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

ALPINE SATELLITE DEVELOPMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

September 2004

VOLUME 1: ABSTRACT SUMMARY SECTIONS 1, 2, 3, 4, 4A, and 4B

In cooperation with:

State of Alaska

US Army Corps of Engineers

U.S. Coast Guard

U.S. Environmental Protection Agency

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
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AUG 1 0 2004

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Dear Reader:

We are pleased to make the Alpine Satellite Development Plan (ASDP) Final Environmental Impact Statement (EIS) available to you. This Final EIS responds to a proposal by ConocoPhillips Alaska Inc. (CPAI) to develop five satellite oil production pads to its Alpine field. The Bureau of Land Management (BLM) is conducting this EIS with four cooperating agencies—the U.S. Army Corps of Engineers, the U.S. Environment Protection Agency, the U.S. Coast Guard, and the State of Alaska. These agencies have contributed to the EIS and will use the results of the Final EIS in making their decisions on CPAI's proposal. We thank these agencies for their contributions to the EIS.

The Final EIS responds to comments made by the public and agencies on the Draft EIS. It also includes a Preferred Alternative that responds to public and agency comments and suggestions and addresses environmental concerns. Major features of the Preferred Alternative include:

- removing substantial infrastructure—much of the proposed roads and pipelines, and all the powerline poles—from the Fish Creek 3-mile setback established in the BLM's 1998 Northeast National Petroleum Reserve-Alaska Integrated Activity Plan/Environmental Impact Statement, while allowing a production pad (CD-6) to be located in the setback as requested by CPAI,
- requiring that the road and pipeline bridges across the Nigliq Channel and Ublutuoch River extend from bank to bank and that their approaches provide for natural water flow,
- requiring that the road south from the existing Alpine facility to a production pad (CD-4) be either located around Lake 9323 or otherwise engineered to provide for natural water flow and fish passage,
- increasing the elevation of all pipelines to a 7-feet minimum as measured at the vertical support members, and
- requiring lighting of higher structures to minimize bird strikes.

We appreciate the extensive comments that we received on the Draft EIS and the thoughts and suggestions from everyone involved, but especially from the residents of the development area.

As required by the National Environmental Policy Act, the Environmental Protection Agency will publish a Notice in the *Federal Register* of the availability of this Final EIS. The BLM will wait 30 days after the publication of the EPA's Notice before issuing our Record of Decision. Other agencies will issue their own separate decision documents.

If you have questions about this document, please call Jim Ducker, BLM Alaska State Office, at (907) 271-3130 or Gary Foreman, BLM Northern Field Office at (907) 474-2339.

Sincerely,

George P. Gratt

Henri R. Bisson
ACTING State Director

ALPINE SATELLITE DEVELOPMENT PLAN

VOLUME 1:
ABSTRACT, SUMMARY, TABLE OF CONTENTS, SECTIONS 1, 2, 3, 4, 4A, 4B

FINAL
ENVIRONMENTAL IMPACT STATEMENT

Prepared by

U.S. Department of the Interior

Bureau of Land Management

September 2004

The Bureau of Land Management Today

Our Vision
To enhance the quality of life for all citizens through the balanced stewardship of America's public lands and resources.

Our Mission
To sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

Our Values
To serve with honesty, integrity, accountability, respect, courage, and commitment to make a difference.

Our Priorities
To improve the health and productivity of the land to support the BLM multiple-use mission.

To cultivate community-based conservation, citizen-centered stewardship, and partnership through consultation, cooperation, and communication.

To respect, value, and support our employees, giving them resources and opportunities to succeed.

To pursue excellence in business practices, improved accountability to our stakeholders, and deliver better service to our customers.

BLM/AK/PL-04/017+3130+931

ALPINE SATELLITE DEVELOPMENT PLAN
FINAL ENVIRONMENTAL IMPACT STATEMENT

Lead Agency: U.S. Department of the Interior, Bureau of Land Management

Cooperating Agencies: U.S. Corps of Engineers, U.S. Environmental Protection Agency, U.S. Coast Guard, State of Alaska

Proposed Action: Alpine Satellite Development Plan Final Environmental Impact Statement (FEIS) for federal, state, and private lands within the North Slope Borough, Alaska.

Abstract:

The Alpine Satellite Development Plan FEIS analyzes alternatives to, and the potential environmental impacts of, the ConocoPhillips Alaska, Inc., proposal to construct and operate five oil production pads and associated wells, roads, airstrips, pipelines, and power lines in the northeast corner of the National Petroleum Reserve-Alaska and the Colville River Delta, North Slope Borough, Alaska. The proposed facilities would be satellites to the existing Alpine Central Processing Facility.

The Bureau of Land Management has lead responsibility for preparation of the FEIS. The U.S. Army Corps of Engineers, U.S. Coast Guard, U.S. Environmental Protection Agency, and the State of Alaska are participating in the analysis as Cooperating Agencies.

This FEIS provides documentation of the analysis of the proposed action and alternatives, based upon issues and concerns identified through the scoping process. Hypothetical Full-Field Development scenarios for the Plan Area have also been analyzed and documented. The FEIS evaluates the potential effects to: Physiography, Geology, Soils and Permafrost, Sand and Gravel, Paleontological Resources, Water Resources, Surface Water Quality, Climate and Meteorology, Air Quality, Noise, Terrestrial Vegetation and Wetlands, Fish, Birds, Terrestrial Mammals, Marine Mammals, Threatened and Endangered Species (bowhead whale, spectacled eider, Steller's eider), Socio-cultural Environment, Regional Economy, Subsistence Harvest and Uses, Environmental Justice, Cultural Resources, Land Use and the Coastal Zone, Recreation, Visual Resources, and Transportation. The potential effects of spills of produced fluids, crude or refined oil, seawater, and other chemicals have also been evaluated.

Public Comments regarding the Alpine Satellite Development Plan Draft Environmental Impact Statement, January 2004 have been considered in this FEIS.

For Further Information: Contact Jim Ducker of the Bureau of Land Management (907-271-3130) or visit the EIS website at www.ak.blm.gov. Written comments can be mailed to Jim Ducker, Alpine Satellite Development Plan EIS, Bureau of Land Management, 222 W. 7th Avenue, Anchorage, AK 99513.

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SUMMARY

S.1 BACKGROUND

The Bureau of Land Management (BLM) and four cooperating agencies — U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), U.S. Coast Guard (USCG), and the State of Alaska — have prepared the Alpine Satellite Development Plan (ASDP) Environmental Impact Statement (EIS) to examine ConocoPhillips Alaska, Inc.'s (CPAI, the applicant's) proposed action to develop five satellite oil accumulations in the Northeast National Petroleum Reserve-Alaska and the Colville River Delta adjacent to the eastern border of the National Petroleum Reserve-Alaska (the Plan Area). This EIS examines the potential impacts of CPAI's proposed Development Plan and evaluates a range of alternatives, consistent with applicable law, by which to accomplish the purpose and need of the proposed action while mitigating adverse impacts. This EIS provides National Environmental Policy Act (NEPA) analysis of CPAI's proposal for five new production well pads and their associated transportation systems.

The purpose of the proposed action is to allow CPAI to develop five satellite oil accumulations in the Plan Area. The need for oil production from the Plan Area, from the perspective of CPAI, is to generate financial return on its investment in oil and gas leases. From a broader perspective, the need for oil production from the Plan Area is to help satisfy the demand for a continued supply of domestic oil, to decrease dependence of the United States on foreign oil imports, and to contribute to employment and economic vitality in the region and nation.

S.2 PROPOSED ACTION AND ALTERNATIVES

S.2.1 The Applicant's Proposed Development Plan

CPAI proposes to develop five satellite drilling pads — two in the Colville River Delta adjacent to the National Petroleum Reserve-Alaska and three in the National Petroleum Reserve-Alaska. The pads are termed CD-3, CD-4, CD-5, CD-6, and CD-7. In the Colville River Delta, CD-3 is on State of Alaska land and CD-4 is on land owned by Kuukpik Corporation, a Native-owned corporation created under the authority of the Alaska Native Claims Settlement Act (ANCSA) for the village of Nuiqsut. CD-5 is on land conveyed to Kuukpik within the National Petroleum Reserve-Alaska; CD-6 and CD-7 are on lands administered by the BLM in the National Petroleum Reserve-Alaska.

The company proposes to place 20 to 30 wells on each pad and to transport the unprocessed, three-phase (oil, gas, and water) drilling product to the Alpine Central Processing Facility (APF-1) for processing. Processed oil would be placed in the existing pipeline system for transport to the Trans-Alaska Pipeline System (TAPS). The applicant's proposed development plan is more fully described at Section 2 of this EIS.

S.2.2 Alternatives to the Applicant's Proposed Development Plan

Five action alternatives, A through D and F, describe the applicant's proposed action and four alternatives to fulfill the purpose and need of the proposed action. Alternative E, the No Action Alternative, will serve as a benchmark, enabling the public and decision makers to compare the magnitude of environmental effects of the action alternatives. Alternative F, the agency preferred alternative, was developed in consideration of Draft EIS public and agency comments. The alternatives introduced below cover the full range of reasonable development scenarios.

Alternatives to CPAI's proposed action (other than the No-Action Alternative) were developed by the BLM by considering public comments at scoping and Draft Environmental Impact Statement (DEIS) review, tribal consultation, and the purpose and need of the proposed action, including options for accomplishing the production objectives of CPAI's proposed five-pad development. These alternatives address specific concerns associated with the individual components of the proposed development. This "component approach" addresses a range of

alternatives for individual project elements, such as access to production pads by gravel road or gravel airstrip, power lines on power poles or vertical support member (VSM)-mounted cable trays, and specific roadway routing and river crossing locations. These components were combined into complete project concepts based on unifying themes.

S.2.2.1 Alternative A

THEME: APPLICANT'S PROPOSED ACTION

The CPAI Development Plan includes five production pads, CD-3 through CD-7. Produced fluids would be transported by pipeline to be processed at APF-1. Gravel roads would connect CD-4 through CD-7 to existing Alpine Facilities. CD-3 would be accessed by ice road or by air. Gravel used for construction of roads, pads, and airstrips would be obtained from the existing Arctic Slope Regional Corporation (ASRC) Mine Site and the Clover Potential Gravel Source (Clover). A bridge across Nigliq Channel near CD-2 would accommodate road traffic and the pipelines. CD-3 would be the only new pad with an airstrip. CD-6 would be within a 3-mile setback from Fish Creek in which the BLM's Record of Decision (ROD) for the Northeast National Petroleum Reserve-Alaska Integrated Activity Plan/Environmental Impact Statement (IAP/EIS) (BLM, 1998b) (Stipulation 39[d]) prohibits permanent oil facilities. This alternative would provide for an exception to this provision to allow location of CD-6 and its associated road and pipeline within the setback. Additional exceptions or modifications of the Northeast National Petroleum Reserve-Alaska IAP/EIS would be required to locate oil infrastructure within 500 feet of some water bodies (Stipulation 41) and to allow roads between separate oilfields (Stipulation 48). The USACE would have to determine compliance with Special Condition 10 of the 1998 permit for the Alpine Development Project that requires roadless development in the Colville River Delta unless an environmentally preferable alternative is available or roadless development is infeasible. Aboveground pipelines would be supported on VSMs and would be at elevations of at least 5 feet above the tundra. Power lines would be supported by cable trays placed on the pipeline VSM, except for a power line suspended from poles between CD-6 and CD-7. Use of roads would be by industry, government, and local residents.

S.2.2.2 Alternative B

THEME: CONFORMANCE WITH STIPULATIONS

Except for those aspects specifically discussed below, the components of Alternative B are the same as those for Alternative A. Differences between the two alternatives provide for conformance to Northeast National Petroleum Reserve-Alaska IAP/EIS development stipulations and include moving proposed permanent oil infrastructure to a distance at least 3 miles from Fish Creek (Stipulation 39[d]). This requires that CD-6 and associated roads and pipelines be moved from within the setback. Proposed permanent oil infrastructure would be moved to a distance of at least 500 feet from water bodies, with the exception of essential pipeline and road crossings (Stipulation 41). The road connection between CD-6 and CD-7 would be maintained; however, these pads would not connect to the existing Alpine Field (Stipulation 48). Power lines would be buried in or near roads, or near VSMs, where there are no roads. Although not specifically prohibited by the development stipulations, access to roads in the development area would not be allowed for local residents under this alternative. Access to roads on federal and state lands would be restricted to industry and government personnel. Local residents would be allowed on roads on Kuukpik lands.

S.2.2.3 Alternative C

THEME: ALTERNATIVE ACCESS ROUTES

Alternative C differs from Alternative A principally by including alternative bridge locations, a road connection to Nuiqsut, a southerly road and pipeline route to CD-6 and CD-7, and road connections to all production pads, including those in the lower Colville River Delta. This alternative also differs from Alternative A by requiring a minimum pipeline height of 7 feet and placing power lines on separate poles rather than on VSMs. Roads to CD-3 and CD-4 would connect to APF-1. Roads to CD-5, CD-6, and CD-7 would connect to either APF-1

(Sub-Alternative C-1) via a road and pipeline bridge near CD-4 or to existing oilfields east of the Colville River using the State's proposed Colville River Road (Sub-Alternative C-2). To address interest by some local residents, both sub-alternatives would provide road access from Nuiqsut to the oilfields. To take better advantage of the state road under Sub-Alternative C-2, a bypass of Nuiqsut would be constructed from the state road to the satellite project road and a 2-acre pad would be added along the bypass primarily for vehicle storage. There would be no 2-inch product pipelines to production pads in Sub-Alternative C-1. A 2-inch products pipeline would extend from CD-2 to CD-6 in Sub-Alternative C-2. Exceptions to the same Northeast National Petroleum Reserve-Alaska IAP/EIS stipulations as in Alternative A would be required. However, Sub-Alternative C-2 would also require that BLM modify Stipulation 48 to allow connection of roads on BLM-managed lands with the state's proposed road. Use of roads on BLM lands would be unrestricted. Industry, government, and local residents would have access to other roads.

S.2.2.4 Alternative D

THEME: ROADLESS DEVELOPMENT

Alternative D excludes the construction of roads for access to production pads. Access to production pads CD-3 through CD-7 would be by fixed-wing aircraft, helicopter, ice roads or low ground pressure vehicle tundra travel. The pipeline crossing of the Nigliq Channel would be accomplished using horizontal directional drilling (HDD) rather than a pipeline bridge. Pipelines would be built with a minimum height of 7 feet (measured at the VSMs). Power cables would be located on VSM mounted cable trays. Exceptions to the same Northeast National Petroleum Reserve-Alaska stipulations as in Alternative A would be required. For the purpose of analysis, Alternative D is presented as two sub-alternatives. Sub-Alternative 1 (D-1) includes gravel airstrips and access by fixed wing aircraft and ice roads. Sub-Alternative 2 (D-2) includes gravel helipads and access by helicopters, ice airstrips, and ice roads. All other project elements are common to both sub-alternatives.

S.2.2.5 Alternative E

THEME: NO ACTION

Under the No-Action Alternative, the proposed CPAI Development Plan or Alternatives B, C, D, or F would not occur. No oil in the Plan Area, except that extracted from the existing CD-1 and CD-2 production pads would be produced in the near future. Ongoing activities, and future actions not related to the proposed action alternatives, could occur in the Plan Area.

S.2.2.6 Alternative F

THEME: AGENCY PREFERRED ALTERNATIVE

Alternative F, the Agency Preferred Alternative, modifies key components of CPAI's proposed development plan to minimize, mitigate, or avoid certain potential environmental impacts identified by the BLM or the cooperating agencies or the public through the NEPA process, while achieving the purpose and need described in Section 1 of this EIS. The modified elements of the Preferred Alternative have either been adopted directly from alternatives analyzed in detail in the DEIS, or reflect measures identified through the DEIS comment process or additional agency review of the applicant's proposal.

The Preferred Alternative modifies CPAI's proposed plan (Alternative A) by:

- Requiring that the road and pipeline bridge across the Nigliq Channel extend from bank to bank
- Requiring that the road and pipeline bridge across the Ublutuoch River extend from bank to bank
- Requiring that approaches to both the Nigliq Channel and Ublutuoch River bridges provide for natural waterflow

- Requiring that the road to CD-4 be either relocated around Lake 9323 or engineered to provide for natural waterflow and fish passage
- Removing substantial infrastructure from the Fish Creek 3-mile setback, while allowing CD-6 to be located as requested by CPAI
- Requiring powerlines between CD-6 and CD-7 to be placed on cable trays
- Increasing the minimum elevation of pipelines to 7 feet at the VSMs
- Requiring lighting of higher structures to address bird strike issues

All other elements of the plan are the same as in Alternative A. Exceptions to the same Northeast National Petroleum Reserve-Alaska stipulations as in Alternative A would be required, and the USACE would have to determine that the intent of Special Condition 10 of the 1998 permit would be met.

S.2.3 Full-Field Development

Also included in this EIS, is an analysis of Full-Field Development (FFD) scenarios for the approximately 890,000-acre Plan Area (Figure 1.1.1-1). FFD is presented as hypothetical scenarios for oil development that could occur during the next 20 years. The Plan Area includes the Colville River Delta west of its easternmost channel and extends west to the vicinity of the mouth of the Kogru River on the west side of Harrison Bay and south from the Kogru River mouth for approximately 45 miles. Though FFD is not proposed at this time, BLM considers it likely that development besides that currently proposed by CPAI will occur in the Plan Area during the next 20 years. As a result, this EIS directly evaluates and analyzes alternative development options for not just the pads, pipeline, and other facilities proposed by CPAI, but also for potential future development. This approach gives the public and decision makers a comprehensive overview of proposed and potential future development in the Plan Area. In this EIS, FFD scenarios have been developed to follow the same themes as the alternatives for the CPAI's proposed development plan.

Two additional hypothetical production facilities (HPFs) and 22 additional hypothetical production pads (HPs) could be constructed in the Plan Area. Gravel roads and/or airstrips would provide access to the HPFs and production pads. Construction and operation strategies described for the applicant's proposed action would apply for the FFD scenarios. Exceptions to the stipulations in the Northeast National Petroleum Reserve-Alaska IAP/EIS and ROD would be necessary to allow placement of facilities in certain areas. It is important to note, however, that the pad locations described in Section 4 of this EIS for FFD are hypothetical and do not reflect any actual proposals, applications, or project plans. The scenarios presented for FFD in Section 4 are presented for purposes of analysis and represent hypothetical potential future development.

S.3 SCOPE OF ANALYSIS

The BLM and the cooperating agencies have sought to define the issues in the Plan Area through public participation and discussions with tribes (the Native village of Nuiqsut, the Native village of Barrow, and the Inupiat Community of the Arctic Slope [ICAS]), the North Slope Borough (NSB), the local government of Nuiqsut, and other federal agencies. (The BLM's consultation and coordination efforts are further described in Section 5 of this EIS.) In the public scoping process, DEIS review, and comment process, input was received from residents of the North Slope, Anchorage, and Fairbanks; interested individuals from throughout the nation; businesses with an interest in oil and gas development; and individuals and groups with an interest in the environment.

The BLM and cooperating agencies have reviewed concerns and questions raised during the scoping process and DEIS review and comment process. Solutions responsive to many of those concerns and questions were integrated into elements of the alternatives developed for consideration in this Final Environmental Impact Statement (FEIS). The major issues and concerns raised during scoping and by DEIS comments generally fall into the categories below:

Adherence to Stipulations Identified in the Northeast National Petroleum Reserve-Alaska IAP/EIS. Many commenters stated that the restrictions and protections (stipulations) issued with the Northeast National Petroleum Reserve-Alaska IAP/EIS were necessary for protecting the environment and urged that the proposed and future developments in the Plan Area adhere to the stipulations without exception.

Oil and Gas Development in the National Petroleum Reserve-Alaska. The development covered in this EIS is the first proposed by industry in the National Petroleum Reserve-Alaska. Proponents of oil and gas development note that the National Petroleum Reserve-Alaska was set aside for oil and gas development. They cite the need for new reserves on the North Slope and increased U.S. production. Many proponents support site-specific exceptions to stipulations to allow development of additional oil reserves.

Impacts to Local Residents and Traditional Subsistence-Use Areas. CPAI's proposed action and the broader FFD would represent the westernmost oil and gas development on the North Slope. Development in this area would be close to the community of Nuiqsut and within traditional subsistence-use areas. There is a concern that a "balance between the benefits of development and the costs to the environment and people" be maintained. Nuiqsut residents, in particular, expressed concern that traditional lifestyles may be changed by impacts to traditional subsistence-use areas and lifestyle changes brought about by employment opportunities within and outside of the community.

Colville River Delta Resources. The Colville River Delta is the largest river delta on Alaska's North Slope and is largely covered by wetlands. It is important to North Slope residents for subsistence hunting and fishing and is recognized for its significance during critical life stages of waterbirds. The area is considered to have high potential for oil and gas resources and requires special consideration during design, construction, operation, and maintenance of oil and gas facilities.

Full-Field Development Analysis within the Plan Area. Issues about expanding oil and gas development in the Plan Area ranged from appreciation that the BLM was looking at the impacts throughout the Plan Area, to caution when looking at foreseeable future development outside of the applicant's proposed plan.

Environmental Quality. Concerns include air and water quality, oil-spill prevention and response, effects of activities and development structures on fish and wildlife and their habitat, and the effects of contaminants on fish, wildlife, and people. It is also a concern that impacts on environmental quality may have subsequent long-term impacts to local residents.

In consideration of these issues, this EIS provides analysis of existing conditions of the affected environment (Section 3) and the potential environmental consequences that would result from implementation of the applicant's proposed plan and alternatives (Section 4).

S.4 ENVIRONMENTAL CONSEQUENCES

Environmental consequences and cumulative effects that would result from implementation of the proposed action and alternatives and FFD scenarios are summarized below:

S.4.1 Spills

Spills of produced fluids, crude or refined oil, seawater, and other chemicals from the proposed five-satellite CPAI Development Plan or from the FFD have a finite rate of occurrence, might affect the environment to varying degrees, and are of concern to all of the stakeholders.

Small spills (e.g., less than100 gallons) will occur (i.e., probability of a spill equals 1.0) during the construction, drilling, and/or operation of the CPAI Development Plan and FFD. As the spill size increases, the rate and probability of occurrence decreases. A Very Large Volume Spill (VLVS) (i.e., greater than 100,000 gallons) is a highly unlikely event.

The majority of construction spills tend to be relatively small, and most result from vehicle and construction equipment fueling and maintenance. A tanker truck accident or a fuel storage tank failure is the most likely source of the largest construction spills. Spills from pipelines, well blowouts, uncontrolled releases, or facility accidents would not occur during construction. These latter spills could occur during drilling and operation phases and have the potential to result in larger-volume spills. Construction, drilling, and operation phases may all occur simultaneously for the first few years of the CPAI Development plan and longer in FFD, though they will usually, but not always, be in separate locations.

Spills could occur from pipelines, production pads (and APF pads in the FFD), airstrips, and roads and bridges. Spills that leave the gravel pads and gravel roadbeds could reach one or more of several habitat types including wet and/or dry tundra, tundra ponds and lakes, flowing creeks and rivers, Harrison Bay, and potentially the adjacent nearshore Beaufort Sea. Spills could occur anytime in the year. The rate of oil and seawater spills from the CPAI Development Plan, its alternatives, and FFD Scenarios is likely to be lower than the history of the past 30 years of oil exploration, development, production, and transportation on the North Slope. The combination of more stringent agency regulations, continually improving industry operating practices, and advancements in Best Available Control Technology (BACT) all serve to reduce the rate and impacts of spills.

A VLVS is most likely to result from a major pipeline break, well blowout, or uncontrolled release. In the latter two cases, some or much of the spilled material could be contained on the pad or on the tundra in the immediate vicinity. However, in all three cases, oil and/or seawater would probably affect the tundra adjacent to the spill source and this may be relatively remote from the road or pads in pipeline spills. A spill from a pressurized pipeline could spray into the air as a mist and be carried a substantial distance downwind and affect tundra and adjacent water bodies. Depending upon proximity and season, the oil and/or seawater could also reach wet tundra, tundra ponds and lakes, creeks, larger rivers, estuaries, Harrison Bay, and the nearshore Beaufort Sea.

S.4.2 Physical Environment

S.4.2.1 Terrestrial Environment

PHYSIOGRAPHY

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON PHYSIOGRAPHY

Impacts to physiography would occur primarily during the construction phase and result from changes to landforms by construction of roads, pads, airstrips, and mine sites. If not properly designed and constructed, gravel fill can adversely affect thermal stability of the tundra and hydrology through thermokarsting and increased ponding. The total land area affected by construction of gravel facilities and mine sites would be 306 acres for CPAI and approximately 1,608 acres for FFD.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON PHYSIOGRAPHY

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same types of impacts as Alternative A. Lesser magnitude of gravel construction and mining actions than Alternative A due to fewer roads and shorter road lengths. Total area of land affected by gravel construction and mining actions = 241 acres. **FFD:** Same as CPAI except total area of gravel construction and mining actions = approximately 1,336 acres.	**CPAI Development:** Same types of impacts as Alternative A. Greater magnitude of gravel construction and mining actions than Alternative A due to additional roads and longer road lengths. Total area of land affected by gravel construction and mining actions for Alternative C-1 = 409 acres, and Alternative C-2 = 410 acres. **FFD:** Same as CPAI, except total area of gravel construction and mining actions = approximately 1,590 acres.	**CPAI Development:** Same types of impacts as Alternative A. Lesser magnitude of gravel construction and mining actions than Alternative A, due to roadless design and reliance on airstrips or helipads. Total area of gravel construction and mining actions = 272 acres for Sub-Alternative D-1, and 93 acres for Sub-Alternative D-2. **FFD:** Same as CPAI, except total area of gravel construction and mining actions = approximately 1,356 acres for Sub-Alternative D-1, and approximately 674 acres for Sub-Alternative D-2.	**CPAI Development:** Same types of impacts as Alternative A. Similar magnitude of gravel construction and mining actions as Alternative A. Total area of land affected by gravel construction and mining actions = 316 acres.

GEOLOGY

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON GEOLOGY

Under either development scenario, the irreversible and irretrievable commitment of petroleum hydrocarbon resources constitutes a major impact, however petroleum hydrocarbon production is the purpose of the project. Impacts to bedrock under either the Alternative A – CPAI Development Plan or Alternative A – FFD would be negligible.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON GEOLOGY

ALTERNATIVE B	ALTERNATIVE C (INCLUDES C-1 AND C-2)	ALTERNATIVE D (INCLUDES D-1 AND D-2)	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as Alternative A - FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A - FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A - FFD.	**CPAI Development:** Same as Alternative A.

SOILS AND PERMAFROST

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SOILS AND PERMAFROST

Placement of fill on the tundra and construction and operation of roads represent the greatest impacts on Plan Area soils and permafrost, respectively. Impacts that increase heat flux to ice-rich permafrost can initiate thermokarst and compromise the integrity of overlying or adjacent infrastructure. Impacts to Plan Area soil and permafrost resources would be unavoidable and semipermanent.

Alternative A would place gravel or ice over 1,757 acres of soil, disturb 2.0 million cubic yards of soil through gravel excavation and placement of infrastructure, and thermally impact 1,152 acres of tundra. The surface area of soil affected both directly and indirectly under Alternative A represents 0.2 percent of the total Plan Area.

FFD would place gravel or ice over 4,195 acres of soil and disturb 8.8 million cubic yards of soil through gravel excavation and placement of infrastructure. The surface area of soil affected both directly and indirectly under Alternative A FFD represents 0.5 percent of the total Plan Area.

ALTERNATIVES B, C, D, AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON SOILS AND PERMAFROST

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Direct and indirect impact types similar to Alternative A. Lesser magnitude of road construction impacts. Surface area of soil disturbed = 1,556 acres. Volume of soil disturbed = 1.6 Mcy Percent of Plan Area disturbed = 0.2% **FFD:** – Direct and indirect impact types similar to Alternative A – FFD. Lesser magnitude of road construction impacts. Surface area of soil disturbed = 4,085 acres Volume of soil disturbed = 7.6 Mcy Percent of Plan Area disturbed = 0.5%	**CPAI Development:** Direct and indirect impact types similar to Alternative A. Greater magnitude of gravel excavation and road construction impacts. Surface area of soil disturbed =1,993 acres (C-1) and 1,979 acres (C-2) Volume of soil disturbed = 2.2 Mcy (C-1) and 2.2 Mcy (C-2) Percent of Plan Area disturbed = 0.2% (C-1) and 0.2% (C-2) **FFD:** Direct and indirect impact types similar to Alternative A – FFD. Greater magnitude of gravel excavation and road construction impacts. Surface area of soil disturbed = 4,638 acres Volume of soil disturbed = 8.8 Mcy Percent of Plan Area disturbed = 0.5%	**CPAI Development:** Direct and indirect impact types similar to Alternative A. Minimal gravel road construction impacts, greater ice road construction impacts. Surface area of soil disturbed = 2,145 acres (D-1) and 602 acres (D-2) Volume of soil disturbed = 1.8 Mcy (D-1) and 0.7 Mcy (D-2) Percent of Plan Area disturbed = 0.2% (D-1) and <0.1% (D-2) **FFD:** Direct and indirect impact types similar to Alternative A – FFD. Minimal gravel road construction impacts, greater ice road construction impacts. Surface area of soil disturbed = 13,457 acres (D-1) and 4,141 acres (D-2 construction would not be completed within the 25 year summary period) Volume of soil disturbed = 8.9 Mcy (D-1) and 4.5 Mcy (D-2) Percent of Plan Area disturbed = 0.2% (D-1) and 0.5% (D-2; does not account for the area of ice roads and pads)	**CPAI Development:** Direct and indirect impact types similar to Alternative A. Similar magnitude of road construction impacts. Surface area of soil disturbed = 1,845 acres. Volume of soil disturbed = 2.0 Mcy Percent of Plan Area disturbed = 0.2%

SAND AND GRAVEL

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SAND AND GRAVEL

Sand and gravel resources used for construction of roads, pads, or airstrips would only be available for reuse upon abandonment.

For Alternative A – CPAI, 2.0 million cubic yards of gravel fill is required; for FFD, 8.8 million cubic yards (cy) is required.

ALTERNATIVES B, C, D, AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON SAND AND GRAVEL

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Requires 1.6 Mcy of sand and gravel for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment. **FFD:** Requires 7.6 Mcy of sand and gravel for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment.	**CPAI Development:** Requires 2.2 Mcy of sand and gravel for Alternative C-1, and 2.2 Mcy of sand and gravel for Alternative C-2 for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment. **FFD:** Requires 8.8 Mcy of sand and gravel for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment.	**CPAI Development:** Requires 1.8 Mcy of sand and gravel for Alternative D-1, and 0.7 Mcy of sand and gravel for Alternative D-2 for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment. **FFD:** Requires 8.9 Mcy of sand and gravel for Alternative D-1, and 4.5 Mcy of sand and gravel for Alternative D-2 for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment.	**CPAI Development:** Requires 2.0 Mcy of sand and gravel for Alternative F for use as fill for construction of roads, pads, or airstrips. Once used, sand and gravel resources could be available for reuse upon abandonment.

PALEONTOLOGICAL RESOURCES

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON PALEONTOLOGICAL RESOURCES

Surface activities such as construction of pad, road, and airfield embankments are not likely to affect paleontological resources. Impacts could result from those activities involving subsurface disturbance such as sand and gravel mining. Gravel mining would cover 65 acres for Alternative A – CPAI, and 346 acres for Alternative A – FFD.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON PALEONTOLOGICAL RESOURCES

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Less chance for subsurface disturbance due to 28 fewer acres of gravel mining than Alternative A. **FFD:** 59 fewer acres affected than Alternative A – FFD.	**CPAI Development:** More chance for subsurface disturbance due to 21 (C-1 and C-2) more acres of gravel mining than Alternative A. **FFD:** 19 more acres affected than Alternative A – FFD	**CPAI Development:** Less chance for subsurface disturbance due to 14 (D-1) and 43 (D-2) fewer acres of gravel mining than Alternative A. **FFD:** 91 (D-1) and 217 (D-2) fewer acres affected than Alternative A – FFD.	**CPAI Development:** Same as Alternative A. No FFD proposed.

S.4.2.2 Aquatic Environment

WATER RESOURCES

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON WATER RESOURCES

Specific localized deep groundwater zones would be affected by the practice of disposing of drilling wastes and wastewater into development or disposal wells; however, because groundwater below permafrost is typically saline, impacts to potable water sources are not expected. Although very local in extent, shallow thawed water-bearing zones may be enlarged or eliminated during the construction, operation, and rehabilitation of any gravel mine. Although rehabilitation would include allowing natural flows to fill the mine site excavation, the subsurface water-bearing zone would be permanently eliminated.

Adequate monitoring and adherence to pumping regulations would limit lake-water level impacts to short-term duration. In general, impacts on lake-water levels are not expected because natural annual recharge processes are sufficient to fully recharge the lakes each year. Demands of FFD on the water supply would be approximately four to five times that associated with the applicant's proposed development plan.

The potential exists to create fish habitat by reclaiming gravel mines used for this project if the mines are sufficiently near waterways. However, the existing ASRC Mine Site was not designed with post-operational fish habitat creation in mind; converting the pits into fish habitat was deemed not feasible during the site's original permitting and thus is not part of its multi-agency/industry-approved rehabilitation plan. The proposed mining and rehabilitation plan for Clover focuses on the creation of waterbird resting, feeding, and nesting habitat.

Rivers and creeks could be affected if construction and operation activities associated with roads, pads, and pipelines block, divert, impede, or constrict flows. Blockage or diversions to areas with insufficient flow capacity can result in seasonal or permanent impoundments. Constricting flows can result in increased stream velocities and a higher potential for ice jams, ice impacts, scour, and streambank erosion. Impeding flows can result in a higher potential for bank overflows and floodplain inundation. Because the pad, road, and pipeline locations are not near the coast, no impacts to the physical conditions or processes within the estuarine and nearshore environment are expected.

For both the CPAI Development Plan and the FFD scenarios, the likelihood of failure of pipeline, road, and facility structures associated with ice conditions is possible but minimized considerably by conservative designs. The total freshwater requirement is 713 million gallons for CPAI and 1,471 million gallons for FFD.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON WATER RESOURCES

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A, except that CD-6 and gravel roads associated with CD-2, CD-5, and CD-6 would be eliminated, minimizing (when compared to Alternative A) the potential impacts to water resources along these segments. Total freshwater requirement = 691 million gallons. **FFD:** Same as CPAI except that HPF-1, HP-1, HP-16, and HP-17 and associated road would be moved away from the Fish-Judy Creek 3-mile setback. Conformance with the Teshekpuk Lake Surface Protection Area would eliminate HP-22, reducing impacts to water resources near the Kogru River. Ice road construction would require up to approximately 195 acre-feet of water to be withdrawn from lakes. The lengths of ice roads to be constructed would be greater than in Alternative A. Total freshwater requirement = 1,671 million gallons.	**CPAI Development:** Same as Alternative A, except the road to CD-3 could have adverse effects on the peak water surface elevations. In addition, the road could be affected by storm surges related to elevated sea levels offshore. Elimination of the road-bridge over the Nigliq Channel would reduce impacts in Alternative C-2. Total freshwater requirement for C-1 and C-2 = 736 million gallons. **FFD:** Same as CPAI except overall impacts to water resources would be more extensive to streams and creeks for road and pipeline crossings because of the proposed expansion of the gravel road system. Overall impacts to lakes (i.e. from water supply) would be similar to Alternative A. Total freshwater requirement = 1,436 million gallons.	**CPAI Development:** Same as Alternative A, except elimination of gravel roads would reduce the overall impacts to water resources (e.g., fewer impacts to streams and rivers resulting from reduced road and pipeline crossings, fewer impacts to shallow subsurface waters from reduced gravel supply requirements), ice road construction would increase, creating an increased demand for water. The ability to spread out water extraction to other permitted lakes, and natural annual recharge volumes, would result in negligible impacts to lakes. Total freshwater requirement D-1 = 866 million gallons, D-2 = 905 million gallons. **FFD:** Same as CPAI except the lengths of ice roads to be constructed would be approximately 79% greater than with Alternative A. Ice road construction would require up to approximately 670 ac-ft of water to be withdrawn from lakes. Total freshwater requirement for D-1 = 5,324 million gallons, D-2 = less than D-1; total estimated.	**CPAI Development:** Same as Alternative A. Rerouting of the CD-4 road would minimize impacts to a nearby lake. Provisions for culvert criteria would reduce impoundment of waters as compared to Alternative A. Longer bridge spans could reduce flow restriction and related erosion and shoaling. Total freshwater requirement = 661 million gallons.

SURFACE WATER QUALITY

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SURFACE WATER QUALITY

Potential surface water quality impacts for the CPAI Development Plan fall into three general source categories: accidental release of fuels and other substances (including oil spills), which could occur during both the construction and operation periods; reductions in dissolved oxygen and changes in ion concentrations in lakes used for water supply, which would occur mainly during construction but could also happen during operations; and increases in terrestrial erosion and sedimentation causing higher turbidity and suspended solids concentrations, which could occur during both the construction and operational periods.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON SURFACE WATER QUALITY

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE D
CPAI Development: Would have fewer sources of potential impacts to surface water quality than Alternative A, due to the movement of several production facilities outside sensitive resource areas and reduction in total miles of roads to be constructed. Facilities would be located farther from water bodies compared to Alternative A, reducing the chance of accidental releases migrating into a nearby water body. Reduced potential for dust fallout and upslope impoundments compared to Alternative A would result in fewer incidences of turbidity impacts. **FFD:** Same as CPAI. Also includes a reduction in facilities to accommodate stipulations.	**CPAI Development:** Would have more sources of potential impacts to surface water quality than Alternative A because of the increased roads, requiring more gravel placement. Increased miles of ice roads compared to Alternative A, would raise the chance that ice roads would be routed across lakes, potentially affecting dissolved oxygen concentrations. More area potentially affected by thermokarst erosion, dust fallout, and upslope impoundments compared to Alternative A, leading to more impacts to water quality from increased turbidity. **FFD:** Same as CPAI.	**CPAI Development:** Would have fewer sources of potential impacts to surface water quality than Alternative A because of the decreased gravel placement. Increased miles of ice roads compared to Alternative A, resulting in increased water withdrawal and increased potential that ice roads would be routed across lakes, potentially affecting dissolved oxygen concentrations. Less area potentially affected by thermokarst erosion compared to Alternative A, reducing the potential for turbidity impacts caused by erosion and sedimentation. Minimal potential for dust fallout and upslope impoundments compared to Alternative A, resulting in less potential for turbidity impacts. **FFD:** Same as CPAI.	**CPAI Development:** Would have more sources of potential impacts to surface water quality than Alternative A because of the increased roads. Increased miles of ice roads compared to Alternative A would raise the chance that ice roads would be routed across lakes, potentially affecting dissolved oxygen concentrations. More area potentially affected by thermokarst erosion, dust fallout, and upslope impoundments compared to Alternative A, leading to increased turbidity impacts.

S.4.2.3 Atmospheric Environment

CLIMATE AND METEOROLOGY

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON CLIMATE AND METEOROLOGY

Greenhouse gas (GHG) emissions would occur during construction and drilling activities from operation of fossil fuel combustion equipment. Because construction would not occur at a single location for any significant length of time, the impact of these GHG emissions at any single location would be minor and short term. GHG emissions would also occur over a longer period from operation of the CPAI and FFD. However, GHG generated from construction, drilling, and operational activities should have a minimal effect upon the air quality of the region.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON CLIMATE AND METEOROLOGY

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A.

AIR QUALITY

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON AIR QUALITY

Construction impacts would contribute air emissions to the regions but would be short-term and transient in nature and would not have a lasting impact to air quality. Aircraft landings and takeoffs would occur in all phases of CPAI and FFD, predominately during construction. Air impacts from aircraft trips, which would also be short-term and transient, would have a negligible impact on air resources. The project would not emit consequential air pollutants under normal drilling and operating conditions. Impacts from FFD would be more substantial because of the addition of two HPFs.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON AIR QUALITY

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A.

NOISE

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON NOISE

During peak periods of construction and drilling, noise levels would be considerably higher than during operations, but would be short-term and would not occur for all proposed production pads at the same time. There are no residences within several miles of any production pad proposed by CPAI. Noise impacts would be minor, unless future development was close to Nuiqsut.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON NOISE

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A – FFD.	**CPAI Development:** Same as Alternative A.

S.4.3 Biological Environment

S.4.3.1 Terrestrial Vegetation and Wetlands

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON TERRESTRIAL VEGETATION AND WETLANDS

Under Alternative A, a total of approximately 306 acres of vegetation would be covered with gravel fill or removed for mining for the construction of CPAI's proposed well pads, connecting roads, an airstrip, a floating dock and access road, and a boat ramp and access road. Gravel extraction for Alternative A would result in a permanent loss of tundra habitat while the mine sites are active and an alteration from tundra to aquatic habitat when the gravel sites are reclaimed. Potential indirect impacts from dust, gravel spray, snow accumulation, impoundments, and thermokarst would result in alteration of approximately 1,152 acres of tundra vegetation.

Construction of temporary ice roads and subsequent use may disturb underlying vegetation. Shrubs, forbs, and tussocks may be damaged and occasionally killed. Compaction of tundra vegetation by ice roads and associated gravel hauling and other construction activities can affect tundra habitats for several years by crushing tussocks. In addition to ice roads, ice pads would be used as staging areas during pipeline and bridge construction. Ice pads may also be used to stockpile overburden material associated with the ASRC Mine Site. Approximately 1,816 acres of vegetation would be disturbed by temporary ice roads and pads under Alternative A.

In the Colville River Delta portion of the Plan Area, the highest surface area impacts would be to Wet Sedge Meadow vegetation (211 acres lost or altered; 0.5 percent of available in the area) and Patterned Wet Meadow habitat (150 acres lost or altered; 0.5 percent of available in the area). In the National Petroleum Reserve-Alaska portion of the Plan Area, the highest surface area impacts are to Tussock Tundra vegetation (581 acres lost or altered; 0.3 percent of available in the area) and Moist Tussock Tundra habitat (581 acres lost or altered; 1.2 percent of available mapped habitat in the area) (Tables 4A.3.1-1 and 4A.3.1-2).

Under Alternative A – FFD, approximately 1,608 acres of tundra vegetation would be lost by gravel fill and extraction associated with roads, pads, airstrips, and gravel mines; and 8,237 acres would be altered or disturbed by ice roads, dust, gravel spray, snow accumulation, impoundments, and thermokarst.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON TERRESTRIAL VEGETATION AND WETLANDS

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: 241 acres covered by gravel fill and mining, 2,116 acres altered by indirect impacts. In the Colville River Delta, the highest surface area impacts would be to Wet Sedge Meadow Tundra vegetation (0.4%) In the National Petroleum Reserve-Alaska portion of the Plan Area, the highest surface area impacts are to Tussock Tundra vegetation (0.1%). **FFD:** Approximately 1,336 acres would be covered by gravel fill and mining, 9,031 acres altered by indirect impacts	**CPAI Development:** For Alternative C-1: 409 acres covered by fill and mining, 3,647 acres altered by indirect impacts. In the Colville River Delta, the highest surface area impacts would be to Wet Sedge Meadow Tundra vegetation (1.1%). In the National Petroleum Reserve-Alaska portion of the Plan Area, the highest surface area impacts are to Tussock Tundra vegetation (0.4%). For Alternative C-2: 410 acres covered by gravel fill and mining, 3,695 altered by indirect impacts. The highest surface area impacts would be to Tussock Tundra vegetation (0.5%). **FFD:** Approximately 1,590 acres would be covered by gravel fill and mining, and 9,725 acres would be altered by indirect impacts.	**CPAI Development:** For Alternative D-1: 272 acres covered by gravel fill and mining, and 2,501 acres altered by indirect impacts. In the Colville River Delta, the highest surface area impacts would be to Wet Sedge Meadow Tundra vegetation (0.7%). In the National Petroleum Reserve-Alaska portion of the Plan Area, the highest surface area impacts are to Tussock Tundra vegetation (0.1%). For Alternative D-2: 93 acres covered by gravel fill and mining, and 784 acres altered by indirect impacts. **FFD:** Approximately 1,356 (D-1) and 674 (D-2) acres would be covered by gravel fill and mining, and 13,829 (D-1) and 3,921 (D-2) would be altered by indirect impacts;	**CPAI Development:** 316 acres covered by gravel fill and mining, 3,150 acres altered by indirect impacts. In the Colville River Delta, the highest surface area impacts would be to Wet Sedge Meadow Tundra vegetation (0.6%). In the National Petroleum Reserve-Alaska portion of the Plan Area, the highest surface area impacts would be to Tussock Tundra vegetation (0.3%).

S.4.3.2 Fish

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON FISH

Primary impacts of concern are those that affect winter habitat, as well as those affecting feeding and spawning areas and access to these areas. Water withdrawal for winter construction may create overcrowding and reduce the available pool of dissolved oxygen in a water body, possibly resulting in fish mortality. Permit limits on amounts of water withdrawn are set to avoid such impacts. Gravel mining could have adverse effects on fish if located within the floodplains of rivers. Sedimentation from erosion could affect fish and other aquatic organisms by interfering with respiration and vision and by smothering benthic habitat. Proper siting to avoid natural over-wintering and spawning areas and major river channels could easily minimize this problem.

As designed, the bridge approaches at the Nigliq Channel, other major Colville River channels, and the Ublutuoch River extend into the floodplain terraces, and thus would alter flow during flood stages. Funneling and the accompanying increased flow rates in years of unusually high flooding could affect fish movement. The effect on fish movements and migrations would be temporary and intermittent and not likely to have a long-term impact. Scouring around bridge piers may cause sedimentation and alteration of salinity regimes, in turn displacing fish to other habitats. Low dissolved oxygen may also result from suspension of oxygen-demanding materials during construction of the Nigliq Channel bridge.

The long network of roads could result in alteration of regional surface hydrology, including interruption of fish movements. If culverts fail, water may be impounded during periods of high flow upstream of the passage, thereby increasing flow velocity within and downstream of the structure. Stream morphology changes may occur downstream of culverts as a result of altered flow.

Construction of ice roads or airstrips on fish over-wintering areas may cause freezing to the bottom and block fish movement if state requirements to maintain fish passage are not met. The new road system —ice roads in the winter and gravel roads in the summer — may facilitate increased human access to fishing areas, potentially increasing subsistence fishing pressures.

The potential impacts described above, should they occur, are likely to be localized and temporary and thus would have negligible effects on fish populations within and adjacent to the Plan Area. Careful planning, appropriate engineering specification and design, and rigorous safety measures should minimize impacts and ensure the reproductive sustainability of stocks overall. Localized impacts could pose a more serious threat to localized (e.g., within a single drainage) stocks if they were to occur in or near prime spawning, nursery, or over-wintering sites.

Types of impacts of future FFD in the Plan Area generally would be similar to those described for the five-pad CPAI proposed development. However, development on the scale postulated could, depending on precise siting, destroy or alter fish habitat substantially more than CPAI's proposed plan. Over-wintering, rearing, migration, and spawning habitats would be affected.

The primary Essential Fish Habitat (EFH) concerns include potential effects on salmon associated with water withdrawal, alteration of flow patterns (for example, by bridge approaches in floodplains), release of contaminants, project-induced erosion, and oil spills. Salmon would not be expected to be present in the Nigliq Channel in the winter; therefore, construction of the Nigliq Channel bridge would not be expected to affect EFH. Winter construction of the bridge across the Ublutuoch River could impact chum or pink salmon if they use the immediate area for over-wintering or spawning.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON FISH

ALTERNATIVE B	ALTERNATIVES C-1 AND C-2	ALTERNATIVES D-1 AND D-2	ALTERNATIVE F
CPAI Development: No facilities would be within the 3-mile sensitive area around Fish Creek, thereby reducing the potential for impacts to this stream. Because the road system for Alternative B would be shorter than that for Alternative A, impacts would be on a smaller scale. Vehicle bridges across the Nigliq Channel and Ublutuoch River would not be constructed, thus eliminating concern for suspension of oxygen-demanding materials. **FFD:** Similar to CPAI but on a larger scale.	**CPAI Development:** Total water demands for Alternative C ice roads, and thus the potential for impact on fish, would be far greater than for Alternative A because the length of roads in Alternative C is greater and power lines in Alternative C do not parallel roads. The road to CD-3 could divert floodwaters to the east across the Colville River Delta, subjecting fish to altered hydrological conditions. For Alternative C2: impacts of the pipeline-only bridge over the Nigliq Channel would be far less severe than those of the road and pipeline bridge for Alternative C1; and ice road water demands would be greater than for Alternative C1. **FFD:** Similar to CPAI but on a larger scale.	**CPAI Development:** Construction impacts would be less than for Alternative A because no roads are proposed, and the pipeline crossing of the Nigliq Channel would be accomplished by HDD. Length of ice roads, and thus potential impacts to fish, would be greater than for Alternative A. **FFD:** Similar to CPAI but on a larger scale.	**CPAI Development:** Similar to Alternative A except that bridges at the Nigliq Channel and Ublutuoch River would span main channels and floodplains to the secondary terraces and therefore have little effect on river flow during normal flood stages; potential impacts to Fish Creek drainage are reduced by substantially reducing lengths of road and pipeline within the 3-mile Fish Creek buffer zone; and potential fish passage impacts at Lake L9323 in Alternative A are mitigated by relocating the road to the east of the lake and crossing water bodies with bridges.

S.4.3.3 Birds

ALTERNATIVES A, B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON BIRDS

Impacts to birds associated with construction and operation of the proposed development include habitat loss, alteration or enhancement; disturbance and displacement; obstructions to movement; and mortality. Additional impacts due to lost productivity are considered but not quantified by this analysis, including impacts due to increased nest depredation caused by increased predator populations. The estimated number of nests effected by habitat loss, alteration or disturbance for each alternative, was based on site specific nesting densities for bird species and species groups to compare alternative development scenarios. In most cases, effects would be localized, and no adverse effects to North Slope populations would be expected. CPAI Alternatives would reduce nesting by 2 percent or less for Plan Area waterfowl, loon, and seabird populations, and 1 percent or less for Plan Area shorebird and passerine populations. FFD Alternatives would reduce nesting by 2 to 8 percent for Plan Area waterfowl, loon and seabird populations and 2 percent or less for Plan Area shorebird and passerine populations. Habitat loss does not involve the direct loss of active nests because winter gravel placement, ice road construction, snow dumping, and snow drifting occurs when nests are not active. Most impacts would be initiated during the construction period, including gravel placement, grading of the gravel surface, placement of all facilities, and initial drilling. The results of effects of these activities on estimated bird production due to loss, alteration, or disturbance of nesting habitat are summarized in the following table.

Summary of Estimated Bird Nests Displaced by Habitat Loss or Alteration and Disturbance (by Alternative)

CPAI Alternative Totals							
Bird Group	**Alt A**	**Alt B**	**Alt C-1**	**Alt C-2**	**Alt D-1**	**Alt D-2**	**Alt F**
Waterfowl	77	91	78	81	102	38	79
Loons	10	9	10	10	12	5	10
Ptarmigan	3	5	5	5	9	3	4
Seabirds	13	11	14	15	14	5	13
Shorebirds	346	232	525	506	219	68	360
Passerines	206	132	305	298	121	38	215
Total Nests	**655**	**480**	**937**	**915**	**477**	**157**	**681**

FFD Alternative Totals					
Bird Group	**Alt A**	**Alt B**	**Alt C**	**Alt D-1**	**Alt D-2**
Waterfowl	344	305	317	470	173
Loons	43	39	40	59	22
Ptarmigan	19	18	17	28	10
Seabirds	69	60	64	93	33
Shorebirds	1,514	1,258	1,717	1,061	357
Passerines	941	772	1,050	627	211
Total Nests	**2,930**	**2,452**	**3,205**	**2,338**	**806**

S.4.3.4 Terrestrial Mammals

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON TERRESTRIAL MAMMALS

The Alternative A – CPAI Development Plan would change the habitats used by terrestrial mammals in several ways. Approximately 241 acres of undeveloped land would be covered with gravel fill and approximately 65 acres excavated to obtain the gravel. This is a small percentage of the land in the Plan Area. The amount of habitat types preferred by caribou, muskoxen, and moose that would be affected by this fill is a small proportion (less than 0.1 percent) of that available in the Plan Area. Alternative A would result in a small direct loss of terrestrial mammal habitat.

Construction and operations would cause some disturbance of terrestrial mammals. Disturbance could in turn displace mammals from preferred habitats. Noise and human activity associated with construction, industry vehicle traffic, aircraft traffic, and activity on facilities and pipeline routes during operations could disturb caribou, moose, muskoxen, and grizzly bears near infrastructure. This could cause animals to move away (be displaced) from infrastructure. Displacement is most likely early in the life of the project, because some habituation is likely over time. Disturbance of caribou (and probably also moose and muskoxen) is most likely for 2 to 3 weeks around the calving period in late May to early June. Because the CPAI Development Plan does not extend westward enough to include the primary calving areas of the Teshekpuk Lake Herd (TLH), as long as the calving range remains west of the development area, Alternative A would have little or no disturbance impact on calving caribou. During the summer post-calving period and winter, caribou are less sensitive to disturbance and would probably habituate to industry infrastructure and activity. However, access to the developed

area by local residents may considerably increase the amount of disturbance to caribou, moose, muskoxen, and grizzly bears during summer and winter if hunting is allowed.

There would be 26 miles of road/pipeline and an additional 10 miles of pipeline without a road under the Alternative A – CPAI Development Plan. Pipelines would be elevated 5 feet and separated from roads by more than 300 feet. This should allow passage of caribou and other terrestrial mammals. The road/pipeline combination may delay or deflect caribou crossing, especially if traffic levels are more than 15 vehicles per hour. If local hunting occurs on the roads, crossing may be impeded because of increased avoidance of human activity.

Mortality of terrestrial mammals directly caused by the Alternative A development would probably be limited to occasional road kills and defense of life and property (DLP) killing of bears. Hunting by local residents on the oilfield roads would increase the mortality of caribou and possibly of moose, muskoxen, and grizzly bears.

All of the impacts described above are relevant to individual animals. It is unlikely these impacts would have a negative impact at the population level. Past experience in existing North Slope oilfields shows that populations of terrestrial mammals (most notably caribou) have grown or remained stable since initiation of development. The inclusion of local access to, and possibly hunting in, the Alternative A development could cause disturbance and mortality that affects the population. However, the past harvest levels of caribou, muskoxen, and moose by the local community are a small enough proportion of the populations that negative impacts are unlikely if proper mitigation and regulations are enforced. In fact, harvest is a primary tool of wildlife managers, for example, to keep a population at a level compatible with available habitat. A positive aspect of increased hunter access is that it could allow more control over hunting harvest if managers would have more ability to increase harvest when necessary. However, the local residents typically choose not to hunt around developed areas.

Impacts from the Alternative A – FFD would have the same effects described for the CPAI Development Plan, but over a larger area. An exception is the potential for increased disturbance of calving caribou of the TCH in the northwestern part of the Plan Area.

ALTERNATIVES B, C, D, AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON TERRESTRIAL MAMMALS

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Approximately 204 acres of undeveloped lands that provide habitat for terrestrial mammals would be covered with gravel fill and 37 acres would be excavated to obtain gravel. Disturbance, obstruction of movements, and mortality impacts will be of less magnitude than in Alternative A because of the smaller amount of road/pipeline combinations, and associated lower levels of vehicle traffic. Disturbance and hunting mortality from local resident access would not occur since roads would be restricted to industry use. **FFD:** Similar to CPAI, but over a larger area.	**CPAI Development:** Approximately 323 acres for C-1 and 324 acres for C-2 of undeveloped lands that provide habitat for terrestrial mammals would be covered with gravel fill and 86 acres would be excavated to obtain gravel (C-1 and C-2). Disturbance, obstruction of movements, and mortality impacts would be of greater magnitude than in Alternative A because of the larger amount of road/pipeline combinations, and associated higher levels of vehicle traffic. Pipelines elevated to 7 feet would mitigate obstruction of movements. Disturbance and hunting mortality from local resident and other public access would occur. The potential impacts of hunting mortality described for Alternative A would occur to a greater extent in Alternative C because of the unrestricted public access. **FFD:** Similar to CPAI, but over a larger area.	**CPAI Development:** Approximately 221 acres for D-1 and 71 acres for D-2 of undeveloped lands that provide habitat for terrestrial mammals would be covered with gravel fill and 51 acres for D-1 and 22 acres for D-2 would be excavated to obtain gravel. Disturbance, obstruction of movements, and mortality impacts would be of lesser magnitude than Alternative A because of the lack of road/pipeline combinations, associated vehicle traffic, and elevation of pipelines to 7 feet. Disturbance and obstruction of movement at airstrips or helipads would occur. Disturbance and hunting mortality from local resident access via roads would not occur due to the absence of roads. **FFD:** Similar to CPAI, but over a larger area.	Approximately 251 acres of undeveloped lands that provide habitat for terrestrial mammals would be covered with gravel fill and 65 acres would be excavated to obtain gravel. Disturbance, obstruction of movements, and mortality impacts would be comparable to Alternative A. Pipelines elevated to 7 feet would mitigate obstruction of movements.

S.4.3.5 Marine Mammals

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON MARINE MAMMALS

There would be limited impacts on marine mammals from the CPAI Development Plan because the project is onshore. Construction of, and traffic on, a bridge over the Nigliq Channel and other rivers could cause some disturbance of spotted seals and beluga whales. Aircraft traffic to and from the Plan Area could also disturb some marine mammals. Construction and operational noise in winter could disturb some denning polar bears.

Access by local residents could increase harvest of marine mammals, including seals in the rivers and nearshore Beaufort Sea. Hunting by local residents on the oilfield roads could increase the mortality of polar bears that are onshore. Mortality of polar bears directly caused by the Alternative A development could include occasional road kills and killing of bears in DLP.

The impacts described above are relevant to individual animals. It is unlikely these impacts would have a negative impact at the population level. Past experience in existing North Slope oilfields shows that populations of marine mammals have not been affected by onshore development. The inclusion of local access to, and possibly hunting in, the Alternative A development could cause disturbance and mortality that affects marine mammal populations. However, the past harvest levels of seals and polar bears by the local community are a small enough proportion of the populations that negative impacts are unlikely if proper mitigation and regulations are enforced. In fact, harvest is a primary tool of wildlife managers, for example, to keep a population at a level compatible with available habitat. A positive aspect of increased hunter access is that it could allow more con-

trol over hunting harvest if managers would have more ability to increase harvest when necessary. However, the local residents typically choose not to hunt around developed areas.

Impacts from Alternative A – FFD would have the same impacts described for the CPAI Development Plan but over a larger area.

ALTERNATIVES B, C, D, AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON MARINE MAMMALS

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Limited roads, including no road over the Nigliq Channel, suggest there would be less disturbance from vehicles and more disturbance from aircraft traffic than in Alternative A. There would not be access by local residents, so increased hunting harvest would not occur. **FFD:** Same as CPAI, but over a larger area.	**CPAI Development:** Impacts to marine mammals under Alternative C (Sub-Alternatives C-1 and C-2) would be similar to those in Alternative A. The road accompanying the pipeline between CD-1 and CD-3 could increase disturbance in that area. The unrestricted access to BLM lands could result in greater polar bear mortality from road kills and DLP kills. The pipeline only bridge over the Nigliq Channel with Sub-Alternative C-2 would reduce potential impacts (disturbance and hunter access) compared to Sub-Alternative C-1. The lack of road connection to CD1, CD2, CD3, and CD4 with Sub-Alternative C-2 would limit access to the northern Colville River Delta areas compared to Sub-Alternative C-1. **FFD:** Same as CPAI, but over a larger area.	**CPAI Development:** Alternative D would have minimal impacts on marine mammals because of the lack of roads and no local or public access. Noise from construction and increased air traffic could cause disturbance of marine mammals as described for Alternative A. **FFD:** Same as CPAI, but over a larger area.	**CPAI Development:** Impacts to marine mammals under Alternative F would be similar to those in Alternative A. Potential disturbance and mortality impacts would be comparable to Alternative A.

S.4.3.6 Threatened and Endangered Species

BOWHEAD WHALE

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON BOWHEAD WHALE

Bowhead whales generally do not occur in the nearshore Beaufort Sea, north of the Plan Area. During spring and fall migrations, bowheads are far offshore in the lead system of the Beaufort Sea. Activities that would occur in the Plan Area under all CPAI alternatives would not affect the bowhead whale population, habitat, migration, foraging, breeding, survival and mortality, or critical habitat. In general, impacts from the Alternative A – FFD would be the same as those described for the CPAI Development Plan over a larger area. Under FFD, sealifts may be used to transport drilling or processing facilities. In this case, there is the potential for additional impacts to bowhead whales from vessels. If some whales do come into the nearshore environment, there could be some disturbance of bowheads from air traffic over the Beaufort Sea. However, altitude restrictions will minimize these impacts.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON BOWHEAD WHALE

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as Alternative A.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A.	**CPAI Development:** Same as Alternative A.

SPECTACLED EIDER

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SPECTACLED EIDER

Impacts to spectacled eiders associated with construction and operation of Alternative A – CPAI include habitat loss, alteration, or enhancement, disturbance and displacement, obstructions to movement, and mortality. Additional impacts due to lost productivity are considered but not quantified by this analysis, including impacts due to increased nest depredation caused by increased predator populations. Spectacled eiders occur in greater numbers near proposed developments in the Colville River Delta than in the National Petroleum Reserve-Alaska portion of the Plan Area. More spectacled eider nests would be affected at CD-3 than at the other four sites. The estimated number of nests effected by habitat loss, alteration and disturbance for each alternative, was based on site specific nesting densities for spectacled eiders to compare alternative development scenarios. In most cases, effects would be localized, and no adverse effects to North Slope populations would be expected. Alternative A – CPAI would affect an estimated 1.7 spectacled eider nests, reducing nesting by 4 percent for Plan Area spectacled eiders. Alternative A – FFD would affect an estimated 9.7 spectacled eider nests, reducing nesting by 22 percent for Plan Area spectacled eiders and less than 1 percent for the North Slope population. Less than 1 percent of available habitats in the Colville River Delta used by spectacled eiders for nesting (Aquatic Sedge with Deep Polygons and Nonpatterned and Patterned Wet Meadow) would be affected by gravel related impacts. Less than 1 percent of available habitats in the National Petroleum Reserve-Alaska used by spectacled eiders for nesting (Deep and Shallow Open Water with Islands, Old Basin Wetland Complex, and Patterned Wet Meadow) would be affected by gravel related impacts. Local road access to the Colville River Delta, the Fish Creek Delta, the Fish-Judy Creek area and the Kalikpik-Kogru River area from Nuiqsut could affect the amount of hunting mortality.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON SPECTACLED EIDER

ALTERNATIVE B	ALTERNATIVE C1 AND C2	ALTERNATIVE D1 AND D2	ALTERNATIVE F
CPAI Development: An estimated 1.9 nests would be affected by habitat loss, alteration, and disturbance. More displacement would be due to disturbance than to habitat loss and alteration. Less than 0.6% of available habitats in the Colville River Delta used by spectacled eiders would be affected by gravel fill related impacts. Less than 0.5% of available habitats in the National Petroleum Reserve-Alaska used by spectacled eiders would be affected. More nests would be affected at CD-3 than other four sites. **FFD:** An estimated 9.4 nests would be affected by habitat loss, alteration, and disturbance. 70% of displacement would be due to habitat loss, alteration, and disturbance in the Colville River Delta. Local road access to Fish Creek Delta from Nuiqsut could affect amount of hunting mortality.	**CPAI Development:** An estimated 0.9 nests would be affected by habitat loss, alteration, and disturbance for Alternative C1 and C2. More displacement would be due to habitat loss and alteration than to disturbance. Less than 1.5% of available habitats in the Colville River Delta used by spectacled eiders would be affected by gravel fill related impacts. Less than 0.5% of available habitats in the National Petroleum Reserve-Alaska used by spectacled eiders would be affected. More potential nests would be affected at CD-3 than other four sites. Local road access to lower Colville River Delta could affect amount of hunting mortality. **FFD:** An estimated 7.0 nests would be affected by habitat loss, alteration, and disturbance. 54% of displacement would be due to habitat loss or alteration in the Colville River Delta. Local access to Colville River Delta and National Petroleum Reserve-Alaska could affect amount of hunting mortality.	**CPAI Development:** For Alternative D-1; an estimated 2.0 nests would be affected by habitat loss, alteration, and disturbance. For Alternative D-2; an estimated 0.7 nests affected by habitat loss, alteration and disturbance. Most displacement would be due to disturbance (70% for D1, 85% for D2) rather than to habitat loss and alteration. Less than 1 % of available habitats in the Colville River Delta used spectacled eiders would be affected by gravel fill related impacts. Less than 0.5% of available habitats in the National Petroleum Reserve-Alaska used by spectacled eiders would be affected. More potential disturbance at CD-3 than other four sites. **FFD:** For Alternative D-1; an estimated 13.3 nests would be affected by habitat loss, alteration, and disturbance. For Alternative D-2; 4 an estimated 5.5 nests would be affected by habitat loss, alteration, and disturbance. Most displacement would be due to disturbance in the Colville River Delta.	**CPAI Development:** An estimated 1.7 nests would be affected by habitat loss, alteration and disturbance. More displacement would be due to disturbance (53%) than to habitat loss and alteration. Less than 0.7% of available habitats in the Colville River Delta used by spectacled eiders would be affected by gravel fill related impacts. Less than 0.6% of available habitats in the National Petroleum Reserve-Alaska used by spectacled eiders would be affected. More potential disturbance would occur at CD-3 than other four sites.

STELLER'S EIDER

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON STELLER'S EIDER

In general, impacts to Steller's eider potentially are the same as those described for the spectacled eider. However, the likelihood of impacts occurring to Steller's eider is very small, even under FFD scenarios, because they occur very rarely in the Plan Area. There would be a loss of potential Steller's eider habitat from the ASDP. Given the current distribution of Steller's eider in the Plan Area, it is unlikely that any of the project alternatives would affect this species.

ALTERNATIVES B, C, D AND F – SUMMARY OF IMPACTS (CPAI AND FFD) ON STELLER'S EIDER

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A.

S.4.4 Social Systems

S.4.4.1 Socio-Cultural Characteristics

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SOCIO-CULTURAL CHARACTERISTICS

For Nuiqsut, potential impacts to subsistence harvest and use may cause stress and change in community social organization. To the extent that they occur, these impacts would likely increase under Alternative A – FFD. Economic benefits are expected to occur as a result of Kuukpik and other corporate participation in construction and operations contracting. These economic benefits would likely be increased under FFD. No direct incremental impacts to community health and welfare concerns (crime, drug abuse, etc.) are expected as a result of the CPAI Development Plan or FFD. To the extent that changes in community social organization occur, changes in community health and welfare may also occur. These impacts, to the extent that they occur, are more likely to occur under FFD. Minimal employment of Nuiqsut residents during construction and operation is expected. Employment levels are not expected to increase under the FFD alternative. No change in the population growth rate is expected.

For Barrow, Atqasuk, and Anaktuvuk Pass, to the extent that subsistence hunters rely on subsistence-use areas in the Plan Area, there may be some effect on subsistence harvest. However, the extent of these impacts is likely to be small and not sufficient to affect community social organization. Under FFD, impacts to subsistence harvest and use are expected to be greater, increasing the potential that changes to community social organization could occur. Economic benefits are expected to occur as a result of village corporate participation in construction and operations contracting. The benefits are expected to be greater under FFD. No direct incremental impacts to community health and welfare concerns are expected as a result of the CPAI Development Plan or FFD. To the extent that changes in community social organization occur, changes in community health and welfare may also occur. These impacts, to the extent that they occur, are more likely to occur under FFD. Minimal employment of residents is expected during construction and operation under Alternative A – CPAI Development Plan or FFD. No change in the population growth rate is expected.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON SOCIO-CULTURAL CHARACTERISTICS

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A with the exception of a potential for reduced economic benefits. **FFD:** Same as Alternative A with the exception of a potential for reduced economic benefits.	**CPAI Development:** Same as Alternative A. Exceptions are the potential for increased local economic benefits and increased indirect community health and welfare impacts to the extent that they are caused by increased impacts to the subsistence harvest (resulting from connecting Nuiqsut to the project road system). **FFD:** Same as Alternative A. Exceptions are the potential for increased local economic benefits and increased indirect community health and welfare impacts to the extent that they are caused by increased impacts to the subsistence harvest (resulting from connecting Nuiqsut to the project road system).	**CPAI Development:** Same as Alternative A. Exceptions are changes in impacts related to subsistence harvest that could result from the general elimination of roads in the Plan Area. **FFD:** Same as Alternative A. Exceptions are changes in impacts related to subsistence harvest that could result from the general elimination of roads in the Plan Area.	**CPAI Development:** Same as Alternative A. Exceptions are lesser negative effects on subsistence harvest resulting from pipelines being elevated to 7 ft, and removal of road segments from Fish Creek buffer zone.

S.4.4.2 Regional Economy

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON REGIONAL ECONOMY

An incremental increase in federal, state, and local tax revenues would occur. This increase would be approximately two to four percent (of 2001 revenues) for the NSB. It would be less than one percent of state tax revenues. Increased revenues under Alternative A – FFD could be 4.5 to 10 times the annual benefit estimated for the CPAI Development Plan, depending on production in any given year.

The NSB would benefit from the expanded property tax base that would help fund government services to residents. The NSB and village corporations also would receive benefits from increased economic activity in the region, increased opportunity for grants under the National Petroleum Reserve-Alaska Impact Mitigation Program, and from direct employment of local residents. As a result of this program, oil lease sale fees and royalties from the National Petroleum Reserve-Alaska have a disproportionately large effect on communities in the region.

There may be economic impacts to subsistence harvesting activities from Alternative A resulting from increased travel costs and increased travel times. The more densely developed FFD scenario for Alternative A would likely exacerbate these impacts.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON REGIONAL ECONOMY

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A except for a potential reduction of between 10 and 30 percent in production from CD-6 caused by moving the drill pad outside the 3-mile setback for Fish Creek, which would result in an overall reduction of 4.15 percent of the total production from CD-3 through CD-7. The economic benefits from the Alternative B – CPAI Development Plan would be reduced by this factor. **FFD:** Same as Alternative A except the production scenario must be adjusted to eliminate production from HP-10, HP-19, and HP-22 to comply with stipulations. Applying this change to FFD production estimates would result in an overall production from 2008 through 2055 that is 16 percent lower than the production estimate for Alternative A.	**CPAI Development:** Same as Alternative A, although a road connection to Nuiqsut could facilitate greater employment for local residents. **FFD:** Same as Alternative A, although a road connection to Nuiqsut could facilitate greater employment for local residents.	**CPAI Development:** Same as Alternative A. **FFD:** Same as Alternative A.	**CPAI Development:** Same as Alternative A.

S.4.4.3 Subsistence Harvest and Uses

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON SUBSISTENCE HARVEST AND USES

Effects from construction and operation would be expected to last for the lifetime of the applicant's proposed action and are expected to be primarily local in extent for the CPAI Development Plan and regional in extent for the FFD Scenario. Construction and operation would affect availability of key subsistence resources because of deflection or displacement of these resources from customary harvest locations. Access to subsistence resources would be affected by the perception of regulatory barriers; the reluctance to hunt and shoot firearms near industrial facilities, including pipelines; raised road berms; pipelines with snowdrifts in winter that hinders passage; and a preference for animals not habituated to industrial development. Indirect effects would include hunters who go to another area, which would result in increased effort, cost, and risks associated with traveling farther. If hunters travel to other areas, they would not go to traditional subsistence places as often.

The FFD scenario would affect key subsistence resources (caribou, fish, waterfowl, wolf, wolverine, and geese) and would occur in seasonal and concentrated subsistence-use areas (the Colville River Delta and the Fish and Judy Creeks area) for these key subsistence resources. Nuiqsut residents, as well as residents of other North Slope communities, have harvested and used resources in these specific areas for multiple generations and currently harvest multiple resources during several seasons each year in these areas. Effects from construction and operation would occur in key geographic areas relative to other areas of subsistence availability and would pertain to Nuiqsut individual subsistence users, groups of users, and the overall pattern of community subsistence uses. Competition for key resources among Nuiqsut, Anaktuvuk Pass, Barrow, and Atqasuk would increase if Nuiqsut hunters expand from traditional subsistence-use areas close to Nuiqsut to farther outlying areas. Potential effects of FFD on Barrow and Atqasuk hunters include increased competition for furbearers as Nuiqsut residents move west to avoid industrial development. The location of the FFD approaches areas used regularly by Barrow hunters for furbearers and caribou. If Nuiqsut hunters continue to move west and south, they could conflict with hunters from other communities. Nuiqsut has development east and north of the community. The primary areas for expansion are south (Anaktuvuk Pass) and west (Barrow and Atqasuk). Barrow hunters already encounter Nuiqsut hunters in the current Barrow subsistence-use area. Atqasuk residents harvest most resources near Atqasuk. Furbearer hunters, who also harvest incidental caribou, travel the farthest from Atqasuk. They are most likely to experience any effects of the area in the FFD scenario because of competition between communities if Nuiqsut hunters move farther west.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON SUBSISTENCE HARVEST AND USES

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Moving CD-6 and associated roads outside the Fish Creek 3 mile buffer zone and elimination of the Nigliq Channel road bridge would decrease potential impacts to subsistence uses in the area; other impacts would be the same as those for Alternative A. **FFD:** FFD facilities would not be placed within 3 miles of Fish-Judy Creek, reducing impacts to a key subsistence-use area. Other impacts would be similar to CPAI.	**CPAI Development:** In addition to impacts of Alternative A, roads and pipelines would be located closer to Nuiqsut. The road connecting Nuiqsut to the development area would provide increased vehicle access to subsistence resources resulting in increased competition for subsistence resources if more hunting efforts are focused on the road corridor. At the same time, vehicular traffic on the roads would result in local deflection/disturbance of terrestrial mammals near the roads, and thus reduce subsistence availability of resources. Unrestricted road access to BLM lands would eventually provide increased access for people who do not live in the area and increase competition for resources. **FFD:** Same as CPAI, plus the road network connecting Nuiqsut to 17 of the 24 new locations and all 5 CPAI-proposed drilling and production pads would provide summer access to areas generally reachable only by boat in summer, and would likely change current subsistence use patterns.	**CPAI Development:** Less impact than Alternative A due to less road traffic that would affect resource availability by associated disturbances. A pipeline clearance of 7 feet would be less restrictive to subsistence users. Other impacts would be similar to Alternative A. **FFD:** Same as CPAI.	**CPAI Development:** Moving road segments outside the Fish Creek 3 mile buffer zone would decrease potential impacts to subsistence uses in the area. A pipeline clearance of 7 feet would be less restrictive to subsistence users. Other impacts would be similar to Alternative A.

S.4.4.4 Environmental Justice

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON ENVIRONMENTAL JUSTICE

The most prevalent impacts are the potential direct and indirect impacts related to subsistence harvest and use. Other impacts identified as potentially disproportionate include spill impacts, potential water quality, air quality, and aircraft noise impacts.

Impacts to subsistence harvest and use would arise from impacts to the availability of subsistence species in traditional use areas or a decrease in subsistence hunting success. The reduction in subsistence hunting success in turn would reduce the availability of Native foods to the community. Since the Native community is the only community that depends to a significant degree on Native foods, this impact, to the extent that it occurs, falls disproportionately on the Native population. Also, displacement of subsistence hunters from traditional subsistence-use areas by oil industry facilities also would result in greater time spent traveling longer distances to other subsistence use areas. It could also result in local hunters from Nuiqsut competing with hunters from other villages when using the same traditional subsistence-use areas.

The analysis of spill impacts shows that very small and small spills are unlikely to have long-term, extensive impacts that would affect water quality, habitat, or subsistence species. Larger spills that are more likely to have more extensive impacts have a very low probability of occurrence. Spill impacts, to the extent that they occur, would be episodic, not continuous. Local residents have shown a propensity to avoid resources from areas where spills have occurred because of a lack of confidence that subsistence resources have not been contaminated. This lack of confidence may affect subsistence use for a period beyond the time when any resources affected from spills would actually persist. Impacts to water quality can occur as a result of spills or construction-induced erosion.

Air quality in Nuiqsut already meets national ambient air quality standards for all criteria pollutants. Short-term episodes of elevated particulate concentrations have been observed at Nuiqsut and are caused by wind-borne dust. Emissions from natural gas flaring (incidental) and equipment operation are not expected to contribute to the chronic exposure of local residents to particulate.

Low-level aircraft noise is expected to be limited to areas surrounding facility airstrips. However, helicopter operations, which are typically at lower altitudes, can range over a larger area as these aircraft move between different facility locations. Subsistence hunters have reported the interruption of hunts in progress by low-flying aircraft, especially helicopters.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON ENVIRONMENTAL JUSTICE

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A, except relaxation of access restrictions limitations that would increase public access to BLM lands and may increase competition for subsistence resources. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A, except reduction in the use of roads between facilities incorporated in Alternative D could reduce the potential for impacts to subsistence harvest in Nuiqsut traditional use areas. However, increased use of aircraft to serve these facilities could have some limited offsetting noise impacts. **FFD:** Same as CPAI.	**CPAI Development:** Same as Alternative A.

S.4.4.5 Cultural Resources

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON CULTURAL RESOURCES

Under the Alternative A – CPAI Development Plan, cultural resources are situated in the vicinity of the production pads, the road/pipeline right of way (ROW), and the ASRC Mine Site. Under Alternative A – FFD, cultural resources are located in each of the three facility groups and the ROWs. Any project facility or pad within 1/4 mile of a cultural resource could result in direct effects including damage to or destruction of the resource during construction of the proposed well pad. Under Alternative A – CPAI, one cultural resource is less than 1/4 mile from the CD-4 production pad, and one cultural resource is less than 1/4 mile from the ASRC Mine Site. Under Alternative A – FFD, cultural resources are within the affected areas of production pads HP-5, HP-8, HP-13, and HP-14 and ROWs HP-8 to HP-6 in the Colville River Delta Facility Group; production pads HP-1, HP-2, HP-3, and HP-11 and HPF-1 in the Fish-Judy Creeks Facility Group; and HP-22 and ROWs HP-21 to HP-22 and HP-20 to HPF-2 in the Kalikpik-Kogru Rivers Facility Group. The HP-8 to HP-6 ROW extends through the village of Nuiqsut, and one cultural resource is less than 1/4 mile from the HP-21 to HP-22 ROW. Indirect effects would include damage to the resource caused by inadvertent oil spills, and subsequent cleanup activities. The integrity of subsurface, surface, and aboveground cultural resources could be significantly affected by con-

struction activities. Unknown or undocumented cultural resources may be situated in the proposed ROWs or footprints of Alternative A and FFD components.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON CULTURAL RESOURCES

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Same as Alternative A, although there would be less risk of impacts to unknown resources because less gravel would be excavated. **FFD:** Same as Alternative A - FFD, except that HP-22 would not be constructed and therefore would not have potential to affect cultural resources and because there would be less risk to unknown resources as less gravel would be excavated.	**CPAI Development:** Same as Alternative A, although there would be more risk of impacts to unknown resources because more gravel would be excavated **FFD:** Same as Alternative A – FFD, although there would be more risk of impacts to unknown resources because more gravel would be excavated	**CPAI Development:** Same as Alternative A, except the absence of roads would eliminate potential impacts to cultural resources associated with road construction and there would be less risk of impacts to unknown resources because less gravel would be excavated. **FFD:** Same as Alternative A – FFD, except the absence of roads would eliminate potential impacts to cultural resources associated with road construction and there would be less risk of impacts to unknown resources because less gravel would be excavated.	**CPAI Development:** Same as Alternative A

S.4.4.6 Land Uses and Coastal Zone

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON LAND USES AND COASTAL ZONE

Construction and operation of Alternative A is not anticipated to result in adverse effects to existing land uses and ownership. A direct impact, however, would be a nearly 300 percent increase in the acres developed for oil production within the Plan Area. Additional impacts of concern for Alternative A to special use areas include the construction and operation of facilities within the designated Fish Creek buffer zone. Construction of CD-6 and associated roads and pipeline requires approval of minimal development within Fish Creek buffer zone. CPAI would have to obtain a waiver of the no permanent facilities restriction from BLM. Approval for minimal development within Fish Creek buffer zone would be necessary for CPAI to implement the proposed plan. The FFD of a production pad and associated pipeline in the area near the Kogru River designated for no surface activities would require an exemption from the surface use restrictions for this area. It also would require approval for additional development within the Fish Creek buffer zone, Sensitive Consultation areas, and the special caribou stipulation area. Coastal and land management developments are not anticipated to have adverse effects. Under the NSB Land Management Regulations (LMR), however, the rezoning of non-federal land from "Conservation" to "Resource Development" would be required for implementation of CPAI's proposed development plan. Application of the NSB's land management regulations to federal lands is subject to legal constraints and therefore must be evaluated on a case-by-case basis as particular activities.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON LAND USES AND COASTAL ZONE

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: Would approximately double the total number of acres developed for oil production within the Plan Area. All facilities and construction would occur outside the Fish Creek buffer zone. Rezoning of non-federal land under the NSB LMR from "Conservation" to "Resource Development" would be required. **FFD:** Would place structures outside of buffer zones and areas where surface activities are restricted. This would also eliminate possible adverse effects on Special Use Areas. Rezoning of non-federal land under the NSB LMR from "Conservation" to "Resource Development" would be required.	**CPAI Development:** Same as Alternative A, except that it would nearly quadruple the total number of acres developed for oil production within the Plan Area. **FFD:** Same as Alternative A – FFD, except for an increased number of acres developed for oil production in the Plan Area.	**CPAI Development:** The increase in the total number of acre developed would be less than that of other alternatives due to the absence of roads. Construction of CD-6 and associated roads and pipeline requires wavier of BLM stipulation for development within Fish Creek buffer zone. Rezoning of non-federal land under the NSB LMR from "Conservation" to "Resource Development" would be required. **FFD:** Same as Alternative A - FFD, except for a smaller number of acres developed for oil production in the ASDP Area.	**CPAI Development:** The total number of acres developed would be nearly the same as Alternative A.

S.4.4.7 Recreation

ALTERNATIVE A – SUMMARY OF IMPACTS ON RECREATION

Construction and operation of the facilities proposed under Alternative A – CPAI and Alternative A – FFD in the Plan Area are not expected to result in adverse effects to recreational resources.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON RECREATION

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development:	**CPAI Development:**	**CPAI Development:**	**CPAI Development:**
Same as Alternative A.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.
FFD: Same as Alternative A.	**FFD:** Same as Alternative A.	**FFD:** Same as Alternative A.	

S.4.4.8 Visual Resources

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFED) ON VISUAL RESOURCES

Under Alternative A – CPAI and Alternative A – FFD, construction and operation would result in adverse impacts to visual resources. The presence of drill rigs would be the most noticeable effect of construction. Other activities such as pad and road construction would have negligible impacts because the construction activities would occur in the winter when viewer sensitivity is not an issue. In addition, the facilities and structures associated with operation would introduce contrast with the natural landscape. When viewed from the foreground-middleground zone, these structures would produce a strong contrast with the natural landscape resulting in an adverse impact. The overall adverse effects of Alternative A – CPAI are a result of the high level of contrast between the proposed structures and the natural landscape.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON VISUAL RESOURCES

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: High contrasts, but slightly less than Alternative A due to buried power lines, removing the need for power poles, and because facilities associated with CD-6 would be moved away from Fish Creek. **FFD:** Same as CPAI.	**CPAI Development:** High contrasts would be greater than Alternative A due to extensive use of aerial power lines. Additional contrasts would occur from vehicular traffic and fugitive dust along the road that would connect to Nuiqsut. **FFD:** Same as CPAI.	**CPAI Development:** High contrasts. Would be the same as Alternative A. **FFD:** Same as CPAI.	**CPAI Development:**High contrasts, but slightly less than Alternative A due to removing the need for powerpoles between CD-6 and CD-7, adoption of lighting restrictions, and because additional road segments would be moved away from Fish Creek.

S.4.4.9 Transportation

ALTERNATIVE A – SUMMARY OF IMPACTS (CPAI AND FFD) ON TRANSPORTATION

Construction and operation of the facilities proposed under the Alternative A – CPAI Development Plan and FFD are not expected to result in adverse effects to transportation resources. Existing and proposed roads, airstrips, and pipelines are expected to adequately transport personnel, materials, and product throughout the Plan Area and into statewide transportation systems. Both local and statewide transportation systems are considered to have adequate capacity to accommodate the level of activity anticipated during construction and operation of the facilities. There would be 26.0 miles of new roads in the Plan Area for Alternative A – CPAI, and 150 miles of new roads for Alternative A – FFD. Use of project roads would be restricted to industry and local residents. Potential secondary effects on wildlife, subsistence, and recreation would result from increased access.

ALTERNATIVES B, C, AND D – SUMMARY OF IMPACTS (CPAI AND FFD) ON TRANSPORTATION

ALTERNATIVE B	ALTERNATIVE C	ALTERNATIVE D	ALTERNATIVE F
CPAI Development: No adverse effects on public roads or transportation system. Would add 10.1 miles of new roads in Plan Area. Project roads would be accessible to industry only. Lesser potential secondary effects on wildlife, subsistence, and recreation from increased access **FFD:** No adverse effects on public roads or transportation system. Would add 118 miles of new roads in Plan Area. Project roads would be accessible to industry only. Lesser potential secondary effects on wildlife, subsistence, and recreation from increased access	**CPAI Development:** No adverse effects on public roads or transportation system. Would add 42.1 (C-1) and 41.6 (C-2) miles of new roads in Plan Area. Unrestricted use of project roads on BLM lands, use by industry and local residents only on state and private lands. Has the greatest potential for secondary effects on wildlife, subsistence, and recreation from increased access. **FFD:** No adverse effects on public roads or transportation system. Would add 190 miles of new roads in Plan Area. Unrestricted use of project roads on BLM lands, use by industry and local residents only on state and private lands. Has the greatest potential for secondary effects on wildlife, subsistence, and recreation from increased access.	**CPAI Development:** No adverse effects on public roads or transportation system. Would add 2.1 (D-1) miles of new roads in Plan Area for industry use only. Has the lowest potential of secondary effects on wildlife, subsistence, and recreation from increased access. **FFD:** No adverse effects on public roads or transportation system. Adds no new roads in Plan Area for industry use only. No potential secondary effects on wildlife, subsistence, and recreation from increased access.	**CPAI Development:** No adverse effects on public roads or transportation system. Would add 27.5 miles of new roads in Plan Area. Project roads would be accessible to industry, government, and local residents

S.5 EXISTING AND POTENTIAL ADDITIONAL MITIGATIVE MEASURES

Any oil development in the Plan Area would incorporate design and operation measures that would protect the environment. These measures would reflect the applicant's proposed action, applicable federal, state, and NSB laws and regulations, and requirements of the leases that the applicant plans to develop. In addition, the federal RODs issued following completion of this FEIS, the State of Alaska Coastal Consistency Review, and any federal, state, and borough permits necessary to authorize development may impose additional mitigation measures.

CPAI's proposed development plan includes measures to protect the environment. These measures include pipeline valves on either side of larger river channels to minimize potential spill impacts or size in the event of a leak or break, placement of gravel roads downhill from the pipeline to aid in control of potential pipeline leaks, and installation of bridges across major waterways to ensure fish passage and minimize changes to riparian habitat. Additionally, CPAI has proposed to minimize the size of gravel pads at production sites to reduce the project footprint, and has placed a heavy reliance on winter construction and ice road use to minimize tundra damage. The proposed winter-only drilling plan for the lower Colville River Delta drill site would minimize impacts to nesting or molting bird populations. Federal, state, and NSB laws and regulations also mitigate impacts by mandating protections for the environment. In addition, the applicant is bound by the conditions of the leases they purchased. These lease conditions include restrictions designed to provide environmental protection.

To further mitigate potential impacts, additional potential mitigation measures have been identified in this FEIS. The BLM ROD will identify which mitigation measures the BLM will adopt. Cooperating agencies may adopt mitigation measures as part of their RODs.

Unless granted an exception or a modification of the Northeast National Petroleum Reserve-Alaska IAP/EIS as part of this FEIS, activities on BLM-managed lands must be conducted and facilities sited in accordance with the ROD for the Northeast National Petroleum Reserve-Alaska IAP/EIS development stipulations (Appendix D). These stipulations were developed to minimize environmental impacts that could result from oil and gas development activities on federal lands within the Northeast National Petroleum Reserve-Alaska.

S.6 EIS PROCESS

This EIS has been prepared in accordance with regulations and guidance of the Council on Environmental Quality (CEQ) (40 CFR 1500-1508).

The BLM began distribution of the Alpine Satellite Development Plan DEIS on January 9, 2004 and announced its availability via a news release on January 12, 2004. A Notice of Availability (NOA) was published by USEPA in the *Federal Register* on January 16, 2004, announcing the 45-day public comment period of January 16 through March 1, 2004. Subsequently, the close of the comment period was extended to March 8, 2004. Written public comments were received by mail, website, and fax until the end of the extended Public Comment Period of March 8, 2004. Six public hearings were held to provide a forum in which the public could provide oral or written comment for the record. These hearings were held in Anaktuvuk Pass, Anchorage, Atqasuk, Barrow, Fairbanks, and Nuiqsut. All comments have been carefully considered, and substantive issues have been addressed and incorporated into this FEIS. A detailed description of the Public Comment process, the Response to Public Comments process, public comments received, and responses to those comments can be found in Section 6.

A NOA for this FEIS has been published in the *Federal Register*. Copies of the FEIS are available to interested individuals, parties, and organizations. A ROD could be issued 30 days after the USEPA's NOA for the FEIS.

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ABBREVIATIONS AND ACRONYMS

2D	two-dimensional (modeling)
AAAQS	Alaska Ambient Air Quality Standards
AAC	Alaska Administrative Code
ABWC	Alaska Beluga Whale Committee
ac-ft	acre-foot
ACMP	Alaska Coastal Management Program
ACX	Alpine Capacity Expansion
ACS	Alaska Clean Seas
ADEC	Alaska Department of Environmental Conservation
ADGC	Alaska Department of Governmental Coordination
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOL	Alaska Department of Labor
ADOT&PF	Alaska Department of Transportation and Public Facilities
ADR	Alaska Department of Revenue
AEWC	Alaska Eskimo Whaling Commission
AFN	Alaska Federation of Natives
AHRS	Alaska Heritage Resource Survey
AKNHP	Alaska Natural Heritage Program
AMMTAP	Alaska Marine Mammal Tissue Archival Project
ANCSA	Alaska Native Claims Settlement Act
ANGTS	Alaska Natural Gas Transportation System
ANILCA	Alaska National Interest Lands Conservation Act
ANIMIDA	Artic Nearshore Impact Monitoring In Development Area
ANWR	Alaska National Wildlife Refuge
AO	Authorized Officer (BLM)
AOGCC	Alaska Oil and Gas Conservation Commission
APF	Alpine Processing Facility
ARCO	Atlantic Richfield Company
AS	Alaska Statutes
ASDP	Alpine Satellite Development Plan
ASME	American Society of Mechanical Engineers
ASRC	Arctic Slope Regional Corporation
AST	aboveground storage tank
ASTt	Arctic Small Tool Tradition
BACT	Best Available Control Technology
bbl	barrel
Bbbl	billion barrel
BCBS	Bering/Chukchi/Beaufort Sea (bowhead whale stock)
bgs	below ground surface
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BMP	best management practice
BP	British Petroleum
B.P.	Before Present
BPMSL	British Petroleum Mean Sea Level

BPXA	BP Exploration (Alaska), Inc.
°C	degrees Centigrade
CAA	Clean Air Act
$CaCl_2$	Calcium Chloride
$CaCO_3$	calcium carbonate
CAH	Central Arctic (caribou) Herd
CBRF	Constitutional Budget Reserve Fund
CCP	Central Compressor Plant
CD	Colville Development Production Pad
CEQ	Council on Environmental Quality
cf	cubic feet
CFR	Code of Federal Regulations
cfs	cubic feet per second
cfsm	cubic feet per second/square mile
CIP	Capital Improvements Project
Class ID	Class I Disposal
Class IID	Class II Disposal
Clover	Clover Potential Gravel Source
cm	centimeter
CMP	Coastal Management Program (of the North Slope Borough)
CO	carbon monoxide
CO_2	carbon dioxide
Councils	Fishery Management Councils
CPAI	ConocoPhillips Alaska, Inc.
CRA	Circumpolar Research Associates
CRSA	Colville River Special Area
CRU	Colville River Unit
CWA	Clean Water Act
cy	cubic yard
CZMA	Coastal Zone Management Act
dBA	decibels on the A-rated scale
DEIS	Draft Environmental Impact Statement
DEW	Distant Early Warning
DLP	defense of life and property
DOD	Department of Defense
DOE	Department of Energy
DOI	Department of the Interior
DS	drill site
DU	Ducks Unlimited
EA	Environmental Assessment
EED	Environmental Evaluation Document
EEZ	Exclusive Economic Zone
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EOR	Enhanced Oil Recovery
ESA	Endangered Species Act
FAA	Federal Aviation Administration

°F	degrees Fahrenheit
FEIS	Final Environmental Impact Statement
FESWMS	Finite Element Surface Water Modeling System
FFD	Full-Field Development
FHWA	Federal Highway Administration
FLIR	Forward-Looking Infrared Radar
FLPMA	Federal Land Policy and Management Act
fps	feet per second
ft/yr	feet per year
GHG	greenhouse gases
GHX	gas handling expansion project
GIS	geographic information system
GMU	Game Management Unit
gpd	gallons per day
gpm	gallons per minute
gpy	gallons per year
H	horizontal
HAP	hazardous air pollutants
HDD	horizontal directional drilling
hp	horse power
HP	Hypothetical Production Pad
HPF	Hypothetical Processing Facility
HSM	horizontal support member
Hz	hertz
IAI	Impact Assessment, Inc.
IAP	Integrated Activity Plan
ICAS	Inupiat Community of the Arctic Slope
IRA	Indian Reorganization Act
ISER	Institute of Social and Economic Research
KHz	kilohertz
km	kilometer(s)
km^2	square kilometer(s)
KOP	key observation point
KRU	Kuparuk River Unit
KSOP	Kuukpik Subsistence Oversight Panel
kW	kilowatt
$L_{eq(24)}$	24-hour equivalent sound level
L_{dn}	day-night sound level
LMR	Land Management Regulations (of the North Slope Borough)
LOA	Letter of Authorization
LTO	landing/takeoff (cycle)
LUEA	Land Use Emphasis Area
$\mu g/m^3$	micrograms per cubic meter
µm	micron
µS/cm	microsiemens per centimeter
m	meter(s)
m^2	square meter(s)
MACT	Maximum Achievable Control Technology

meq/L	milliequivalents per liter
mg	milligram(s)
mg/L	milligrams per liter
mg/m^3	milligrams per cubic meter
MI	miscible injectant
mi^2	square mile(s)
mm	millimeter
MMbbl	million barrels
MMBtu/hr	million Btus per hour
mmhos/cm	millimhos per centimeter
MMPA	Marine Mammal Protection Act
MMS	Minerals Management Service
mmscfd	million standard cubic feet per day
mph	miles per hour
MW	megawatt
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NAC	Northern Air Cargo
NARL	Naval Arctic Research Laboratory
NCSS	National Cooperative Soil Survey
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service (now NOAA Fisheries)
NO_x	nitrogen oxides
NO_2	nitrogen dioxide
NOA	Notice of Availability
NOAA	National Oceanic and Atmospheric Administration
NOC	Nuiqsut Operations Center
NOI	Notice of Intent
NPDES	National Pollutant Discharge Elimination System
NPFMC	North Pacific Fisheries Management Council
NPR-4	Naval Petroleum Reserve-4
NPR-A	National Petroleum Reserve-Alaska
NPRPA	Naval Petroleum Reserves Production Act of 1976
NRC	National Research Council
NRHP	National Register of Historic Places
NSA	Noise Sensitive Area
NSB	North Slope Borough
NSPS	New Source Performance Standards
NSR	New Source Review
NSSI	North Slope Science Initiative
NWI	National Wetlands Inventory
O_3	ozone
OCS	Outer Continental Shelf
OCSEAP	Outer Continental Shelf Environmental Assessment Program
ODPCP	Oil Discharge Prevention and Contingency Plan
OHV	off-highway vehicle

OOIP	original oil in place
OSHA	Occupational Safety and Health Administration
PAI	Phillips Alaska, Inc.
PBU	Prudhoe Bay Unit
PCB	polychlorinated biphenyl
PCH	Porcupine Caribou Herd
PL	Public Law
Plan Area	ASDP Area
PM	particulate matter
$PM_{2.5}$	particulate matter less than 2.5 microns
PM_{10}	particulate matter less than 10 microns
PN&D	Peratrovich, Nottingham & Drage
POL	petroleum, oils, and lubricants
ppb	parts per billion
ppm	parts per million
ppmv	parts per million by volume
ppt	parts per thousand
PSD	Prevention of Significant Deterioration
psi	pounds per inch
RCRA	Resource Conservation and Recovery Act
RM	river mile
RMP	Resource Management Plan
RMT	Research and Monitoring Team
ROD	Record of Decision
ROS	Recreation Opportunity Spectrum
ROW	right of way
SAP	Subsistence Advisory Panel
SDWA	Safe Drinking Water Act
Secretary	Secretary of the Interior
SHPO	State Historic Preservation Office
SMZ	Special Management Zone
SO_x	sulfur oxides
SO_2	sulfur dioxide
SPCC	spill prevention, control, and countermeasure
SPM	Semi-Primitive Motorized
SRB&A	Stephen R. Braund & Associates
STP	Seawater Treatment Plant
TAGS	Trans-Alaska Gas System
TAPS	Trans-Alaska Pipeline System
Tcf	trillion cubic feet
TERA	Troy Ecological Research Associates
TCH	Teshekpuk Lake (caribou) Herd (used to be TLH)
TLSA	Teshekpuk Lake Special Area
TLUI	Traditional Land Use Inventory
TMA	Tom Mortensen Associates
tpd	Tons per day
tpy	Tons per year
UIC	underground injection control

USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDOC	U.S. Department of Commerce
USDOT	U.S. Department of Transportation
USDW	underground sources of drinking water
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VLVS	very large volume spill
V	vertical
VOC	volatile organic compounds
VRM	Visual Resource Management
VSM	vertical support member
WAH	Western Arctic (caribou) Herd
WSR	wild and scenic river
WSRA	Wild and Scenic Rivers Act
Y-K	Yukon-Kuskokwim

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SECTION 1
INTRODUCTION

1.1 PURPOSE AND NEED

1.1.1 Intent of this Environmental Impact Statement (EIS)

The Bureau of Land Management (BLM) and four cooperating agencies — U.S. Army Corps of Engineers (USACE), U.S. Environmental Protection Agency (USEPA), U.S. Coast Guard (USCG), and the State of Alaska — have prepared the Alpine Satellite Development Plan (ASDP) Environmental Impact Statement (EIS) to examine ConocoPhillips Alaska, Inc.'s (CPAI, the applicant's) proposed action to develop five satellite oil accumulations in the northeastern National Petroleum Reserve-Alaska and the Colville River Delta adjacent to the eastern border of the National Petroleum Reserve-Alaska. The 890,000-acre Plan Area includes the Colville River Delta west of its easternmost channel and extends west to the vicinity of the mouth of the Kogru River on the west side of Harrison Bay and south from the Kogru River mouth for approximately 45 miles (Figure 1.1.1-1). This EIS examines the potential impacts of development and evaluates a range of alternatives, consistent with applicable law, by which to accomplish the purpose and need of the proposed action while mitigating adverse impacts to the greatest extent possible.

This EIS analyzes a proposal by CPAI to develop five satellite production pads — two in the Colville River Delta and three in the National Petroleum Reserve-Alaska. The pads are termed CD-3, CD-4, CD-5, CD-6, and CD-7. In the Colville River Delta, CD-3 is on State of Alaska land and CD-4 is on land owned by Kuukpik Corporation, the Native corporation created under the authority of the Alaska Native Claims Settlement Act (ANCSA) for the village of Nuiqsut. CD-5 is on land conveyed to Kuukpik within the National Petroleum Reserve-Alaska (NPR-A). CD-6 and CD-7 are on lands administered by the BLM in the National Petroleum Reserve-Alaska (Figure 1.1.1-2). CPAI proposes to place 20 to 30 wells on each pad and to transport the unprocessed, three-phase (oil, gas, and water) production to the existing Alpine Processing Facility (APF) at CD-1 for processing. Processed oil would be transported in the existing pipeline system to the Trans-Alaska Pipeline System (TAPS). The proposed action is more fully described in Section 2.

In addition to development proposed by CPAI, several alternatives analyze development options for pads, pipelines, and other facilities at a higher-than-project-specific level throughout the Plan Area in order to identify potential mitigation measures for future development in the area. Through this analysis, the EIS directly analyzes different development options for pads, pipelines, and other facilities in addition to those proposed by CPAI for oil development. It is important to note that no Preferred Alternative or Record of Decision will be developed for what is referred to in this EIS as the Full-Field Development (FFD) Scenario. Decisions on future proposals for developments in the area would be addressed through additional National Environmental Policy Act (NEPA) analysis. Such NEPA analysis could be an EIS or an environmental assessment (EA). An EA would be prepared for actions that are not anticipated to result in significant impacts. If significant impacts are expected or if an EA identifies significant impacts, an EIS will be prepared. For all EISs and for any less impacting proposal with potential controversy, local residents will be informed and involved. Also, readers should note that the pad locations described in Section 2 of this EIS for the FFD are hypothetical and do not reflect any actual proposals, applications, or project plans. The scenarios presented for FFD in Section 2 are presented for purposes of analysis and represent hypothetical potential future development within the next twenty years. While gas production through sales is considered speculative and is not part of CPAI's proposal, the effects of gas production as part of the oil stream and gas handling are considered.

1.1.2 Purpose and Need for the Proposed Action

The purpose of the Proposed Action is to allow CPAI to develop five satellite oil accumulations in the Plan Area. The need for oil production from the perspective of CPAI is to generate financial return on its investment in oil and gas leases.

Oil companies, but principally CPAI, have invested more than $100 million in leases in the Plan Area and have spent tens of millions of dollars more in seismic exploration, exploratory drilling, and scientific and engineering studies preparatory to development. Also, additional oil production on Alaska's North Slope extends the useful life of the TAPS, in which the oil industry has invested many billions of dollars.

Federal and state governments allow development of valid federal, state, and private oil and gas leases consistent with applicable law and regulation. Furthermore, although not a purpose of CPAI's proposal, development of these energy resources is consistent with broader national policies. Oil production from CPAI's discoveries helps to satisfy the demand for a continued supply of domestic oil, to decrease dependence of the United States on foreign oil imports, and to contribute to employment and economic vitality in the region and nation.

The United States currently imports about half its oil supply, and the U.S. Department of Energy (DOE) projects that the proportion of the nation's oil coming from overseas will continue to climb, approaching 68 percent by 2025. The DOE also reports that domestic oil and gas production in the United States overall is declining (DOE 2003). The DOE Office of Transportation Technologies reports that the trade deficit caused by oil imports represents a major transfer of wealth and jobs from the United States to foreign oil suppliers, stifling domestic economic growth (DOE n.d.).

Domestic oil production contributes directly to the health of the nation's economy and to federal, state, and local government revenues. Oil production in Alaska is especially significant to the State of Alaska because it generates revenue to the state from jobs, investment, and royalties. Rentals and royalties from oil and gas leases contribute to the federal and state treasuries, as do taxes paid by oil companies and their workers.

The portion of the proposed action situated in the National Petroleum Reserve-Alaska helps satisfy the purpose of the Naval Petroleum Reserves Production Act of 1976 (NPRPA) to explore and develop oil and gas resources in the National Petroleum Reserve-Alaska. Specifically, the NPRPA, as amended, encourages oil and gas leasing in the National Petroleum Reserve-Alaska while requiring protection of important surface resources and uses. Development of the five satellite oil accumulations with appropriate environmental protection measures is consistent with the president's directive to his National Energy Policy Development Group to "promote dependable, affordable and environmentally sound production of energy for the future" (National Energy Policy Development Group 2001). Furthermore, President Bush issued Executive Order 13212 on May 18, 2001, calling on federal agencies to give priority to energy-related projects: "For energy-related projects, agencies shall expedite their review of permits or take other actions as necessary to accelerate the completion of such projects, while maintaining safety, public health, and environmental protections."

1.1.3 Lead and Cooperating Agency Authorities

This EIS is intended to fulfill the needs and obligations set forth by NEPA and other relevant laws, regulations, and policies of the BLM (lead agency) and of the USACE, USEPA, USCG, and the State of Alaska (cooperating agencies).

As the federal manager of the National Petroleum Reserve-Alaska, the BLM is responsible for land-use authorizations on federal land in the National Petroleum Reserve-Alaska. Upon completion of the EIS process, BLM will make decisions regarding CPAI's proposal on lands it manages; these encompass CD-6 and CD-7 and facilities associated with them on lands eastward to the limit of federal lands. The authority for management of the land and resource development options presented in the EIS comes from several statutes, including

NEPA, the Federal Land Policy and Management Act (FLPMA), the NPRPA, as amended, and Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA).

- NEPA sets out policy and provides the means by which the federal government, including both the BLM and the federal cooperating agencies, examines major federal actions that may have significant effects on the environment, such as the authorization of oil and gas development contemplated in this EIS (42 USC § 4231 et seq.).

- Under the FLPMA, the Secretary of the Interior has broad authority to regulate the use, occupancy, and development of public lands and to take whatever action is required to prevent unnecessary or undue degradation of public lands (43 USC § 1732). In accordance with the FLPMA, the BLM manages its Alaska lands and their uses to ensure healthy and productive ecosystems.

- The NPRPA provides the Secretary of the Interior with the authority to conduct oil and gas leasing and development in the National Petroleum Reserve-Alaska (42 USC § 6508); protect "environmental, fish and wildlife, and historical or scenic values" in the reserve [42 USC § 6503(b)]; and provide "conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable and significantly adverse effects on the surface resources of the National Petroleum Reserve-Alaska" [42 USC § 6508(1)].

- The NPRPA also directs that development in designated Special Areas "shall be conducted in a manner which will assure the maximum protection of such surface resources to the extent consistent with the requirements of [the] NPRPA for the exploration of the reserve" [42 USC §§ 6504(b), 6508]. There are portions of two such Special Areas in the Plan Area — the Teshekpuk Lake Special Area (TLSA) and the Colville River Special Area (CRSA) (Figure 1.1.3-1).

- Title VIII of ANILCA establishes procedures for federal agencies to evaluate impacts on subsistence uses and needs and means to reduce or eliminate such impacts (16 USC § 3120).

The USACE has the authority to issue or deny permits for placement of dredge or fill material in the waters of the United States, including wetlands (which incorporate most, if not all, of the Plan Area) and for work and structures in, on, over, or under navigable waters of the United States. Consequently, the USACE's authority extends, and its decisions following completion of the EIS will extend, to CPAI's entire proposal, regardless of who owns the land.

- Under Section 404 of the Clean Water Act (CWA) (33 USC § 1251 et seq.), the USACE regulates placement of dredge and fill material in waters of the United States, including wetlands.

- Under Section 10 of the Rivers and Harbors Act (33 USC 403), the USACE has regulatory authority for work and structures performed in, on, over, or under navigable waters of the United States.

The USEPA authority to regulate oil and gas development is contained in the CWA (33 USC § 1251 et seq.), Clean Air Act (CAA) (42 USC § 7401 et seq.), and the Safe Drinking Water Act (SDWA) (42 USC § 300). Like the authority of the USACE, the USEPA'S authority extends, and its decisions following completion of the EIS will extend, to CPAI'S entire proposal, regardless of who owns the land.

- Under Section 311 of the CWA (33 USC §1251 et seq.), the USEPA requires a spill prevention, control, and countermeasure (SPCC) plan to be developed by owners or operators of any facility storing a total capacity of 1,320 gallons of fuel in aboveground storage tanks (AST). The SPCC plan describes the location of the fuel storage tank and methods of spill prevention to be implemented at the proposed facility. The SPCC plan must be developed and implemented before oil production begins (40 CFR 112).

- Under Section 402 of the CWA (33 USC §1251 et seq.), the USEPA issues permits for the discharge of pollutants from a point source into waters of the United States for facilities, including oil and gas facilities. Point-source discharges that require a National Pollutant Discharge Elimination System (NPDES) permit include, but are not limited to, sanitary and domestic wastewater, gravel pit and construction dewatering, and hydrostatic test water, storm water discharges, etc. (40 CFR 122).

- Under Section 404 of the CWA (33 USC §1251 et seq.), the USEPA reviews and comments on USACE Section 404 permit applications for compliance with the Section 404(b)(1) guidelines and other statutes and authorities within its jurisdiction (40 CFR 230).

- Under the SDWA (42 USC §300), the USEPA's responsibilities include the management of the Underground Injection Control (UIC) program and the direct implementation of Class I and Class V injection wells in Alaska for injection of non-hazardous and hazardous waste through a permitting process for fluids that are recovered from down hole, as well as municipal waste, stormwater, and other fluids that did not come up from down hole (40 CFR 124A, 40 CFR 144, 40 CFR 146). The USEPA oversees the Class II program delegated to the State of Alaska that is managed by the Alaska Oil and Gas Conservation Commission, which includes Class II enhanced oil recovery, storage, and disposal wells that may receive non-hazardous produced fluids originating from down hole, including muds and cuttings (40 CFR 147).

- Under Sections 165 and 502 of the CAA (42 USC §7401 et seq.), the State of Alaska is delegated authority to issue air quality permits for facilities operating within state jurisdiction for the Title V operating permit (40 CFR 70) and the Prevention of Significant Deterioration (PSD) permit (40 CFR 52.21) to address air pollution emissions. The USEPA maintains oversight authority of the state's program.

- Under Section 309 of the CAA (42 USC §7401 et seq.), the USEPA has the responsibility to review and comment on, in writing, the EIS for compliance with the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500–1508).

- Under Sections 3001 through 3019 of the Resource Conservation and Recovery Act (RCRA) (42 USC 3251 et seq.), the USEPA establishes criteria governing the management of hazardous waste. Although drilling fluids, produced waters, and other wastes associated with the exploration, development, or production of crude oil, natural gas, or geothermal energy are solid wastes that are not hazardous waste in accordance with 40 CFR §261.4(b)(5), any other hazardous waste generated at the facility is subject to the hazardous waste regulations.

The USCG has authority under the Rivers and Harbors Act of 1899 to approve construction of any bridge across navigable waters to ensure safe navigability of waterways. The USCG exercises its authority to prevent unauthorized obstruction or alteration of the nation's navigable waters (33 USC 403). Within the Plan Area, USCG decisions will address any potential obstruction, including bridges, of the Colville River or its major distributaries.

The State of Alaska manages development on its land in the Colville River Delta on which one of CPAI's proposed satellites (CD-3) is located. The state has subsurface interest in both satellite locations in the Colville River Delta (CD-3 and CD-4). The state is responsible for regulating activities and developments on federal, state, and private lands that may affect air or water quality or resident species of fish and wildlife. The state also is responsible for providing subsistence use of fish and wildlife and to ensure consistency of activities and development with the Alaska Coastal Management Program (ACMP). In addition, the EIS studies development options that will help the state meet its responsibilities under various state statutes including Alaska Statutes (AS) Title 16 (Fish and Game), Title 31 (Oil and Gas), Title 38 (Public Land), Title 41 (Public Resources), and Title 46 (Water, Air, Energy, and Environmental Conservation). Consequently, following completion of the EIS, the State will make some decisions on the entire CPAI proposal, while it will make other decisions that rest with the land owner only on lands it manages at and near CD-3.

1.1.4 Other Agency Authorities

Several other federal, state, and local government agencies have authorities that apply to the proposed action and alternatives. These agencies include the U.S. Fish and Wildlife Service (USWFS), National Oceanic and Atmospheric Administration (NOAA) Fisheries (formerly National Marine Fisheries Service [NMFS]), and the North Slope Borough (NSB). Table 1.1.4-1 summarizes authorities that apply to the proposed action and alternatives. A more detailed description of the authorities is presented in Appendix C.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES

FEDERAL		
Legal Authority	**Authorizations**	**Regulatory Intent**
Federal Laws and Executive Orders Common To Multiple Federal Agencies		
National Environmental Policy Act (NEPA) 42 USC 4321	The NEPA of 1970 requires all federal agencies to prepare a detailed statement of the environmental effects of proposed federal actions that may significantly affect the quality of the human environment.	Protect the environment through procedures that ensure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.
Alaska National Interest Lands Conservation Act (ANILCA) 16 USC 410hh-3233 43 USC 1602-1784	Section 810: Federal agencies must evaluate and provide a proposed finding of effects of proposed development on subsistence.	Provide the opportunity for rural Alaska residents to continue to engage in a subsistence way of life.
National Historic Preservation Act (NHPA) of 1966 16 USC 470 et seq.	Federal agencies are responsible for ensuring protection of historical, cultural, and archaeological sites and resources in the USACE's permit areas.	Ensure consideration of the values of historic properties in carrying out federal activities. Make efforts to identify and mitigate impacts to significant historic properties.
Native American Graves Protection and Repatriation Act 25 USC 3001	Discovery or disturbance of any human remains in project area must be accounted for and protected and/or properly returned to the tribe of origin.	Protect Native American sacred and grave sites.
The American Indian Religious Freedom Act of 1978 42 USC 1996	Federal agencies must consider protection of sites considered sacred to Native Americans.	Reaffirm Native Americans' right to religious freedom, "including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonial and traditional rites."
Executive Order 11988 – Floodplain Management	Federal agencies must establish procedures to ensure that the potential effects of flood hazards and floodplain management are considered for actions undertaken in a floodplain. Impacts to floodplains are to be avoided to the extent practicable.	Protect floodplains and manage risk from flooding.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (CONT'D)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
Federal Laws and Executive Orders Common To Multiple Federal Agencies		
Executive Order 11990 – Protection of Wetlands	Federal agencies must avoid short- and long-term adverse impacts to wetlands whenever a practicable alternative exists.	Protect wetlands.
Executive Order 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations	Federal agencies must develop Environmental Justice (EJ) strategies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority populations and low-income populations (including Native American tribes).	Protect the health and environment of minority and low-income populations.
Executive Order 13007 – Indian Sacred Sites	Federal agencies must accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners and avoid adversely affecting the physical integrity of such sacred sites.	Protect and accommodate access to Native American sites.
Executive Order 13112 – Invasive Species	Federal agencies are to prevent the introduction of invasive species, control those that are introduced, and provide for the restoration of native species.	Prevent the introduction of invasive species and provide for their control.
Executive Order 13175 – Consultation and Coordination with Indian Tribal Governments	Federal agencies must establish regular and meaningful consultation and collaboration with tribal officials in the development of federal policies that have tribal implications, strengthen the government-to-government relationships with Indian tribes, and reduce the imposition of unfunded mandates upon Indian tribes.	Encourage communication and active cooperation between the federal government and Native American tribal governments.
Executive Order 13186 – Responsibilities of Federal Agencies to Protect Migratory Birds	Federal agencies must avoid or minimize the impacts of their actions on migratory birds and take active steps to protect birds and their habitat.	Protect migratory bird habitat and populations.
Executive Order 13212 – Actions to Expedite Energy-Related Projects	Federal agencies must take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy.	Increase production and transmission of energy in a safe and environmentally sound manner.
Bureau of Land Management (BLM)		
The Alaska Native Claims Settlement Act (ANCSA) 14 USC 33 1601-1629g	The BLM is responsible for transfer of federal lands to Native corporations and villages.	The ANCSA established Alaska Native land entitlements.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
Bureau of Land Management (BLM)		
Federal Land Policy and Management Act (FLPMA) 43 USC § 1732	Gives the BLM the authority to grant permits and regulate the use, occupancy, and development of the public lands and to take whatever action is required to prevent unnecessary or undue degradation of the public lands.	Provide for multiple use of public lands while protecting them from unnecessary or undue degradation.
Naval Petroleum Reserves Production Act 42 USC § 6500	Provides the secretary of the interior with the authority to lease and approve oil and gas development in the National Petroleum Reserve-Alaska while protecting the reserve's "environmental, fish and wildlife, and historical or scenic values."	Manage National Petroleum Reserve-Alaska "in a manner consistent with the total energy needs of the Nation, and for other purposes."
U.S. Army Corps of Engineers (USACE)		
Clean Water Act (CWA) of 1972 33 USC 1344	The USACE issues a Section 404 permit for discharge of dredged and fill material into U.S. waters, including wetlands.	Minimize impacts to waters of the United States (including wetlands) by regulating the discharge of dredged and/or fill material.
Rivers and Harbors Act of 1899 33 USC 403	The USACE issues a Section 10 permit for structures or work in, or affecting, navigable waters of the U.S.	Prevent unauthorized obstruction or alteration (dam, dike, or other structure) of any navigable waters of the United States.
U.S. Environmental Protection Agency (USEPA)		
Clean Air Act of 1967, Amended 1977 (CAA) 42 USC 7401 et seq.	The USEPA conducts a review and evaluation of the Draft and Final Environmental Impact Statement (EIS) for compliance with Section 309 of the CAA. The USEPA maintains oversight of the Alaska Department of Environmental Conservation's (ADEC's) implementation of the federal Prevention of Significant Deterioration (PSD) program through its state implementation plan.	Protect and enhance the quality of the nation's air resources by controlling emissions of USEPA-designated air pollutants by stationary and mobile sources.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
U.S. Environmental Protection Agency (USEPA)		
CWA of 1972, Amended 1977 33 USC 1251 et seq.	The USEPA issues a National Pollutant Discharge Elimination System (NPDES) Permit and Fact Sheet under Section 402, Federal Water Pollution Control Act of 1972, as amended (CWA) for discharges of pollutants, including oil and gas, from a point source into water of the United States. Section 402 – NPDES Water Discharge Permit. The USEPA may issue coverage under AK-33-0000 for discharges of excavation, dewatering, stormwater, hydrostatic testing, and domestic wastewater discharge from temporary camps, or an individual permit covering these discharges could be issued (see Appendix M). Section 311 – The USEPA provides a Federal On-Scene Coordinator responsible for direction and monitoring of spills. The USEPA also issues a spill prevention, control, and countermeasure (SPCC) plan for storage of more than 1,320 gallons in aggregate in aboveground tanks with capacity of 55 gallons or more. Section 404 – The USEPA reviews and comments on permit applications for compliance with Section 404(b)(1) guidelines and other statutes and authorities within their jurisdiction.	The purpose of the CWA is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. It prohibits the "discharge of toxic pollutants in toxic amounts" to navigable waters of the United States. Section 402 establishes guidelines for effluent discharges from point-sources to the waters of the United States and for the NPDES permitting program. Section 311 establishes procedures, methods and equipment, and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines. Section 404's purpose is to minimize impacts to waters of the United States (including wetlands) by regulating the discharge of dredged and/or fill material.
Comprehensive Environmental Response, Compensation and Liability Act and the Superfund Amendments and Reauthorization Act 42 USC 9601	The USEPA implements facility reporting requirements to state and federal agencies for releases of hazardous substances in excess of specified amounts.	Protect public health and the environment from risks posed by uncontrolled hazardous waste sites.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
U.S. Environmental Protection Agency (USEPA)		
Emergency Planning and Community Right-to-Know Act 42 USC 9601 40 CFR 255, 370, and 372	The USEPA implements facility reporting requirements to state and federal agencies for releases of hazardous substances in excess of specified amounts.	The prevention of an accidental release of an extremely hazardous substance from any facility and, in the event of a release, to provide a mechanism for emergency response through state and local emergency planning teams and emergency response plans.
Resource Conservation and Recovery Act of 1976 (RCRA) 42 USC 6901	The USEPA develops and implements regulatory programs to manage hazardous waste from generation until ultimate disposal, including issuing an identification number for any entity that generates hazardous wastes. Under the authority of RCRA, the USEPA also regulates underground storage tanks that store petroleum or certain chemical products.	The protection of human health and environment from the potential hazards of waste disposal, conservation of energy and natural resources, waste reduction, and environmentally sound waste management.
Safe Drinking Water Act (SDWA) 42 USC §§ 300f et seq.	The USEPA issues an Underground Injection Control (UIC) Class 1 Industrial Well permit for underground injection of Class 1 (industrial) waste materials.	The protection of the quality of public water supplies and all sources of drinking water. The UIC program (authorized by Part C of the SDWA) was established to provide safeguards so that injection wells do not endanger current and future underground sources of drinking water.
Toxic Substances Control Act 15 USC 2601	The USEPA develops and implements regulatory requirements for the testing of new and existing chemical substances and regulates the treatment, storage, and disposal of certain toxic substances.	The protection of human health and the environment from hazardous chemicals.
Executive Order 11514 – Protection and Enhancement of Environmental Quality	The USEPA reviews and evaluates the Draft and Final EIS for compliance with Council on Environmental Quality (CEQ) guidelines.	This Executive Order details the responsibilities of federal agencies and the CEQ in directing their policies, plans, and programs to meet national environmental goals.
U.S. Coast Guard (USCG)		
Rivers and Harbors Act of 1899 33 USC 403	The USCG approves construction of a bridge across navigable waters to ensure safe navigability of waterways.	Prevent unauthorized obstruction or alteration (dam, dike, or other structure) of any navigable waters of the United States.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
U.S. Department of Transportation (USDOT)		
Hazardous Materials Transportation Act 49 USC 1801-1819	Hazardous materials must be transported according to USDOT regulations.	The Secretary of Transportation must protect the nation adequately against risks to life and property that are inherent in the transportation of hazardous materials.
U.S. Fish and Wildlife Service (USFWS)		
Fish and Wildlife Coordination Act (FWCA) 16 USC 661 et seq.	The USFWS provides consultation on effects to fish and wildlife resources.	Ensure that fish and wildlife resources receive equal consideration to other project features.
FWCA of 1980 16 USC 2901	The USFWS consults with the state agency responsible for fish and wildlife resources to conserve or improve wildlife resources.	Conserve and promote conservation of non-game fish and wildlife species and their habitats.
Bald and Golden Eagle Protection Act 16 USC 668	The USFWS permits relocation of bald and golden eagle nests that interfere with resource development or recovery operations.	Protect bald eagle populations.
Marine Mammal Protection Act (MMPA) 16 USC 1361-1407	The USFWS issues a Letter of Authorization for incidental takes of marine mammals including polar bear and walrus.	Ensure that marine mammal populations are maintained at, or in some cases restored to, healthy population levels.
Migratory Bird Treaty Act 16 USC 703	The USFWS implements provisions of the Migratory Bird Protection Act.	Protect birds that have common migration patterns between the United States and Canada, Mexico, Japan, and Russia.
Endangered Species Act of 1973 (ESA) 16 USC 1531	The USFWS provides consultation on effects to threatened or endangered species.	Protect wildlife, fish, and plant species in danger of becoming extinct, and conserve the ecosystems on which endangered and threatened species depend.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

Federal		
Legal Authority	**Authorizations**	**Regulatory Intent**
National Oceanic and Atmospheric Administration (NOAA) Fisheries		
FWCA 16 USC 661 et seq.	NOAA Fisheries (formerly National Marine Fisheries Service) provides consultation regarding effects on fish and wildlife resources.	Ensure that fish and wildlife resources receive equal consideration to other project features.
Magnuson-Stevens Fishery Management and Conservation Act 16 USC 1801-1883	NOAA Fisheries provides consultation on the effects on Essential Fish Habitat. Essential Fish Habitat includes habitats necessary to a species for spawning, breeding, feeding, or growth to maturity.	Protect fish habitats and populations.
MMPA 16 USC 1361-1407	NOAA Fisheries provides consultation regarding effects on marine mammals. NOAA Fisheries issues Incidental Harassment Authorization under the MMPA for incidental takes of certain protected marine mammals (ringed seals, bowhead whales, etc.).	Ensure that marine mammal populations are maintained at, or in some cases restored to, healthy population levels.
The ESA of 1973 16 USC 1531	NOAA Fisheries provides consultation on effects to threatened or endangered species.	Protect certain species of marine mammals and fish in danger of becoming extinct, and conservation of the ecosystems on which endangered and threatened species depend.
State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Department of Environmental Conservation (ADEC)		
Oil Pollution Act of 1990 33 USC 2701-2761 AS 46.04.030 18 AAC 75	The ADEC reviews and approves the Oil Discharge Prevention and Contingency Plan (ODPCP) and the Certification of Financial Responsibility for storage or transport of oil.	Protect the environment from discharges of oil and assure financial responsibility in the event of a discharge.
CAA of 1967, Amended 1977 42 USC 7401 et seq. (CAA) 18 AAC 50.300(a) 18 AAC 50.020(a)	The ADEC issues an Air Quality Control permit to construct and to operate. The ADEC issues a Title V Operating permit and a PSD permit for air pollutant emissions under CAA Amendments (Title V).	Protect and enhance the quality of the nation's air resources by controlling emissions of USEPA-designated air pollutants by stationary and mobile sources.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Department of Environmental Conservation (ADEC)		
SDWA 42 USC §§ 300f et seq.	The ADEC reviews and approves all public water systems including plan review, monitoring program, and operator certification.	Protect drinking water.
Authorities, Water Quality Standards, and Wastewater Treatment AS 46.03.020, 050, 070, 100 and 720	The ADEC issues a Class I Well Wastewater permit for underground injection of non-domestic wastewater under AS 46.03.020.050, and 100.	Protect drinking water.
CWA of 1972, Amended 1977 33 USC 1251 et seq.	Section 401 – The ADEC can review the Storm Water Discharge Pollution Prevention Plans.	Establishes guidelines for effluent discharges from non-point sources to the waters of the United States and the NPDES permitting program.
	Section 404 – The ADEC issues a Certificate of Reasonable Assurance for Section 404 Permits.	Minimize impacts to waters of the United States (including wetlands) by regulating the discharge of dredged and/or fill material.
	Section 311 – The ADEC can review all SPCC plans.	Establishes procedures, methods and equipment, and other requirements for equipment to prevent the discharge of oil from non-transportation-related onshore and offshore facilities into or upon the navigable waters of the United States or adjoining shorelines.
CWA of 1972, Amended 1977 33 USC 1251 Drinking Water Standards 18 AAC 72	The ADEC provides approval for domestic wastewater collection, treatment, and disposal plans for domestic wastewaters. The ADEC provides approval for treatment and disposal plans for industrial wastewaters.	Regulation of discharges to protect water quality.
RCRA of 1976 42 USC 6901 18 AAC 60.430. – AS 46.03.005, 010	The ADEC reviews and approves solid waste processing and temporary storage facilities plan for handling and temporary storage of solid waste on state lands.	The protection of human health and environment from the potential hazards of waste disposal, conservation of energy and natural resources, waste reduction, and environmentally sound waste management.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Department of Environmental Conservation (ADEC)		
Oil & Hazardous Substance Pollution Control 18AAC 75	The ADEC reviews and approves any road stabilizing chemical or additive prior to its use. 18 AAC 75.055 establishes leak detection system requirements for crude oil transmission pipelines.	Protect the environment from any potentially hazardous materials being spread on the ground or in sensitive areas.
Alaska Department of Fish and Game (ADF&G)		
The Fish and Wildlife Conservation Act of 1980 16 USC 2901	The ADF&G consults with the USFWS about fish and wildlife resources to conserve or improve wildlife resources.	Conserve and promote conservation of non-game fish and wildlife species and their habitats.
The Fish and Wildlife Conservation Act of 1980 16 USC 661 et seq.	The ADF&G provides comments and recommendations to federal agencies pursuant to the FWCA.	Ensure that fish and wildlife resources receive equal consideration to other project features.
Alaska Department of Natural Resources (ADNR)		
Alaska Coastal Management Program (ACMP) Act of 1977 AS 46.40 6, 6AAC 50, 80, & 85 6AAC 50, 80, and 85 Coastal Zone Management Act (CZMA) of 1972, as amended in 1976 16 USC 1451 et seq.	The ADNR conducts a Coastal Zone Consistency review and issues determination of consistency of proposed development within the coastal zone.	Provide a balance through its guidelines and regulations for conservation of the coastal zone along with the development and use of natural resources.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Department of Environmental Conservation (ADEC)		
Alaska Historic Preservation Act AS 41.35.010 to .240 NHPA of 1966 16 U.S.C 470 et seq. 36 CFR 800 Sections 106 and 110 The Archeological Resources Protection Act of 1979 16 USC 470	Section 106 of the NHPA requires consultation with the Alaska State Historic Preservation Office (SHPO) and, when there are effects on cultural resources listed on or eligible for inclusion in the National Register of Historic Places (NRHP), with the President's Advisory Council on Historic Preservation. The SHPO issues a Field Archaeology Permit for archaeological fieldwork on state lands. The SHPO would also be consulted by the USACE. The ADNR issues a Cultural Resources Concurrence for developments that may affect historic or archaeological sites.	Protect cultural and archaeological resources to ensure consideration of the values of historic properties in carrying out federal activities and to make efforts to identify and mitigate impacts to significant historic properties. The Archeological Resources Protection Act secures the protection of archaeological resources and sites on public and Indian lands and encourages the exchange of information between involved individuals and entities.
Public Land Act Material Sales AS 38.05.110 Permits AS 38.05.850 Mining Sites Reclamation Plan Approvals AS 27.19	The ADNR issues a Material Sales Contract for mining and purchase of gravel from state lands. The ADNR issues Right-of-Way (ROW) and Land Use permits for use of state land, ice road construction on state land, and state waters. The ADNR approves mining reclamation plans on state, federal, municipal, and private land and water.	Manage use of Alaska's land and water resources.
Establishment of Drilling Units AS 31.05.100, AS 31.05.110	The ADNR establishes drilling units covering oil pools where leases are held by more than one operator.	Require unit plans of operation to maximize equitable returns to leaseholders and royalty recipients.
Right of Way (ROW) Leasing Act AS 38.35.020	The ADNR Joint Pipeline office issues pipeline ROW leases for pipeline construction and operation across state lands. The ADNR Commissioner signs the leases and the State Pipeline Coordinator manages the leases. The ADNR Division of Oil and Gas issues Lease Operation approvals for oil and gas development on state leases.	Manage use of Alaska's land and water resources.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Department of Environmental Conservation (ADEC)		
Water Use AS 46.15	The ADNR Division of Land, Mining and Water Management issues a Temporary Water Use Authorization for water use necessary for construction and operations. The ADNR issues a Water Rights Permit for appropriation of a significant amount of water on other than a temporary basis.	Manage use of Alaska's land and water resources.
Fishway Act AS 41.14.840	Requires that an individual or governmental agency notify and obtain authorization from the ADNR for activities within or across a stream used by fish if the ADNR determines that such uses or activities could represent an impediment to the efficient passage of fish.	Protect fish migration and spawning habitat.
Anadromous Fish Act AS 41.14.870	Requires that an individual or governmental agency notify and obtain authorization from ADNR "to construct a hydraulic project or use, divert, obstruct, pollute, or change the natural flow or bed" of a specified anadromous water body or "to use wheeled, tracked, or excavating equipment or log-dragging equipment in the bed" of a specified anadromous water body.	Protect fish migration and spawning habitat.
Alaska Oil and Gas Conservation Commission (AOGCC)		
Alaska Oil and Gas Conservation Act AS 31.05 and 20AAC 25	Drilling Permits: AOGCC regulates the drilling of wells on "all land in the state lawfully subject to its police powers, including land of the United States and land subject to the jurisdiction of the United States.	Regulate the drilling and production of oil and gas resources, prevent contamination of fresh water, protect correlative rights, and prevent waste.
20AAC 25.080	Disposal Permits: Regulates disposal of RCRA exempt wastes using annular disposal.	Ensure that waste is isolated and contained, and fresh water (if present) is not contaminated.
40 CFR 147.100 20AAC 25.252	Injection permits: AOGCC administers the Class II portion of the Underground Injection Control (UIC) program. Authorizes permits for disposal injection into Class II wells.	Ensure that injection wells are properly constructed and that injected fluids are contained within the intended subsurface formation.

TABLE 1.1.4-1 AUTHORITIES APPLYING TO THE PROPOSED ASDP AND ALTERNATIVES (COND'T)

State		
Legal Authority	**Permit**	**Regulatory Intent**
Alaska Oil and Gas Conservation Commission (AOGCC)		
20AAC 25.402-460	Issues permits for enhanced oil and gas recovery. In conjunction with the USEPA, AOGCC may exempt fresh water aquifers as needed for Class II wells.	
20AAC 25.280	Issues sundry notices to authorize work on existing wells. AOGCC requires reservoir or pool development plans, verifies the function of custody transfer metering systems, reviews and approves well work and well abandonment.	Maximize recovery and conservation of petroleum products.
North Slope Borough (NSB)		
Alaska Coastal Management Program (ACMP) Act of 1977 AS 46.40	The North Slope Borough has a coastal management plan and participates in ACMP consistency reviews for projects located inside the coastal district. The NSB participates in ACMP consistency reviews for projects located outside the coastal district if the project may have direct and significant impacts on the coastal zone or resources.	The NSB involvement in the ACMP provides the opportunity to address uses sensitive to development and issues of local concern, accessing traditional and contemporary local knowledge in order to achieve a balance in conservation of the coastal zone and the development and use of natural resources.
NSB Land Management Regulations (NSBMC §§ 19.10.010 – 19.70.060	The NSB requires compliance with its zoning and permitting ordinances and issues permits for development, uses, and activities on land within the NSB.	The NSB regulates land uses and activities within the borough to provide for the protection of the health, safety, and welfare of NSB residents and to ensure compliance with environmental policies of local concern.

1.2 BACKGROUND

1.2.1 State and Arctic Slope Regional Corporation (ASRC) Leases

The State of Alaska and ASRC administer existing leases in the Plan Area. The leased lands are in or just west of the Colville River Delta and lie east of BLM-managed lands in the National Petroleum Reserve-Alaska. State lands in the Colville River Delta were first leased in 1964 under Sale 13. The Alaska Department of Natural Resources (ADNR) has continued to hold lease sales in the Colville River Delta: Sale 23 in 1969, Sale 43A in 1984, Sale 54 in 1987, Sale 75 in 1992, and Sale 75A in 1993. The state has prepared "best interest findings" for sales since 1979. Before holding a state oil and gas lease sale, the ADNR Division of Oil and Gas is required to determine whether the sale serves the best interest of the state. In making this determination, the state solicits input from agencies and the public. For areawide sales, the ADNR prepares one best interest finding, which remains in effect for 10 years and offers all available acreage each year for the life of the finding. If substantial new information becomes available, the ADNR issues supplements to the finding. In 1998, the ADNR prepared an areawide best interest finding for the NSB. The Colville River Delta falls within the North Slope Areawide Sale boundaries and will be offered each year through 2008.

The Arctic Slope Regional Corporation (ASRC) is the subsurface land owner, and Kuukpik Corporation holds the surface estate to Native-owned lands resulting from ANCSA. ASRC also shares some subsurface estate with the State of Alaska in the Colville River Delta. The percent interest varies by lease. ASRC administers leases that existed at the time they became the subsurface owner of lands that were previously federally owned. ASRC has also sold additional leases for its subsurface estate acquired under ANCSA.

1.2.2 Northeast National Petroleum Reserve-Alaska IAP/EIS and BLM Leases

The BLM initiated the Northeast National Petroleum Reserve-Alaska Integrated Activity Plan (IAP)/EIS in 1997 to determine the appropriate multiple-use management of the 4.6-million-acre Northeast Planning Area of the National Petroleum Reserve-Alaska, consistent with existing statutory direction for its management. All BLM-managed lands in the Plan Area were encompassed in the Northeast Planning Area. The agency's Record of Decision (ROD) for the IAP/EIS (BLM and Minerals Management Service [MMS] 1998b) authorized leasing and provides management direction for oil and gas development on federal land in the Plan Area.

The BLM conducted lease sales in the Northeast National Petroleum Reserve-Alaska in May 1999 and June 2002. The 1999 lease sale resulted in the sale of 133 tracts for $104.6 million. The BLM sold 60 tracts for $63.8 million at the 2002 lease sale. Leases for 82 of the 110 tracts in the Plan Area were sold in 1999 for a total of nearly $71 million, and 10 tracts in the Plan Area were sold in 2002 for $1.8 million. Of the leased tracts in the Plan Area, CPAI is the sole or leading leaseholder in 75 leases; Anadarko is the sole owner of four of the remaining 17 leases in the Plan Area. Chevron USA, Inc., and ConocoPhillips Company (a company distinct from, but affiliated with, CPAI) jointly hold 13 leases in the Plan Area. Eighteen tracts in the Plan Area have not been leased.

The ROD for the ASDP EIS may authorize modifications or exceptions to the requirements of the Northeast National Petroleum Reserve-Alaska IAP/EIS. These modifications or exceptions will be limited to those necessary for the development authorized by the BLM following completion of this EIS and will not constitute a general amendment of the IAP/EIS. An amendment of the IAP/EIS is currently being evaluated by the BLM through the preparation of a separate EIS that will be completed subsequent to the ROD for this EIS. For more discussion of this amendment now under consideration, see Section 4G.4.6.

1.2.3 Future Potential Kuukpik Corporation/ASRC Conveyance in National Petroleum Reserve-Alaska

In accordance with ANCSA provisions, Kuukpik Corporation is entitled to select and receive title to approximately 22,000 acres of federal land. Kuukpik Corporation will receive the surface estate to its lands,

and, under the terms of ANCSA, ASRC will receive the subsurface estate. All available federal land in Kuukpik Corporation's entitlement area is within the National Petroleum Reserve-Alaska and the Plan Area, and all of this federal land subject to Kuukpik selection was leased in 1999. Following Kuukpik Corporation's selection, the BLM will convey to the corporation all valid selections up to the amount of the corporation's entitlement. These conveyances include lands upon which currently proposed or future proposed oil and gas development may occur. Once the lands are conveyed, the BLM may transfer lease administration to ASRC for any leases that are completely encompassed by the conveyance "unless there is a finding by the Secretary that the interest of the United States requires continuation of the administration by the United States" (43 CFR 2650.4-3). The BLM will retain jurisdiction for leases that are only partially conveyed. ASRC would become the successor in interest to any and all interests of the United States for any leases that it assumes as a consequence of a conveyance of the underlying estate under ANCSA.

1.2.4 Oil Exploration and Development in the Plan Area

Before the 1923 establishment of the Naval Petroleum Reserve-4 (NPR-4), the predecessor of the National Petroleum Reserve-Alaska, private firms staked approximately 117 claims in the reserve. None were in the Plan Area, though several claims were staked not far to the west along the south shore of Teshekpuk Lake. No records exist of any exploration of these claims (BLM and MMS 1998a).

Encouraged by oil seeps in the region, the U.S. Navy began oil and gas exploration in the reserve in 1944 and continued this work until 1952 (King 1994). The Navy began another drilling program in the National Petroleum Reserve-Alaska in 1975, and the Department of the Interior (DOI) continued this program through the U.S. Geological Survey (USGS) after administration of the reserve was transferred to its authority in 1976. The DOI continued this drilling program until 1982. In the Plan Area, the Navy drilled one well northwest of the confluence of Fish and Judy Creeks, and the DOI drilled four sites, including one near the Navy well and three close to the Beaufort Sea coast or the south bank of Kogru River (BLM and MMS 1998a).

In the early 1980s, in the wake of completion of the TAPS and the development of Prudhoe Bay and other North Slope oilfields, the BLM sold leases in the National Petroleum Reserve-Alaska. Private oil firms conducted extensive seismic exploration of the National Petroleum Reserve-Alaska and drilled some exploratory wells on leases they purchased in these sales. None of the wells were drilled in the Plan Area, and all of these leases expired without development.

The first commercial discovery of oil in the Plan Area was the Alpine field in the Colville River Delta. Atlantic Richfield Company (ARCO) and its partners discovered the field in the winter of 1994–1995 (Alaska Report 1996), and subsequent appraisal drilling confirmed its original oil in place (OOIP) reserve potential of 365 million barrels (Alaska Report 1997). The field is currently estimated to contain 429 million barrels (OOIP). Alpine is the largest field discovered in Alaska since the discovery of the Point McIntyre field in 1988 and one of the largest fields discovered in the United States in recent decades. The Alpine infrastructure built by ARCO, a predecessor of CPAI, is composed of two drilling pads: CD-1 and CD-2. CD-1 contains the APF as well as production wells. CD-2 is a production pad. A road and pipeline link the two pads. Both CD-1 and CD-2 are accessed by air, with a landing strip that was constructed as a wider portion of the road connecting the two pads. They may also be accessed in the winter by ice road. In November 2000, Phillips Alaska, Inc., (successor to ARCO Alaska, Inc., and predecessor to CPAI) began production at Alpine, which is the westernmost producing oilfield on Alaska's North Slope.

In November 2000, Phillips Alaska, Inc., began the process to permit two satellite oil and gas accumulations near Alpine in the Colville River Unit (CRU): CD-3 (called CD North during exploration) and CD-4 (formerly CD South). On May 21, 2001, Phillips announced several discoveries of oil and gas accumulations on its leases in the Northeast National Petroleum Reserve-Alaska Plan Area. Subsequently, the USACE, which had initiated evaluation of CPAI's permit applications for CD-3 and CD-4, and the BLM determined to cooperate to evaluate the proposed development in the National Petroleum Reserve-Alaska and in the Colville River Delta through the current ASDP EIS.

1.3 TIERING

This EIS has been prepared in accordance with regulations and guidance of the CEQ (40 CFR 1500-1508). Subsection 1502.20 encourages lead agencies to "tier off their environmental impact statements to eliminate repetitive discussions of the same issues and to focus on the actual issues ripe for decision at each level of environmental review." The BLM has followed that approach in this EIS by tiering off the Northeast National Petroleum Reserve-Alaska IAP/EIS and other BLM EIS documents mentioned in this EIS. Relevant text from these documents is summarized and incorporated by reference where appropriate.

1.4 ISSUES

The BLM and the cooperating agencies have sought to define the issues in the Plan Area through public participation and discussions with tribes (the Native Village of Nuiqsut, the Native Village of Barrow, and the Inupiat Community of the Arctic Slope [ICAS]), the NSB, the local government of Nuiqsut, and other federal agencies. (The BLM's consultation and coordination efforts are further described in Section 5 of this EIS.) In this public scoping process, input was received from residents of the NSB, Anchorage, and Fairbanks; interested individuals from throughout the nation; businesses with an interest in oil and gas development; and individuals and groups with an interest in the environment.

The BLM and cooperating agencies have reviewed concerns and questions raised during the scoping process. Responsive solutions to many of those concerns and questions were integrated into elements of the alternatives developed for consideration in this EIS. The major issues and concerns raised during scoping generally fall into the categories below:

- **Adherence to Stipulations Identified in the Northeast National Petroleum Reserve-Alaska IAP/EIS.** Many commenters stated that the restrictions and protections (stipulations) issued with the IAP/EIS were necessary for protecting the environment and urged that the proposed and future developments in the Plan Area adhere to the stipulations without exception.

- **Oil and Gas Development in National Petroleum Reserve-Alaska.** The development covered in this EIS is the first proposed by industry in the National Petroleum Reserve-Alaska. Proponents of oil and gas development note that the National Petroleum Reserve-Alaska was set aside for oil and gas development. They cite the need for new reserves on the North Slope and increased U.S. production. Many proponents support site-specific exceptions to stipulations to allow development of additional oil reserves.

- **Impacts to Local Residents and Traditional Subsistence-Use Areas.** CPAI's proposed action and the broader FFD would represent the westernmost oil and gas development on the North Slope. Development in this area would be close to the community of Nuiqsut and within traditional subsistence-use areas. There is a concern that a "balance between the benefits of development and the costs to the environment and people" be maintained. Nuiqsut residents in particular expressed concern that traditional lifestyles may be changed by impacts to traditional subsistence-use areas and lifestyle changes brought about by employment opportunities within and outside of the community.

- **Colville River Delta Resources.** The Colville River Delta is the largest river delta on Alaska's North Slope and is largely covered by wetlands. It is important to NSB residents for subsistence hunting and fishing and is recognized for its significance during critical life stages of waterbirds. The area is considered to have high potential for oil and gas resources and requires special consideration during design, construction, operation, and maintenance of oil and gas facilities.

- **Full-Field Development Analysis within the Plan Area.** Issues regarding expanding oil and gas development in the Plan Area ranged from appreciation that the BLM was looking at the impacts throughout the Plan Area to caution when looking at foreseeable future development outside of the applicant's proposal.

- **Environmental Quality.** Concerns include air and water quality, oil-spill prevention and response, effects of activities and development structures on fish and wildlife and their habitat (including some habitat identified in Special Areas under ANILCA), and the effect of contaminants on fish, wildlife, and people. It is also a concern that impacts on environmental quality may have subsequent long-term impacts to local residents.