of the public made a number of suggestions related to the future of the TAPS. Although the suggestions summarized below do not generally meet the criteria for TAPS renewal alternatives, the BLM has considered all of them. As indicated in the following discussions, there are different reasons for not analyzing those alternatives in detail. One reason common to several of the suggested alternatives is that BLM does not require additional authority to achieve the purpose of the suggested alternatives. Because of the broad authority granted in TAPAA, the BLM could undertake some of the following suggested alternatives under its current authority at any time. The BLM, for example, could establish advisory committees or conduct audits at any time based upon authority provided by statute, regulation, and the Federal Grant.

The BLM considered the following 12 alternatives but eliminated them from detailed analysis for the reasons described below.

1. **Transfer Ownership of TAPS to Another Entity.** The BLM determined not to analyze in detail in this EIS an alternative that would transfer ownership of the TAPS ROW. Such an alternative would have had ownership of the TAPS ROW denied to some or all of the current owners. This alternative would have the BLM granting the ROW to a new mix of owners or to a single company.

2. **Transfer Operation to Another Common Agent.** The BLM determined not to analyze in detail in this EIS an alternative that would require a new common agent for the TAPS Owners. This alternative would require that the TAPS Owners no longer use APSC as their common agent. Instead, the BLM would require the TAPS Owners to authorize one of the TAPS Owner companies or another company other than APSC to act as the common agent for all of the TAPS Owners.

   The TAPS ROW grant as it is proposed for renewal requires the TAPS Owners to appoint a common agent. Stipulation 1.4.2 states: "Permittees shall maintain a common agent for the construction, operation, maintenance and termination of the Pipeline System at all times during this Agreement." Defects in actions by the agent are the responsibility of the TAPS Owners and can be remedied through government oversight under the provisions

of the proposed renewal of the grant, regardless of who is acting as common agent. Changing the agent in and of itself, in contrast, would not ensure improved operation. Indeed, changing agents could, to the extent that the new agent relied on different personnel, cause significant disruptions. To the extent that the new agent would rely on current personnel, this alternative would have the same environmental effects and is therefore the same as the proposed action.

3. **Require Payment of the Exxon Valdez Oil Spill Settlement.** The BLM determined not to analyze in detail in this EIS an alternative that would require ExxonMobil Corporation to pay a $5 billion jury award for punitive damages stemming from the *Exxon Valdez* oil spill before renewing that corporation's TAPS ROW.

4. **Give BLM the Authority to Fine TAPS Owners.** The BLM determined not to analyze in detail an alternative that would have provided the BLM with the authority to fine the TAPS Owners. Under such an alternative, the BLM would have authority to fine the TAPS Owners for a variety of reasons, including failure to implement orders from the BLM in a timely fashion; failure to abide by the agreement for Alaska Native employment outlined in the Federal Grant; violations of Federal Grant provisions that protect pipeline integrity, worker safety, human health, or the environment; substantiated harassment or intimidation to prevent whistle-blowing by employees; and retaliation against whistle-blowers.

   New rule-making and perhaps new legislation would be required to give the BLM authority to levy fines for this wide range of actions of the TAPS Owners. In addition, a separate process, including NEPA review, would be required to adopt such regulations. Adopting such a rule-making could be undertaken at any time; it does not have to be done in at the time of renewal. Consideration of such regulations is outside the scope of this EIS.

   The Oil Pollution Act of 1990 gives the Secretary of the Interior the authority to impose civil penalties on the TAPS Owners or APSC for any discharge of oil from the pipeline or at its terminal (43 USC § 1656 [2002]). While this penalty authority is limited, it is still one method the Secretary has to discourage these types of problems.

5. **Establish an Advisory Committee Funded by the TAPS Owners.** The BLM determined not to analyze in detail in this EIS an alternative that would have established an advisory or oversight committee. Such a committee could take in all aspects of the TAPS or focus on specific aspects, such as Native-related issues or subsistence. Such a committee could be entirely voluntary or could have funding of various levels from the BLM or from the TAPS Owners. It might be authorized and sponsored by BLM alone or be authorized and sponsored by the various agencies within the JPO. It might be composed of local officials and Tribal leaders representing the communities along or near the TAPS. Alternatively, it could be structured more broadly, such as with the Regional Citizens' Advisory Councils (RCACs) for Prince William Sound and Cook Inlet established pursuant to the Oil Pollution Act of 1990.

   Establishment of a citizens' oversight committee for TAPS operations and maintenance is generally outside the scope of the EIS process for the renewal of the Federal Grant. The BLM and other federal and state agencies have statutory authority to provide regulatory oversight for TAPS operations and maintenance activities. This authority and responsibility cannot be displaced, shared, or abdicated. Agencies that operate within the framework of the JPO also derive their oversight responsibilities from specific statutes and regulations. As with the BLM, these authorities form a legally binding regulatory responsibility on the agency. An additional layer of oversight would not

increase authority over the TAPS, nor relieve the agencies of their statutory obligations.

Citizen participation and citizen input have been and will continue to be fundamental components of the government's responsibility to ensure safe and environmentally protective TAPS operations. Nothing prohibits the BLM from establishing an advisory group at any time. At this time, however, the agency believes that a citizens' advisory committee is unnecessary. As noted above, there are several processes and advisory committees currently seeking public input, and a new advisory committee would be redundant and would potentially cause public confusion as to which committee is most suitable for any given topic.

6. **Conduct Periodic Audits.** The BLM determined not to analyze in detail an alternative that would require periodic audits of the operation of the TAPS. Under such an alternative, the TAPS Owners would be required to fund an independent audit of TAPS at specified intervals (e.g., every 5 years). Under this alternative, continued authorization of the TAPS ROW would be contingent upon the results of these periodic audits.

   The BLM does not see a need to conduct an immediate independent audit of TAPS facilities and the associated management and operation processes, or to conduct a continuing series of third-party audits at predetermined intervals. As noted above, audits are one of the tools commonly used by the BLM and the agencies of the JPO to evaluate and regulate TAPS operations and maintenance. The BLM has existing discretion and authority under the Federal Grant to conduct or contract for independent reviews and audits as appropriate and needed. Consequently, this alternative was eliminated from separate detailed analysis because this tool is already available to BLM under current operating practices so it is effectively analyzed by the analysis presented in the proposed action.

7. **Establish an Escrow Account for TAPS Removal and ROW Rehabilitation.** The BLM determined not to analyze in detail in this EIS an alternative that would have required the TAPS Owners to establish an escrow account that could be drawn upon to fund removal of the TAPS and rehabilitation of the ROW after TAPS was terminated. Such an escrow account would be readily available to the government, independent of any action by the TAPS Owners, to assure that TAPS removal and rehabilitation is conducted promptly and satisfactorily following completion of the use of the TAPS.

   Proper removal of the TAPS and rehabilitation of the TAPS ROW is a valid concern. The BLM believes that the legal commitments in regulations and the guarantees provided by the TAPS Owners constitute adequate assurances to ensure full-cost recovery from the TAPS Owners for the dismantlement, removal, and restoration of the ROW upon the termination of TAPS. In addition, prior to renewing the ROW the Secretary, pursuant to the Mineral Leasing Act (Section 28(j), 30 USC § 185(j)), will determine whether the TAPS Owners have "the technical and financial capability to . . . terminate the project." Renewal cannot proceed without such a determination. Therefore, evaluating this alternative is redundant because the environmental effects would be the same as those of the proposed action.

8. **Establish an Escrow Account to Fund Emergency Aid for Loss of Subsistence or Economic Benefit Because of TAPS Activities, and Permit Individuals to Sue for Such Aid.** The BLM determined not to analyze in detail in this EIS an alternative that would require the TAPS Owners to establish an escrow account from which subsistence users and others could be compensated for loss because of the TAPS. The BLM also determined not to analyze in detail an alternative that would allow individuals to sue the TAPS Owners

to obtain emergency subsistence and other aid.

The BLM determined not to analyze this alternative in detail because the obligations placed on the TAPS Owners by law and the Federal Grant assure compensation for loss of subsistence resources and allow for expedited aid. There is nothing in law or policy that would prevent affected individuals from suing TAPS Owners or the federal government for harm caused by operation of the TAPS. Consequently, this alternative does not substantially differ from the proposed action.

9. **Establish an Escrow Account to Fund Studies of Impacts of the TAPS on Rural Alaska and to Address Those Impacts.** The BLM determined not to analyze in detail in this EIS an alternative that would require the TAPS Owners to establish an escrow account to fund studies of impacts of the TAPS on rural Alaska and to address those impacts. Some rural Alaskans contend that the TAPS has had large impacts on rural Alaska, although the scope of these impacts is not well understood. Studies might determine what impacts on rural Alaska stem from the pipeline. On the basis of the improved understanding the studies would provide on this issue, the escrow account would also fund remedies to rural problems.

   The BLM has the ability to fund any studies it finds necessary in the course of its monitoring of the TAPS and can oblige the TAPS Owners to fund such studies. If additional specific studies of such impacts are considered necessary, the BLM, under all the alternatives, may conduct them or hire an appropriate contractor to do them. Consequently, this alternative does not substantially differ from the proposed action.

10. **Require Maintenance of 20% Native-Hire Employment and Allow Natives to Bring Suit for Failure to Achieve That Goal.** The BLM determined not to analyze in detail in this EIS an alternative that would specifically require that 20% of employees working on the TAPS be Alaska Natives. The agency also determined not to analyze in detail an alternative that would grant Alaska Natives the ability to sue the TAPS Owners for failure to achieve that percentage.

    The authority in the renewal grant is sufficient to assure Alaska Native hire goals, as is demonstrated by the recent success of TAPS Owners to meet Alaska Native employment goals. Consequently, the BLM determined not to analyze this alternative in detail. The BLM already has the authority to require that the TAPS Owners achieve their Alaska Native employment objectives, so this alternative is substantially similar to the proposed action analyzed in detail in the EIS.

11. **Close the Dalton Highway or Restrict Access along the Highway.** The BLM determined not to analyze in detail in this EIS an alternative that would close or restrict access along the Dalton Highway, which parallels the TAPS from near Livengood north to the Prudhoe Bay oil fields. This alternative would have allowed only oil-related traffic or access by oil-related traffic and local residents. Traffic on the highway may impact migrating animals, including caribou, that are important for local subsistence. In addition, anglers and hunters from other areas can use the highway to access this remote part of Alaska, thus competing with local residents for fish and game and potentially subtly changing the local culture.

    The Dalton Highway is a federal aid highway under the jurisdiction of the State of Alaska Department of Transportation. The BLM does not have the authority to regulate access to the Dalton Highway. Moreover, the highway is an integral part of the infrastructure needed not only to maintain and operate the TAPS, but also to provide numerous other public benefits, including tourism, sight-seeing, security or law enforcement access, and hunting and fishing.

12. **Increase Oil Spill Response Capabilities by Training, Hiring, and Equipping Additional Local Oil Spill Response Crews.** The BLM determined not to analyze in detail in this EIS an alternative that would involve training, hiring, and equipping additional local oil spill response crews. The intent of such crews would be increased oil spill response capabilities and additional employment opportunities for communities along the TAPS.

    Oil spill prevention and response planning are central to the BLM's and other agencies' missions within JPO. The oil spill planning and prevention effort in the JPO is a large-scale, multiagency endeavor. Each of five participating agencies (BLM, Alaska Department of Environmental Conservation [ADEC], U.S. Environmental Protection Agency [EPA], Alaska Department of Natural Resources [ADNR], and the U.S. Department of Transportation's Office of Pipeline Safety [DOT/OPS]) has a particular focus, but these are all considered collectively in the JPO TAPS oil spill response and planning group.

    Oil spill response planning involves a separate process and is not part of the decision on the application to renew the Federal Grant. APSC submits oil spill contingency plans for the TAPS to the BLM and other federal and state agencies within the JPO that have regulatory authority over the pipeline. These oil spill plans address the training, hiring, and equipping of oil spill response crews. The BLM reviews these plans annually and participates in the triennial reviews of such plans by the ADEC. The ADEC's reviews incorporate public reviews of the plans. The BLM completed its most recent review in April 2002, and the ADEC completed its most recent review in November 2001. In addition, the EPA completed its review of spill response plans for oil storage facilities in 1998 and participated in the ADEC's review in the fall of 2001. Also, the DOT completed a review of the TAPS spill response plan in September 2000. None of these reviews indicated a need to train, hire, or equip additional local oil spill response crews. Future reviews, however, may reexamine that question.

PUBLIC PARTICIPATION

Scoping

A scoping process was conducted from July 31 to October 19, 2001, to obtain input on the scope for this EIS. During that period, the BLM invited the public and interested groups to provide information, suggest issues that should be examined, and express their concerns and opinions on all aspects of the proposal to renew the Federal Grant. Six public meetings were held at various locations throughout Alaska as a part of the scoping process.

More than 1,700 people participated in this process by providing comments, requesting information, attending public or Tribal government consultation meetings, or visiting the TAPS Renewal EIS Web Site. All comments, regardless of how they were submitted, received equal consideration. The results of the scoping process were documented in a report issued in November 2001. This document can be viewed at the TAPS Renewal EIS Web Site at http://tapseis.anl.gov.

Comments on the Draft Environmental Impact Statement

The Draft EIS (DEIS) was issued in July 2002. The Notice of Availability (NOA) of the DEIS was published by the EPA in the *Federal Register* on July 5, 2002 (Volume 67, Number 129). Publication of the NOA began the required 45-day public comment period on the DEIS. Additionally, the BLM notified the public about the comment process via newsletters, newspaper advertisements, local media, and the TAPS EIS Web Site during the period June 24-July 25, 2002. The public comment period closed at 5 P.M. (ADT) on August 20, 2002.

During the public comment period, six ways were provided for the public to submit comments on the DEIS:

- Open public hearings were held in Cordova, Valdez, Glennallen, Fairbanks, Minto, Anchorage, and Barrow. The meetings were facilitated by a hearing officer, and all testimony was captured verbatim by a court reporter.
- Traditional mail.
- Hand delivery.
- Toll-free facsimile transmission.
- Toll-free voice message.
- Directly through a web site on the Internet.

This variety of ways to provide comments was intended to encourage maximum participation. All comments, regardless of how they were submitted, received equal consideration.

More than 580 people and organizations participated in the public comment process by providing letters, oral testimony, Internet-based comments, faxes, or voice message comments. More than 100 recognized organizations (public and private), including Alaska Native organizations, provided comments on the DEIS.

Approximately 460 individuals and organizations provided state and country locations. Based on that information, comments were received from a minimum of 32 states, the District of Columbia, and two foreign countries. Of those commentors, 55% were from Alaska and 45% were from the other states. States with the most commentors included Alaska (252), California (33), New York and Ohio (14 each), Illinois (13), Washington and Pennsylvania (12 each), Texas (11), Oregon (9), New Jersey (7), and Virginia, Florida, and Massachusetts (6 each).

On the basis of the documents (sets of comments from an individual or organization) received during the public comment period, comment categorization resulted in approximately 3,200 individual comments. Responses to comments are found in Volume 6 of the Final EIS (FEIS). Response to the comments resulted in many changes and improvements to the FEIS.

Government-to-Government

The federal government works on a government-to-government basis with Alaska Native Tribes. The government-to-government relationship was formally recognized on November 6, 2000, with Executive Order 13175. As a matter of practice, the BLM coordinates with all Tribal governments, associated Native communities, Native organizations, and individuals who are interested in the TAPS ROW renewal process. The BLM has given substantial consideration to the proper conduct of government-to-government consultations for this project in order to provide for multiple opportunities for Tribal consultation.

The BLM developed an explicit consultation process that offers specific opportunities to “directly and substantially affected” Tribes as required under the government-to-government provisions. Executive Order 13175 stipulates that Tribes identified as “directly and substantially affected” be consulted by federal agencies during the NEPA process. In May 2001, 19 Tribes (later increased to 21) were identified by the BLM as being “directly and substantially” affected by the TAPS ROW renewal process.

Throughout the renewal process, the BLM and the EIS team provided special presentations or further information exchange. The BLM carefully listened to the concerns of the Native people. The majority of concerns were related to employment opportunities, possible impacts on a subsistence life style, the importance of preserving the subsistence-oriented aspects of traditional culture, and spill response activities.

CURRENT AND ONGOING MITIGATION

General

A number of mitigation measures have been employed by the TAPS Owners and the JPO over the course of the TAPS operations under the current Federal Grant. These measures and other oversight steps would be expected to continue under an extension of the Federal

Grant. Mitigation measures include those covered by technical, environmental, and general stipulations as well as by the requirements of the 41 sections of the Federal Grant and the 42 sections of the State Lease.

JPO oversight of TAPS operations represents the foundation of mitigation activities. The fundamental objective of all JPO oversight is to ensure that the APSC, as the permittees' common agent, complies with all requirements delineated in the Federal Grant and State Lease and their stipulations. JPO member agencies have clear and direct regulatory authority in five compliance activities:

1. Issue necessary permits and authorizations to operate the TAPS;
2. Monitor the TAPS and TAPS activities to identify situations requiring corrective action;
3. Approve construction or other actions;
4. Perform direct compliance or remediation actions, as necessary, to protect public safety and health, the environment, and pipeline integrity; and
5. Respond to oil spills and other abnormal conditions.

Once the JPO, through the appropriate governmental process, directs APSC to conduct a corrective action (including compliance or remediation activities), APSC must comply. APSC's failure to comply in a sufficient and timely manner may result in civil or criminal penalties levied by regulatory agencies or in termination or civil penalties under the Federal Grant, using the process described in Federal Grant Section 31.

In addition to the ongoing oversight of TAPS operations by JPO agencies, numerous design features were incorporated into the TAPS to mitigate anticipated events. For example, special installation techniques and foundations used during original construction of the pipeline included the following:

- Conventional burial of the pipe along 376 miles of ROW where the ice content of the permafrost was very low or absent,
- Burial of pipe at specific locations to ensure free passage of big game animals,
- Refrigeration of buried pipe along about 4 miles of the pipe to avoid thawing of permafrost, and
- Placing insulated boxes along the pipeline where avalanches could likely threaten the pipeline integrity if it were above ground.

Many corrosion control measures were implemented along the pipeline to avoid structural degradation from chemical processes. Cathodic protection technologies are employed to mitigate corrosion of buried main-line pipe. In addition, cathodic protection systems are installed at each pump station and also function to provide protection to adjacent segments of buried pipe.

In addition to corrosion protection, design measures were implemented to ensure pipeline integrity in case of earthquakes. Stipulation 3.4.1.1 of the Federal Grant sets criteria governing the design features to mitigate the effects of earthquakes and fault displacement (see earlier text box on the November 3, 2002 earthquake).

Special design considerations were also implemented where the pipeline crosses 80 major rivers either below or above ground and is in or adjacent and parallel to a number of river valleys. In accordance with Federal Grant Stipulation 3.6.1.1, these crossings were designed to accommodate foreseeable erosion, scour, ice conditions, and river meanders. In addition, the pipeline was designed to maintain its integrity during the "pipeline design flood," a theoretical major flood magnitude computed for every significant river and creek crossing.

Air quality issues have also been considered in design criteria. Certain crude oil handling activities have the potential to release volatile organic compounds (VOCs). Storage tanks and equipment are vented for fire and overpressure safety reasons, and the VOCs released could be emitted to the atmosphere. Major sources of crude oil vapor emissions are controlled through vapor recovery systems at PS 1 and the Valdez Marine Terminal, including a tanker vapor control system to capture vapors during tanker

loading operations at two of four existing tanker births.

The most significant water quality issue has been addressed with addition of the Ballast Water Treatment Facility (BWTF) located at the Valdez Marine Terminal. Oily ballast water from tankers and other wastewaters are treated to reduce pollutant discharge into the harbor area.

Measures to control leaks are integral components of the TAPS. Main-line pipeline and pump station valves have three purposes: minimize spills in the event of a leak in the main line, prevent overpressurization of the pipeline, and isolate pump station and terminal facilities. The prevention of oil spills is a key TAPS design objective.

The TAPS leak detection systems include deviation alarms for pressure and flow rate, line volume balance (LVB) leak detection, and transient volume balance (TVB) leak detection. Each system capitalizes on unique leak characteristics. The intent is to detect leaks as early as possible and when they are as small as possible so as to minimize environmental damage. To supplement leak detection systems, regular and frequent visual field observations are performed from both the air and the ground.

Several Federal Grant stipulations pertain to the conservation of terrestrial mammals and require mitigation of impacts to wildlife associated with TAPS construction, operation, and maintenance. Concern for potential obstruction of the migration patterns and local movements of caribou, moose, and bison resulted in construction of special pipeline ROW crossings for big game animals. A total of 554 of these crossings were installed along the pipeline in areas known by state and federal biologists to be regularly used by bison, moose, and/or caribou on the basis of traditional use and/or habitat characteristics.

In addition to design controls, TAPS operation controls are in place to provide management with “business model” to conduct daily work functions, including administrative control on monitoring, surveillance, and maintenance and biological considerations for operations and maintenance. For example, in response to stipulations of the Federal Grant and State Lease, as well as in recognition of the overall program quality objectives of Section 9 of the Federal Grant and Section 16 of the State Lease, APSC has developed numerous formal procedures and operating manuals to control critical aspects of TAPS operations.

In addition, numerous routine monitoring, surveillance, and maintenance activities are performed to preserve and ensure system integrity. Although monitoring and surveillance activities do not themselves constitute mitigation, they do produce reliable data on the current condition of critical TAPS equipment relative to predetermined adequate levels of performance. These data, in turn, support mitigation decisions. The TAPS monitoring, surveillance, and preventive maintenance efforts focus on the following areas: main-line pipeline integrity, corrosion control, bridge monitoring, river and floodplain monitoring, seismic (earthquake) activity, slope stability, glacier surge, fuel gas line, and buildings and structures.

APSC’s response to Federal Grant stipulations that control impacts on biological resources involves numerous initiatives, including (1) development and distribution of corporate policies on interacting with and protecting biological resources; (2) issuance of explicit directives, guidance, and prohibitions to APSC personnel and TAPS contractors; (3) training of APSC personnel about potential impacts on biological resources, including appropriate behavior toward wildlife; (4) appropriate posting at facilities or distribution of relevant permits and the TAPS environmental atlas delineating sensitive areas; (5) development of contingency plans that include special consideration for biological resources; and (6) development and implementation of internal administrative controls and procedures.

Spill Prevention and Response

Many JPO agencies have authorities over spill prevention and response measures. The DOT/OPS regulates pipeline safety and approves contingency plans. The JPO Authorized Officer monitors system integrity and approves spill contingency plans for the pipeline

and terminal. The ADEC also approves spill contingency plans for their conformance with state requirements.

In 1990, after the Exxon Valdez spill, Alaska enacted legislation that significantly strengthened standards for oil tankers, terminals, pipelines, and oil exploration and production facilities. The ADEC amended its regulations under 18 AAC 75, Oil and Other Hazardous Substances Pollution Control, accordingly. Among other measures, the new law required that spill prevention requirements be added to spill contingency plan rules; that response planning standards be established for different types of facilities; and that ADEC review and approve oil discharge prevention and contingency plans.

Pipeline. Operation of the main TAPS pipeline and pump station facilities, beginning at the incoming producer pipeline block valve and ending at the Valdez Marine Terminal property fence, is governed by the TAPS Oil Discharge Prevention and Contingency Plan (APSC 2001a). It provides detailed information for reconnaissance, response, and containment actions in the event of an oil spill.

This TAPS Contingency Plan, which is reviewed annually by the BLM, every 3 years by ADEC, and every 5 years by DOT, divides the 800-mile pipeline into five regions. (Region 1 extends from MP 0 to 206, Region 2 from MP 206 to 357, Region 3 from MP 357 to 496, Region 4 from MP 496 to 648, and Region 5 from MP 648 to 800.) It contains an oil discharge prevention and contingency plan for each region.

Valdez Marine Terminal. Spill prevention and response measures for the Valdez Marine Terminal are established in the Valdez Marine Terminal Oil Discharge Prevention and Contingency Plan (CP-35-2) (APSC 2001b), which has been approved by ADEC. Part 2 of this plan addresses the prevention programs, procedures, requirements, and equipment in place at the Valdez Marine Terminal.

Part 1 of the Valdez Marine Terminal Contingency Plan addresses the terminal's response actions in the event of an oil spill there. It does not address the response to spills from tankers berthed at the terminal. Such spills are responded to in accordance with each tanker's plan and the Prince William Sound Oil Discharge Prevention and Contingency Plan.

Prince William Sound. Spill prevention and response measures for oil spills originating from a tanker at berth or traveling upon state waters of Prince William Sound are outlined in the Prince William Sound Oil Discharge Prevention and Contingency Plan (Prince William Sound Tanker Plan Holders 1999).

In Prince William Sound, oil spills can occur while a tanker is in transit from causes such as collisions, groundings, striking floating objects, or impact with a fixed object. They also can occur while a tanker is at berth from such causes as berthing or unberthing impact, mooring line failures, structural failure, or mishaps during crude oil or ballast water transfer operations.

An important prevention and response resource is the APSC Ship Escort/Response Vessel System (SERVS). One of the missions of SERVS is to prevent oil spills by helping tankers safely navigate through Prince William Sound. SERVS uses five escort response vessels (ERVs) for this mission. SERVS response responsibilities include assisting laden tankers in emergencies and providing an initial oil spill response.

North Slope. North Slope operators maintain oil spill contingency plans in accordance with state and federal laws. North Slope spill response plans are based on the operators' membership in Alaska Clean Seas (ACS), an oil spill response cooperative. The Alaska Clean Seas Technical Manual (ACS 1999) provides member companies with a unified response plan for spills in the North Slope oil fields, both onshore and offshore, and spills from PS 1 to PS 4 of the TAPS.

IMPACT FINDINGS

Table ES-1 provides a summary of the impact findings for the three alternatives analyzed in the EIS. The following material provides additional details on those findings.

TABLE ES-1 TAPS ROW Renewal FEIS Summary of Direct and Indirect Effects

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Physiography and Geology		
Soils and Permafrost		
Action Impacts: Geologic processes associated with the TAPS are expected to be confined to localized areas near the TAPS. Destruction of vegetation cover, erosion, and siltation would be localized and would not increase over levels seen historically during TAPS operations. An increase in oil throughput could expand thaw bulbs and result in ground settlement near the TAPS. A reduction in throughput could result in frost heaves. *Cumulative Impacts:* Oil and gas activities, as well as other construction activities and human habitation would impact soils and permafrost in local areas. Travel on gravel roads would generate road dusts, which would facilitate thawing of permafrost along roadways. If the current warming trend in Alaska would continue to occur, permafrost changes would occur with time. The TAPS would be a minor contributor to cumulative effects.	*Action Impacts:* The types of impacts on geology during the renewal period would be similar to those of the proposed action. Excavation associated with pipeline maintenance (e.g., rerouting of pipeline, valve replacements, corrosion digs) and spill cleanup and heat transfer associated with oil throughput would impact soil and permafrost similarly to such activities under the proposed action. However, such activities may be fewer and cease sooner under a shorter-term renewal. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts*: The impacts on geology during the first two years of termination activities would be comparable to those of the proposed action, though the risk of impacts from spill cleanup would be reduced. Dismantlement and removal of the TAPS would cause minor change in geological processes and the removal of some geologic material. During the first 2 years of preparatory work for termination activities, the impacts on soils and permafrost would be about the same as those from the proposed action. Increased traffic, movements of heavy equipment, and ground disturbance during the dismantlement and removal phase would degrade previously stabilized permafrost. These impacts would be limited to areas adjacent to the aboveground portions of the pipeline and access roads. An estimated 4,525 acres would be disturbed. Activities associated with the restoration of disturbed land would temporarily increase soil erosion and siltation in nearby water bodies. In addition, the dismantlement and removal of TAPS components would redisturb the thermal regime of the surface soil, possibly resulting in thermokarst topography. The impact on soils from the decrease in heat flow in the belowground pipeline, once the crude oil stopped flowing, would be local and minor. With time, the belowground pipeline segments left in place would become corroded and collapse. Ground depressions might be created above such collapses.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Soils and Permafrost (Cont.)		*Cumulative Impacts:* If the operation of the TAPS was terminated, there would be no impacts from new oil development on the North Slope; however, geologic impacts would continue with gas development and production and construction of a new buried natural gas pipeline. There could still be impacts from gas development, including both additional drilling pads and associated roads and construction of a gas pipeline. Termination activities would temporarily increase soil disturbance and increase generation of dusts from roads, which would affect permafrost in the vicinity of the pipeline and in the vicinity of oil production facilities being dismantled. Longer-term impacts to soils would be reduced due to reduced petroleum activities and less oil-related traffic on unpaved roads. Other construction activities and human habitation would continue to impact soils and permafrost. The current warming trend in Alaska would continue to occur, compounding permafrost effects with time.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Sands, Gravels, and Quarry Resources		
Action Impacts: Less than 100,000 yd^3/yr of sand, gravel, and quarry stone would be extracted for maintenance. *Cumulative Impacts:* Oil and gas development, mining, urban development, and logging would require sand, gravel, and quarry resources, primarily from local sources. Quarry stones would be transported to the North Slope from the Brooks Range. TAPS operation would be a minor contributor to requirements for these resources.	*Action Impacts:* Less than 100,000 yd^3/yr of sand, gravel, and quarry stone would be extracted for maintenance during the renewal period. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Field activities in the first 2 years of termination activities might use more of these resources than the proposed action (i.e., less than 100,000 yd^3/yr). These materials would not be needed after the preparatory phase of the termination activities; therefore, subsequent impacts on these resources would be much smaller than for the proposed action. *Cumulative Impacts:* Following an initial demand during facility removal, use of these resources would decline with the decline in oil exploration, development, and production. Other uses, such as requirements for a buried natural gas transportation pipeline, road building, mining, and urban development would continue.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Paleontology		
Action Impacts: Renewal of the Federal Grant would be unlikely to adversely affect paleontological resources. There is a very low potential for contamination of nonpetrified paleontological materials by an oil spill.	*Action Impacts:* Renewal of the Federal Grant would be unlikely to adversely affect paleontological resources. There is a very low potential for contamination of nonpetrified paleontological materials by an oil spill.	*Action Impacts.* Although no adverse effects on paleontological resources are anticipated under the no-action alternative, there is a very small potential that ground disturbance during dismantlement could damage or obscure paleontological resources. Following termination activities, the potential for impacts from TAPS would cease.
Cumulative Impacts: Depending on the local presence or absence of fossil-bearing deposits, ground-disturbing activities, such as construction, have the potential to impact paleontological resources, and these resources would require mitigation or protection on a case-by-case basis. TAPS operation would be a small contributor to the risk of impacts to paleontological resources.	*Cumulative Impacts:* Depending on the local presence or absence of fossil-bearing deposits, ground-disturbing activities, such as construction, have the potential to impact paleontological resources, and these resources would require mitigation or protection on a case-by-case basis. TAPS operation would be a small contributor to the risk of impacts to paleontological resources. Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Cumulative Impacts:* Depending on the local presence or absence of fossil-bearing deposits, ground-disturbing activities have the potential to impact paleontological resources, and these resources would require mitigation or protection on a case-by-case basis. There is a very small potential that ground disturbance during TAPS facility dismantlement could damage or obscure paleontological resources. However, reduced oil exploration, development, and production would reduce the overall risks to paleontological resources from disturbance.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Surface Water Resources		
Action Impacts: Impacts to surface water from routine operations would be small and local, and not produce a large impact on any single water body. However, spills could produce substantial contamination if they occur over or near surface water.	*Action Impacts:* On an annual basis, the number of small and local impacts and the risk of substantial impacts would be the same as in the proposed action. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative.	*Action Impacts:* Until the oil is removed from the pipeline in 2004, impacts and the risk of impacts would be the same as those under the proposed action. Subsequent impacts during termination would be small and local and cease at the conclusion of termination activities. Once termination activities are completed, there would be no further impacts from the TAPS until and unless corrosion caused the collapse of underground pipe, which could drain adjacent wetlands. This impact, however, would be negligible.
Cumulative Impacts: The large amount of water required for ice roads for oil and gas development and production on the North Slope would be met from surface sources. Impacts on water quantity and quality in taliks would be small when winter withdrawals are limited by permit restrictions. There would be small, localized discharges to surface water from other actions. Impacts to surface waters would be localized unless an oil spill occurs, in which case impacts could be substantial. TAPS operation would have a very small effect on surface water quantity.	*Cumulative Impacts:* As for the proposed action, during the renewal period, impacts to surface waters would be small and localized unless an oil spill occurs, in which case impacts could be substantial. Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Cumulative Impacts:* During the initial dismantlement period, local impacts on the quantity and quality of surface waters would continue, as ice roads would continue to be needed for facilities being dismantled and for gas exploration, development, and production. After the initial dismantlement period, surface water requirements and the risks of small oil spills would decline due to declining oil and gas development. The reduced need for ice roads would reduce potential local surface water impacts. Water requirements and discharges to surface water from other activities would continue.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Groundwater Resources		
Action Impacts: Impacts to groundwater quality from routine operations would be small and local but an oil spill, depending on its size, location, and the effectiveness of response activities, could create local small to very large impacts. *Cumulative Impacts:* Withdrawals from all activities would have small and local effects. Fairbanks and Valdez are the largest groundwater users. Municipal use would have minor impacts. However, an oil spill from the TAPS or oil development activities, could impact groundwater quality to a small to large extent, depending on the spill's size, location, and the effectiveness of response activities.	*Action Impacts:* The impacts from routine operations and the number and risk of spills would be the same on an annual basis as those described for the proposed action. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* There would be negligible to minor local impacts to groundwater through completion of termination activities. Other water users might be impacted by dismantlement only along the southern portion of the TAPS, where there is a greater dependence on groundwater than on the North Slope. After completion of these activities, there would be no additional impacts to groundwater. *Cumulative Impacts:* Impacts from dismantling the TAPS would be of a short duration and would occur along a substantial portion of the length of the pipeline. Impacts from dismantlement would be greater along the southern portion of the TAPS, where there is a greater dependence on groundwater than on the North Slope. Once oil development, production, and transportation ends with the shutdown of the TAPS, impacts from those activities on the southern portions of the pipeline would cease. On the northern portion, produced water injections to groundwater would be reduced with declining oil industry. Other groundwater uses would continue.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Physical Marine Environment		
Action Impacts: Impacts from routine operations are expected to be no more than those in the past, that is, small and local. They may be less than those in the past because discharges are expected to be reduced from current volumes because of reduced throughput and the segregation of ballast water in new tankers. Discharges from routine operations would continue to comply with applicable regulations. Most spills from the Valdez Marine Terminal would be local and impacts short-lived. However, a very unlikely large spill from the Valdez Marine Terminal could have large impacts over up to 2 miles of shoreline. *Cumulative Impacts:* Other activities could affect the marine environment from spills in oil and gas production areas reaching the Beaufort Sea and spills from tanker and other forms of marine transportation in Prince William Sound or along Pacific transportation routes. Reasonably foreseeable spills would be small and rapidly cleaned up and of local consequence. Larger, less probable spills might take longer to clean up and result in widespread contamination of the marine environment.	*Action Impacts:* Impacts would be similar to those for the proposed action for the length of the renewal after the introduction of double-hulled tankers. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* The type, magnitude, and risk of impacts on a per-year basis would be similar to those for the proposed action. These risks are not time-dependent; thus, a shorter renewal period would not reduce the per-year risk. However, a shorter renewal period would eliminate the risk at the end of the shorter renewal period compared to a 30-year renewal.	*Action Impacts:* Impacts from Valdez Marine Terminal releases resulting from termination activities would generally be smaller than current TAPS impacts. However, while historical releases have been continuous, releases under the no-action alternative would be temporary and cease with the completion of termination activities. The impacts to physical marine resources from scrap metal transport would be short-lived and would cease with the completion of termination activities. *Cumulative Impacts:* Impacts from oil-related spills in both the Beaufort Sea and Prince William Sound would decline as North Slope oil production and transportation of North Slope oil ends. However, impacts from spills due to other marine transport could increase without the presence of the oil industry's spill containment response apparatus and personnel.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Air Quality		
Action Impacts. Air quality impacts from routine operations are generally expected to be local, temporary, and small, and within regulatory limits for the TAPS and federal and state air quality standards. Impacts on air quality from spills, including those associated with a spill involving a fire, would pose health risks for people within the immediate area of the spill. These impacts would rapidly diminish with distance from the spill and with time after the spill. *Cumulative Impacts:* Little or no long-term or short-term impacts on air quality from the routine activities of all actions are anticipated. As stated above, impacts of a large spill involving a fire may have human health consequences.	*Action Impacts:* Impacts and risks of impacts on air quality would be expected to continue as described for the proposed action. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Impacts would be the same as those under the proposed action while oil flows in the pipeline. Impacts would be less than those for the proposed action on an annual basis during the three years of peak dismantlement, removal, and restoration activities and substantially less during the last year of termination activities. Thereafter, the TAPS would not impact air quality. *Cumulative Impacts:* Impacts from all activities on the North Slope and from marine transportation in Prince William Sound would decline with the termination of the TAPS and its associated oil production. Other impacts would be largely the same as for the proposed action.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Noise		
Action Impacts: Construction and maintenance activities are anticipated to generate short-lived and small noise impacts, which would be barely distinguishable above background noise beyond TAPS facility boundaries. No adverse impacts are anticipated from such activities. Air traffic, particularly helicopter pipeline surveillance, may disturb wildlife temporarily. *Cumulative Impacts:* All activities would have the potential to produce local impacts on noise.	Action Impacts: Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Impacts would be less than those under the proposed action in all years except for the third year of termination activities. In the third year, impacts would be comparable to current levels. At the end of the termination period, all noise and vibration due to TAPS-related activities would cease. *Cumulative Impacts:* All activities would have the potential to produce local impacts on noise. Local noise generated by the TAPS and associated oil production facilities would be comparable to current levels, until after the termination period. Thereafter, these noise sources would be reduced or absent.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Transportation		
Action Impacts: No adverse impacts are anticipated because the current transportation infrastructure is adequate to support continued TAPS operations at any anticipated throughput level. *Cumulative Impacts:* Anticipated increases in traffic volume from new or growing activities would not be large and could be accommodated by existing infrastructure. No increases in traffic would result from continued TAPS operations.	*Action Impacts:* No adverse impacts are anticipated. *Cumulative Impacts:* Anticipated increases in traffic volume from new or growing activities would not be large and could be accommodated by existing infrastructure. No increases in traffic would result from continued TAPS operations during a shorter renewal period.	*Action Impacts:* Considerable road traffic would be generated by termination activities, particularly in the immediate vicinity of dismantlement. However, this level of traffic would be well within the current traffic borne by the road network. Air traffic to areas north of Fairbanks might increase slightly for up to several years during dismantlement to handle the transport needs of the increased workforce. After termination activities have been completed, air and highway traffic, particularly north of Fairbanks would greatly decrease. *Cumulative Impacts:* Anticipated increases in traffic volume from new and existing actions and from termination activities and decline of oil production could be accommodated by existing infrastructure. After the termination period, traffic would decline. SERVS would not be available to provide services to the marine industry in Prince William Sound.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Waste Management		
Action Impacts: Impacts on waste management from TAPS operation, including spill cleanup would be within acceptable limits as set by regulatory standards.	*Action Impacts:* Impacts on waste management from TAPS operation, including spill cleanup, would be within acceptable limits as set by regulatory standards during a shorter renewal period.	*Action Impacts:* Impacts on waste management from TAPS termination, including spill cleanup, would be within acceptable limits as set by regulatory standards.
Cumulative Impacts: Impacts on waste management from all actions are expected to be within acceptable limits, as set by regulatory standards.	*Cumulative Impacts:* Impacts on waste management from all actions are expected to be within acceptable limits, as set by regulatory standards for the renewal period.	*Cumulative Impacts:* Impacts on waste management from termination of the TAPS and from declining oil production, as well as all other actions, are expected to be within acceptable limits as set by regulatory standards.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Human Health and Safety		
Action Impacts: Over a 30-year renewal period, the total anticipated number of worker fatalities would be approximately six. The estimated annual numbers of recordable injuries would be 125–153, and lost time injuries would be 76–92. Health risk to the public would be small, though individuals who remain in the vicinity of a spill or fire or eat noticeably spill-impacted fish could be adversely affected. *Cumulative Impacts:* Best management practices could reduce fatality and injury rates for all industries. Operating procedures could limit exposure to naturally occurring radioactive material (NORM). TAPS operation does not produce NORM. No adverse health impacts would be expected from inhalation of industrial air emissions in the Valdez area. Valdez Marine Terminal operations contribute to, but are not the sole source of, organic air pollutant emissions in the Valdez area. Levels of polychlorinated biphenyls (PCBs) and mercury in tissues of Alaska Natives and others consuming contaminated natural food supplies would be elevated from past actions and global sources. There would be no impact from other actions or from TAPS operation. The general public would be exposed to more vehicle emissions over the next 30 years unless additional controls are placed on such emissions. Accidental releases of hazardous materials and spills into the marine environment also could have small impacts on public health.	*Action Impacts:* There would be fewer anticipated fatalities and recordable injuries under a shorter renewal period. *Cumulative Impacts:* There would be fewer anticipated fatalities and recordable injuries under a shorter renewal period. After the renewal period, either a further renewal would be approved, with similar consequences as the proposed action, or the operations of the pipeline would be terminated, with impacts similar to no action.	*Action Impacts:* The total number of fatalities over the 6-year termination period would be approximately one. The estimated annual number of recordable injuries (43–109) and lost time injuries (20–204) represent upper bound ranges on the physical hazard risks of injuries to TAPS workers during termination. Public health risks would essentially cease once oil no longer flows through the TAPS. *Cumulative Impacts*: The types of impacts would be similar to those for the other alternatives; however, the contribution of the TAPS to those hazards would cease with the completion of termination actions.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Terrestrial Vegetation and Wetlands		
Action Impacts: Impacts, including variations in vegetation types compared with types outside the ROW and disturbance to vegetation (with subsequent restoration) from excavation, dust shadow, or spills, would be small and local. *Cumulative Impacts:* The cumulative impacts of all the anticipated actions would be minor to negligible and local in extent.	*Action Impacts:* Impacts would be similar to those under the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Disturbances to terrestrial vegetation and wetland communities would continue during the 6-year termination period, as described for the proposed action. The ROW, pump station sites, and other TAPS areas would eventually become vegetated with stable terrestrial and wetland vegetative communities. These communities would have many similarities to adjacent undisturbed communities; however, differences in their structure and species composition would likely remain over the long term. *Cumulative Impacts:* A temporary increase in disturbance would result from removal of TAPS facilities. Declining oil exploration and development would reduce impacts. Following termination activities, there would be a small long-term recovery of vegetation communities.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Fish		
Action Impacts: With the exception of the occurrence of a large oil spill under unfavorable circumstances, impacts to fish would be small and temporary, with no population-level effects. A major spill into a waterway could be severe and possibly long term, depending on the size of the receiving waterbody, the affected fish community, and the season of the year. *Cumulative Impacts:* Habitat alternation would be minor and not substantially affect fish populations. Impacts of obstructions to fish passage would be low to moderate. Increased human access would have minor impacts. Impacts of small spills would be local and minor. Risks of large spills with large consequences would be low, as stated above. .	*Action Impacts:* Impacts would be similar to those under the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* There would be an increased potential for short-term impacts to fish habitat during the pipeline removal phase because of localized increases in workers, traffic, and construction activity. Over the long-term, however, impacts would be less than those from the proposed action, though reductions in statewide employment and income could increase pressure on fish through sport, commercial, and subsistence fishing. *Cumulative Impacts:* Impacts to fish would be reduced after TAPS termination and as North Slope oil development and production declined. The potential for accidental spills would decline on the North Slope, along the TAPS, and from tankers in Prince William Sound and Pacific transportation routes, as would the potential for introduction of nonnative organisms from tankers in Prince William Sound.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Birds and Terrestrial Mammals		
Action Impacts: Impacts generally are anticipated to be local, affect only individual animals, and have no adverse impacts to populations. Population level impacts are considered very unlikely. They only would be anticipated from a very large spill or a spill that contaminated a crucial habitat in which a large number of animals were concentrated. *Cumulative Impacts:* Impacts from many activities could be large in local areas but would be minor on the population level.	*Action Impacts:* Impacts would be similar to those under the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Small, localized impacts would be associated with termination activities. Following termination, habitat conditions along the TAPS would, over a matter of several years or several decades, return to those of adjacent lands. *Cumulative Impacts:* Indirect adverse impacts could potentially result if wild food was used to compensate for the loss of income (e.g., by increasing loss of wildlife through subsistence hunting). However, overall impacts, particularly on the North Slope, would be reduced because of the decline of oil development, production, and transportation activities.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Threatened, Endangered, and Protected Species		
Action Impacts: Impacts are not expected to produce population-level effects that are distinguishable from natural variation in numbers, unless a low-probability, high-volume spill reached marine waters such as Prince William Sound. In the latter case, impacts may be moderate on the population level. *Cumulative Impacts:* Impacts are anticipated to be negligible to minor and are not anticipated to threaten population viability, unless a low-probability, high-volume spill from oil transportation occurred in Prince William Sound or along Pacific transportation routes. Such a spill might cause impacts that would be high on a local level and moderate on a local level.	*Action Impacts:* Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* During termination, impacts on an annualized basis would be greater than those for the proposed action. Thereafter, impacts would be less than for the proposed action. Population-level impacts are not anticipated to be distinguishable from natural variation. *Cumulative Impacts:* Impacts on the North Slope and Prince William Sound would decline with declining oil exploration, development, and production. Removal of TAPS facilities might create temporary, minor impacts.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Economics		
Action Impacts: North Slope oil production would make a substantial, though declining (14% by 2020), contribution to domestic oil production and would continue to reduce the need for foreign oil imports, thus improving national energy security and the overall balance of trade. Significant federal tax revenues would be generated with continued TAPS operations, together with marine and shipbuilding employment and employment in the economy as a whole. Gross state product, population, employment, personal income, and tax revenues would experience slow to moderate growth, though North Slope oil production and resultant employment and revenues would decline. *Cumulative Impacts:* Overall cumulative impacts are reflected in the above discussion. Temporary, local negative cumulative economic impacts might occur during the construction of a gas pipeline and the National Missile Defense System (NMDS), because they would primarily test the capabilities of local services. No long-term or statewide negative cumulative impacts are anticipated. Anticipated positive economic impacts of these two projects likely would help to offset declines in economic activity expected to accompany reduced oil volumes transported through the TAPS over the coming decade.	*Action Impacts:* With a shorter renewal period, investment in new North Slope production could be reduced, and that reduction could have economic repercussions at the local, state, and national levels. On the national level, TAPS contribution to oil production, energy security, the balance of trade, federal revenues, and marine and shipbuilding employment could be reduced, depending on prevailing economic conditions and the length of the renewal period. A shorter TAPS renewal period might reduce the prospect of further diversification of the Alaska economy by creating a riskier business climate. This condition would result in less predictable employment prospects, slower income growth, and slower growth in population. A shorter TAPS ROW renewal period would reduce the flow of funds into state and local governments, thereby reducing their ability to implement a wide range of programs requiring long operating lives. *Cumulative Impacts:* Overall cumulative economic impacts are reflected in the above discussion. Construction and operation of a natural gas pipeline and the NMDS could help to offset the projected decline in oil throughput and revenues.	*Action Impacts:* Reduction in economic activity would occur. A major source (17% currently) of U.S. oil production would stop production, with related impacts to national energy security, the balance of trade, and federal taxes. The gross state product and state revenues would drop substantially following the end of oil production in 2003; gross state product would not recover to 2003 levels in the following three decades. Impacts on employment and personal income in the state would be substantial, but less severe. Growth would be expected in both of these measures over the period 2004–2034, especially during the second half of that period, but it would be substantially less than under the proposed action. *Cumulative Impacts:* Overall cumulative impacts are reflected in the above discussion. Construction and operation of a natural gas pipeline and the NMDS could help to offset the projected decline in oil throughput and revenues.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Subsistence		
Action Impacts: TAPS renewal for 30 years would have small impacts on subsistence. *Cumulative Impacts:* There would be low impacts on subsistence, except on the North Slope where impacts would be moderate. Subsistence hunting and fishing, particularly on the North Slope (and, to a lesser extent, in Interior Alaska) could be negatively impacted, primarily as a result of restrictions in areas where subsistence can be pursued and as a result of possible disruptions to the movement of subsistence resources from human presence and activities. However, both of these main impacts are not anticipated to be severe, with restricted access affecting relatively small portions of large subsistence harvest areas and with changes in animal movement patterns often temporary and usually affecting only a relatively few individual animals. Contributions from the TAPS to these cumulative impacts are expected to be relatively small.	*Action Impacts:* There would be smaller impacts to subsistence under the less-than-30-years alternative than in the proposed action. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Adoption of the no-action alternative would result in a slight improvement in subsistence. *Cumulative Impacts:* Certain impacting factors in different local areas would be different from those described under the proposed action (e.g., reduced employment, reduced competition from sport hunting and recreation, increased need for resources, removal of barriers), but the overall cumulative effect might be the same.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Sociocultural Systems		
Action Impacts: The proposed action would contribute to continued change in Alaska Native and rural non-Native sociocultural systems that likely would be small.	*Action Impacts:* Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative.	*Action Impacts:* The overall impacts of the no-action alternative on sociocultural systems would likely be negative and sufficiently large to be detectable. Short term impacts would occur during termination.
Cumulative Impacts: In sociocultural systems founded on cooperation and subsistence, cumulative impacts might accompany their continued interaction with modern American society and the continued growth in the importance of a cash economy. However, these changes are largely a part of changes occurring throughout Alaska and are not attributable solely to cumulative actions considered in this EIS. The contribution of the TAPS to these cumulative impacts would be relatively small.	*Cumulative Impacts*: Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Cumulative Impacts:* Impacts of the same type and substantially similar in degree as those under the proposed action.
Cultural Resources		
Action Impacts: Mitigation measures should adequately address possible impacts from routine operations. The risk of impact to cultural resources, therefore, is low because the chance of a large oil spill that could impact these resources is low.	*Action Impacts:* Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative.	*Action Impacts:* Mitigation measures should adequately address impacts from termination activities and from the dismantlement and removal of the TAPS, which may be determined eligible for listing on the National Register of Historic Places (NRHP). Impacts from oil spills would be much lower than those under the other alternatives.
Cumulative Impacts: Negative cumulative impacts to cultural resources are expected to be absent or negligible, in part as a result of adhering to existing state and federal regulations on such resources during project development and operation.	*Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Cumulative Impacts:* Cumulative impacts to cultural resources are expected to be absent or negligible, in part, as a result of adhering to existing state and federal regulations on such resources during project development and operation.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Land Uses and Coastal Zone Management		
Action Impacts: Under the proposed action, there could be some access and use conflicts with private land holders, temporary noise impacts on recreationists from TAPS construction work, and impacts from spills (of varying degrees, depending on volume, timing, duration, and location) on other users of the area along the TAPS. There would be no conflict with coastal management programs (CMPs). *Cumulative Impacts:* Negative cumulative impacts on land use are anticipated to be minor. Negative cumulative impacts similarly are anticipated to be minor both on the North Slope and in Prince William Sound. The contribution of TAPS operation to these cumulative impacts is expected to be relatively small. However, an oil spill to marine waters from marine transportation or from oil production could impact implementation of CMPs.	*Action Impacts:* Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts*: Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Termination activities may temporarily impact recreation uses near the TAPS. After termination, there would be no impacts. There would be no conflict with CMPs. *Cumulative Impacts:* The reduced economic activity as a result of the shutdown of the TAPS would result in less commercial, municipal, and residential development. There would be no conflict with CMPs.

TABLE ES-1 (Cont.)

Proposed Action (Renew for 30 Years)	Less-Than-30-Year Renewal Alternative (Renew for Less Than 30 Years)	No-Action Alternative (Do Not Renew)
Recreation, Wilderness, and Aesthetics		
Action Impacts: Under the proposed action, restrictions on recreational use of the ROW; noise from associated TAPS road and air traffic; the visual impact of the pipeline, pump stations, and the Valdez Marine Terminal; and the risk of an oil spill creating local temporary, and possibly long-term, impact on recreation, aesthetics, and (less likely) wilderness values would continue for 30 years. *Cumulative Impacts:* Construction of a gas pipeline parallel to the TAPS, of other anticipated facilities near the TAPS, and of additional oil and gas facilities on the North Slope, as well as potential oil and gas spills could impact recreation, aesthetic, and wilderness values. Construction impacts would be short term, but the presence of these structures and spills could result in long-term impacts. Long-term aesthetic impacts along the TAPS may be major.	*Action Impacts*: Impacts would be similar to those for the proposed action on an annual basis during the renewal period. Total impacts over the period of renewal would be comparable to a similar duration under the 30-year renewal alternative. *Cumulative Impacts:* Impacts for this renewal period would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Thereafter, if an additional renewal period were approved, impacts would be similar to those described for the proposed action. If an additional renewal period were not requested or were not approved, then subsequent impacts would be similar to those described for no action.	*Action Impacts:* Termination activities would impact recreational opportunities, aesthetics, and, to a lesser extent, wilderness. Following termination, aesthetics would return to a state similar to that prior to construction of the pipeline. The recreational experience would change to the extent that opportunities to learn about the TAPS would have been removed and a less developed landscape along the current TAPS ROW would be presented. *Cumulative Impacts:* Impacts would be similar to those under the other alternatives except that the recreation, visual, and wilderness impacts associated with the TAPS may not last as long.

Proposed Action — Normal Operations

Physiography and Geology

The interaction between geologic processes and the continued operations of the TAPS would impact the local environment adjacent to the TAPS. The impacts may be further complicated by the current warming trend of the climate that may affect the TAPS. Because the TAPS has been in operation for more than 25 years, most of the current impacts have been observed and have become part of the existing environment.

Activities that would impact the physiography and geology include (1) creating new or expanding existing operation material sites (OMSs) to mine sand, gravel, and quarry stones; (2) using the material from OMSs to maintain workpads, access roads, and to protect the pipeline from shore erosion near rivers; and (3) conducting any relocation of the pipeline, if needed. Most of these activities would be carried out for maintenance. The impacts to the physiography and geology would result from changes to landforms and removal of geological material. As compared to the scale of the landscape crossed by the TAPS, the change to landforms caused by the construction and operation of the pipeline would be insignificant.

Under the proposed action, the impact of mass wasting processes on the pipeline would continue and expand, especially on sloped areas, as evidenced at various sites along the southern ROW. Historically, the effects of mass wasting processes on the TAPS have been mitigated through rerouting a section of pipeline; using passive thermal-transfer devices (pipes to remove heat from the soil in winter) for the vertical support members; using insulated boxes and refrigeration for buried pipes at locations where the underlying soils are thaw-unstable; applying wood chips on workpads for insulation; using “smart pigs” to detect anomalous curvature of underground pipeline; and instituting vigilant surveillance, monitoring, and maintenance. Under the proposed action, similar types of mitigation measures would continue. The impacts of any mass wasting processes on pipeline integrity would be mitigated as in the past.

Soils and Permafrost

Excavations for pipeline rerouting, corrosion digs, valve replacements, buried pipe repairs, and pipeline coating refurbishment are part of routine maintenance for the TAPS. Historically, excavation has destroyed local surface vegetation and impacted the soils and permafrost, producing drainage, surface subsidence, ponding, and slope stability problems. The impacts have been local, occurring immediately adjacent to the ROW and access roads. Under the proposed action, these types of excavations would continue. Their associated impacts would be about the same as those seen historically, and the affected areas would be of the same localized scale.

The integrity of the structures of the TAPS, including the VSMs, may be affected by the consequences of the warming of Alaska. However, the extent and the magnitudes of the impacts vary spatially, ranging from insignificant to credible. The extent of impact depends on many factors, including the expected magnitude of the warming in the next 30 years, the thermal regime of the permafrost, the geologic material in the subsurface, groundwater conditions, topography, the engineering practices used in constructing the TAPS, and the maintenance and monitoring programs used by APSC. Changes to natural systems caused by climate changes may also magnify the adverse impacts of earthquakes were they to occur. On the basis of these factors and the experience gained in the last 25 years of pipeline operations, it is concluded that the impact of the warming on the VSMs is of limited extent. Most of the impacts can be mitigated through regular monitoring and maintenance.

Seismicity

Since the TAPS was built, the three largest earthquakes that have been recorded in east or southern Alaska had moment magnitudes of 7.5 (1979), 7.8 (1988), and 7.9 (1987). The epicenter of each of the three earthquakes was more than 190 miles southeast of Valdez. No damage was done to the TAPS by these earthquakes. In central Alaska, an earthquake with a moment magnitude of 7.9 and an epicenter about

November 3, 2002 Earthquake

An earthquake registering 7.9 on the Richter scale occurred at 1:12 PM (AST) on November 3, 2002, on the Denali Fault 55 miles west of the pipeline. The TAPS Earthquake Monitoring System (EMS) performed as designed by initiating automatic shutdown of the pipeline, calculating the severity of the event, and identifying locations and features to be evaluated for damage. Pipeline controllers brought the pipeline to a safe shutdown condition an hour later. The pipeline was not breached and no oil was released.

The earthquake damaged eight aboveground vertical support members near pipeline Milepost (MP) 589; eight pipeline support shoes separated from the pipe at those locations and five cross beams were damaged. A number of shoes displaced longitudinally, including those at the Denali Fault crossing. Longitudinal movement of the pipe tripped a number of anchor assemblies, which were installed on the pipeline to absorb energy from external initiating events such as this earthquake. Soil cracks were noted along the TAPS ROW and near remote gate valve (RGV) 91.

On the basis of output from the EMS, a list of approximately 160 items was prepared for inspection and evaluation of the pipeline. These items include detailed inspections of the aboveground and belowground portions of the pipeline, valves, communications equipment, vertical support members, and bridges in this area. The belowground ROW will be inspected for depressions, mounds, or cracks that might indicate pipeline movement, and an internal inspection of the belowground pipe will be performed using automated devices sent through the pipeline. Following an inspection of critical items and completion of a number of repairs, such as temporary supports for the damaged vertical support members, the flow of oil through TAPS was restarted on November 6, 2002. Work on repairing the damaged sections of the pipeline continues and should be completed by early December.

90 miles south of Fairbanks occurred on November 3, 2002. Some damage to VSMs occurred in the vicinity of MP 588; however, no leaks were detected. It is reasonable to assume that future earthquakes of that magnitude in the same general areas would be unlikely to cause more significant damage to the TAPS. The TAPS digital strong motion accelerometers and automatic shutdown systems required by Federal Grant Stipulation 3.4.1.2 operated and initiated a prompt shutdown of the TAPS for inspection. The TAPS was restarted three days later. However, it is uncertain whether an earthquake as large and as close as the Great Alaska Earthquake of 1964 (also known as the Good Friday Earthquake, 9.2 moment magnitude) would damage the TAPS. The epicenter of the Great Alaska Earthquake was about 60 miles west of Valdez, and the quake caused extensive ground cracks and landslides in the Chugach Mountains and the southern edge of the Copper River Lowland area. If an earthquake-triggered landslide or ground cracking occurred in an area crossed by the TAPS, the integrity of the pipeline would likely be threatened. The pipeline was not designed to withstand a landslide, although previous landslide areas were avoided to the extent possible, and additional engineering practices were used to reduce the risk of landslides when the pipeline was constructed.

Sand, Gravel, and Quarry Resources

The volume of sand, gravel, and quarry stone required for workpad repairs, roadbed and surface materials, and flood damage control is estimated to be less than 100,000 cubic yards per year (yd^3/yr). The main impact of sand, gravel, and quarry stone mining would be resource extraction.

Under the proposed action, impacts from the use of sand, gravel, and quarry stone would be expected to be similar to those observed historically.

Paleontology

Renewal of the Federal Grant is not expected to have an adverse effect on any known paleontological resources. All

Pleistocene fossils that were discovered in the ROW during pipeline construction and subsequent operation and maintenance were removed at the time of discovery. APSC would be required to implement specific protective measures for any additional paleontological resources discovered during pipeline operations.

Surface Water Resources

Direct impacts to surface water resources along the TAPS ROW could occur through continued water use to support operations. None of the activities of the proposed action would require use or disposal of more water than the amounts used or disposed of historically by TAPS operations. Historically, surface water use and disposal have represented a very small fraction of the total quantity of water available along the TAPS ROW and have been regulated under Alaska regulatory permits. Impacts from these historical uses and disposals have, thus, been small, local, and temporary. Because water use and disposal activities under the proposed action would be about the same as those that have previously taken place, impacts from the proposed action would also be small, local, and temporary.

Indirect impacts to surface water resources could occur by discharge of water from operations to the land, with subsequent runoff to nearby surface water bodies. None of the activities of the proposed action would dispose of more water than the amounts that have been disposed of historically. Impacts from the historical land discharges have been local and temporary and regulated by appropriate discharge permits. Because the quantity of water that would be discharged to the land for the proposed action would be similar to the quantities discharged historically, impacts to the surface water bodies would also be similar.

For the proposed action, the pipeline would remain subject to the impacts of flooding, debris flows, erosion, and sedimentation. Historically, rapid response and immediate implementation of appropriate mitigation activities have been used to prevent or minimize damage to the pipeline from these natural processes. Contingency planning, continued surveillance, and timely mitigation would continue to be used in the future, and impacts for the proposed action would be similar to those that have previously occurred.

Groundwater Resources

Under the proposed action, two processes could produce direct impacts to groundwater resources: (1) pumping water for drinking, cooking, personal hygiene, equipment washing, dust abatement, and hydrostatic testing and (2) moving warm oil through sections of the pipeline that are buried in permafrost. Because the anticipated use of groundwater would be about the same as that used historically for TAPS operations, impacts of pumping would be similar. Melting of permafrost along the ROW could change the number and size of thaw bulbs, depending on the throughput of the pipeline. However, the range of variation in the number and size of thaw bulbs is expected to remain within the historical range observed. Any changes in thaw bulbs would be local and small (less than about 60 feet in diameter).

Indirect impacts to groundwater resources could occur through infiltration of contaminated surface water. Historically, during TAPS operations, groundwater impacts from surface contamination have been local because of the presence of permafrost that limits deep percolation, the assimilation properties of the groundwater, and adherence to guidelines specified in the linewide NPDES permit. Because the activities associated with the proposed action would produce impacts similar to those observed historically, the magnitude of the impacts would also be similar. In addition, under current operations, septic fields have been used to dispose of sanitary wastewater at PS 7, 9, 10, and 12. Impacts to groundwater from these systems have been local and have not affected other groundwater users along the TAPS ROW. Continued operation of the TAPS would be expected to produce similar impacts at these septic fields.

Physical Marine Environment

Materials discharged to the water during the continued operation of the Valdez Marine Terminal and its associated tanker operations for

the next 30 years could impact physical marine resources. These discharges can be divided into the following categories: industrial wastewater, domestic sanitary wastewater, and storm water. Regulatory permits govern the type, quantity, and methods of treatment or best management practices applicable to each wastewater discharge.

Discharges from the Valdez Marine Terminal

Materials discharged to the water during the continued operation of the Valdez Marine Terminal and its associated tanker operations for the next 30 years could impact physical marine resources.

Impacts from Valdez Marine Terminal releases resulting from normal operations under the proposed action would not be expected to be different from historical impacts and could decrease with decreasing oil throughput of the pipeline.

Impacting factors include contaminants in the treated industrial wastewater and domestic sanitary sewage, and contaminants and sediments in overland storm-water runoff. Normal maintenance and construction activities under the proposed action could result in increased sediment loads in the Valdez Marine Terminal runoff during construction. These increases would end with the completion of the activity that could potentially cause them.

Under the proposed action, the Valdez Marine Terminal would continue to treat and release industrial wastewater, domestic sanitary wastewater, and storm-water runoff to Port Valdez. Effluent volumes released from the terminal to Port Valdez would be expected to remain largely unchanged, except for treated ballast water from tankers. That treated water would be expected to decrease in volume over time. Ballast and bilge waters currently account for as much as 93% of the influent to the Ballast Water Treatment Facility (BWTF) at the Valdez Marine Terminal. Reduced throughput of oil in the pipeline would reduce the number of tanker visits to the Valdez Marine Terminal, and segregation of ballast water in new tankers would reduce the average volume of wastewater treated on a per tanker basis.

Air Quality

The potential impacts on air quality and air-quality-related values (AQRVs) (visibility and acid deposition) from emissions associated with TAPS activities under the proposed action have been estimated. Maximum concentrations of criteria pollutants are estimated to be below applicable standards. Hazardous air pollutant emissions from TAPS are estimated to contribute little to the ambient concentrations in residential areas, except in the residential areas of Valdez, where the emissions from Valdez Marine Terminal are estimated to contribute up to about 10% of HAPs exposures to the residents. Carbon dioxide (CO_2) emissions from TAPS would add little to the global CO_2 concentration level. Water vapor emissions from TAPS and associated facilities and activities would not contribute noticeably to ice fog problems. Analyses for specific TAPS sources did not predict any adverse visibility impacts. The impacts of TAPS facility emissions on acidic deposition would be minor.

Noise

Noise emitted from TAPS facility operations and maintenance activities under the proposed action is estimated to be barely distinguishable from background noise levels at the towns and residences closest to the site boundaries of each TAPS facility. Potential impacts of noise due to construction activities associated with repair and maintenance and future TAPS system upgrades occurring under the proposed action would be temporary and decrease to the EPA guideline level for hearing protection or less within 200 to 1,600 feet. Noise from air traffic, particularly helicopters, during pipeline surveillance overflights under the proposed action is expected to cause some disturbances to wildlife in the immediate vicinity of flight paths.

Transportation

The current Alaskan transportation network that supports TAPS operations is an upgraded

version of the infrastructure that was in place to handle maximum capacity pipeline throughput levels of 2.1 million barrels of oil per day. Thus, the current transportation infrastructure is adequate to support pipeline activities at any anticipated throughput level.

Hazardous Materials and Waste Management

Hazardous material usage and management under the proposed action would be similar to current circumstances. The majority of hazardous materials used would continue to be refined petroleum products that serve as fuels for TAPS equipment and vehicles, including aircraft. Waste generation and management under the proposed action would be fundamentally the same as current activities. Hazardous waste would be delivered to out-of-state facilities for treatment and/or disposal. Solid wastes would be managed in APSC-operated or municipal landfills; however, some would be incinerated at pump stations prior to landfill disposal. Industrial wastewaters generated along the ROW (e.g., excavation dewatering) would be managed according to the current linewide National Pollutant Discharge Elimination System (NPDES) permit. Industrial wastewaters at the Valdez Marine Terminal would continue to be treated in the BWTF and discharged to the Port of Valdez under the authority of the current Valdez Marine Terminal NPDES permit. Domestic and sanitary wastewaters generated at pump stations and at the Valdez Marine Terminal would continue to be managed by stack injection, septic systems, activated biological treatment package plants, or through treatment agreements with nearby municipalities. Minimal amounts of special wastes (e.g., polychlorinated biphenyls [PCBs], asbestos, medical waste, etc.) are expected to be generated and would continue to be managed in accordance with existing procedures and regulations.

Human Health and Safety

Operations, maintenance, and construction workers at any facility are subject to risks of fatalities and injuries from physical hazards. Over the 30-year renewal period, the estimated annual number of fatalities for TAPS workers is less than one, while the total number of fatalities over the 30-year renewal period is approximately six. The estimated annual numbers of recordable injuries (125-153) and lost time injuries (76-92) represent upper bound ranges of the physical hazard risks of injuries to TAPS workers over 30 years. Recent JPO oversight has addressed employee safety concerns and compliance issues related to fire safety and electrical systems.

Potential risks to the general public from chemical exposures resulting from normal operations of the pipeline were also evaluated. Effluent from the BWTF has not been shown to present an elevated carcinogenic risk through the consumption of fish or shellfish. Human health risks from inhalation of TAPS-associated emissions would be below EPA levels of concern. While some persistent, bioaccumulative, and toxic (PBT) chemicals have been detected at elevated concentrations in Alaskan mammal and fish species, normal operation of TAPS is not associated with significant quantities of these chemicals.

Biological Resources

Impacts of the proposed action on terrestrial vegetation and wetlands would be similar to impacts of current pipeline operations. For the most part, differences between vegetation types in the ROW and those in surrounding areas would continue. In addition, localized disturbances to vegetation (with subsequent restoration) in the immediate vicinities of pipeline maintenance and repair activities and in association with extraction of sand, gravel, and quarry stone for pipeline-associated needs would generally be expected to continue at rates similar to those currently experienced.

The proposed action could have the potential to produce impacts to fish habitat, but continued operations are not expected to substantially affect fish populations during the renewal period. The proposed action could also result in temporary impediments to fish movement in some streams, but long-term effects on fish populations from such impacts are not anticipated.

Potential impacts to birds and terrestrial mammals from routine operation, maintenance, and monitoring of the TAPS include habitat loss, alteration, or enhancement; disturbance and/or displacement; mortality; and obstruction of movement. These impacts would essentially be continuations of those currently associated with the TAPS. Impacts would be localized (usually limited to the immediate area of activity, although temporary avoidance responses may extend up to about half a mile). Only individual animals would be impacted; no adverse impacts to populations of a species would be expected.

Impacts to listed and protected species that may result from the proposed action would be within the range of those experienced over the past 25 years of TAPS operations. Impacts may result from ground disturbing activities, operational noise, human disturbance, and release of effluents from the Valdez Marine Terminal into Prince William Sound. Impacts are not expected to produce population-level effects that are distinguishable from natural variation in numbers.

Economics

The Man in the Arctic Program (MAP) computer model developed at the University of Alaska-Anchorage, Institute for Social and Economic Research, was used to assess potential economic impacts of future TAPS operations. The model uses three modules – an economic module, a demographic module, and a fiscal module – to evaluate possible impacts in those areas over the range of changing conditions being examined.

Nationally, North Slope oil production would make a substantial, although declining, contribution to domestic oil production and would continue to reduce the need for foreign oil imports, thus improving national energy security and the overall balance of trade. Significant federal tax revenues would be generated with continued TAPS operations, together with marine and shipbuilding employment and employment in the economy as a whole.

North Slope oil production and the pipeline would continue to have a large impact on population, employment, incomes, and tax revenues in Alaska. While TAPS throughput is projected to begin a long decline starting in 2005 (meaning that the impact of the oil sector and supporting industries would diminish over the renewal period), population, gross state product, employment, and personal incomes are projected to increase slightly on average over the renewal period. Unemployment is also projected to increase slightly. The decline of state oil revenues would mean that the state would need additional sources of revenue to cover the moderate growth expected in expenditures at the state and local levels.

Subsistence Impacts

The analysis of subsistence activities shows that any negative impacts to subsistence under the proposed action would be extremely small. This conclusion is based on a finding of very small restrictions on the use of certain areas traditionally used for subsistence, and the continued possibility of disrupting the movement of a few terrestrial land mammals because of the TAPS or TAPS-related vehicles and activity. The analysis acknowledges the presence of negative impacts (e.g., competition for fish and game by nonlocals using the Dalton Highway), as well as positive impacts (economic conditions providing cash for modern technology used in subsistence), but notes that these are not exclusively consequences of renewing the TAPS ROW.

Sociocultural Systems

A series of impacts on sociocultural systems are anticipated under the proposed action, but taken together, the overall impact would likely be small and slightly negative.

Possible positive consequences would include (1) continued access to cash employment, even in rural areas — important to supplement subsistence in mixed economies, and (2) continuation of state-funded programs and public services — important to many rural communities and to both Native and non-Native sociocultural systems.

On the other hand, possible negative consequences would include (1) continued growth in importance of cash economy and

Alaska Natives' (especially) need to participate in an economy for which they may not be particularly well prepared; (2) continued fragmentation of rural Alaska Native and non-Native sociocultural systems, as some individuals leave to pursue other opportunities; and (3) continued loss of isolation from conventional modern American culture and the many rapid changes that tend to accompany interaction with that culture.

Cultural Resources

Although continued operation of the pipeline for 30 more years under a renewed grant could have the potential to adversely affect known and previously unreported cultural resources, mitigation measures would be developed through consultation on a case-by-case basis with the Alaska State Historic Preservation Officer (SHPO) and any Alaska Native Tribes, as appropriate. Such mitigation might include avoidance, data recovery, and monitoring.

Land Use and Coastal Zone Management

Renewal of the Federal Grant and resulting continued operation and maintenance of the TAPS for 30 more years would be expected to have some impacts on land use along the pipeline. No major additional changes in current land use activities would be expected, but the Ahtna and Chugach Corporations' concerns about trespassing and land use conflicts, respectively (which they attribute to the existence of the pipeline), could continue if the grant is renewed.

Although no new land use impacts would result from renewal of the Federal Grant, impacts that have occurred over the past 25 years would likely continue. Increased recreational opportunities and use of public lands along the length of the pipeline would be expected to continue. The current security restrictions on recreational use of the ROW would continue for an unknown period of time.

The existing aesthetic impacts from the TAPS and related structures would continue. The current views of the pipeline from the easternmost ridges in the Wilderness Area within the Gates of the Arctic National Park and Preserve (NPP) would remain. A temporary increase in impacts would occur in localized areas during pump station upgrading or removal or during the removal of one or more tanker berths at the Valdez Marine Terminal. After completion of removal activities, the visual impact would be diminished in those areas.

The northern and southern ends of the pipeline pass through the North Slope Borough and Valdez coastal zones, respectively. Pipeline operation and maintenance are currently permitted activities consistent with the coastal management programs (CMPs) for those zones and are in compliance with enforceable policies and applicable Alaska Coastal Management Plan (ACMP) statewide standards. Continued operation and maintenance of TAPS under the proposed action would not be expected to alter this status.

Environmental Justice

In the absence of high and adverse effects in any particular impact area, no negative environmental justice impacts would be expected.

Oil Spill Analysis for Proposed Action

Introduction

The EIS spill analysis focuses on potential spills associated with continued operation and maintenance of the TAPS from 2004 through 2034. Review of existing spill records contained in the TAPS Spills Database (TAPS Owners 2001b) established that the spills analysis should consider crude oil, gasoline, diesel fuel, and turbine fuel, on the basis of the projected continued pipeline transport and use of these materials in TAPS facility operations. The potential environmental impacts of the various types of petroleum products, such as gasoline and diesel fuel, are another measure by which the various petroleum products were considered for inclusion in the spills analysis.

Potential spill scenarios were developed by using available literature concerning current

TAPS operations (APSC 2001c; Capstone 2001; ARRT 2000). Recent NEPA documents for other pipeline projects (USFS and WEFSEC 1998; USFS 1999; CPUC and USFS 1996; CPUC 1998) were also reviewed to ensure consideration of a wide spectrum of spill scenarios consistent with current industry practice.

The spill scenarios developed for analysis took into account spill location, duration, magnitude, and frequency. Sensitive receptor locations and environmental features, such as rivers and streams, serving as spill transport-enhancing media to a sensitive receptor were identified as impacting factors along the pipeline. The spill magnitude and duration were computed in defining each spill scenario. Although large spills of relatively short duration may impose large to catastrophic environmental consequences, relatively long duration spills with release rates too small for detection with current technology could also pose large environmental consequences. Considering the extremely small frequencies of very large spills, such spills would be expected to represent a relatively small environmental risk (which takes into account frequency as well as consequence).

Estimated spill frequencies for pipeline operations for each spill scenario were derived from data compiled from a number of available sources. Data on small- to moderate-sized spills with frequencies characterized as *anticipated* to *likely* were collected for all of the recorded spills that have occurred on the entire TAPS pipeline system over the 25 years from January 1977 to November 2001 (TAPS Owners 2001b). Frequencies for likely events also included data from DOT domestic natural gas transmission and gathering lines (DOT 2001a,b), and DOT domestic hazardous liquid pipelines (DOT 2001c). The spills analysis contained in the TAPS ROW Environmental Report (TAPS Owners 2001a) was used as an aid in identifying major spill events and in evaluating statistical distributions for the historical TAPS spill record.

The analysis of catastrophic pipeline events resulting in oil spills considered vehicle impact and landslides triggered by a flood or earthquake. The analysis assumes that the initiator is a strong earthquake as demonstrated by the historical significant seismic activity in Alaska.

The spill volumes were estimated with the OSV model for three crude oil throughput levels: 0.3, 1.1, and 2.1 million barrels per day. These crude oil spill volumes are specific to scenarios involving a guillotine break (complete rupture) of the TAPS pipeline and were taken from an APSC-supplied OSV model output file that gave the spill volumes at each survey point (over 100,000 points along the pipeline) for a given TAPS throughput (Norton 2001, 2002; Brown 2002).

Large spill events along these pipeline segment locations could have both land-based and/or water-based impacts. Two approaches — parametric and objective analyses — were used to arrive at estimates of the area that may be potentially contaminated by a spill of crude oil or other petroleum product. Spill areas estimated with the parametric approach were simply calculated by dividing the projected spill volume by a parametric adjustment to an assumed crude oil spill depth. At the time when the crude oil stops spreading, the spilled liquid pool on the ground was assumed to have an average depth or thickness of 1, 2, or 3 inches. To ensure conservative estimates of spill areas, it was assumed that no crude oil losses occur from seepage into the underlying surface or from evaporation to the atmosphere.

The use of the objective analysis method for estimating the size of a contaminated area on land is restricted to terrain constraining spill spread areas where significant terrain features can be clearly discerned from topographic maps, and for which spill volumes were large enough to sufficiently cover the area constrained by the topographic and/or hydrologic feature. This essentially restricted the application of the objective analysis to the guillotine break spill scenarios. The objective analysis takes advantage of site-specific land features, such as slopes, surface water bodies, access roads, workpads, and/or highways, that control the pathway of a plume and influence the extent of ground contamination from a surface release of liquid such as crude oil.

The potential exists for a large release of soot and gaseous air contaminants as a result of

an aircraft crash into the crude oil storage tanks at the Valdez Marine Terminal. The 18 crude oil storage tanks at Valdez Marine Terminal are located in two areas, the East and West Tank Farms, with individual tank storage capacities exceeding 0.5 million barrels. In this analysis, an aircraft accident was defined to be an event that results in destruction of the aircraft by the impact and subsequent fire. A methodology was used that takes into consideration items determined to be important to understanding the risk from an aircraft crash into fixed facilities (DOE 1996).

Summary of Impacts from Spill Events

The following discussion is interdisciplinary and includes the most important or significant impacts likely to occur from spill events. Where specific examples of past spill events adds clarity to the description of impacts, information has been included.

During an oil spill to water, an oil sheen is likely to develop. An oil sheen is a very thin layer of oil that floats on the water surface and is transported downstream with the current (NOAA 2001). While moving as a slick, crude oil can be affected by a number of physical processes. These include advection (moving along with the current); mechanical spreading because of the balance among gravitational, viscous (viscosity is a measure of a fluid's internal resistance to flow), and surface-tension forces; horizontal turbulent diffusion (spreading driven by a difference in concentration); evaporation; dissolution; and shoreline deposition (Shen and Yapa 1988). In addition, photochemical reactions and microbial biodegradation are also possible. Spreading, dissolution, evaporation, and photochemical reactions of the crude oil usually occur within hours after the spill. Light crude oils can lose as much as 75% of their original volume within the first few days after a spill; medium-weight crudes might lose as much as 40% of their original volume; heavy crude or residual oils, on the other hand, might only lose about 10% of their volume in the same period of time (Overstreet and Galt 1995). The formation of oil-in-water emulsions and sinking can require days to occur, but water-in-oil emulsions can require years to degrade.

Sometime after the spill event, oil will reach a shoreline and be deposited. In sands and gravels, the lighter-weight crude oil components may then penetrate the surface, contaminating deeper layers of soil and possibly the underlying groundwater. Some of this deposited oil will be reentrained by the water and transported farther downstream. Exposed headlands (high steep-faced promontories that extend into the water) rapidly lose deposited oil to the adjacent water (Shen and Yapa 1988). At a sandy beach, it takes about 1 day to lose one-half of the original mass of oil. Sand and cobble beaches, sheltered rock shores, and sheltered marshes can take up to 1 year to lose half of the original mass of oil deposited.

Human Health: Primarily because some toxicity evaluation factors for polycyclic aromatic hydrocarbons (PAHs) have changed since the time of the U.S. Food and Drug Administration (FDA) assessment of the Exxon Valdez oil spill impacts, additional risk calculations were conducted to support the foodchain health risk evaluation presented here. Risk calculations were conducted for ingestion of shellfish, but not for finfish or mammalian species, because the data were sufficient to conclude that risk from ingestion of these latter species would be negligible (Hom et al. 1999).

Two data sets were used for the assessment, each from National Oceanic and Atmospheric Administration (NOAA) analyses in association with the Alaska Oil Spill Health Task Force (OSHTF) (Varanasi et al. 1993). One set was the data for mussels collected at Windy Bay in July 1989. The three samples collected from that location contained the highest levels from among the 13 subsistence use areas investigated as a result of the Exxon Valdez oil spill. Levels in mussel tissue collected at Windy Bay were considerably higher than levels in chiton or snail, so the averages for the three mussel samples were used to bound the ingestion concentrations. The second data set was for nine mussel samples collected at Windy Bay in April 1991. The PAH levels observed in these samples were much lower than those collected immediately after the oil spill, in fact, many of the PAH compounds were not detected in these samples. Consequently, the maximum level (not the average) of each PAH compound detected was used in evaluating the 1991 data.

The sum of the 15 PAHs for the 1989 data set was 160 parts per billion (ppb); the sum of the PAHs for the 1991 data set was 2 ppb. The combination of shellfish tissue contamination data and average ingestion rate was used to estimate the average daily intake of 15 PAHs for Alaska Natives on a subsistence diet.

To bound the risk from ingestion, it was assumed that the more highly contaminated shellfish could be ingested for up to 10 years. This time period was used to allow comparison with the FDA results. However, the 1991 data showed that contamination levels declined significantly within just 2 years; thus, 10 years of exposure at the elevated levels would be unlikely. An assessment of the risks from ingestion of the moderately contaminated shellfish (1991 data) over a lifetime of 70 years was also included. It was considered reasonable to include a prolonged possible exposure period because the PAH compounds are relatively persistent, and significant oil contamination was still found in some mussel beds 10 years after the Exxon Valdez oil spill (Fall 1999).

On this basis, the bounding estimates of increased lifetime cancer risk associated with 10 years of ingestion of highly contaminated shellfish is 1×10^{-5}, the increased risk from an additional 70 years of ingestion of moderately contaminated shellfish is 3×10^{-7}, for a total lifetime increased risk of about 1×10^{-5}. This risk is within the 10^{-6} to 10^{-4} tolerable risk range specified by the EPA (1990).

Biological Resources: An evaluation of the impacts of spills on biological resources was conducted both for releases along the TAPS ROW and at Port Valdez. The impacts of spills on biological resources would vary according to the material spilled, volume of the spill, and the location of the spill. Spills could contaminate soils, surface water, and groundwater and affect biological resources associated with these media. For the most part, spills that are *anticipated* or *likely* to occur would be small and affect only areas within the existing ROW or facility areas. The largest potential catastrophic spill to land (resulting from a guillotine break in the pipeline) would affect about 84 acres. If such a spill occurred at one of the rivers crossed by the TAPS, a considerable length of the river downstream of the spill site could be affected. The actual area affected would depend on river flow at the time of the spill and cleanup response time. The largest spill at the Valdez Marine Terminal could affect about 2 miles of shoreline and up to about 2 square miles in Port Valdez.

The impacts of a large spill to land would be expected to have localized effects on vegetation communities; bird and mammal populations; and threatened, endangered, and protected species populations, but would not noticeably affect regional vegetation patterns or animal populations. Such a spill could have localized effects on fish populations in adjacent water bodies. Containment and cleanup of a land spill are expected to be rapid and effective and would substantially reduce the magnitude and duration of impact.

A large spill to water (either at one of the rivers crossed by the TAPS or at Port Valdez) could have more widespread effects on biological resources. Unless quickly contained, a large spill to a river could affect a large portion of the river's fish population, much of the shoreline riparian vegetation, and riverine wildlife (e.g., waterfowl, river otters). Listed and protected species would not be affected by a river spill. A large spill to Port Valdez could affect shoreline vegetation, fish communities, and a number of listed and protected species (a variety of marine mammals) that occur in Port Valdez. The magnitude and duration of the impact would depend on the ability to contain and remove spilled oil.

The effects of an oil spill on fish primarily depend on the location of the spill relative to the location of fish and their habitat, the type of petroleum (e.g., crude oil vs. refined products) involved, the concentration of oil present, the stage of fish development exposed to the oil (eggs, larvae, and juveniles are most sensitive), and the duration of exposure. Depending on the quantity spilled, oil can affect aquatic organisms in several ways. Physically coating a fish in oil, especially its respiratory surfaces (i.e., gills), can cause immobilization or suffocation. If concentrations of certain chemical constituents of the oil are sufficiently high, exposed fish will die. Lower concentrations may have sublethal effects, such as reduced growth, reduced reproduction, or altered behavior. Elevated concentrations of oil may also indirectly affect

fish if impacts of the oil on other organisms reduce the availability of prey for fish. The presence of oil may also cause some fish to avoid areas traditionally used for reproduction, feeding, overwintering, or as migration corridors.

In open water, such as Prince William Sound, fish have the ability to avoid a spill by going deeper in the water or farther out to sea, thereby reducing the likelihood that they will be harmed by even a major spill. Fish that live closer to shore are at risk from oil that washes onto beaches or from consuming oil-contaminated prey. In shallow waters, oil may also harm invertebrates used as food or sea grasses and kelp beds that are used for feeding, shelter, or nesting sites by many different fish species. In addition, the Solomon Gulch Fish Hatchery is located near the Valdez Marine Terminal, and an oil spill in the vicinity could affect adult salmon returning to the hatchery or juvenile salmon leaving Solomon Creek.

The impacts to wildlife from an oil spill would depend on such factors as the time of year and volume of the spill, type and extent of habitat affected, and home range or density of the wildlife species. Bird species most susceptible to oil pollution of water bodies include loons, cormorants, grebes, sea ducks, auklets, murrelets, murres, guillemots, and puffins because they spend much of their time on the water surface, often congregate in dense flocks, depend on intertidal habitats close to shore, or may be flightless while undergoing a complete molt (Piatt et al. 1991).

Terrestrial mammals exposed to oil are not as likely as birds to suffer from the loss of insulation. While most herbivores would avoid consuming oiled plants, contaminants could be absorbed through the skin, inhaled, or ingested (e.g., while trying to clean their fur) (MMS 1998).

In summary, a spill would exclude large, wide-ranging terrestrial mammals from relatively small portions of their home ranges, although behavioral disturbance by spill response activities would extend the functional loss of habitat area. Temporary loss of available habitat would occur for birds and small mammals. Such losses would encompass a negligible portion of habitat available within the distributional range of such species. Wildlife habitat would be impacted for the length of time it takes for cleanup and restoration. This period could range up to several years or more.

Threatened, endangered and protected species could experience both direct and indirect impacts from spills. Spills to land on the North Slope have the potential to affect spectacled eider, Steller's eider, Arctic peregrine falcon, and polar bear. Impacts of a land spill could result from direct oiling of individuals (especially eiders), effects on the food base of species, and habitat impacts, such as reduced productivity and changes in the species composition of plant communities. The largest *anticipated* spill is 100 barrels, which could contaminate an area up to 0.15 acre. The largest *likely* spill is 10,000 barrels, which could contaminate an area up to 15 acres. Spills that are considered *unlikely* or *very unlikely* could be as large as 54,000 barrels (resulting from a guillotine break of the pipeline) and contaminate an area up to 84 acres. Although the amount of oil spilled in these scenarios is quite large, the size of the area that would be contaminated and require cleanup is relatively small, thus reducing the likelihood of impact to listed or protected species.

Threatened, endangered, and protected species in Prince William Sound would only be affected by a spill at the Valdez Marine Terminal if oil entered Port Valdez. Several of the scenarios examined would result in oil or fuel entering Port Valdez. Anticipated spills would result in very small volumes (0.5 barrel or less) entering Port Valdez. Spills of this size are expected to have negligible impact on listed and protected species. The largest likely spill (frequency of 3 in 100 years or 1 during the renewal period) would result in the release of 1,700 barrels of oil into Port Valdez. A spill of this volume would contaminate a limited area near the Valdez Marine Terminal and could result in minor short-term impacts to listed and protected species. Spill response, containment, and cleanup would limit the duration of exposure and impact.

Economics: The economic impacts associated with spills would include the impacts that might result both directly from degradation of land and other natural resources and indirectly to state and local governments as a result of lost

oil revenues during periods when the pipeline would be shut down for repair and cleanup activities following a spill. The potential direct economic impacts of spills include impacts to recreation and tourism, mainly in rural locations, and the impacts on property values and local economic activity, primarily in urban locations. The relative importance of the direct and indirect impacts of potential pipeline spills would depend on the size and, to a lesser extent, the location of the spill. For smaller spills that would not require suspending pipeline operations, direct impacts would be primarily a local concern because these impacts would occur in the immediate vicinity of the spill location. Larger spills requiring shutdown of the TAPS would result in losses of oil tax revenues to the state and local governments.

Subsistence: The consideration of spills in addition to the proposed action changes the conclusions reached for likely subsistence impacts. For terrestrial spills, the small area involved likely would have only negligible impacts on subsistence — the animal resources of interest possessing large ranges that would enable them to avoid the relatively small area affected. Similarly, a spill directly associated with the TAPS into Prince William Sound likely would have very small negative impacts to subsistence. Once again, this would be due to the relatively small area affected, which would not include any known subsistence use areas. However, a large spill into a river under certain conditions could have a severe impact on subsistence activities relying on that river that would last for several years. The conditions under which such an impact would occur are essentially those that would affect fish — shallow river or stream, low flow conditions, and occurring during an important time in the life cycles of resident or anadromous fish. Despite the serious consequences of such a spill, its likelihood of occurring in one of the 800 streams or rivers crossed by the TAPS is extremely remote, on the order of 1 in 255 million for a river with a 300-foot pipeline crossing.

Sociocultural: The EIS anticipates severe sociocultural impacts only under certain spill conditions. Many of these impacts are tied closely to anticipated subsistence impacts. Smaller, more probable spills are expected to yield small impacts to sociocultural systems. That is not to say that spills would not produce impacts, nor to say that these impacts would not be a concern. However, given the inherent ability of sociocultural systems to adapt to changing conditions in the natural and human environment, the impacts produced by relatively small spills likely would fall within the ability of Alaska Native and rural non-Native sociocultural systems to adjust to them. The impacts of larger spills would be a different matter.

As discussed for spill impacts to subsistence, certain accidents could have a severe negative impact on subsistence activities — particularly a large spill into a river or stream under certain conditions (shallow depth, low volume, and particularly sensitive period in the life cycle of anadromous or resident fish). The inextricable connection between subsistence activities and (especially) Alaska Native sociocultural systems would carry the effects of such impacts into the latter — affecting the maintenance of social networks through patterns of exchanging subsistence resources and ceremonies that rely heavily on subsistence resources. Moreover, such a high-impact spill would have an important economic effect on rural sociocultural systems, Native and non-Native alike, effectively removing a key component of the mixed economies that characterize this part of Alaska. It is unlikely that sociocultural impacts would be permanent, but depending on the size and effect of a spill, they could last several years and place the people affected under considerable stress that extends well beyond the individual or household.

Environmental Justice: As with the proposed action, the evaluation of environmental justice for spills considers impacts for all other impact areas. Under certain conditions for particular spill scenarios, high and adverse impacts are expected for eight different issue areas: surface water; groundwater; human health and safety; fish; birds and terrestrial mammals; subsistence; sociocultural systems; and recreation, wilderness, and aesthetics. In part because the TAPS passes through a portion of Alaska inhabited by higher proportions of minority and low income persons than found in the state as a whole, all of these high and adverse impacts have environmental justice implications. That stated, the likelihood of such spills occurring is quite remote for each of those

spills that could generate high and adverse impacts, suggesting that the probability of actual environmental justice impacts occurring is quite remote.

In summary, it is important to reiterate that the high and adverse impacts discussed would be the result of generally highly improbable accidents, not normal operation of the TAPS. This statement is not meant to downplay the possible consequences of such accidents, which, in many cases, could be severe and last several years. Rather, it is meant to help keep in perspective that the spills necessary to generate the impacts mentioned above probably would not occur during the renewal period. Should such an accident occur, explicit steps would be taken to limit impacts and mitigate consequences, for both environmental justice populations and affected people in general.

Less-Than-30-Year Renewal Alternative

The less-than-30-year renewal alternative examined the relationship between a shorter renewal period and the environmental impacts developed under the preferred alternative (30-year renewal). The general finding from this analysis was relatively straightforward: the duration of most impacts (positive or negative) would be less under a shorter renewal period. This would be especially true for impacts that occur at regular intervals (e.g., yearly, seasonally, or daily) because the impacting factors that generates these events also occur at regular intervals. For example, pump station operations continue every day and air emissions associated with those operations occur every day. A shorter renewal period would result in fewer days of emissions from pump stations.

The estimated frequencies and spill volumes for the postulated spills scenarios along the pipeline, at the Valdez Marine Terminal, at the North Slope, and during tanker traffic in Prince William Sound, could be slightly different under the less than 30-year alternative. However, because of the uncertainties and the conservative nature of assumptions made in estimating the spill parameters under the proposed action alternative, the impacts estimated for the spills under the proposed action can also be used to represent the spill impacts under the less-than-30-year alternative. Thus, for each year of the shorter renewal period, spills represent the same risk to the environment as analyzed under the proposed action.

The key time-dependent variable related to the less-than-30-year renewal alternative is the increased investment risk associated with major oil developments on the North Slope. A shorter renewal period may inhibit the large capital expenditures necessary for new or enhanced oil production facilities, with longer production periods required to recoup initial capital invested from oil revenues generated. Obviously each project would need to be analyzed on its own business merits to determine how the length of the renewal period would impact the decision to move forward with the project. As a conservative impact approach for this EIS, it was assumed that all currently foreseeable projects would not be halted based solely on the length of the renewal period.

It is also likely that public and private capital investment in the state as a whole could also be restricted. Economic activity in the state is closely dependent on oil development and production activities and state and local oil tax revenues, and, thus, the length of the period during which oil production activities and the tax revenues they generate would occur could affect economic conditions.

No-Action Alternative

The no-action alternative represents a decision not to renew the Federal Grant of ROW for the TAPS. Operation of the pipeline would cease, and termination activities would be instituted. Termination activities are generally defined as the dismantlement and removal of the TAPS and the initial restoration of the TAPS ROW. Termination would be followed by activities for long-term-restoration of the ROW. No specific plans or designs for termination activities currently exist, they would have to be developed before specific actions could be taken. Any decision on how termination would occur would be subject to further NEPA analysis of the available options. For purposes of impact analysis, however, experiences during the

construction and operation of the TAPS and the policies and stipulations of the BLM and the State of Alaska can be used as the bases for the assumptions regarding termination activities.

It is estimated, on the basis of the time required to construct the TAPS and effort involved in common construction practices, that the termination activities would require about 6 years to complete. (Monitoring and maintenance in restored areas would continue for an extended period as follow-on actions.) Years 1 and 2 of termination activities would be devoted primarily to planning and design, with some limited preparatory field activities (e.g., preparing staging areas). The next 3 years (Years 3, 4, and 5) would involve dismantlement and removal of the TAPS and the Valdez Marine Terminal (beginning with purging and cleaning of the pipeline in Year 3) and initial restoration of the ROW. The final year (Year 6) would be used to close out the dismantlement and removal operations, to restore any remaining land areas, and to demobilize the remaining termination labor force. The restoration process would continue as a follow-on action for many years after termination was complete. Other follow-on activities would include monitoring and maintenance of any mitigation measures.

Spill Scenarios under the No-Action Alternative

The first phase of termination (Years 1 and 2) is for planning and design; therefore, the annual frequency of an oil spill would be the same as that under normal operations, as discussed above for the proposed action. Phase 2 of termination would involve the cessation of the oil supply from the North Slope and the purging of the remaining crude oil from the pipeline. This would be implemented by using kerosene as a solvent to clean the pipe of crude oil residue and then by using seawater with additives as a final wash.

An estimated volume of more than 7 million gallons of kerosene needed for pipeline purging and cleaning would be shipped to the North Slope by liquid kerosene tanker trucks. A total of over 900 shipments in 8,000-gallon bulk containers would be needed. The largest spill (Scenario 1) analyzed would be caused by human error, which would result in an accident involving a fuel truck carrying kerosene from the Williams North Pole Refinery to Prudhoe Bay.

Catastrophic spill scenarios of the type assessed for the proposed action alternative were also considered to be extremely rare and, therefore, were screened from further analysis as incredible events. When appropriate, impacts of spills are included in the following discussions of no-action impacts.

Physiography and Geology

During the first two years of preparatory work for termination activities, the impact on geological resources would not be changed measurably from that expected for the proposed action. The dismantlement and removal of the TAPS would cause minor change in geological processes and in the removal of geologic material along the TAPS ROW.

Soils and Permafrost

During the preparatory phase of termination, the impacts on soils and permafrost would be about the same as those from the proposed action — local and small. During TAPS dismantlement and removal, impacts would likely be local, limited to areas adjacent to aboveground portions of the pipeline and access roads. The area of land that would be disturbed is estimated to be 4,525 acres. Restoration of the disturbed land would involve regrading and, if necessary, reseeding. The regrading would temporarily increase soil erosion and siltation in nearby water bodies. In addition, the dismantlement and removal of TAPS components would redisturb the thermal regime of the surface soil. With time, the belowground pipeline segments left in place would become corroded and collapse. Ground depressions might be created above such collapses. The potential impacts of spills on soils would be much smaller under the no-action alternative than under the proposed action.

Seismicity

Seismicity-related issues of concern would be earthquake-triggered events that could

threaten the integrity of the pipeline and storage facilities while they still contained oil, causing environmental contamination. Once the pipeline was drained of oil and cleaned and once storage facilities were removed, the threat of TAPS-related spills caused by earthquakes would be eliminated.

Sand, Gravel, and Quarry Resources

Under the no-action alternative, the demand for sand, gravel, and quarry stones used to maintain the TAPS in the first 2 years of termination activities might be more than the annual requirement under the proposed action, but these materials would no longer be needed after the preparatory phase of the termination activities. Therefore, the impacts from removing these materials would be much smaller for the no-action alternative than for the proposed action.

Paleontology

No adverse effects on paleontological resources are anticipated under the no-action alternative.

Surface Water Resources

Direct impacts to surface water resources along the TAPS ROW for the no-action alternative could result from water use and spills. Groundwater wells along the ROW would not be able to provide all of the water needed for termination activities. For the peak year, about 500 gallons per minute of surface water would be needed. If withdrawn from a river such as the Tanana, which has a flow range of 110,000 to 450,000 gallons per minute, the needed water would be only a small fraction of the water available. In addition, the withdrawals would be made under the guidelines of a permit, ensuring that the impacts on the quantity of surface water would not adversely affect the environment. During the termination process, impacts from spills would be the same as those for the proposed action until the oil was removed from the pipeline. Because many miles of river banks and beds could be coated with oil, the impacts could be large. Once the oil was removed from the pipeline, the most severe accident postulated would involve an 8,000-gallon release of kerosene. Because evaporation of the spilled kerosene would limit the extent of contamination, impacts from this type of accident are expected to be minor.

Indirect impacts to surface water resources for the no-action alternative could result from discharging water to the land, with subsequent runoff to nearby surface water bodies. The quality of the runoff water would be regulated under appropriate permits, and best management practices would be used to limit the quantities of contaminants leaving construction sites. Impacts to water quality would be similar to those that occurred during construction of the pipeline. These impacts would be local and temporary.

Groundwater Resources

Under the no-action alternative, direct impacts on groundwater resources could result from extraction of groundwater for operational needs. Because the groundwater that would be used for termination activities would be obtained from existing wells, without changes to the number of wells pumping or their extraction rates, impacts to groundwater resources would be similar to those for the proposed action and historical operations. These impacts would be minor and local.

Indirect impacts on groundwater resources for the no-action alternative could occur through infiltration of contaminated surface water and water from septic fields. Historically, groundwater impacts from surface contamination have been local because of the presence of permafrost that limits deep percolation of contaminated water, the assimilation properties of the groundwater, and adherence to guidelines specified in the linewide NPDES permit. Because the activities associated with the no-action alternative would produce impacts similar to those observed historically, the impacts would also be similar.

Historically, septic fields have been used to dispose of sanitary wastewater at PS 7, 9, 10, and 12. Impacts on groundwater from these systems have been local, and other groundwater

users along the TAPS ROW have not been affected. Use of these facilities during the termination process would produce similar impacts.

Physical Marine Environment

Impacts from Valdez Marine Terminal releases resulting from termination activities under the no-action alternative would be generally smaller than historical impacts. However, while historical releases have been continuous, releases under the no-action alternative would be temporary and cease with the completion of termination activities.

The impacts to physical marine resources from transport of scrap metal recovered during pipleine dismantlement would be short-lived and would cease with the completion of termination activities.

Major accidents that could occur under the no-action alternative would be similar to those discussed for the proposed action. The potential for tanker accidents to occur would end once oil shipments ceased.

Air Quality

The potential impacts on air quality and air-quality-related values (AQRVs) — visibility and acid deposition — resulting from emissions associated with TAPS during termination activities are estimated to be (1) similar to those estimated for the proposed action during the first 2 years of termination (when TAPS facilities would be operated normally); (2) less than those estimated to result under the proposed action during Years 3 to 5 of the termination activities because emissions would be less; and (3) much less than those estimated to result under the proposed action during Year 6 of termination activities, when emissions would be limited to those associated with demobilization of equipment and personnel utilized in termination activities.

Noise

The activities affecting ambient noise levels in the vicinity of TAPS facilities would be at their peak during Year 3 of the 6-year termination period under the no-action alternative. The potential impacts on noise during Year 3 are estimated to be similar to those occurring during normal TAPS facility operation and construction (for repair, maintenance, and system upgrades) under the proposed action. Noise impacts resulting from TAPS termination activities during other years of the 6-year termination period would be less. Using explosives to blast large concrete structures at Valdez Marine Terminal during Years 3 to 5 of the termination activities would cause ground vibration and airblast overpressure (manifested in the blast wave from an explosion). No damages to structures or impacts on animals from airblast overpressure are anticipated.

Transportation

The current transportation infrastructure in Alaska is adequate to handle termination activities. The highway and rail networks that provide support to TAPS operations would be expected to experience lower levels of traffic during termination activities except for the immediate vicinity of current operations. Air traffic to areas north of Fairbanks might increase slightly during this period to handle the transport needs of the increased workforce. After termination activities have been completed, air and highway traffic north of Fairbanks would be greatly decreased because of the reduced support needs for TAPS operations. Rail operations in the state would also be reduced since fuel trains from the Fairbanks area to Anchorage would be significantly reduced because of a decline in refinery operations associated with TAPS oil.

Hazardous Materials and Waste Management

Under the no-action alternative, amounts of hazardous materials used to support TAPS operations would be reduced to zero once termination activities were completed. Hazardous waste generation could increase during the period of equipment cleanout but would be reduced to zero thereafter. Hazardous waste would be delivered to out-of-state facilities for treatment and/or disposal. Solid waste

generation would increase during termination activities, primarily as the result of the increased workforce and the dismantlement of TAPS facilities. Domestic solid wastes and nonhazardous solid wastes from facility dismantlement would be disposed of in APSC-operated landfills (after incineration) or in municipal landfills (also after incineration in some cases). Scrap metal and other salvageable materials would be recycled at out-of-state locations to the greatest extent possible. Domestic and sanitary wastewaters would increase during termination activities primarily because of the increased workforce but would then be reduced to zero as TAPS facilities were dismantled. Industrial wastewater treated at the Valdez Marine Terminal would decrease with the reduction in tanker traffic. It would then increase dramatically because of the flushing of the pipeline with seawater and surfactants during cleanout. Such wastewaters would be treated at the BWTF and discharged into the Port of Valdez pursuant to the Valdez Marine Terminal NPDES permit. Volumes of special wastes (primarily asbestos and PCBs) could increase slightly with the dismantlement of pipeline components and facilities. Some special wastes (e.g., tanker garbage) would decrease with the reduction in tanker traffic at the Valdez Marine Terminal. All special wastes would be managed in accordance with existing procedures and regulations.

Human Health and Safety

Operations, maintenance, and construction workers at any facility are subject to risks of fatalities and injuries from physical hazards. During the termination activities under the no-action alternative, the estimated annual number of fatalities for TAPS workers is less than one, while the total number of fatalities over the 6-year period is approximately one. The estimated annual numbers of recordable injuries (43–409) and lost time injuries (20–204) represent upper-bound ranges on the physical hazard risks of injuries to TAPS construction, transportation, and service workers over the 6-year period of pipeline planning and removal activities.

Criteria pollutants or hazardous air pollutants emitted from transportation vehicles used for termination activities would not cause adverse public health impacts. Health and safety impacts from a transportation-related spill were also assessed. For that spill, the maximum impact distance estimated was 0.02 km. People who remain present within this area could experience serious health effects from this or a similar spill.

Biological Resources

Under the no-action alternative, the ROW, pump station sites, and other TAPS areas would eventually become revegetated with stable terrestrial and wetland vegetation communities. These communities would have many similarities to adjacent undisturbed communities; however, differences in their structure and species composition would likely remain over the long term.

Within the TAPS ROW, gravel, moisture, nutrients, organic material, and thickness of the surface organic mat differ from the surrounding undisturbed areas. The TAPS ROW generally has a high gravel content and lower moisture level, lower organic matter, and reduced organic mat thickness. On these sites, pioneer plant species are adapted to soil and light conditions that often result from disturbance. They typically appear following disturbances that eliminate vegetative cover, such as avalanches or floods along rivers that create new sand and gravel bars or mud flats. Pioneer species quickly colonize these unvegetated areas and establish a vegetation cover.

For the no-action alternative, there would be an increased potential for impacts to fish habitat during the pipeline removal phase because of increased traffic and construction activity. Over the long term, impacts would be less than those from the proposed action because there would be less maintenance traffic along the pipeline ROW. A small temporary increase in impacts to fish might result from increased human access to fishing areas during TAPS removal activities.

Adverse impacts to birds and terrestrial mammals from the no-action alternative would primarily occur during the period of termination activities. Impacts would be similar to those that occurred during TAPS construction. Termination

activities at the aboveground segments of the pipeline system would have the higher level of impacts because of the more intensive activities and longer time required to dismantle and dispose of the pipeline components. Following termination activities, the pipeline corridor would be restored to habitat conditions comparable to surrounding areas. Achieving this level of restoration could take several years to several decades. No direct population-level adverse impacts to any species would be expected from the no-action alternative. Indirect adverse impacts could potentially occur from adverse socioeconomic impacts associated with the no-action alternative (e.g., increased wildlife loss from subsistence hunting).

Threatened, Endangered, and Protected Species

Under the no-action alternative, impacts to listed and protected species would result from ground-disturbing activities, equipment noise, and human disturbance during termination activities. These impacts would be greater than those of the proposed action for the duration of the termination process but would decrease to less than those of the proposed action as operations ceased, natural succession occurred in previously disturbed areas, and the effects of past development diminished. Impacts would not be expected to produce population-level effects that are distinguishable from natural variation in numbers.

Economics

Loss of North Slope oil production, oil industry support activities, and state and local tax revenues with the termination of the TAPS would have substantial consequences for the economy of the state, producing significant losses in gross state product (GSP) over the period 2004 to 2008. Smaller losses would occur in total population, employment, and personal incomes over the same period. These losses would only be partially offset by the expansion of the economy during TAPS termination activities. Although moderate growth in the non-oil sectors after 2008 would allow population, employment, and personal income to fully recover by 2015, GSP would not regain 2003 levels until 2021. Fairly rapid growth in the Alaska Native population would continue throughout the period 2004 to 2034.

Nationally, North Slope oil production currently contributes about 18% of domestic oil production, and although this contribution would have been expected to fall to about 14% by 2020 with the renewal of TAPS, the impact of the no-action alternative over the period 2004-2034 would still be substantial. In addition to a loss of domestic production, the no-action alternative would impact national energy security and the U.S. balance of trade in oil and would remove an important source of federal tax revenues. The no-action alternative would also impact the domestic marine transportation and shipbuilding industries.

Loss of North Slope oil would have a substantial effect on Alaska state tax revenues in 2004, reducing oil revenues by more than 90% and oil production and oil-related corporate income tax revenues by more than 95%. Overall state revenues would fall by 25%, but with a decline of less than 10% likely at the local level with the loss of property tax revenues. Although some growth in state revenues would be expected from nonpetroleum sources, these sources would not be enough to cover projected expenditures.

Subsistence

Implementation of the no-action alternative could result in (1) reduced financial ability to pursue recreational hunting and fishing, (2) reduced access to subsistence hunting and fishing areas by nonlocals, (3) reduced ability to use the Dalton Highway (although the highway would remain), (4) increased economic reasons to pursue subsistence, (5) reduced restrictions to very small portions of traditional subsistence use areas, and (6) reduced activity on the Dalton Highway and near the TAPS that has disrupted the movement of small numbers of terrestrial mammals.

Cultural Resources

Two separate categories of impacts to cultural resources could result from the no-action alternative. The first category would be the

impacts on the pipeline itself from dismantlement and removal of the aboveground TAPS components. The development of the TAPS was a massive engineering and construction accomplishment, and the pipeline has played a historically important role in Alaska and in U.S. domestic oil production. As such, the pipeline itself may be eligible for listing on the National Register of Historic Places. In addition, the activities associated with dismantlement and removal would have the potential to damage other cultural resources, both known and unreported, in the vicinity of the ROW.

Land Uses and Coastal Zone Management

No impacts to land ownership would result if the TAPS ROW was not renewed. Any effects on federal, state, and private land use in the vicinity of the pipeline would be local in nature. The current rate of commercial, municipal, and residential development would be expected to decline. Land use conflicts that have occurred on Native lands near the pipeline and its access roads would end after completion of termination activities.

Termination activities conducted under the no-action alternative would comply with the ACMP statewide standards and with the enforceable policies in both the North Slope Borough and Valdez CMPs.

Recreation, Wilderness, and Aesthetics

Implementation of the no-action alternative would have mostly local and temporary impacts on recreation at federal and most state lands. It could have long-term impacts on recreational opportunities at some state recreation areas, sites, and parks near the TAPS because of reduced state funding (resulting from the loss of oil-related revenue) that could force the closure of some of these state facilities.

Implementation of the no-action alternative would have no direct impacts and mostly temporary indirect impacts on the wilderness area within Gates of the Arctic NPP.

Aesthetic impacts along the entire 800-mile length of the pipeline would temporarily increase during termination activities because of the presence of machinery and personnel and the disturbance of the soil surface during dismantlement and removal operations. However, upon completion of termination activities and as vegetation becomes reestablished on disturbed ground, these impacts would cease.

Environmental Justice

Environmental justice impacts would be expected because of economic consequences and socioeconomic effects that can be judged as high and adverse:

- Large reduction of state revenues and hence reduced ability of the state to provide programs and public services relied upon by many minority or low-income populations in rural areas.
- Large, short-term influxes of nonlocals into rural communities close to the TAPS during termination activities.

CUMULATIVE EFFECTS

Cumulative effects result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions, regardless of what government agency or private entity undertakes such actions. Cumulative effects can result from individually minor impacts that when viewed collectively over space and time can produce significant impacts.

The analysis of cumulative impacts focuses on specific human resources or environmental receptors that can be affected by the incremental impacts. Generally, the geographic area for a cumulative impact analysis is defined by the specific resource or receptor of concern and the spatial extent of the interacting (cumulative) impact generators. The temporal extent of the cumulative analysis extends from the past history of impacts to each receptor through the anticipated life of the project, including additional

time necessary for decommissioning and restoration, if appropriate.

The time frames of actions considered in this analysis included reasonably foreseeable future actions (generally actions within a planning horizon less than the proposed action). These actions have either already occurred, are ongoing, are currently being implemented, are funded for future implementation, or are included in firm near-term plans. Types of proposals with firm near-term plans include these:

1. Proposals for which NEPA documents are in preparation or finalized;
2. Proposals in a detailed design phase;
3. Proposals listed in formal Notices of Intent published in the *Federal Register* or state publications;
4. Proposals that are funded;
5. Proposals for which enabling legislation has been passed; and
6. Proposals that have been submitted to federal and state regulators to begin the permitting process.

Proposals considered too uncertain to be part of the cumulative impact analysis included the controversial proposal for oil and gas production in the Arctic National Wildlife Refuge (ANWR); the Liberty Project designed to develop offshore oil reserves in the Beaufort Sea, and a road west from Prudhoe Bay to Nuiqsut on the Colville River. Actions analyzed included oil and gas exploration, development, and production; oil refining, oil and refined product storage, oil and gas transportation; human habitation and development; legislative action related to land use, land management, and natural resource use; and petroleum spills. Impacting factors such as ground disturbance, fugitive dust generation, transport of equipment and supplies, and various factors associated with employment, to name a few, were used to determine potential cumulative impacts for each environmental attribute in the (1) Beaufort Sea and North Slope, (2) Interior Alaska, and (3) Prince William Sound and oil transportation routes to Pacific ports.

Physical Environment

Soil and Permafrost

Construction related to all activities would disturb vegetative cover and affect soils and permafrost. The disturbance caused by construction of the natural gas pipeline would be substantially larger than that caused by maintaining the TAPS; the contribution of the TAPS to cumulative impacts of soil disturbance in the region is expected to be small.

Permafrost is affected by road dust generated by traffic on unpaved roads; snow melt due to dust deposition can lead to flooding, ponding, and hydrological changes in soil. Continuing oil and gas exploration, development, and production; construction of a natural gas pipeline; the operation of the TAPS; and other activities requiring road travel would add cumulatively to the volume of road dust generated on unpaved roads.

The cumulative impact of road dust from all activities on soil and permafrost would be smaller in the proposed action case than in the first few years of no-action case.

Sand, Gravel, and Quarry Resources

Sand, gravel, and quarry stones are needed to build the access roads, air strips, workpads, drilling pads, and gravel islands needed for oil and gas exploration, development, and production. Quarry stones are mined in the Brooks Range, and sand and gravel are mined in floodplains throughout the region. Other activities using these resources include development of a natural gas pipeline, other industrial and community development, and road construction. The sand and gravel requirements for the natural gas pipeline and other activities are not known, but these materials would be available both outside the areas where the TAPS is located and in areas near the TAPS or from the same quarries or gravel pits as those used by the TAPS. Use of the latter sources would contribute to a cumulative impact. However, taken as a whole, sand, gravel, and stone

resources are abundant, and all requirements are unlikely to deplete these resources.

The requirement designed to protect the tundra environment — to use ice roads in winter and ice pads in exploratory drilling pads — reduces the quantity of gravel that would otherwise be used for roads to reach remote areas. However, ice roads or ice pads might not be used in places where continued access during summer (for maintenance) or operational access is required. Sands and gravels would be required at remote locations for pad construction, production facilities, and associated infrastructure. On the North Slope, the source for rock for riprap and river framing is limited to quarries in the Brooks Range. The contribution of the TAPS to the total impact would likely be much smaller than that of the other continuing and new activities in the North Slope area.

Cumulative impacts under the less-than-30-year alternative and the no-action alternative would be similar to those under the proposed action, except that requirements for sand, gravel, and quarry stone may be less after the initial few years of no action.

Paleontology

Any action that involves ground disturbance creates a potential for impacts to paleontological resources in the affected area. Paleontological resources may also be impacted by collecting and disturbance by the presence of people associated with these actions. Mitigating these impacts would require addressing protection of paleontological resources for actions on a case-by-case basis.

Cumulative impacts under the less-than-30-year alternative and no-action alternative would be similar to those under the proposed action.

Surface Water Resources

Impacts to the quantity of surface water from all activities would be cumulative if the water withdrawals occurred from the same water source. Because the total water use for the North Slope is about 0.27% of the available water, impacts on water availability would be small in magnitude and local. Water withdrawals from water pooled under ice cover (taliks) is regulated by state permits to prevent impacts to water quality and waste of water. Surface water quality impacts from continued operation of the TAPS would be small in comparison to the magnitude of impacts from oil and gas exploration on the North Slope. The effects on water quality if a large spill was released directly to surface water could be large and extensive, and the magnitude of the effects would depend on the speed of cleanup response teams and the local conditions affecting oil dispersion.

In Interior Alaska (i.e., along the TAPS ROW), the quantity and quality of surface water could be cumulatively affected by oil and gas exploration, development, and production; oil and gas transportation; oil refining; and human habitation and development. Surface water would be used for activities such as drilling, oil refining, construction (including a natural gas pipeline), dust control, and human consumption. Impacts of these activities on surface water quantity could be cumulative with those from the proposed action if the water withdrawals occurred in the same watershed; however, most water needs are met by using groundwater wells along the TAPS ROW. The quality of surface water resources in Interior Alaska could be affected by discharges during drilling, sedimentation and runoff from road construction (particularly during construction of a natural gas pipeline), refinery construction and operation, human habitation and development, and spills. Impacts of these activities would be cumulative with those from the proposed action if the surface discharges or spills occurred in the same watershed.

Depending on the quantities of pollutants released, impacts from all actions could be large in magnitude and local. Impacts from continued operation of the TAPS would, in general, be small and local because of compliance with existing permit conditions. However, impacts from a large spill could be major in magnitude and extensive, depending on the speed of cleanup response and the conditions affecting dispersal. In the case of smaller spills, cleanup response would limit the extent of contamination and the effects on water quality. Compliance with guidelines established for appropriate

Alaska discharge permits, restrictions on the storage of toxic construction and operations materials, and requirements for cleanup of all toxic materials as part of construction and normal operations, would minimize cumulative impacts of all actions on water quality.

The quantity of surface water resources in the area of Prince William Sound would be affected by oil refining, oil and gas transportation, and human habitation and development. The quality of surface water could be affected by runoff from road construction, refinery construction and operation, human habitation and development, and spills. Impacts from all actions could be large in magnitude and local; however, impacts from continued operation of the TAPS would, in general, be small in magnitude and local. In the case of a large, but unlikely, oil spill into fresh water (e.g., a catastrophic failure of an oil storage tank at the Valdez Marine Terminal), however, impacts could be large. For anticipated or likely small spills, impacts to surface water quality would be small and local because of the small volumes of oil released. The recipients of most of these impacts would be marine waters rather than freshwater rivers or streams, which are limited in number and size in the vicinity of the Valdez Marine Terminal. Compliance with guidelines established for appropriate Alaska discharge permits, restrictions on the storage of toxic construction and operations materials, and requirements for cleanup of all toxic materials as part of construction and normal operations would minimize cumulative impacts on water quality.

Because TAPS water use is a small part of the surface water requirement of all activities in the Interior and Prince William Sound, all alternatives would have similar cumulative effects in these areas. However, declining oil exploration, development, and production may decrease cumulative impacts on surface water after the first few years of no action.

Groundwater Resources

While groundwater resources could be used for such activities as drilling, road construction (particularly ice roads), construction and dust control, and human consumption, water needs on the North Slope are typically met with surface water resources. Therefore, cumulative impacts to the available groundwater from the foreseeable actions, together with the proposed action would be none to negligible.

In Interior Alaska (i.e., along the TAPS ROW), groundwater quantity and quality could be cumulatively impacted by oil and gas exploration, development, and production; oil and gas transportation; oil refining; and human habitation and development. Within Interior Alaska, municipal water needs are usually met by using groundwater wells, and as a result, the quantity of groundwater available may be locally reduced in areas with large withdrawals. Direct impacts to water quality could result from direct discharges to the groundwater from industrial activities and septic fields. Indirect impacts could result from the infiltration of contaminated surface water from industrial and municipal sources. Impacts from continued operation of the TAPS would, in general, be small and local, except for impacts from unlikely or very unlikely large spills releasing contaminants to groundwater (e.g., a very unlikely underground guillotine break caused by seismic activity or a landslide). For anticipated spills, impacts to groundwater would be small and local because of the small volumes of contaminants released and because they would be promptly cleaned up.

In the area of Prince William Sound, oil and gas transportation, and human habitation and development could affect both the quantity and quality of groundwater. The quantity of groundwater could be reduced because water would be used for such activities as industrial developments and operations, road construction and dust control, building construction, and human consumption and development. In some locations, meeting the water needs of all activities could lower the water table. Water in the Valdez area is supplied by four primary groundwater wells. Water for operation of the Valdez Marine Terminal is obtained from surface water resources, thus impacts from continued operation of the TAPS under the proposed action would thus be a negligible component of the cumulative impact to groundwater quantities in the Prince William Sound area.

The quality of groundwater resources in the area of Prince William Sound could be affected by direct discharges to the groundwater from

septic fields and by the infiltration of contaminated surface water from one or more foreseeable actions. Impacts from continued operation of the TAPS would, in general, be small in magnitude and local, except for impacts from spills. The cumulative impacts could be very large and extensive for unlikely to very unlikely spill scenarios; however, the impacts of anticipated small spills would be small and local because of the small volumes of contaminants released.

Compliance with guidelines established for appropriate Alaska discharge permits, restrictions on the storage of toxic construction and operations materials, and requirements for cleanup of all toxic materials as part of construction and normal operations would minimize cumulative impacts on groundwater quality from all activities in all regions.

Physical Marine Environment

Potential cumulative impacts to the physical marine environment associated with the TAPS would come from tankers traveling from the Valdez Marine Terminal through Prince William Sound and beyond to Pacific ports. These transits would create noise and involve the risks of petroleum spills or other accidents. Other actions that would be cumulative with the impacts from tanker traffic are commercial fishing, recreational fishing/sightseeing, commercial sightseeing/tours, and other commercial cargo operations in Port Valdez and Prince William Sound. With the exception of the risks from larger oil spills, these cumulative impacts on the physical marine environment would be small and short-lived. Small spills from all vessels are rapidly responded to and cleaned up by the spill response infrastructure supporting the oil transportation industry.

Impacts on the physical marine environment from large, but unlikely, oil spills would be experienced over a wide area prior to containment and cleanup. Heavily oiled areas of shoreline would be affected for a long time; dilution and mixing would eventually reduce hydrocarbon levels to near background concentrations. Impacts would be similar under the proposed action and less-than-30-year alternatives. The risks presented by oil transportation would decline under no action.

Air Quality

Reasonably foreseeable actions that might impact air quality and AQRVs (visibility and acid deposition) include exploration, development, production, storage, refining, and transportation of oil and gas; human habitation and development; land management activities; and natural resource uses. Specific factors inherent to these actions include emissions from (1) the operation of facilities and equipment (exhaust emissions from fuel-burning equipment and fugitive emissions of dust and volatile organic compound); (2) construction activities (exhaust emissions from heavy equipment and vehicles and fugitive emissions of dust from land disturbance); (3) accidental spills of crude oil, petroleum products, and hazardous chemicals (evaporative emissions); and (4) transportation activities (exhaust and road dust emissions from vehicles).

Little or no potential long-term and short-term impacts on air quality (and AQRVs) are estimated to result from reasonably foreseeable actions in combination with the proposed action. Such impacts would not result in deterioration of air quality that would cause ambient air quality to exceed applicable standards.

Noise

The construction and operation of industrial facilities and equipment, transportation, and mining can produce annoying or harmful levels of noise. It is estimated that there would be no adverse noise impacts beyond TAPS facility site boundaries from the noise emitted during TAPS facility operations. Potential noise impacts due to any construction activities under the proposed action or termination activities under the no-action alternative would also be limited to within the TAPS facility site boundaries or the immediate vicinity of construction sites. Therefore, any cumulative noise impacts due to noise emitted from the reasonably foreseeable actions, in combination with noise emitted from TAPS operational or construction activities under the proposed action or termination activities

under the no-action alternative, would be limited to within the facility site boundaries or the immediate vicinity of construction sites.

Transportation

Under all alternatives, the construction of a natural gas pipeline might impact the transportation corridor that is also used by the TAPS, by North Slope oil activities, by communities and industry, and by land managers. The existing transportation network is expected to be capable of meeting transportation needs. The most noticeable effects would occur in the immediate vicinity of construction along the affected highways as a result of the entry and exit of workers and construction equipment. However, proper staging of equipment and gas pipeline components along the affected highways would minimize delays along the routes associated with deliveries to the current construction site. In general, any impacts to travel along the affected highways would be expected to be small because daily traffic volumes are relatively low.

Wastes

Cumulative waste impacts would result from nearly all of the past, present, and reasonably foreseeable activities, mainly due to human habitation or presence (i.e., the generation of domestic solid wastes and domestic and sanitary wastewaters). With the exception of North Slope activities, much of the workforce engaged in other actions would be located near population centers or established communities, and solid wastes and domestic and sanitary wastewaters attributable to that workforce would be managed in existing municipal treatment or disposal facilities. The relative sizes of the workforces engaged in most cumulative actions would be small compared with the sizes of the communities in which they would reside or work, and thus they would have only small incremental impacts on existing waste management systems. Three ongoing actions would have substantial waste impacts: North Slope oil exploration, development, and production (including maintaining the North Slope workforce); oil refining at three of the four operating refineries in Alaska; and tanker loading activities at the Valdez Marine Terminal. One proposed action, the construction of a natural gas pipeline, could also have substantial waste impacts.

Domestic and sanitary wastewaters associated with North Slope operations are managed by (1) biological treatment followed by discharge of treated effluents to area lakes or the Beaufort Sea or (2) injection into Class II underground injection wells located on the North Slope. These impacts are, however, limited by the conditions of the NPDES and Class II injection well permits, respectively, under which discharges to surface water or underground injection occur. Solid wastes are generated in association with North Slope activities. While some nonhazardous solid industrial waste is generated, the majority of solid waste is nonhazardous solid domestic waste from activities that support the workforce. All nonhazardous solid domestic and industrial wastes from North Slope operations are delivered to the Oxbow Landfill for disposal. Thus, impacts to the environment from the operation of the Oxbow Landfill are cumulative, resulting from the management of wastes from both North Slope operations and TAPS operations. However, TAPS solid waste volumes are estimated to be only a minor portion of all the wastes delivered to Oxbow.

Waste impacts associated with oil refining operations could result in small cumulative impacts when combined with impacts of TAPS operations. Examples of impacts include discharge of domestic/sanitary wastewaters and industrial wastewaters, and hazardous waste generation. After primary treatment, wastewater is discharged to a publicly owned treatment works (POTWs) or undergoes secondary treatment before being discharged directly to surface waters under an appropriate NPDES permit. Domestic/sanitary wastewaters and industrial wastewaters (including process waters and cooling waters) from oil refining operations are not discharged to the same watercourses or POTWs as TAPS wastewaters.

Hazardous wastes, including oily wastes that may contain hazardous constituents (e.g., benzene), are generated during refinery operations. In addition, certain EPA-listed wastes are associated with oil refinery

processes. All hazardous wastes generated in Alaska are transported to out-of-state treatment, storage, and disposal facilities (TSDFs) for ultimate treatment and disposal. There could be some cumulative impacts at out-of-state TSDFs that receive hazardous wastes from both TAPS operations and from oil refining operations. However, permit conditions would limit the extent of those impacts to acceptable levels.

Human Health and Safety

Actions considered that, together with the proposed action, could have cumulative impacts on human health and safety include oil and gas exploration, development, and production on the North Slope; construction and operation of natural gas pipelines; land management activities; human habitation and development; and natural resource use. Impacts for occupational workers can be minimized when workers adhere to safety standards and use appropriate protective equipment. Although fatalities and injuries would still occur from on-the-job accidents, the use of best management practices for occupational health and safety compliance is recommended to reduce statewide fatality and injury incidence rates from all of the actions in combination.

An assessment of potential health impacts to members of the public from Valdez Marine Terminal air toxics emissions concluded that no adverse health impacts would be expected in association with the inhalation of those emissions throughout the renewal period. Some planned future projects in the regions of interest (e.g., new natural gas pipelines) could result in additional VOC emissions, presumably with maximum emissions similar to or less than those associated with TAPS facilities. Another important source of some of the same VOCs that are emitted from TAPS facilities is motor vehicle exhaust. Auto emissions would be expected to increase over the renewal period as the state population and automobile transportation increased. An increased cancer risk of about 3×10^{-5} has been estimated for residents of Valdez from benzene inhalation from all sources. As sources such as motor vehicle emissions increase over the next 30 years, additional emission controls on mobile and point sources might be needed to minimize increasing cancer risks.

During construction of a natural gas pipeline, the main type of emission of concern during the 2- to 3-year construction period would most likely be criteria pollutants generated from excavation, heavy equipment operation, and vehicles used for transporting workers and raw materials. Unless residential areas were located in close proximity to the pipeline or related facilities, adverse health impacts due to limited-duration increases in criteria air pollutant levels from future construction actions in conjunction with the proposed action would not be expected.

The projected increase in the population of Alaska over the next 30 years might be problematic in the Fairbanks/North Pole area, which is an air quality nonattainment area with respect to carbon monoxide (CO). However, none of the TAPS emissions of CO under the proposed action or alternatives would cause a measurable increase in CO levels in the Fairbanks nonattainment area. Therefore, although the CO levels might become more problematic as the population increased, such an increase in CO levels would not constitute a cumulative impact with respect to the action being considered.

Numerous hazardous materials would be used and stored in association with some of the actions considered in this cumulative impacts assessment, especially oil and gas exploration, development, and production; oil refining; and oil and gas transportation. Human health and safety impacts from accidental releases of hazardous materials could result in exposures to contaminated air, soils, groundwater, or food. However, the potential for additional cumulative adverse impacts from accidental releases is relatively small.

The potential for ingestion or dermal exposure of the general public to soils and groundwater contaminated by spills of hazardous materials is very low, because there is extensive regulation with regard to the containment and cleanup of spill sites. Because spills onto gravel or soil surfaces must be cleaned up according to these ADEC requirements, there should be no complete exposure pathways or elevated concentrations

remaining after remediation of these types of spill sites. Therefore, no long-term health impacts from exposure to contaminants in soil would be expected.

Other potential impacting factors, such as oil spills in the marine environment and continued exposures of Alaska Natives and others from regular consumption of game contaminated with PCBs and mercury, are not expected to result in cumulative impacts that result in long-term human health effects. Foreseeable actions, including the TAPS, are not expected to result in emissions of PCBs or mercury. The long-term health impacts of oil spills from uptake in the foodchain are not insignificant but are on the same order as impacts from ingestion of smoked meats and fish.

Biological Resources

Terrestrial Vegetation and Wetlands

The construction and operation of facilities for oil exploration and production in the Beaufort Sea could result in losses of vegetative communities from direct removal, sedimentation, or spills and could include marine vegetative communities or coastal marshes. Cumulative impacts from these actions are expected to be minor.

On the North Slope, the area of impact from individual drilling or production sites has become considerably smaller over the past 30 years as advances in technology have reduced the area required for well pads. Losses of vegetative communities might result from direct removal, sedimentation, or spills; these communities might include lowland and upland tundra. However, less than 1% of the vegetation of the Arctic Coastal Plain would likely be impacted by oil development. Construction of a natural gas transportation system would also impact vegetation on the North Slope in the vicinity of existing oil production facilities and near the TAPS ROW. The cumulative effects of these activities on North Slope terrestrial vegetation and wetlands would be expected to be minor. Very little new construction or other major disturbance of vegetation on the North Slope is anticipated for continued operation of the TAPS.

Impacts to vegetation in Interior Alaska and Prince William Sound and along Pacific transportation routes might result from direct removal, sedimentation, or spills; these communities might include marine vegetative communities or coastal marshes. The cumulative effects of activities such as oil storage and transportation, land development, logging, and natural resource use on the terrestrial vegetation and wetlands would be expected to be minor. A major, but highly unlikely, spill would have a large effect on vegetation communities in coastal marshes and wetlands.

In summary, with the exception of a large, but highly unlikely, oil spill, the cumulative effects on terrestrial vegetation and wetlands under the proposed action and the less-than-30-year renewal alternative would be small. Following TAPS termination activities, cumulative impacts on vegetation and wetlands would be reduced.

Fish

The assessment of cumulative effects on fish considered the proposed action and foreseeable actions that could alter or eliminate habitat, obstruct fish passage, increase human access to fish populations, and result in releases of oil, fuel, and chemicals. On the North Slope and Beaufort Sea, the most important future activities that could contribute to cumulative impacts on fish would be planned oil and gas development activities, oil and gas transportation, and natural resource use (e.g., subsistence). In Interior Alaska, future actions that could contribute to cumulative impacts on fishes include oil and gas transport, other transportation activities, human habitation and development, and land management actions. In Prince William Sound, future actions contributing to cumulative impacts on fish include oil transport, other transportation activities (e.g., barging and cruise ships), human habitation, natural resource use (e.g., commercial, subsistence, and recreational fishing), land management activities, and introduction of non-native species. However,

these activities are not expected to significantly increase cumulative impacts on fish or affect the viability of species' populations. Oil spills could not significantly add to cumulative impacts, except for an unlikely large spill to aquatic habitats, in which case impacts similar to the Exxon Valdez oil spill could occur. Cumulative impacts of all activities on fish are similar for the proposed action and less-than-30-year renewal alternative, and would be reduced after the initial termination period under no action.

Birds and Mammals

Assessment of the cumulative effects of foreseeable actions including the proposed action considered loss or alternation of habitat, mortality, obstruction to movement of wildlife, disturbance and displacement, and impacts associated with oil spills.

On the North Slope and in the Beaufort Sea, the most important future activities that could contribute to cumulative impacts on birds and terrestrial mammals would be planned oil and gas development activities, oil and gas transportation, and natural resource use (e.g., subsistence). In Interior Alaska, future actions that could contribute to the cumulative impacts on these species would include oil and gas transport, other transportation activities, human habitation and development, natural resource use (e.g., subsistence and recreational hunting), and land management actions. For example, timber harvests and post-harvest management may directly and indirectly affect winter habitat of caribou through loss of lichen. In Prince William Sound, future actions that could contribute to cumulative impacts on birds and terrestrial mammals would include oil transport, other transportation activities (e.g., barging and cruise ships), human habitation, natural resource use (e.g., commercial, recreational, and subsistence fishing, hunting, and trapping), and land management activities. However, it is expected that none of these activities would significantly increase cumulative impacts or affect the viability of populations of species. Oil spills would not significantly add to cumulative impacts, except for an unlikely to very unlikely large spill to aquatic habitats; in this case, impacts similar to those from the Exxon Valdez oil spill could occur. Cumulative impacts to birds and mammals would be similar under the proposed action and less-than-30-year renewal alternative, but less under no action.

Threatened, Endangered, and Protected Species

Cumulative impacts to threatened, endangered, and protected species could result from past, present, and reasonably foreseeable future actions in the three regions crossed by or located in the vicinity of the TAPS: (1) North Slope and Beaufort Sea; (2) Interior Alaska; and (3) Prince William Sound. Cumulative impacts are considered separately for species in these three regions because there are few species that occur in more than one. The gray whale, humpback whale, fin whale, and Steller sea lion have experienced large cumulative effects, mainly because of the Exxon Valdez oil spill. The Steller's eider and beluga whale are likely to continue to experience moderate cumulative effects from foreseeable activities in Prince William Sound. Cumulative effects rated as large are likely to continue in the North Slope and Beaufort Sea area for the bowhead whale. The spectacled eider and Steller's eider are likely to experience moderate cumulative effects. For all the above species, the cumulative effects are mainly the result of past oil exploration and oil transportation activities. The five listed avian species occurring in the region of TAPS influence in Interior Alaska are expected to experience overall minor or negligible cumulative effects. The contribution of the TAPS has been and is likely to continue to be negligible or minor for all listed species. Cumulative impacts on listed species would be similar under the proposed action and less-than-30-year renewal alternative. Although removal of TAPS facilities might have temporary and minor impacts, cumulative impacts in the North Slope and Prince William Sound would decline.

Social Systems

Economics

The assessment of the cumulative economic impacts of the TAPS covers the impacts from

continued TAPS operation (including renewal for less than 30 years) and no action, together with impacts from other existing and projected economic development activities likely to occur in the state during the proposed ROW renewal period, including spills that could potentially occur in Prince William Sound during tanker operations.

The largest planned activity potentially occurring during the renewal period would be the construction and operation of the proposed natural gas pipeline from the North Slope. One estimate of the total capital cost associated with the pipeline is between $5 and $6 billion, and it may take up to 7 years to build. The largest impact of the pipeline to the state and local economy would be tax revenues amounting to $189 million annually from royalties and severance taxes and $188 million annually in property taxes. Employment created by the pipeline could be 7,200 direct workers during the peak year, with an additional 3,300 jobs created indirectly in the state as a whole. Annual operations jobs are estimated to total 550, with an additional 1,250 indirect jobs. Deterioration in the provision of local public services might also occur in some communities along the proposed route in the short term as a large number of in-migrating workers arrive, especially if some are accompanied by their families.

The National Missile Defense System (NMDS) includes a facility to be located in Alaska to support an antiballistic missile system, most likely at Fort Greely, near Delta Junction. The system would cost $626 million and create 400 direct construction jobs over a 5-year period and create an additional 620 jobs in the state. A total of 360 direct operations jobs and an additional 110 indirect jobs would be created. Currently, 600 civilian and military jobs are under threat as part of the plan to close the base at Fort Greely.

An unlikely oil spill in Prince William Sound could also result in additional spending in local communities and at the state level. As a result of the Exxon Valdez oil spill in 1989, Exxon Corporation spent more than $2.6 billion on cleanup activities in the following 3-year period, creating an average of 2,500 direct cleanup jobs and approximately 2,500 indirect jobs over the period. The local economy was stimulated by income generated by the oil spill; income doubled and employment increased by 30% in the Valdez-Cordova Census Region in 1989. The long-term effects of the spill on the environment in Price William Sound have yet to be fully established, and the potential costs of compensatory claims for additional environmental damages may still significantly increase the overall monetary cost of the spill.

While the Exxon Valdez oil spill resulted in significant economic benefits to the communities in Prince William Sound, there were numerous other social and psychological costs incurred by many of those directly and indirectly involved in the spill. These impacts include damage to fisheries resources and cultural, spiritual, and community damages, many of which are long term and highly significant, possibly life-changing, to those involved.

Because of improvements to tankers, shipping safety, and spill response capability in Prince William Sound developed after the Exxon Valdez incident, it is unlikely that a spill of the same magnitude would occur again, and the local and state economic impacts associated with spill response and cleanup activities for any spill would not be as significant as those following the Exxon Valdez incident. The possibility of compensatory and punitive damage resulting from a future spill, however, may still increase the monetary cost of even a relatively small spill, although there may be offsetting economic impacts, depending on the extent to which cash from compensation payments is spent inside the state.

Construction and operation of the gas pipeline project and the NMDS under the no-action alternative would partially offset the losses in employment, income, and tax revenues that would occur at both the state and local levels with the end of TAPS operation and North Slope production. Construction of the gas pipeline project would not conflict with the latter stages of TAPS termination activities or with the NMDS, and gas pipeline operation would likely provide an alternative basis of support for state and local revenue generation and continuing efforts toward diversifying the state's economy.

The impacts of continued TAPS operation for the less-than-30-year renewal alternative,

together with the gas pipeline and NMDS, would be less than those for the proposed action. Less oil-related investment would occur in the North Slope fields and other parts of the oil sector, and supporting industries, together with lower levels of private and public investment in the non-oil-related parts of the economy, would produce less employment, income, and tax revenues.

Subsistence

Cumulative impacts to subsistence likely would vary for the three broad geographic regions — the North Slope, Interior Alaska, and Prince William Sound/Gulf of Alaska area. In all cases, cumulative impacts to subsistence under past, present, and reasonably foreseeable actions should not be large. Those occurring in the North Slope likely would be the greatest, due primarily to the relatively large amount of oil and gas exploration, development, and production occurring there and the associated human activity and restrictions on subsistence in certain areas. However, the size of subsistence harvest areas in all three regions would leave much of these areas unaffected by cumulative impacts — that is, still available for subsistence and outside the geographic influence of various cumulative activities that might cause minor disruptions to subsistence resource movements. Moreover, the increase in size of certain key subsistence resource populations over the past several years suggests that improved availability of certain species may help compensate for reduced access to certain subsistence use areas.

Any negative cumulative impacts associated with the less-than-30-year renewal alternative likely would be less than those associated with cumulative impacts under the proposed action. Cumulative impacts associated with the no-action alternative, in contrast, likely would be positive, although improved conditions from termination of North Slope oil development likely would be dampened by an increase in subsistence activity.

Sociocultural Systems

Overall, cumulative impacts to sociocultural systems likely would be a mix of positive and negative consequences. Both types probably are a consequence of continued acculturation and influence by modern American society, particularly affecting Alaska Native sociocultural systems but also influencing rural non-Native systems. As was the case when evaluating sociocultural impacts under the proposed action, clearly linking acculturation with the TAPS or any of the cumulative actions considered in this EIS is extremely difficult given the general modernization that continues to occur throughout Alaska.

Cumulative impacts associated with the proposed action likely would be negative, but would be small in magnitude. This conclusion rests on a comparison of positive and negative consequences of cumulative impacts. Revenues would be available to help support many public services and programs upon which many Alaska Native and rural non-Native communities rely. Also, access to employment for wages would continue in much of rural Alaska, providing cash for the mixed economies that characterize this portion of the state. However, cumulative impacts also would include continued modernization of Alaska, providing the basis for further acculturation of Native and non-Native sociocultural systems. Cumulative impacts also would produce an environment where members of rural sociocultural systems continue to participate in wage labor, requiring competition and occasionally absence from communities, inconsistent with maintaining these systems.

Cumulative impacts of the less-than-30-year renewal alternative likely would be similar to those associated with the proposed action cumulative case. Cumulative impacts of the no-action alternative, in turn, are expected to be negative but stronger than for the other two alternatives. Alaska Native and rural non-Native sociocultural systems likely would face lessened acculturation than under current conditions, but also would face greater economic challenges in conjunction with reduced public services and programs.

Cultural Resources

Under the proposed action alternative, negative cumulative impacts to cultural resources are expected to be absent or negligible, in part as a result of adhering to

existing state and federal regulations during project development and operation. Impacts for the less-than-30-year alternative would be similar to those under the proposed action, depending upon the level of North Slope petroleum activities. Under the no-action-alternative, cumulative impacts to cultural resources are expected to be absent or negligible, in part, as a result of adhering to existing state and federal regulations during project development and operation.

Land Use and Coastal Zone Management

The TAPS and other actions in the vicinity of the pipeline have had cumulative effects on land ownership and use near the ROW during the past 25 years. Valid legal access for TAPS operation and maintenance has been acquired on the lands it crosses. Access to public and some private lands has increased in the vicinity of the pipeline due to construction of the Dalton Highway, TAPS access roads, and airstrips. Some trespassing and conflict of use issues have resulted on Native lands. Some increases in recreational, residential, municipal, and commercial land uses have occurred; some of these increases can be attributed to the pipeline. Commercial development has occurred at three development nodes along the Dalton Highway. The existence of the pipeline has contributed to the increase in oil exploration, development, and transportation activities at the North Slope during the past 25 years.

The natural gas pipeline and its related infrastructure would have some effects on land use in the vicinity of the TAPS right-of-way under all alternatives. Aesthetics would be affected along and/or within the TAPS ROW, with resulting effects on recreation likely. Effects on military, residential, municipal, commercial, or private land use could also occur from preclusion or interference of use from the gas pipeline and related structures. Conflicts with mining and other natural resource use would be possible, depending on the route of the pipeline and locations of structures.

The TAPS and other actions in the vicinity of the pipeline have had cumulative effects on the North Slope Borough and Valdez coastal zones during the past 25 years. Aesthetic and land use impacts from the TAPS and other activities are evident in both zones. Other currently existing development in the coastal zones would be expected to be consistent and in compliance with the coastal management programs as would future development, and therefore would be unlikely to have a large cumulative impact on coastal zone management. Spills from the TAPS, a future natural gas pipeline, or other oil and gas development facilities represent factors that could have the greatest potential cumulative effect on coastal zone management with regard to either the North Slope Borough or Valdez coastal zone management programs.

Recreation, Wilderness, and Aesthetics

The TAPS and other actions have had some cumulative effects on recreation on federal and state lands in the vicinity of the pipeline. Access to public lands has increased since construction of the TAPS, particularly as a result of the construction of the Dalton Highway, resulting in an increase in recreational opportunities and use in some areas. A future gas pipeline and its related infrastructure would substantially add to the currently existing visual impacts along, and within, the TAPS ROW. Only temporary visual impacts would occur from burying the gas pipeline, but construction of the related infrastructure would create long-term aesthetic impacts.

The Wilderness Area within the Gates of the Arctic NPP is the only federally designated Wilderness Area within a few miles of the TAPS or in the vicinity of the proposed gas pipeline. No state designated, or federal or state proposed, wilderness areas exist in the vicinity of the TAPS or the proposed gas pipeline.

The construction of a buried natural gas pipeline within or adjacent to the TAPS ROW as it passes the Gates of the Arctic NPP is a reasonably foreseeable future activity and would add to the indirect impacts of the TAPS. Temporary visual impacts would occur from burying the pipeline and would persist until revegetation occurred. An increase in personnel in the area due to the additional pipeline could

potentially result in an increase in recreational use in the Gates of the Arctic Wilderness Area.

The combined effects from both pipelines would likely have a larger impact on the Gates of the Arctic NPP Wilderness Area than the current impact, depending in large part on the location of the natural gas pipeline. The cumulative impacts would be similar under the proposed action and the less-than-30-year renewal alternative.

Cumulative effects on wilderness from the no-action alternative would include elimination of the currently existing visual impact of the TAPS after the termination period, as well as elimination of some of the noise associated with the pipeline and related traffic on the Dalton Highway. Increased access and a small increase in use from other activities would be expected to continue.

The TAPS and several other actions have resulted in a large cumulative visual impact in the vicinity of the pipeline. The TAPS and its related infrastructure represent one of the more substantial visual impacts on the landscape along much of its length. The highways that it parallels also represent major aesthetic impacts, as do the communities and other developments within the pipeline viewshed. Other existing visual impacts include additional pipelines and oil development infrastructure on the North Slope; commercial, industrial, residential, and recreational development along the Dalton and Richardson Highways; mining operations; pipeline viewing stations; and the Valdez Marine Terminal.

All of these visual impacts currently exist and have existed for many years or decades along the length of the pipeline. Development in the vicinity of the pipeline is expected to occur slowly, as it has in the past. No major municipal, commercial, industrial, recreational, or mining development has been identified adjacent to the TAPS, and no major additional TAPS-related construction is anticipated. However, a 200- to 300-acre residential development and an approximately 2,000-acre agricultural development have been proposed about 5 miles south of Copper Center.

Renewal of the TAPS ROW would continue to have mostly localized impacts to aesthetics in the vicinity of the pipeline. In the absence of spills, continued operation and maintenance of the TAPS would have very little additional aesthetic effect on the landscape. However, the anticipated construction of the natural gas pipeline and related infrastructure would have additional visual impacts on the landscape in the vicinity of the TAPS. That potential project, combined with existing aesthetic impacts from the TAPS, as well as other probable future development in the vicinity of the pipeline, would combine to create a major aesthetic impact in the vicinity of the TAPS ROW under the proposed action.

Environmental Justice

The evaluation of cumulative impacts with implications for environmental justice depends first on the identification of high and adverse cumulative impacts in other impact areas (groundwater, human health, etc.) and then on whether those impacts would affect minority and low-income populations disproportionately. Disproportionate impacts can occur two ways: (1) because the environmental justice population under consideration is present at a percentage higher than that found in the state as a whole, or (2) because the environmental justice population under consideration is more susceptible to such impacts. In either case, it is a necessary precondition that the cumulative impacts have already been determined to be high and adverse. However, analyses indicate that high and adverse impacts would not be anticipated for cumulative actions combined with the proposed action or less-than-30-year renewal alternative. Impacts associated with the no-action cumulative case, in contrast, are expected to produce high and adverse economic consequences. Both because minority and low-income populations occur in disproportionately high percentages in many parts of Alaska (the entire state economy likely to be affected) and because these populations tend to be more susceptible to such impacts because of their financial status (see Section 3.29), environmental justice impacts would be anticipated.

OTHER NEPA CONSIDERATIONS

Unavoidable Adverse Impacts

In general, the unavoidable adverse impacts under the proposed action (renewal of the ROW for 30 years) and the less-than-30-year renewal alternative are small and may be mitigated or offset by the positive aspects of the actions. There would be continued localized impacts to the environment as a result of operation, construction, and maintenance activities, such as soil and vegetation disturbances, the use of surface and groundwater resources, and air emissions. However, such impacts are readily mitigated through measures already in place. The potential impacts from spills would remain, and those impacts could be adverse. However, preventive and mitigative measures are in place to limit and repair the damage from spills.

Under both alternatives to renew the ROW, impacts on subsistence and sociocultural systems would continue. However, numerous factors are involved that would negate or limit adverse effects. For example, while local disruption of animal movement patterns would continue, the ability of subsistence resource users to meet their needs would continue to be enhanced by the availability of the financial resources to purchase modern technology.

The no-action alternative (i.e., not renew the ROW) would have localized unavoidable adverse impacts on fish and wildlife during pipeline dismantlement, removal, and restoration activities. These impacts would cease after the completion of these activities and would not threaten entire fish or wildlife populations. However, the potentially adverse impacts on economics would last for a number of years. Initially, the pipeline termination activities would create jobs and revenue. However, as termination activities ceased, those jobs and additional revenue would end. The large reduction in revenues from terminating the TAPS operations would adversely impact the ability of the state to provide public services, and a reduction of the Permanent Fund would impact all Alaskans. The no-action alternative would indirectly affect North Slope oil production, as well as other industries.

Relationship Between Local Short-Term Uses of the Environment and Long-Term Productivity

The comparison of the proposed action and the less-than-30-year renewal alternative shows that the impacts over the renewal period would vary little on an annualized basis between the two alternatives. The use of the environment under the alternatives to renew allows the continued passage of North Slope crude oil to the Port of Valdez. The use of the TAPS further facilitates the development and production of North Slope oil fields. This allows the continued generation of revenues from the operation of the North Slope oil fields, TAPS, and contributions into Alaska's Permanent Fund. These monies would be used by Alaska and its residents beyond any renewal period.

At the end of the TAPS activities under the proposed action, the less-than-30-year alternative, and the no-action alternative, there would be continued use of the environment for the duration of termination activities. At the end of termination activities, the impacts from TAPS on the physical environment would end, and restoration of the environment would continue. As the impacts of the operation of the TAPS would be small and temporary, the long-term productivity of the physical environment would not be affected by any of the alternatives.

Irreversible and Irretrievable Commitment of Resources

The continued disturbance of soil and withdrawal of sands, gravels, and quarry resources to support TAPS construction and maintenance activities under the proposed action or the less-than-30-year renewal alternative would result in the partial loss of these resources. Similarly, other materials (such as fuels, structural steel, and lumber) would be consumed in continuing TAPS operations and in TAPS termination activities, to include actions under the no-action alternative. Some of the

material would be available for reuse after TAPS termination activities.

In general, the impacts of the three alternatives on biological resources would not constitute irreversible and irretrievable commitment of resources. While there would be impacts on individual animals and plants, entire populations would not be adversely impacted. In localized areas, vegetation and animal life and habitats would be affected by the TAPS and TAPS termination activities (e.g., by oil spills). However, the affected individuals would be replaced by other members of their population. The restoration of habitat under the various stipulations would reverse the loss of wildlife resources over time.

The trend of effects of modernization on Alaska Native cultural systems would continue under all alternatives. The subsistence resources used by Alaska Native groups, although possibly disrupted by the activities under all three alternatives, would not be irreversibly and irretrievably committed. As stated above, biological resources would recover over time.

Cultural and paleontological resources are nonrenewable. The continued operation of the TAPS would create the potential for damage to cultural and paleontological resources from oil spills and construction and maintenance activities. This irreversible and irretrievable commitment of resources also would potentially occur during termination activities under the no-action alternative.

Under the proposed action and the less-than-30-year renewal alternative, the continued operation of the TAPS would allow continued depletion and use of North Slope oil resources, constituting an irreversible and irretrievable commitment of those resources. Potential oil spills from the continued operation of the TAPS would result in the economic loss of the spilled material and the resources needed to manage the materials. Under the no-action alternative, the ability to use North Slope oil resources would cease until an alternative means of transporting the oil was developed.

Mitigation of Potential Adverse Effects

The Trans-Alaska Pipeline Authorization Act (TAPAA), the Mineral Leasing Act (MLA), and the Federal Grant provide the BLM with the authority to implement changes at any time in TAPS oversight and operation that are protective of human health and the environment. Thus, studying, developing, and implementing mitigation actions represent an ongoing component of the adaptive management business model of JPO. In recognition that mitigation of all sorts is an ongoing and required activity, the development of new mitigation measures as an outcome of the NEPA analysis of the proposed action and alternatives is appropriately limited to describing a set of ongoing activities that enhance the efficiency and/or knowledge base of BLM and JPO oversight. Indeed, it can be asserted that developing new mitigation strategies only under the current NEPA analysis and waiting until a Record of Decision is issued to implement the mitigation would be somewhat contrary to the day-to-day oversight requirements of TAPAA, MLA, the Federal Grant, and the State Lease.

Several initiatives (ongoing, but not completed) that will further enhance the efficiency or knowledge base for BLM and JPO oversight are discussed below.

Development of a Programmatic Agreement

The BLM, ADNR, and APSC (as a concurring party) are in the process of completing a Programmatic Agreement (PA) with the State of Alaska Historic Preservation Office and the National Council on Historic Preservation that will guide the protection and mitigation of cultural and historic resources. While Section 106 consultations are an ongoing activity, the PA will provide an efficient method with more structure for future consultations.

Copper River Basin Spill Analyses

The Copper River Basin complex represents a challenging environment for spill mitigation

and recovery. The BLM and JPO continue to investigate and put in place methods, equipment requirements, and training to improve spill response activities on the streams and rivers that form the Copper River Basin. These analyses and studies will continue in future years and could include:

Listed below are activities designed to reduce the potential of a spill into the Copper River drainage and, if a spill does occur, to reduce the potential consequences. Several of these actions have already been completed, others are either underway or being planned:

- Construct berms on river banks in areas of aboveground pipe and defined drainage on the Gulkana, Tazlina, and Klutina Rivers [complete].
- Purchase a LCM-style support boat and an on-board skimmer system [complete].
- Increase area responders by staffing a Glennallen-based response team [complete].
- Deliver to PS 11 new response trailers and a 45-foot van to improve overall response [complete].
- Develop a rapid containment boom deployment system on the lower Tonsina River [underway].
- Conduct a number of containment-site evaluations and training sessions in the region [complete].
- Develop three additional Gulkana River access sites [complete].
- Locate an equipment connex at the Gulkana River/Richardson Highway bridge [complete].
- Add 12,000 feet of smaller dimension fast-water boom (2,400 feet is located within the PS11/12 area) [complete].
- Develop pre-deployed anchor systems on the Klutina, Gulkana, and Tazlina Rivers [planned].
- Develop boat access for the Copper River [planned].

It is anticipated that the oil spill prevention and response measures already in place and new measures being instituted as discussed above will reduce both the likelihood and the consequences of potential spills in the Copper River drainage area.

Employee Concerns Survey

APSC and contractor quality assurance programs are enhanced if workers perceive that they can identify problems and deficiencies without fear of harassment, intimidation, retaliation, or discrimination. To attempt to measure and monitor the degree to which TAPS employees feel free to pursue concerns related to safety, system integrity, and environmental protection, the BLM and JPO have conducted and published results of three TAPS employee concerns surveys. The BLM and JPO plan to conduct another survey within the next 3 years. The results of the survey will be available to the public.

Alaska Native Utilization Agreement

APSC and contractors have met the successive interim employment goals of the last three Alaska Native Utilization Agreements (ANUAs) executed under Section 29 of the Federal Grant. There has been no cause for any BLM enforcement action related to recruiting or hiring of Alaska Natives. With Alaska Native employment expected to reach the 20% target by 2004, the monitoring focus will be on sustaining these employment percentage levels of Alaska Natives and maintaining compliance with future ANUAs. In this regard, the BLM will pursue formal processes within the next ANUA to promptly address any significant slippage in the percentage of Alaska Native employment.

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