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Table II-01
Land Management Designations:
Potential Wilderness/Special Areas and Wild and Scenic Rivers

Issue/Action	No Action	Alternative A	Alternative B	Alternative C	Preferred Alternative
Potential Wilderness Study Area (WSA) or Special Area Designation	No WSA or Special Area designations proposed	No WSA or Special Area designations proposed	Kasegaluk Lagoon area proposed for Special Area designation	Kasegaluk Lagoon, Foothills, and Mountain areas proposed for WSA designation	Kasegaluk Lagoon area proposed for Special Area designation
Wild and Scenic Rivers (WSR)	No WSR's recommended	No WSR's recommended	No WSR's recommended	Colville River recommended for wild WSR designation; 21 streams recommended for scenic WSR designation: Alataktok, Alaktak, Avak, Avalik, Chipp, Inaru, Ivisaruk, Kaolak, Ketik, Kigalik, Kuk, Kungok, Meade, Nokotlek, Ongorakvik, Oumalik, Titaluk, Topagoruk, and Tunalik, Usuktuk Rivers, and Maybe Creek	No WSR's recommended

Note:
Portions of the existing Teshekpuk Lake and Colville River Special Areas are in the Planning Area. Their designations are not altered in any alternative.

WSA = Wilderness Study Area.

WSR = Wild and Scenic Rivers.

Table II-01
Land Management Designations (continued)
Visual Resource Management

Issue/Action	No Action	Alternative A	Alternative B	Alternative C	Preferred Alternative
Visual Resource Management (VRM) Designations **(See Maps 21-24 for depictions of VRM units for Alternatives A through C)**	None	For an area up to ½ mile from rivers and estuarine areas: VRM II: Colville River VRM III: estuarine and 21 rivers* VRM IV: rest of Planning Area	For an area up to 1 mile from rivers and estuarine areas: VRM II: Avak, Colville, Nokotkek, Ongoravik, and Tunalik Rivers, estuarine area, and Kasegaluk Lagoon Special Area VRM III: 17 Rivers* VRM III-IV: rest of Planning Area	For an area up to 5 miles from rivers and estuarine areas: VRM I: Colville River; and the 3 proposed wilderness areas VRM II: other WSR corridors and estuarine area VRM III: rest of Planning Area	For an area up to 3 miles from rivers and estuarine areas: VRM I: Colville River VRM III: estuarine and 21 rivers* VRM IV: rest of Planning Area

Notes:
Visual Resource Management classes are described in Appendix 3. The extent of VRM objective classes from the rivers and estuarine areas would be less than the above distances where land features limit the viewshed.

VRM **=** Visual Resource Management.

*Rivers are those recommended for scenic WSR status under Alternative C but not recommended for scenic status under Alternative B.

Table II-01
Land Management Designations (continued)
Travel Management

Issue/Action	No Action	Alternative A	Alternative B	Alternative C	Preferred Alternative
1. Off Highway Vehicle (OHV) Designations	The Planning Area would remain Undesignated.	Designated Open to all OHV use throughout the Planning Area.	Designated Limited: a. winter use by snowmachines and other low-ground-pressure vehicles; and	Designated Limited: a. winter use by snowmachines and other low-ground-pressure vehicles (closed to summer use); and	Designated Limited: a. winter use by snowmachines and other low-ground-pressure vehicles; and
			b. summer use of OHV's with ground pressure ≤ 2.2 psi on designated trails only (none in the Kasegaluk Lagoon Special Area).	b. no summer recreational use of motorized vehicles.	b. no summer recreational use of motorized vehicles.
2. Subsistence and Authorized Uses	No restrictions on subsistence use; specific authorizations may stipulate use.	No restrictions on subsistence use; specific authorizations may stipulate use.	Airboat use in summer would be limited to streams, lakes, and estuaries that are seasonally accessible by motorboats; airboat use would be prohibited in seasonally flooded tundra and shallow waters with vegetation adjacent to streams, lakes, and estuaries. Specific authorizations may further stipulate use of airboats and OHV's.	Airboat use in summer would be limited to streams, lakes, and estuaries that are seasonally accessible by motorboats; airboat use would be prohibited in seasonally flooded tundra and shallow waters with wetland vegetation adjacent to streams, lakes, and estuaries. Specific authorizations may further stipulate use of airboats and OHV's.	Airboat use in summer would be limited to streams, lakes, and estuaries that are seasonally accessible by motorboats; airboat use would be prohibited in seasonally flooded tundra and shallow waters with wetland vegetation adjacent to streams, lakes, and estuaries. Specific authorizations may further stipulate use of airboats and OHV's.

Note:
With the exception of airboats, the above restrictions do not apply to boats.
OHV = **Off Highway Vehicle(s)**

Table II-01
Land Management Designations (continued)
Lands Available for Oil and Gas Leasing; Fire Management

Issue/Action	No Action	Alternative A	Alternative B	Alternative C	Preferred Alternative
Lands Available for Oil &Gas (O&G) Leasing	None	All federal oil and gas resources in the Planning Area: 100% of BLM subsurface; 100% of high oil and gas potential BLM subsurface.	All federal oil and gas resources in the Planning Area except the Kasegaluk Lagoon Special Area: 96% of BLM subsurface; 100% of high oil and gas potential BLM subsurface.	All federal oil and gas resources in the Planning Area, except in areas associated with important surface resources or under non-federal surface lands: 47% of BLM subsurface <2% of high oil and gas potential BLM subsurface.	All federal oil and gas resources in the Planning Area: 100% of BLM subsurface; 100% of high oil and gas potential BLM subsurface. Leasing would be deferred for 10 years on the 17% of lands that are located in the western part of the Planning Area.
Fire Management (See Appendix 6 for Fire Management Constraints)	None	No constraints. BLM may use management-ignited fires to improve vegetation conditions for specific resources.	No constraints. BLM may use management-ignited fires to improve vegetation conditions for specific resources.	No constraints. BLM may use management-ignited fires to improve vegetation conditions for specific resources.	No constraints. BLM may use management-ignited fires to improve vegetation conditions for specific resources.

Note:
O&G = Oil and Gas

Table II-02
Stipulations and Required Operating Procedures (ROP's)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
A. Waste Prevention, Handling, and Disposal and Spills	**Stipulation A-1.** For oil- and gas-related activities, a Hazardous-Materials Emergency-Contingency Plan shall be prepared and implemented before transportation, storage, or use of fuel. The plan shall include a set of procedures to ensure prompt response, notification, and cleanup in the event of a hazardous substance spill or threat of a release. Sufficient oil-spill-cleanup materials (absorbents, containment devices, etc.) shall be stored at all fueling points and vehicle-maintenance areas and shall be carried by field crews on all overland moves, seismic work trains, and similar overland moves by heavy equipment. Procedures applicable to fuel handling (associated with transportation vehicles) may consist of Best Management Practices if approved by the AO. The plan shall include a list of resources available for response (e.g., heavy-equipment operators, spill-cleanup materials or companies), and names and phone numbers of Federal, State, and NSB contacts. Other Federal and State regulations may apply and require additional planning requirements. All staff shall be instructed regarding these procedures.			**A-3** **A-4(a)**
	Stipulation A-2. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO, whether in excess of 660 gallons in a single tank or in excess of 1,320 gallons in multiple containers, shall be stored within an impermeable lined and diked area capable of containing 110 percent of the stored volume. The liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills. The storage area shall be located at least 100 ft from the active flood plain of any non-fish bearing waterbody and 500 ft from the active floodplain of any fish-bearing waterbody, with the exception of small caches (up to 210 gallons) for motor boats, float planes, ski planes and small equipment.		**Stipulation A-2.** Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO—whether in excess of 660 gallons in a single tank or in excess of 1,320 gallons in multiple containers—shall be stored within an impermeable lined and diked area capable of containing 110 percent of the stored volume. The liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period. Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills. The storage area shall be located at least 500 ft from the active flood plain of any waterbody, with the exception of small caches (up to 210 gallons) for motorboats, float planes, and ski planes.	**A-4 (b)** **(c)** **(d)** **E-2**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
A. Waste Prevention, Handling, and Disposal and Spills (continued)	**Stipulation A-3.** Refueling of equipment within 500 ft of the active flood plain of any fish-bearing waterbody and 100 ft from non-fish-bearing waterbodies is prohibited. The BLM acknowledges that exceptions are commonly warranted for refueling motorboats, float planes, ski planes, small generators, water pumps, and other light equipment used in conjunction with temporary activities.		**Stipulation A-3.** Refueling of equipment within 500 ft of the active flood plain of any waterbody is prohibited, with the exception of refueling motorboats, float planes, ski planes, small generators, water pumps, and other light equipment used in conjunction with temporary activities.	**A-5**
	ROP A-1. Attracting wildlife to food and garbage is prohibited. All feasible precautions shall be taken to avoid attracting wildlife to food and garbage. A current list of approved precautions, specific to type of permitted use, can be obtained from the AO. Lessees and permitted users shall have a written procedure to ensure that the handling and disposal of putrescible waste will be accomplished in a manner to prevent the attraction of wildlife.			**A-2 (a)**
	ROP A-2. Burial of garbage is prohibited. All putrescible waste shall be incinerated or composted in a manner approved by the AO. All solid waste, including incinerator ash, shall be removed from BLM lands and disposed of in an approved waste-disposal facility in accordance with U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) regulations and procedures. Burial of human waste is prohibited except as authorized by the AO.			**A-2 (b)**
	ROP A-3. Except as specifically provided, all pumpable solid, liquid, and sludge waste shall be disposed of by injection in accordance with EPA, ADEC, and the Alaska Oil and Gas Conservation Commission regulations and procedures. On-pad temporary muds and cuttings storage will be allowed as necessary to facilitate annular injection and/or backhaul operations.			**A-2 (c)**
	ROP A-4. Wastewater disposal: a. Unless authorized by the National Pollution Discharge Elimination System (NPDES) or State permit, disposal of domestic wastewater into bodies of fresh, estuarine, and marine water, including wetlands, is prohibited. b. Surface discharge of reserve-pit fluids is prohibited unless authorized by applicable NPDES, ADEC, and NSB permits and approved by the AO. c. Disposal of produced waters in upland areas, including wetlands, will be by subsurface-disposal techniques. The AO may permit alternate disposal methods if the lessee demonstrates that subsurface disposal is not feasible or prudent. d. Discharge of produced waters into open or ice-covered marine waters less than 33 ft (10 m) is prohibited. The AO may approve discharges into waters greater than 33 ft (10 m) deep based on a case-by-case review of environmental factors and consistency with the conditions of an NPDES permit. Alternate disposal methods will require an NPDES permit certified by the State.			**A-2 (d)** **A-6** **A-7**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
A. Waste Prevention, Handling, and Disposal and Spills (continued)	**ROP A-5.** Areas of operation shall be left clean of all debris.			**A-1**
	ROP A-6. Operators shall prevent migration of fuel or chemicals from storage areas to the environment. Notice of any reportable spill (as required by 40 CFR 300.125 and 18 AAC 75.300) shall be given to the AO as soon as possible, but no later than 24 hours after occurrence. Other Federal, State, and NSB entities shall be notified as required by law. All spills shall be cleaned up immediately and to the satisfaction of the AO and all agencies with regulatory authority over spills, including the EPA, ADEC, and the U.S. Coast Guard.			**A-4(f)**
	ROP A-7. Before production and as required by law, lessees shall develop spill prevention and response contingency plans.			**A-4**
	ROP A-8. All fuel containers, including barrels and propane tanks, shall be marked with the responsible party's name, product type, and year filled or purchased.			**A-4(e)**
B. Ice Roads and Water Use	**Stipulation B-1.** Water withdrawal is not allowed during winter from lakes less than 7 ft (2.1 m) deep unless the water body lacks a connection with, and is not subject to, seasonal flooding by a fish-bearing stream. The AO may authorize water withdrawals from any lakes, creeks, or rivers if the proponent demonstrates that the location and volume of water withdrawal does not endanger resident fish populations.		**Stipulation B-1.** Water withdrawal from rivers and streams during winter is prohibited. Water withdrawal is limited to 15% of the under-ice water volume in any fish-bearing lake. After consultation with the appropriate Federal, State, and NSB regulatory and resource agencies, the AO may authorize withdrawals from any lake if the proponent demonstrates that no fish exist in the lake.	**B-1** **B-2(a)-(f)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
B. Ice Roads and Water Use (continued)			A water-monitoring plan will be required to assess drawdown and water quality changes before, during, and after pumping any fish-bearing lakes. Ice chips may be removed from lakes and shallow rivers that the proponent demonstrates are not fish bearing and where the ice is grounded.	
			Stipulation B-2. Compaction of snow cover or snow removal from fish-bearing waterbodies shall be prohibited except at approved ice-road crossings and water pumping stations on lakes.	**B-2(h)**
C. Overland Moves and Seismic Work	**Stipulation C-1.** The following restrictions apply to overland moves, seismic work, and any similar use of heavy equipment (other than actual excavations as part of construction) on non-roaded surfaces during the winter season: **a.** Operators shall consult with the Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NOAA Fisheries, formerly NMFS) before initiating activities in coastal habitat between October 30 and April 15. Activities are prohibited within 1 mile of known or observed polar bear dens. **b.** Ground operations are to begin only after frost and snow cover have reached sufficient depths to meet the tundra protection objectives of minimizing compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Ground operations shall cease when the spring melt of snow begins, approximately May 5 in the foothills area where elevations exceed 300 ft and approximately May 15 in the northern coastal areas. The exact dates will be determined by the AO.			**C-1(b)** **C-2(a)**
	ROP C-1. The following restrictions apply to overland moves, seismic work, and any similar use of heavy equipment (other than actual excavations as part of construction) on non-roaded surfaces during the winter season: a. Snow bridges shall be removed or breached immediately after use or before spring breakup. Ramps and bridges shall be substantially free of soil and/or debris. b. To avoid additional freeze down of deep-water pools harboring over-wintering fish, waterways shall be crossed at shallow riffles from point bar to point bar whenever possible.			**C-3** **C-4**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
C. Overland Moves and Seismic Work (continued)	c. On-the-ground activities shall use low-ground-pressure vehicles such as Rolligons, ARDCO, Trackmaster, Nodwell, or similar types of vehicles. A current list of approved vehicles can be obtained from the AO. Limited use of tractors equipped with wide tracks or "shoes" will be allowed to pull trailers. d. To reduce the possibility of ruts, vehicles shall avoid using the same trails for multiple trips unless necessitated by serious safety or superseding environmental concern. This provision does not apply to ice roads or hardened snow trails for use by Rolligons. e. Bulldozing of tundra, trails, or seismic lines is prohibited. Clearing of drifted snow along a trail, seismic line, or in a camp is allowed to the extent that the tundra mat is not disturbed.			**C-2(b)-(e)**
	f. Motorized ground-vehicle use will be minimized within 1 mile of any raptor nest from April 15 through August 15, with the exception that use will be minimized near gyrfalcon nests beginning March 15. Such use may be prohibited within ½ mile of active raptor nests. g. Refueling of equipment, when practical, should occur at least 500 ft from fish bearing waterbodies and 100 ft from other waterbodies.		**Stipulation C-2.** The following restrictions apply to overland moves, seismic work, and any similar use of heavy equipment (other than actual excavations as part of construction) on non-roaded surfaces during the winter season: a. Motorized ground-vehicle use will be minimized within 1 mile of any raptor nest from April 15 through August 15, with the exception that use will be minimized near gyrfalcon nests beginning March 15. Such use will be prohibited within ½ mile of known raptor-nesting sites. b. Refueling of equipment is prohibited within the active floodplain of any waterbody.	**(Note: C-2a removed from the Preferred Alternative--not relevant to winter operations**) **A-5**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
D. Oil and Gas Exploratory Drilling	**Stipulation D-1.** Exploratory drilling in shallow lakes, streams, lake beds and the active floodplain will only be approved if the applicant can demonstrate to the satisfaction of the AO that impacts to fish, wildlife, vegetation, and the hydrologic condition are minimal.		**Stipulation D-1.** Exploratory drilling in river, stream, and lakebeds, as determined by the active floodplain, is prohibited. In addition, exploratory drilling is not allowed within ¼ mile of any fish-bearing deep lake as determined to be in lake zone III, i.e., depth greater than 4 m (Mellor 1985) as shown in Map 20. If the fish-bearing status of the waterbody is unknown, the burden is on the lessee to demonstrate whether fish are absent.	**D-1**
			Stipulation D-2. Permanent facilities such as airstrips and roads shall not be constructed during the exploration phase of oil and gas development.	**D-2**
E. Facility Design and Construction		**Stipulation E-1.** The following subsistence, wildlife habitat, cultural/paleontological, and traditional/cultural land use areas are of significant concern to resource managers and local communities. (Resources of concern are listed in parentheses on the following pages.) Should significant resources occur within these land use areas based on site specific investigation, additional design features or mitigation developed through site/project specific NEPA analysis will be required to minimize impacts. As listed on the following pages, setbacks include the bed of waterbodies and are measured from the active floodplain.	**Stipulation E-1.** Permanent oil and gas facilities, including roads, airstrips, and pipelines are prohibited within and adjacent to the waterbodies and within the prescribed distances from other resources listed below (see Map 84) at the distances identified to protect fish and raptor habitat, cultural and paleontological resources, and subsistence and other resource values. (Resources of concern are listed in parentheses on the following pages.) Setbacks include the bed of the waterbody and are measured from the active floodplain. On a case-by-case basis, and in consultation with appropriate Federal, State, and NSB regulatory and	**K-1 as noted below**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)		**Stipulation E-1.** (continued) a. Ikpikpuk River: extending from the mouth south through the raptor nesting area extending from section 13, T7N., R12W. UM, to T2N., R 12W., UM where up to a 1-mile setback may be required (fish, raptors, subsistence, cultural, and paleontological resources). b. Alaktak River: up to ½-mile setbacks extending from the mouth to the Ikpikpuk River (fish and subsistence resources). c. Chipp River: up to ½-mile setbacks extending from the mouth to the Ikpikpuk River (fish and subsistence resources). d. Oumalik River: up to ½-mile setbacks downstream from section 11, T5N., R15W.,UM (fish and subsistence resources). e. Titaluk River: up to ½-mile setbacks downstream from section 30, T2N., R16W.,UM (fish and subsistence resources). f. Kigalik River: up to ½-mile setbacks (riparian, cultural, and paleontological resources). g. Maybe Creek: up to ½-mile setbacks (riparian, cultural, and paleontological resources). h. Topagoruk River: up to ½-mile setbacks downstream from the confluence with Ishuktak Creek (fish and subsistence resources).	**Stipulation E-1.** (continued) resource agencies, essential pipeline and road crossings will be permitted through setback areas in those instances where no other suitable sites are available. Stream crossings will be sited perpendicular to the main channel flow; lake crossings will be at the narrowest point. Road crossings are prohibited in the setback area adjacent to the Colville River (see items below). a. Ikpikpuk River: a 1/2-mile setback from the bank of the Ikpikpuk River extending from the mouth south to the Raptor nesting area extending from section 13, T7N., R12W. UM, to T2N., R 12W., UM where a 1-mile setback is required (fish, raptors, subsistence, cultural, and paleontological resources). b. Alaktak River: a ½-mile setback from each bank of the Alaktak River extending from the mouth to the Ikpikpuk River (fish and subsistence resources). c. Chipp River: a ½-mile setback from each bank of the Chipp River extending from the mouth to the Ikpikpuk River (fish and subsistence resources). d. Oumalik River: a ½-mile setback from each bank of the Oumalik River downstream from section 11, T5N., R15W.,UM (fish and subsistence resources).	**K-1(b)** **K-1(c)** **K-1(d)** **K-1(e)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)		**Stipulation E-1.** (continued) i. Meade River: up to ½-mile setbacks downstream from section 7, T2N., R23W.,UM (fish, subsistence, cultural and paleontological resources). j. Inaru River: up to ½-mile setbacks downstream from the confluence with Kucheak Creek (fish and subsistence resources). k. Kugrua River: up to ½-mile setbacks downstream from section 18, T15N., R27W.,UM (fish and subsistence resources). l. Kuk River: up to ½-mile setbacks (fish, subsistence, cultural and paleontological resources). m. Alataktok River: up to ½-mile setbacks downstream from section 3, T5N., R16W.,UM (fish and subsistence resources). n. Ivisaruk River: up to ½-mile setbacks downstream from section 24, T10N., R34W.,UM (fish and subsistence resources). o. Kaolak River: up to ½-mile setbacks downstream from section 35, T9N., R31W.,UM (fish and subsistence resources). p. Ketik River: up to ½-mile setbacks downstream from section 32, T9N., R31W.,UM (fish and subsistence resources).	**Stipulation E-1.** (continued) e. Titaluk River: a ½-mile setback from each bank of the Titaluk River downstream from section 30, T2N., R16W.,UM (fish and subsistence resources). f. Kigalik River: a ½-mile setback from each bank of the Kigalik River (riparian, cultural, and paleontological resources). g. Maybe Creek: a ½-mile setback from each bank of the Maybe (riparian, cultural and paleontological resources) h. Topagoruk River: a ½-mile setback from each bank of the Topagoruk River downstream from the confluence with Ishuktak Creek (fish and subsistence resources). i. Meade River: a ½-mile setback from each bank of the Meade River downstream from section 7, T2N., R23W.,UM (fish, subsistence, cultural and paleontological resources). j. Inaru River: a ½-mile setback from each bank of the Inaru River downstream from the confluence with Kucheak Creek (fish and subsistence resources).	**K-1(f)** **K-1(g)** **K-1(h)** **K-1(i)** **K-1(k)** **K-1(o)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)		**Stipulation E-1.** (continued) q. Avalik River: up to ½-mile setbacks downstream from section 31, T9N., R28W.,UM (fish and subsistence resources). r. Kungok River: up to ½-mile setbacks downstream from section 35, T9N., R31W.,UM (fish and subsistence resources). s. Colville River: up to 2-mile setbacks from the northern bluff (or bank if there is no bluff) of the Colville River extending the length of that portion of the river within the Planning Area and identified as raptor nesting and foraging habitat. (raptor, fish, riparian, paleontological, subsistence, scenic, and recreational resources). t. Deep-water lakes: up to ½-mile setbacks around any fish-bearing deep lake as determined to be in lake zone III, i.e., depth > 4m (Mellor 1985). If the fish-bearing status of the waterbody is unknown, the burden would be on the lessee to demonstrate whether fish are present (fish and subsistence resources). u. Waterfowl nesting and brood-rearing areas: up to ½-mile setbacks from identified nesting colonies, nest sites, brood rearing areas, or molting areas (waterfowl habitat).	**Stipulation E-1.** (continued) k. Kugrua River: a ½-mile setback from each bank of the Kugrua River downstream from section 18, T15N., R27W.,UM (fish and subsistence resources). l. Kuk River: a ½-mile setback from each bank of the Kuk River (fish, subsistence, cultural and paleontological resources). m. Alataktok River: a ½-mile setback from each bank of the Alataktok River downstream from section 3, T5N., R16W.,UM (fish and subsistence resources). n. Ivisaruk River: a ½-mile setback from each bank of the Ivisaruk River downstream from section 24, T10N., R34W.,UM (fish and subsistence resources). o. Kaolak River: a ½-mile setback from each bank of the Kaolak River downstream from section 35, T9N., R31W.,UM (fish and subsistence resources). p. Ketik River: a ½-mile setback from each bank of the Ketik River downstream from section 32, T9N., R31W.,UM (fish and subsistence resources). q. Avalik River: a ½-mile setback from each bank of the Avalik River downstream from section 31, T9N., R28W.,UM (fish and subsistence resources) .	**in deferral area (IDA)** **IDA** **IDA** **IDA** **IDA** **IDA** **K-1(q)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)		**Stipulation E-1.** (continued) v. Bays and Lagoons: up to ½-mile setbacks along Kasegaluk Lagoon, Kuk River, and Peard Bay, and coastal waters within Northwest NPR-A east of Barrow, including Elson Lagoon, Dease Inlet, and Admiralty Bay. (Note: Kasegaluk Lagoon is unavailable for leasing under this alternative).	**Stipulation E-1.** (continued) r. Kungok River: a ½-mile setback from each bank of the Kungok River downstream from section 35, T9N., R31W.,UM (fish and subsistence resources). s. Colville River: a 2-mile setback from the northern bluff (or bank if there is no bluff) of the Colville River extending the length of that potion of the river within the Planning Area and identified as raptor nesting and foraging habitat (raptor, fish, riparian, paleontological, subsistence, scenic, and recreational resources). t. Deep-water lakes: a ½-mile setback around the perimeter of any fish-bearing deep lake as determined to be in lake zone III, i.e., depth > 4m (Mellor 1985). If the fish-bearing status of the waterbody is unknown, the burden is on the lessee to demonstrate whether fish are present. u. Waterfowl nesting and brood-rearing areas: ½-mile setbacks from identified nesting colonies, nest sites, brood-rearing areas or molting areas.	**IDA** **K-1(a)** **K-7** **K-2** **K-4**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)			**Stipulation E-1.** (continued) v. Bays and Lagoons: ½-mile setbacks along Kasegaluk Lagoon, Kuk River, and Peard Bay, and coastal waters within NPR-A east of Barrow, including Elson Lagoon, Dease Inlet, and Admiralty Bay. (Note: Kasegaluk Lagoon would be unavailable for leasing under this alternative).	**K-3** **K-6** **K-8** **and** **IDA**
			Stipulation E-2. Permanent roads (i.e. gravel, sand) connecting to a road system or docks outside the Planning Area are prohibited. Permanent roads necessary to connect pads within independent, remote oil fields are allowed but they must be designed and constructed to create minimal environmental impacts. Roads connecting production sites between separate oil fields may be considered.	**E-1**
	ROP E-1. All crude oil, produced water, seawater, and natural gas pipelines shall be designed, constructed, and operated under an approved Quality Assurance/Quality Control plan.			**E-4**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)	**ROP E-2.** The lessee shall minimize the development footprint.			**E-5**
	ROP E-3. Bridges, rather than culverts, shall be used for any allowed road crossings on all rivers identified by the AO to reduce the potential of ice-jam flooding and erosion. When necessary on smaller streams, culverts shall be large enough to avoid restricting fish passage or adversely affecting natural stream flow.			**E-6**
	ROP E-4. Design, locate, construct, and operate permanent oil and gas infrastructure to minimize adverse effects on caribou movement.			**E-7(a)-(c)**
	ROP E-5. Pipelines and roads shall be designed to facilitate caribou and subsistence user passage.		**ROP E-5.** Aboveground pipelines shall be elevated at least 5 ft, as measured from the ground to the bottom of the pipe, except where the pipeline intersects a road, pad, or a ramp installed to facilitate wildlife passage and subsistence passage and access. Lessees shall separate elevated pipelines from roads by a minimum of 500 ft, if feasible. Separating roads from pipelines may not be feasible within narrow land corridors between lakes and where pipe and road converge on a drill pad.	**E-7(a)** **(b)** **(c)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
E. Facility Design and Construction (continued)	**ROP E-6.** Permanent oil and gas facilities upon or within 500 ft of shallow lakes, streams, lake beds, estuaries, and their active floodplain will only be approved if the applicant can demonstrate to the satisfaction of the AO that adverse impacts to fish, wildlife, vegetation, and the hydrologic condition are minimal. Essential pipeline and road crossings will be permitted on a case-by-case basis.		**Stipulation E-3.** For those waterbodies not listed in stipulation E-1, permanent oil and gas facilities, including roads, airstrips, and pipelines, are prohibited upon or within 500 ft as measured from the active floodplain. Essential pipeline and road crossings will be permitted on a case-by-case basis.	**E-2**
	ROP E-7. Gravel mine site reclamation will be in accordance with a plan approved by the AO.		**Stipulation E-4.** Gravel mine sites are prohibited within the active floodplain of a river, stream, or lake. Gravel mine site reclamation will be in accordance with a plan approved by the AO.	**E-8**
	ROP E-8. Coastal facilities shall be designed, sited, and constructed to prevent significant changes to nearshore oceanographic circulation patterns and water-quality characteristics (e.g., salinity, temperature, suspended sediments) that result in measurements exceeding water-quality criteria, and must maintain free passage of marine and anadromous fish.		**Stipulation E-5.** Causeways and docks are prohibited in river mouths or deltas. Artificial gravel islands and bottom-founded structures are prohibited in river mouths or active stream channels on river deltas, except as provided in the paragraphs below.	**E-3**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
			Approved causeways docks, artificial gravel islands, and bottom-founded structures, shall be designed, sited, and constructed to prevent significant changes to nearshore oceanographic circulation patterns and water-quality characteristics (e.g., salinity, temperature, suspended sediments) that result in measurements exceeding water-quality criteria, and must maintain free passage of marine and anadromous fish. A monitoring program will be required to address the objectives of water quality and free passage of fish. Additional mitigation shall be required where significant deviation from these objectives occurs.	
F. Air Traffic*	**ROP F-1.** All aircraft use shall be conducted in a manner that will minimize impacts to wildlife and birds.		**ROP F-1.** Aircraft shall maintain an altitude of at least 1,500 ft AGL when within ½ mile of cliffs identified as raptor nesting sites from April 15 through August 15 and within ½ mile of known gyrfalcon nest sites from March 15 to August 15, unless doing so would endanger human life or violate safe flying practices. Permittees shall obtain information from BLM necessary to plan flight routes when routes may go near falcon nests.	**F-1(a)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
F. Air Traffic* (continued)			**Stipulation F-1.** Aircraft shall maintain an altitude of at least 1,000 ft above ground level (AGL) (except for takeoffs and landings) over caribou winter ranges from October 1 through May 15.	**F-1(b)**
			Stipulation F-2. Aircraft shall maintain an altitude of at least 2,000 ft AGL over the caribou insect relief area from June 20 through July 31, unless doing so would endanger human life or violate safe flying practices.	**F-1(e) (f)**
Note: *The BLM's authority to restrict air traffic is limited to those activities associated with use authorization on BLM-administered lands.				
G. Oil Field Abandonment	**Stipulation G-1.** Upon field abandonment or expiration of a lease or oil- and gas-related permit, all facilities shall be removed and sites rehabilitated to the satisfaction of the AO after determining whether it is in the best interest of the public to retain some or all of the facilities.			**G-1**
H. Subsistence	**Stipulation H-1.** All operations shall be conducted in a manner that prevents unreasonable conflicts with subsistence activities. Before submitting an application to the BLM, the applicant shall consult with directly affected subsistence communities, NSB, and the Subsistence Advisory Panel to discuss the siting, timing and methods of proposed operations. Through this consultation, the applicant shall make every reasonable effort, including such mechanisms as a conflict avoidance agreement and mitigating measures, to ensure that proposed activities will not result in unreasonable interference with subsistence activities. The applicant shall submit documentation of consultation efforts and a written plan that shows how the applicant's activities, in combination with other activities in the area, will be scheduled and located to prevent unreasonable conflicts with subsistence activities. In the event that no agreement is reached between the parties, the AO shall consult with the directly involved parties and determine which activities will occur, including the timeframes.			**H-1** **H-2**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
H. Subsistence (continued)	**ROP H-1.** During exploration, development, and production the lessee shall develop and implement a plan, approved by the AO in consultation with the Research and Monitoring Team and the Subsistence Advisory Panel, to monitor the effects of activities on subsistence. The lessee shall provide biannual reports to BLM, the Research and Monitoring Team, and the Subsistence Advisory Panel.			**H-1(c)(7)**
I. Orientation Program	**ROP I-1.** The lessee shall include in any application for permit to drill a proposed orientation program for all personnel involved in exploration or development and production activities (including personnel of lessee's agents, contractors, and subcontractors) for review and approval by the AO. The program shall be designed in sufficient detail to inform individuals working on the project of specific types of environmental, social, and cultural concerns that relate to the Planning Area. The program shall address the importance of not disturbing archaeological and biological resources and habitats, including endangered species, fisheries, bird colonies, and marine mammals and provide guidance on how to avoid disturbance. Guidance shall include the production and distribution of information cards on endangered and/or threatened species in the Planning Area. The program shall be designed to increase sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which personnel will be operating. The orientation program shall also include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation. The program shall be attended at least once a year by all personnel involved in on-site exploration or development and production activities (including personnel of lessee's agents, contractors, and subcontractors) and all supervisory and managerial personnel involved in lease activities of the lessee and its agents, contractors, and subcontractors. Individual training is transferable from one facility to another except for elements of the training specific to a particular site. Lessees shall maintain a record onsite of all personnel who attend the program for so long as the site is active, though not to exceed the 5 most recent years of operations. This record shall include the name and dates(s) of attendance of each attendee.			**I-1**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

Activity	Alternative A	Alternative B	Alternative C	Preferred Alternative (Table II-03)
J. Miscellaneous Activities	**Stipulation J-1.** If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate permanent facilities as far from raptor nests as practical and feasible, but consistent with the following: alteration of limited, high quality habitat that could significantly reduce prey availability shall be minimized. Of particular concern are ponds, lakes, wetlands, and riparian habitats.		**Stipulation J-1.** If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate permanent facilities as far from raptor nests as feasible, but consistent with the following: within 15 miles of nest sites, alteration of limited, high quality habitat that could significantly reduce prey availability shall be prohibited. Of particular concern are ponds, lakes, wetlands and riparian habitats.	**K-7**
			Stipulation J-2. Petroleum exploration and production activities are prohibited within ½ mile of occupied grizzly bear dens, identified by the ADF&G, unless alternative mitigation measures are approved by the AO in consultation with appropriate Federal, State, and NSB regulatory and resource agencies.	**C-1(a)**
	ROP J-1. Oil and gas lessees and their contractors and subcontractors will prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These plans shall include measures to: (a) minimize attraction of bears to the drill sites; (b) organize layout of buildings and work areas to minimize human/bear interactions; (c) warn personnel of bears near or on drill sites and identify proper procedures to be followed; (d) if authorized, deter bears from the drill site; (e) provide contingencies in the event bears do not leave the site or cannot be deterred by authorized personnel; (f) discuss proper storage and disposal of materials that may be toxic to bears; and (g) provide a systematic record of bears on the site and in the immediate area. Lessees shall develop educational programs and camp layout and management plans as they prepare their lease operations plans.			**A-8(a)-(g)**

Table II-02. Stipulations and Required Operating Procedures (ROP's) (continued)

New Stipulations and Required Operating Procedures (i.e., not in Draft IAP/EIS under any Alternative)		
Endangered Species Act-Section 7 Consultation	**Stipulation K.** The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.	**L**
Various Activities	No corresponding stipulations or required operating procedures for Alternative A, B, or C.	**B-2 (g)** **E-9** **E-10** **E-11** **E-12** **F-1(c) and (d)** **K-1(j)** **K-1(l)** **K-1(m)** **K-1(n)** **K-1(p)** K-5

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
A. Waste Prevention, Handling, Disposal; Spills, and Public Safety	**A-1 Required Operating Procedure** **Objective:** Protect the health and safety of oil field workers and the general public by avoiding the disposal of solid waste and garbage near areas of human activity. **Requirement/Standard:** Areas of operation shall be left clean of all debris.
	A-2 Required Operating Procedure **Objective:** Minimize impacts on the environment from non-hazardous waste generation. Encourage continuous environmental improvement. Protect the health and safety of oil field workers and the general public. Avoid human-caused changes in predator populations. **Requirement/Standard:** Lessees/permittees shall prepare and implement a comprehensive waste management plan for all phases of exploration and development, including seismic activities. The plan shall be submitted to the AO for approval, in consultation with Federal, State and North Slope Borough regulatory and resource agencies, as appropriate (based on agency legal authority and jurisdictional responsibility), as part of a plan of operations or other similar permit application. The plan shall consider and take into account the following requirements: **a) Methods to avoid attracting wildlife to food and garbage:** All feasible precautions shall be taken to avoid attracting wildlife to food and garbage. (A current list of approved precautions, specific to type of permitted use, can be obtained from the AO.) **b) Disposal of putrescible waste:** Current requirements prohibit the burial of garbage. Lessees and permitted users shall have a written procedure to ensure that the handling and disposal of putrescible waste will be accomplished in a manner that prevents the attraction of wildlife. All putrescible waste shall be incinerated, backhauled, or composted in a manner approved by the AO. All solid waste, including incinerator ash, shall be disposed of in an approved waste-disposal facility in accordance with U.S. Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC) regulations and procedures. The burial of human waste is prohibited except as authorized by the AO. **c) Disposal of pumpable waste products:** Except as specifically provided, BLM currently requires all pumpable solid, liquid, and sludge waste be disposed of by injection in accordance with EPA, ADEC, and the Alaska Oil and Gas Conservation Commission regulations and procedures. On-pad temporary muds and cuttings storage, as approved by ADEC, will be allowed as necessary to facilitate annular injection and/or backhaul operations. **d) Disposal of wastewater and domestic wastewater:** BLM currently prohibits wastewater discharges or disposal of domestic wastewater into bodies of fresh, estuarine, and marine water, including wetlands, unless authorized by the National Pollution Discharge Elimination System (NPDES) or State permit.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
A. Waste Prevention, Handling, Disposal; Spills, and Public Safety (continued)	**A-3 Required Operating Procedure** **Objective:** Minimize pollution through effective hazardous-materials contingency planning. **Requirement/Standard:** For oil- and gas-related activities, a Hazardous-Materials Emergency-Contingency Plan shall be prepared and implemented before transportation, storage, or use of fuel or hazardous substances. The plan shall include a set of procedures to ensure prompt response, notification, and cleanup in the event of a hazardous substance spill or threat of a release. Procedures applicable to fuel and hazardous substances handling (associated with transportation vehicles) may consist of Best Management Practices if approved by the AO. The plan shall include a list of resources available for response (e.g., heavy-equipment operators, spill-cleanup materials or companies), and names and phone numbers of Federal, State, and NSB contacts. Other Federal and State regulations may apply and require additional planning requirements. All staff shall be instructed regarding these procedures.
	A-4 Required Operating Procedure **Objective:** Minimize the impact of contaminants on fish, wildlife, and the environment, including wetlands, marshes and marine waters, as a result of fuel, crude oil and other liquid chemical spills. Protect subsistence resources and subsistence activities. Protect public health and safety. **Requirement/Standard:** Before initiating any oil and gas or related activity or operation, including field research/surveys and/or seismic operations, lessees/permittees shall develop a comprehensive spill prevention and response contingency plan per 40 CFR 112 (OPA). The plan shall consider and take into account the following requirements: **a) On-site clean-up materials.** Sufficient oil-spill-cleanup materials (absorbents, containment devices, etc.) shall be stored at all fueling points and vehicle-maintenance areas and shall be carried by field crews on all overland moves, seismic work trains, and similar overland moves by heavy equipment. **b) Storage Containers.** Fuel and other petroleum products and other liquid chemicals shall be stored in proper containers at approved locations. Except during overland moves and seismic operations, fuel, other petroleum products, and other liquid chemicals designated by the AO in excess of 1,320 gallons in storage capacity, shall be stored within an impermeable lined and diked area or within approved alternate storage containers such as overpacks, capable of containing 110 percent of the stored volume. **c) Liner Materials.** Liner material shall be compatible with the stored product and capable of remaining impermeable during typical weather extremes expected throughout the storage period. **d) Permanent Fueling Stations.** Permanent fueling stations shall be lined or have impermeable protection to prevent fuel migration to the environment from overfills and spills. **e) Proper Identification of Containers.** All fuel containers, including barrels and propane tanks, shall be marked with the responsible party's name, product type, and year filled or purchased. **f) Notice of Reportable Spills.** Notice of any reportable spill (as required by 40 CFR 300.125 and 18 AAC 75.300) shall be given to the AO as soon as possible, but no later than 24 hours after occurrence.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
A. Waste Prevention, Handling, Disposal; Spills, and Public Safety (continued)	**A-5 Required Operating Procedure** **Objective:** Minimize the impact of contaminants from refueling operations on fish, wildlife, and the environment. **Requirement/Standard:** Refueling of equipment within 500 ft of the active flood plain of any fish-bearing water body and 100 ft from non-fish-bearing water bodies is prohibited. Small caches (up to 210 gallons) for motorboats float planes, ski planes, and small equipment, e.g. portable generators and water pumps, will be permitted. The AO may allow storage and operations at areas closer than the stated distances if properly designed to account for local hydrologic conditions.
	A-6 Required Operating Procedure **Objective:** Minimize the impact on fish, wildlife, and the environment from contaminants associated with the exploratory drilling process. **Standard/Requirement:** Surface discharge of reserve-pit fluids is prohibited unless authorized by applicable NPDES, ADEC, and NSB permits (as appropriate) and approved by the AO.
	A-7 Required Operating Procedure **Objective:** Minimize the impacts to the environment of disposal of produced fluids recovered during the development phase on fish, wildlife, and the environment. **Requirement/Standard**: Procedures for the disposal of produced fluids shall meet the following requirements: a) In upland areas, including wetlands, disposal will be by subsurface-disposal techniques. The AO may permit alternate disposal methods if the lessee demonstrates that subsurface disposal is not feasible or prudent and the alternative method will not result in adverse environmental effects. b) In marine waters, approval of discharges by the AO will be based on a case-by-case review of environmental factors and consistency with the conditions of an NPDES permit. Discharge of produced fluids will be prohibited at locations where currents and water depths, in combination with other conditions, are not adequate to prevent impacts to known biologically sensitive areas. Alternate disposal methods will require an NPDES permit certified by the State.
	A-8 Required Operating Procedure **Objective:** Minimize conflicts resulting from interaction between humans and bears during leasing and associated activities. **Requirement/Standard:** Oil and gas lessees and their contractors and subcontractors will, as a part of preparation of lease operation planning, prepare and implement bear-interaction plans to minimize conflicts between bears and humans. These plans shall include measures to: a) Minimize attraction of bears to the drill sites. b) Organize layout of buildings and work areas to minimize human/bear interactions. c) Warn personnel of bears near or on drill sites and identify proper procedures to be followed. d) Establish procedures, if authorized, to deter bears from the drill site. e) Provide contingencies in the event bears do not leave the site or cannot be deterred by authorized personnel. f) Discuss proper storage and disposal of materials that may be toxic to bears. g) Provide a systematic record of bears on the site and in the immediate area.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
B. Water Use for Permitted Activities	**B-1 Required Operating Procedure** **Objective:** Maintain populations of, and adequate habitat for, fish and invertebrates. **Requirement/Standard:** Water withdrawal from rivers and streams during winter is prohibited.
	B-2 Required Operating Procedure **Objective:** Maintain natural hydrologic regimes in soils surrounding lakes and ponds and maintain populations of, and adequate habitat for, fish and invertebrates. **Requirement/Standard:** Water withdrawal from lakes may be authorized on a site-specific basis depending on size, water volume, depth and fish population and species diversification. Current water withdrawal requirements specify: a) Water withdrawals from any fish bearing lake 7 ft or deeper shall be limited to 15 percent of the estimated free water volume located beneath the ice. b) Water withdrawals from lakes with depths between 5 and 7 ft that contain only ninespine stickleback and/or Alaska blackfish are limited to up to 30 percent of the under-ice volume. c) Water withdrawal may be authorized from any lake if the proponent demonstrates that no fish exist in the lake. d) A water-monitoring plan may be required to assess draw down and water quality changes before, during, and after pumping any fish-bearing lake. e) The removal of naturally grounded ice may be authorized from lakes and shallow rivers on a site-specific basis depending upon its size, water volume, depth, and fish population and species diversification. f) Removed ice aggregate shall be included in the 15 percent or 30 percent (whichever is the appropriate case) withdrawal limits, unless otherwise approved. g) Any water intake structures in fish-bearing waters shall be designed, operated and maintained to prevent fish entrapment, entrainment, or injury. h) Compaction of snow cover or snow removal from fish-bearing water bodies shall be prohibited except at approved ice road crossings, water pumping stations on lakes or areas of grounded ice.
C. Winter Overland Moves and Seismic Work	The following stipulations and ROP's apply to overland moves, seismic work, and any similar cross-country vehicle use of heavy equipment on non-roaded surfaces during the winter season. These restrictions do not apply to the use of such equipment on ice roads after they are constructed.
	C-1 Required Operating Procedure **Objective:** Protect grizzly bear, polar bear, and marine mammal denning and/or birthing locations. **Requirement/Standard:** a) Cross-country use of heavy equipment and seismic activities are prohibited within ½ mi of occupied grizzly bear dens identified by ADF&G unless alternative mitigation measures are approved by the AO in consultation with ADF&G. b) Cross-country use of heavy equipment and seismic activities are prohibited within 1 mi of known or observed polar bear dens or seal birthing lairs. Operators shall consult with the U.S. Fish and Wildlife Service (FWS) and/or NOAA Fisheries, as appropriate, before initiating activities in coastal habitat between October 30 and April 15.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
Overland Moves and Seismic Work (continued)	**C-2 Required Operating Procedure** **Objective*:*** Protect stream banks, minimize compaction of soils, and minimize the breakage, abrasion, compaction, or displacement of vegetation. **Requirement/Standard:** a) Ground operations shall be allowed only when frost and snow covers are at sufficient depths to protect the tundra. Ground operations shall cease when the spring snowmelt begins, approximately May 5 in the foothills area where elevations reach or exceed 500 ft, and approximately May 15 in the northern coastal areas. The exact dates will be determined by the AO. b) Only low-ground-pressure vehicles shall be used for on-the-ground activities off ice roads or pads. A current list of approved vehicles can be obtained from the AO. Limited use of tractors equipped with wide tracks or "shoes" will be allowed to pull trailers, sleighs, or other equipment with approved undercarriage. Note: This provision does not include the use of heavy equipment such as front-end loaders and similar equipment required during ice road construction. c) Bulldozing of tundra mat and vegetation, trails, or seismic lines is prohibited; however, on existing trails, seismic lines or camps, clearing of drifted snow is allowed to the extent that the tundra mat is not disturbed. d) To reduce the possibility of ruts, vehicles shall avoid using the same trails for multiple trips unless necessitated by serious safety or superseding environmental concern. This provision does not apply to hardened snow trails for use by low-ground-pressure vehicles such as Rolligons. e) The location of winter ice roads shall be designed and located to minimize compaction of soils and the breakage, abrasion, compaction, or displacement of vegetation. Offsets may be required to avoid using the same route or track in the subsequent year.
	C-3 Required Operating Procedure **Objective:** Maintain natural spring runoff patterns, avoid flooding, prevent streambed sedimentation, protect water quality and protect stream banks. **Requirement/Standard:** Snow and ice bridges shall be removed, breached or slotted before spring breakup. Ramps and bridges shall be substantially free of soil and debris.
	C-4 Required Operating Procedure **Objective:** Avoid additional freeze down of deep-water pools harboring over-wintering fish and invertebrates used by fish. **Requirement/Standard:** Rivers and streams shall be crossed at shallow riffles from point bar to point bar whenever possible.
D. Oil and Gas Exploratory Drilling	**D-1 Lease Stipulation** **Objectives:** Protect fish-bearing rivers, streams and lakes from blowouts, and minimize alteration of riparian habitat. **Requirement/Standard:** Exploratory drilling is prohibited in rivers and streams, as determined by the active floodplain, and fish-bearing lakes, except where the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
D. Oil and Gas Exploratory Drilling (continued)	**D-2 Lease Stipulation** **Objective:** Minimize surface impacts from exploratory drilling. **Requirement/Standard:** Exploratory drilling shall be limited to temporary facilities such as ice pads, ice roads, ice airstrips, temporary platforms, etc., unless the lessee demonstrates that construction of permanent facilities such as gravel airstrips, storage pads, and connecting roads is environmentally preferable or necessary to carry out exploration more economically.
E. Facility Design and Construction	**E-1 Required Operating Procedure** **Objective:** Protect subsistence use and access to traditional subsistence hunting and fishing areas, and minimize the impact of oil and gas activities on air, land, water, fish and wildlife resources. **Requirement/Standard:** All roads must be designed, constructed, maintained and operated to create minimal environmental impacts and to protect subsistence use and access to traditional subsistence hunting and fishing areas. Subject to approval by the AO, the construction, operation and maintenance of oil field roads is the responsibility of the lessee. Note: This provision does not apply to intercommunity or other permanent roads constructed with public funds for general transportation purposes. This preserves the opportunity to plan, design and construct public transportation systems to meet the economic, transportation, and public health and safety needs of the State of Alaska and/or communities within NPR-A.
	E-2 Lease Stipulation **Objective:** Protect fish-bearing water bodies, water quality and aquatic habitats. **Requirement/Standard:** The design and location of permanent oil and gas facilities within 500 ft of fish-bearing or 100 ft of non-fish-bearing waterbodies will only be approved on a case-by-case basis if the lessee can demonstrate that impacts to fish, water quality, and aquatic and riparian habitats are minimal. (Note: Also refer to Area-Specific Stipulations and ROP's for Rivers (Stipulation K-1) and Deep Water Lakes (Stipulation K-2).)
	E-3 Lease Stipulation **Objective:** Maintain free passage of marine and anadromous fish, and protect subsistence use and access to traditional subsistence hunting and fishing. **Requirement/Standard:** Causeways and docks are prohibited in river mouths or deltas. Artificial gravel islands and bottom-founded structures are prohibited in river mouths or active stream channels on river deltas. Causeways, docks, artificial islands, and bottom-founded structures shall be designed to ensure free passage of marine and anadromous fish and to prevent significant changes to nearshore oceanographic circulation patterns and water quality characteristics. A monitoring program may be required to address the objectives of water quality and free passage of fish.
	E-4 Required Operating Procedure **Objective***:* Minimize the potential for pipeline leaks, the resulting environmental damage and industrial accidents. **Requirement/Standard:** All pipelines shall be designed, constructed, and operated under an AO-approved Quality Assurance/Quality Control plan that is specific to the product transported.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
E. Facility Design and Construction (continued)	**E-5 Required Operating Procedure** **Objective**: Minimize impacts of the development footprint. **Requirement/Standard:** Facilities shall be designed and located to minimize development footprint to the maximum extent practicable considering environmental, economic, and social impacts. Note: Where aircraft traffic is an issue, consideration shall be given to balancing gravel pad size and available supply storage capacity with potential reductions in the use of aircraft to support oil and gas operations.
	E-6 Required Operating Procedure **Objective:** Reduce the potential for ice-jam flooding, erosion, and restriction of fish passage. **Requirement/Standard:** Water crossings shall be designed and constructed to ensure free passage of fish, maintain natural drainage, and minimal adverse effects to natural stream flow. Note: Bridges, rather than culverts, are the preferred structures for crossing rivers. When necessary, culverts can be constructed on smaller streams, if they are large enough to avoid restricting fish passage or adversely affecting natural stream flow.
	E-7 Required Operating Procedure **Objective:** Minimize disruption of caribou movement and subsistence use. **Requirement/Standard:** Pipelines and roads shall be designed to allow the free movement of caribou and the safe, unimpeded passage of the public while participating in traditional subsistence activities. Listed below are the currently accepted design practices: a) Above ground pipelines shall be elevated an average of at least 7 ft as measured from the ground to the bottom of the pipeline (except where pipelines intersect a road, pad, in transition zones between buried and elevated pipelines, or at ramps installed to facilitate wildlife passage and subsistence passage and access). b) In areas where facilities or terrain may funnel caribou movement, ramps over pipelines, buried pipelines, or pipelines buried under roads may be required by the AO after consultation with Federal, State, and North Slope Borough regulatory and resource agencies (as appropriate, based on agency legal authority and jurisdictional responsibility). c) A minimum distance of 500 ft between pipelines and roads should be maintained when feasible. Separating roads from pipelines may not be feasible within narrow land corridors between lakes and where pipelines and roads converge on a drill pad.
	E-8 Required Operating Procedure **Objective:** Minimize the impact of mineral materials mining activities on air, land, water, fish, and wildlife resources. **Requirement/Standard:** Gravel mine site design and reclamation will be in accordance with a plan approved by the AO. The plan shall consider: a) Locations outside the active flood plain. b) Design and construction of gravel mine sites within active flood plains to serve as water reservoirs for future use. c) Potential use of site for enhancing fish and wildlife habitat.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
E. Facility Design and Construction (continued)	**E-9 Required Operating Procedure** **Objective**: Avoidance of human-caused increases in populations of predators of ground nesting birds. **Requirement/Standard**: Lessee shall utilize best available technology to prevent facilities from providing nesting, denning, or shelter sites for ravens, raptors, and foxes. The lessee shall provide the AO with an annual report on the use of oil and gas facilities by ravens, raptors and foxes as nesting, denning, and shelter sites.
	E-10 Required Operating Procedure **Objective:** Prevention of migrating waterfowl, including species listed under the Endangered Species Act, from striking oil and gas and related facilities during low light conditions. **Requirement/Standard:** Except for safety lighting, illumination of higher structures shall be designed to direct artificial exterior lighting inward and downward, rather than upward and outward. All drilling structures, production facilities, and other structures that exceed 20 ft shall be illuminated as outlined above.
	E-11 Required Operating Procedure **Objective**: Minimize the take of species listed under the Endangered Species Act and minimize the disturbance of other species of interest from direct or indirect interaction with oil and gas facilities. **Requirement/Standard:** In accordance with the guidance below, before the approval of facility construction, aerial surveys of breeding pairs of the following species shall be conducted within any area proposed for development. **Spectacled and/or Steller's Eiders** a) Surveys shall be conducted by the lessee for at least three (3) years before authorization of construction, if such construction is within the FWS North Slope Eider survey area (Map 62), and at least one (1) year outside that area. Results of aerial surveys and habitat mapping may require additional ground nest surveys. Spectacled and/or Steller's eider surveys shall be conducted following accepted BLM-protocol during the second week of June. b) If spectacled and/or Steller's eiders are determined to be present within the proposed development area, the applicant shall consult with the FWS and BLM in the design and placement of roads and facilities in order to minimize impacts to nesting and brood-rearing eiders and their preferred habitats. Such consultation shall address timing restrictions and other temporary mitigating measures, construction of permanent facilities, placement of fill, alteration of eider habitat, aircraft operations, and introduction of high noise levels. c) To reduce the possibility of spectacled and/or Steller’s eiders from striking above-ground utility lines (power and communication), such lines shall either be buried in access roads, or suspended on vertical support members, to the extend practical. Support wires associated with communication towers, radio antennas, and other similar facilities, shall be clearly marked along their entire length to improve visibility for low flying birds. Such markings shall be jointly developed through consultation with FWS.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
E. Facility Design and Construction (continued)	**E-11 Required Operating Procedure** (continued) **Yellow-billed Loon** a) Aerial surveys shall be conducted by the lessee for at least 3 years before authorization of construction of facilities proposed for development that are within 1 mi of a lake 25 acres or larger in size. These surveys along shorelines of large lakes shall be conducted following accepted BLM protocol during nesting in late June and during brood rearing in late August. b) Should yellow-billed loons be present, the design and location of facilities must be such that disturbance is minimized. Current accepted mitigation is a one-mile buffer around all recorded nest sites and a minimum 500-m buffer around the remainder of the lake shoreline. Development may be prohibited within buffers or activities curtailed while birds are present.
	E-12 Required Operating Procedure **Objective:** Use of ecological mapping as a tool to assess wildlife habitat before development of permanent facilities, to conserve important habitat types during development. **Requirement/Standard:** An ecological land classification map of the development area shall be developed before approval of facility construction. The map will integrate geomorphology, surface-form and vegetation at a scale, level of resolution, and level of positional accuracy adequate for detailed analyses of development alternatives. The map shall be prepared in time to plan one season of ground-based wildlife surveys, if deemed necessary by the AO, before approval of exact facility location and facility construction.
F. Use of Aircraft for Permitted Activities	**F-1 Required Operating Procedure** **Objective:** Minimize the effects of low-flying aircraft on wildlife, traditional subsistence activities, and local communities. **Requirement/Standard:** The lessee shall ensure that aircraft used for permitted activities maintain altitudes according to the following guidelines: a) Aircraft shall maintain an altitude of at least 1,500 ft above ground level (AGL) when within ½ mi of cliffs identified as raptor nesting sites from April 15 through August 15 and within ½ mi of known gyrfalcon nest sites from March 15 to August 15, unless doing so would endanger human life or violate safe flying practices. Permittees shall obtain information from BLM necessary to plan flight routes when routes may go near falcon nests. b) Aircraft shall maintain an altitude of at least 1,000 ft AGL (except for takeoffs and landings) over caribou winter ranges from December 1 through May 1, unless doing so would endanger human life or violate safe flying practices. Caribou wintering areas will be defined annually by the AO. c) The number of takeoffs and landings to support oil and gas operations with necessary materials and supplies should be limited to the maximum extent possible. During the design of proposed oil and gas facilities, larger landing strips and storage areas should be considered so as to allow larger aircraft to be employed, resulting in a fewer number of flights to the facility. d) Use of aircraft, especially rotary wing aircraft, near known subsistence camps and cabins or during sensitive subsistence hunting periods (spring goose hunting and fall caribou and moose hunting) should be kept to a minimum. e) Aircraft used for permitted activities shall maintain an altitude of at least 2,000 ft AGL (except for takeoffs and landings) over the Caribou Study Area (Map 91) from June 15 through July 31, unless doing so would endanger human life or violate safe flying practices.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
F. Use of Aircraft for Permitted Activities (continued)	**F-1 Required Operating Procedure (Continued)** f) Aircraft shall maintain an altitude of at least 2,000 ft AGL (except for takeoffs and landings) over the Caribou Coastal Insect-Relief Areas (Map 91) from June 15 through July 31, unless doing so would endanger human life or violate safe flying practices.
G. Oil Field Abandonment	**G-1 Lease Stipulation** **Objective:** Ensure the final disposition of the land meets the current and future needs of the public. **Requirement/Standard:** Upon abandonment or expiration of the lease, all oil- and gas-related facilities shall be removed and sites rehabilitated to as near the original condition as practicable, subject to the review of the AO. The AO may determine that it is in the best interest of the public to retain some or all facilities.
H. Subsistence Consultation for Permitted Activities	"Consultation" may take place by in-person meetings, teleconference, videoconference, and exchange of written documents, e-mail, or other means appropriate to the circumstances. Consultation does not include public meetings that are primarily for the purpose of information distribution, unless it is explained at the beginning of the meeting that there is an open dialogue, and that comments, concerns, or other information are being actively solicited.
	H-1 Required Operating Procedure **Objective:** Provide opportunities for participation in planning and decision-making to prevent unreasonable conflicts between subsistence uses and oil and gas and related activities. **Requirement/Standard:** Lessee/permittee shall consult directly with affected communities using the following guidelines. a) Before submitting an application to the BLM, the applicant shall consult with directly affected subsistence communities, the North Slope Borough, and the NPR-A Subsistence Advisory Panel to discuss the siting, timing and methods of proposed operations. Through this consultation, the applicant shall make every reasonable effort, including such mechanisms as conflict avoidance agreements and mitigating measures, to ensure that proposed activities will not result in unreasonable interference with subsistence activities. b) The applicant shall submit documentation of consultation efforts as part of its operations plan. Applicants should submit the proposed plan of operations to provide an adequate time for review and comment by the NPR-A Subsistence Advisory Panel and to allow time for formal government-to-government consultation with Native Tribal Governments. The applicant shall submit documentation of its consultation efforts and a written plan that shows how its activities, in combination with other activities in the area, will be scheduled and located to prevent unreasonable conflicts with subsistence activities. Operations plans must include a discussion of the potential effects of the proposed operation, and the proposed operation in combination with other existing or reasonably foreseeable operations. c) A subsistence plan addressing the following items must be submitted. 1. A detailed description of the activity(ies) to take place (including the use of aircraft). 2. A description of how the lessee/permittee will minimize and/or deal with any potential impacts identified by the AO during the consultation process.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
H. Subsistence Consultation for Permitted Activities (continued)	**H-1 Required Operating Procedure** (continued) 3. A detailed description of the monitoring effort to take place, including process, procedures, personnel involved and points of contact both at the work site and in the local community. 4. Communication elements to provide information on how the applicant will keep potentially affected individuals and communities up-to-date on the progress of the activities and locations of possible, short-term conflicts (if any) with subsistence activities. Communication methods could include holding community meetings, open house meetings, workshops, newsletters, radio and television announcements, etc. 5. Procedures necessary to facilitate access by subsistence users to conduct their activities. 6. In the event that no agreement is reached between the parties, the AO shall consult with the directly involved parties and determine which activities will occur, including the timeframes. 7. During development, monitoring plans must be established for new permanent facilities, including pipelines, to assess an appropriate range of potential effects on resources and subsistence as determined on a case-by-case basis given the nature and location of the facilities. The scope, intensity, and duration of such plans will be established in consultation with the AO and Subsistence Advisory Panel.
	H-2 Required Operating Procedure **Objective:** Prevent unreasonable conflicts between subsistence activities and geophysical (seismic) exploration. **Requirement/Standard:** In addition to the consultation process described above for permitted activities**,** before applying for permits to conduct geophysical (seismic) exploration, the applicant shall consult with local communities and residents: a) Because of the large land area covered by typical geophysical operations and the potential to impact a large number of subsistence users during the exploration season, the permittee/operator will notify, in writing, all potentially affected long-term cabin and camp users. b) The official recognized list of cabin and campsite users is the North Slope Borough's 2001 (or most current) inventory of cabins and campsites. c) For the purpose of this standard, potentially affected cabins and campsites are defined as any camp or campsite within the boundary of the area subject to proposed geophysical exploration and/or within 1,200 ft of actual or planned travel routes used to supply the seismic operations while it is in operation. d) A copy of the notification letter and a list of potentially affected users shall also be provided to the office of the appropriate Native Tribal Government. e) Based on that consultation, the AO may prohibit seismic work up to 1,200 ft of any known, long-term, cabin or campsite. Generally, the AO will allow wintertime seismic work to be conducted within 300 ft of a long-term cabin or campsite that is not in use.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
I. Orientation Programs Associated with Permitted Activities	**I-1 Required Operating Procedure** **Objective:** Minimize cultural and resource conflicts. **Requirement/Standard:** All personnel involved in oil and gas and related activities shall be provided information concerning applicable stipulations, required operating procedures, standards, and specific types of environmental, social, traditional, and cultural concerns that relate to the region. The lessee/permittee shall ensure that all personnel involved in permitted activities shall attend an orientation program at least once a year. The proposed orientation program shall be submitted to the AO for review and approval and should: a) Provide sufficient detail to notify personnel of applicable stipulations and required operating procedures as well as inform individuals working on the project of specific types of environmental, social, traditional and cultural concerns that relate to the region. b) Address the importance of not disturbing archaeological and biological resources and habitats, including endangered species, fisheries, bird colonies, and marine mammals, and provide guidance on how to avoid disturbance. c) Include guidance on the preparation, production, and distribution of information cards on endangered and/or threatened species. d) Be designed to increase sensitivity and understanding of personnel to community values, customs, and lifestyles in areas in which personnel will be operating. e) Include information concerning avoidance of conflicts with subsistence, commercial fishing activities, and pertinent mitigation. f) Include information for aircraft personnel concerning subsistence activities and areas/seasons that are particularly sensitive to disturbance by low flying aircraft. Of special concern is aircraft use near traditional subsistence cabins and campsites, flights during spring goose hunting and fall caribou and moose hunting seasons, and flights near North Slope communities. g) Provide that individual training is transferable from one facility to another, except for elements of the training specific to a particular site. h) Include on-site records of all personnel who attend the program for so long as the site is active, though not to exceed the 5 most recent years of operations. This record shall include the name and dates(s) of attendance of each attendee. i) Include a module discussing bear interaction plans to minimize conflicts between bears and humans.
K. Area-Specific Lease Stipulations and Required Operating Procedures	**K-1 Lease Stipulation–Rivers** **Objective:** Minimize the disruption of natural flow patterns and changes to water quality; the disruption of natural functions resulting from the loss or change to vegetative and physical characteristics of floodplain and riparian areas; the loss of spawning, rearing or over-wintering habitat for fish; the loss of cultural and paleontological resources; the loss of raptor habitat; impacts to subsistence cabin- and camp-sites; the disruption of subsistence activities; and impacts to scenic and other resource values. (See ROP D-1 for restrictions on exploration activities.) **Requirement/ Standard:** Permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines, are prohibited in the stream bed and adjacent to the rivers listed below at the distances identified. These setbacks are measured from the centerline of the river as determined by the current hydrology at the time of application. The standard setback is ½ mi and increased to ¾ mi where subsistence cabin- and camp-sites are numerous. Along the Colville River and a portion of the Ikpikpuk

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
K. Area-Specific Lease Stipulations and Required Operating Procedures (continued)	**K-1 Lease Stipulation–Rivers** (continued) a 1-mi setback is required to protect important raptor habitat. (For locations along rivers where setback distances change, see Map 20.) On a case-by case basis, and in consultation with Federal, State, and North Slope Borough regulatory and resource agencies (as appropriate, based on agency legal authority and jurisdictional responsibility), essential pipeline and road crossings perpendicular to the main channel will be permitted (unless noted otherwise) through setback areas. The above setbacks may not be practical within river deltas. In these situations, permanent facilities shall be designed to withstand a 200-year flood event. a) Colville River: a 1-mi setback from the northern bluff (or bank if there is no bluff) of the Colville River extending the length of that portion of the river within the Planning Area. Road crossings intended to solely support oil and gas activities are prohibited. Note: This provision does not apply to intercommunity or other permanent roads constructed with public funds for general transportation purposes. This preserves the opportunity to plan, design, and construct public transportation systems to meet the economic, transportation, and public health and safety needs of the State of Alaska and/or communities within NPR-A. b) Ikpikpuk River: a ¾-mi setback from the centerline of the Ikpikpuk River extending from the mouth south to Sec. 19, T7N, R11W, UM. From Sec. 19, T7N, R11W, UM to Sec. 4 T3N, R12W, UM, a 1-mile setback is required. Beginning at Sec. 4 T3N, R12W, UM, a ½-mi setback will be required to the confluence of the Kigalik River and Maybe Creek. NOTE: setback distances only apply to the west bank where the Ikpikpuk River is the Planning Area boundary. c) Alaktak River: a ¾-mi setback from the centerline of the Alaktak River extending from the mouth to the Ikpikpuk River. d) Chipp River: a ¾-mi setback from the centerline of the Chipp River extending from the mouth to the Ikpikpuk River. e) Oumalik River: a ¾-mi setback from the centerline of the Oumalik River from the mouth upstream to Sec. 5, T8N, R14W, UM, and a ½-mi setback from Sec. 5, T8N, R14W, UM, upstream to Sec. 2, T5N, R15W, UM. f) Titaluk River: a ½-mi setback from the centerline of the Titaluk River from the confluence with the Ikpikpuk River upstream to Sec. 1, T2N, R22W, UM. g) Kigalik River: a ½-mi setback from the centerline of the Kigalik River from the confluence with the Ikpikpuk River upstream to the Planning Area boundary. h) Maybe Creek: a ½-mi setback from the centerline of the Maybe Creek from the confluence with the Ikpikpuk River upstream to Sec. 8, T2S R6W, UM. i) Topagoruk River: a ¾-mi setback from the centerline of the Topagoruk River from the mouth upstream to the confluence with Ishuktak Creek. A ½-mi setback from each bank upstream from the confluence with the Ishuktak to Sec. 3, T7N, R17W, UM. j) Ishuktak Creek: a ½-mi setback from the centerline of Ishuktak Creek from the confluence with the Topagoruk River to Sec. 24, T8N, R16W, UM. k) Meade River: a ¾-mi setback from the centerline of the Meade River upstream to Sec. 6, T6N, R21W, UM. A 1/2-mile setback from each bank upstream from Sec. 6, T6N, R21W, UM to the Planning Area boundary. l) Usuktuk River: a ¾-mi setback from the centerline of the Usuktuk River upstream from the confluence with the Meade River to Sec. 36, T10N, R19W, UM.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
K. Area-Specific Lease Stipulations and Required Operating Procedures (continued)	**K-1 Lease Stipulation–Rivers** (continued) m) Pikroka Creek a ¾-mi setback from the centerline of the Pikroka Creek upstream from the confluence with the Meade River to Sec. 11, T8N, R23W, UM. n) Nigisakturik River: a ¾-mi setback from the centerline of the Nigisakturik River upstream from the confluence with the Meade River to Sec. 1, T11N, R25W, UM. o) Inaru River: a ¾-mi setback from the centerline of the Inaru River from the mouth upstream to Sec. 17, T15N, R25W, UM. p) Kucheak Creek: a ¾-mi setback from the centerline of Kucheak Creek from the confluence with the Inaru River upstream to Sec. 20, T13N, R24W, UM. q) Avalik River: a ½-mi setback from the centerline of the Avalik River along that portion of the river within the Planning Area.
	K-2 Lease Stipulation–Deep Water Lakes **Objective:** Minimize the disruption of natural flow patterns and changes to water quality; the disruption of natural functions resulting from the loss or change to vegetative and physical characteristics of deep water lakes; the loss of spawning, rearing or over wintering habitat for fish; the loss of cultural and paleontological resources; impacts to subsistence cabin- and camp-sites; and the disruption of subsistence activities. **Requirement/ Standard:** Permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines, are prohibited on the lake or lakebed and within ¼ mi of the ordinary high water mark of any deep lake as determined to be in lake zone III, i.e., depth > 4m (Mellor, 1985). On a case-by case basis, and in consultation with Federal, State and North Slope Borough regulatory and resource agencies (as appropriate based on agency legal authority and jurisdictional responsibility), essential pipeline, road crossings and other permanent facilities may be permitted through or in these areas where the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative.
	K-3 Lease Stipulation–Dease Inlet, Admiralty Bay, Elson Lagoon, and Associated Barrier Islands Lease stipulations for Dease Inlet, Admiralty Bay, Elson Lagoon, and the Barrier Islands, contain specific criteria that have been incorporated into stipulation language. Because of sensitive biological resources and/or subsistence concerns of Dease Inlet, Admiralty Bay, Elson Lagoon, and inland of the Barrier Islands, the standard(s) for exploration and development activities are set high with the burden of proof resting with the lessee to demonstrate to the AO that granting an approval is warranted. **Objective:** Protect fish and wildlife habitat, preserve air and water quality, and minimize impacts to traditional subsistence activities and historic travel routes on Dease Inlet, Admiralty Bay, and Elson Lagoon. **Requirement/Standard (Exploration):** Oil and gas exploration operations (e.g., drilling, seismic exploration, and testing) are not allowed on Dease Inlet, Admiralty Bay, and Elson Lagoon (including natural and barrier islands), between May 15 and October 15 of each season. Requests for approval of any activities must be submitted in advance and must be accompanied by evidence and documentation that demonstrates to the satisfaction of the Authorized Office that the actions or activities meet all of the following criteria: a) Exploration activities will not unreasonably conflict with traditional subsistence uses or significantly impact seasonally concentrated fish and wildlife resources.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
K. Area-Specific Lease Stipulations and Required Operating Procedures (continued)	**K-3 Lease Stipulation–Dease Inlet, Admiralty Bay, Elson Lagoon, and Associated Barrier Islands** (continued) b) There is adequate spill response capability to effectively respond during periods of broken ice and/or open water, or the availability of alternative methods to prevent well blowouts during periods when adequate response capability cannot be demonstrated. Such alternative methods may include improvements in blowout prevention technology, equipment and/or changes in operational procedures and "top-setting" of hydrocarbon-bearing zones. c) Reasonable efforts will be made to avoid or minimize impacts related to oil spill response activities, including vessel, aircraft, and pedestrian traffic will be conducted to minimize additional impacts or further compounding of "direct spill" related impacts on area resources and subsistence uses. d) The location of exploration and related activities shall be sited so as to not pose a hazard to navigation by the public using high-use traditional subsistence-related travel routes into and through Dease Inlet, Admiralty Bay and Elson Lagoon, as identified by the North Slope Borough, recognizing that marine and nearshore travel routes change over time, subject to shifting environmental conditions. e) Before conducting open water activities, the lessee shall consult with the Alaska Eskimo Whaling Commission and the North Slope Borough to minimize impacts to the fall and spring subsistence whaling activities of the communities of the North Slope. **Requirement/Standard (Development):** With the exception of linear features such as pipelines, no permanent oil and gas facilities are permitted on or under the water within ¾ mi seaward of the shoreline (as measured from mean high tide) of Dease Inlet, Admiralty Bay, and Elson Lagoon or the natural islands (excluding Barrier Islands). Elsewhere, permanent facilities within Dease Inlet, Admiralty Bay, and Elson Lagoon will only be permitted on or under the water if they can meet all the following criteria: f) Design and construction of facilities shall minimize impacts to traditional subsistence uses, travel corridors, seasonally concentrated fish and wildlife resources. g) Daily operational activities, including use of support vehicles, watercraft, and aircraft traffic, alone or in combination with other past, present, and reasonably foreseeable activities, shall be conducted to minimize impacts to traditional subsistence uses, travel corridors, and seasonally concentrated fish and wildlife resources. h) The location of oil and gas facilities, including artificial islands, platforms, associated pipelines, ice or other roads, bridges or causeways, shall be sited and constructed so as to not pose a hazard to navigation by the public using traditional high-use subsistence-related travel routes into and through Dease Inlet, Admiralty Bay and Elson Lagoon as identified by the North Slope Borough. i) Demonstrated year-round oil spill response capability, including the capability of adequate response during periods of broken ice or open water, or the availability of alternative methods to prevent well blowouts during periods when adequate response capability cannot be demonstrated. Such alternative methods may include seasonal drilling restrictions, improvements in blowout prevention technology, equipment and/or changes in operational procedures, and "top-setting" of hydrocarbon-bearing zones.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
K. Area-Specific Lease Stipulations and Required Operating Procedures (continued)	**K-3 Lease Stipulation–Dease Inlet, Admiralty Bay, Elson Lagoon, and Associated Barrier Islands** (continued) j) Reasonable efforts will be made to avoid or minimize impacts related to oil spill response activities, including vessel, aircraft, and pedestrian traffic that add to impacts or further compound "direct spill" related impacts on area resources and subsistence uses. k) Before conducting open water activities, the lessee shall consult with the Alaska Eskimo Whaling Commission and the North Slope Borough to minimize impacts to the fall and spring subsistence whaling activities of the communities of the North Slope.
	K-4 Required Operating Procedure–Brant Survey Area **Objective:** Minimize the loss or alteration of habitat for, or disturbance of, nesting and brood rearing brant in the Brant Survey Area. **Requirement/Standard:** a) Aerial surveys for brant nesting colonies and brood-rearing areas shall be conducted for a minimum of 2 years before authorization of construction of permanent facilities. At a minimum, the survey area shall include the proposed development site(s) (i.e., the footprint) and the surrounding ½-mi area. These surveys shall be conducted following accepted BLM protocol. b) Development may be prohibited or activities curtailed within ½ mi of all identified brant nesting colonies and brood-rearing areas identified during the 2-year survey.
	K-5 Required Operating Procedure–Caribou Study Area **Requirement/Standard:** Before authorization of construction of permanent facilities, the lessee shall design and implement a study of caribou movement, especially during the insect season. The study would include a minimum of 3 years of current data on caribou movements. The study design shall be approved by the AO and should provide information necessary to determine facility (including pipeline) design and location. Lessees may submit individual study proposals or they may combine with other lessees in the area to do a single, joint study for the entire Caribou Study Area. Study data may be gathered concurrently with other activities.
	K-6 Lease Stipulation–Coastal Areas **Objective:** Minimize hindrance or alteration of caribou movement within caribou coastal insect-relief areas; to prevent contamination of marine waters; loss of important bird habitat; alteration or disturbance of shoreline marshes; and impacts to subsistence resources activities. **Requirement/Standard:** In the Coastal Area, permanent oil and gas facilities, including gravel pads, roads, airstrips, and pipelines established to support exploration and development activities shall be located at least ¾ mi inland from the coastline to the extent practicable. Where, as a result of technological limitations, economics, logistics, or other factors, a facility must be located within ¾ mi inland of the coastline, the practicality of locating the facility at previously occupied sites, such as the former Cape Simpson, Peard Bay, or Wainwright DEW-line sites, shall be considered. Use of existing sites within ¾ mi of the coastline shall also be acceptable where it is demonstrated that use of such sites will reduce impacts to shorelines or otherwise be environmentally preferable. All lessees/permittees involved in activities in the immediate area must coordinate use of these new or existing sites with all other prospective users.

Table II-03
Stipulations and Required Operating Procedures for the Preferred Alternative (continued)

Activity	Stipulations and Required Operating Procedures for the Preferred Alternative
K. Area-Specific Lease Stipulations and Required Operating Procedures (continued)	**K-7 Required Operating Procedure–Colville River Special Area** **Objective:** Prevent or minimize loss of raptor foraging habitat. **Requirement/Standard:** If necessary to construct permanent facilities within the Colville River Special Area, all reasonable and practicable efforts shall be made to locate permanent facilities as far from raptor nests as feasible. Within 15 mi of raptor nest sites, significant alteration of high quality foraging habitat shall be prohibited unless the lessee can demonstrate on a site-specific basis that impacts would be minimal or it is determined that there is no feasible or prudent alternative. Of particular concern are ponds, lakes, wetlands, and riparian habitats. Note: On a case-by case basis, and in consultation with appropriate Federal and State regulatory and resource agencies, essential pipeline and road crossings will be permitted through these areas where no other options are available.
	K-8 Lease Stipulation–Kasegaluk Lagoon Special Area **Objective:** Protect the habitat of the fish, waterfowl, and terrestrial and marine wildlife resources of Kasegaluk Lagoon, and protect traditional subsistence uses and public access to and through Kasegaluk Lagoon for current and future generations of North Slope residents. **Requirement/Standard:** Within the Kasegaluk Lagoon Special Area, oil and gas leasing is approved subject to the decision to defer the implementation of oil and gas leasing in the "Leasing Deferral Area." When leasing is implemented, no permanent oil and gas facilities are permitted within the boundary of the Special Area. Geophysical (seismic) exploration is authorized subject to the terms and conditions provided in other applicable ROP's. No restrictions are imposed on traditional subsistence activities and access for subsistence purposes.
L. Endangered Species Act Section 7 Consultation Stipulation	**L Lease Stipulation** The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

Note:
ROP = Required Operating Procedure

Table III-01
Discovered Fields, New Discovery Wells, and New Fields in and Adjacent to NPR-A

Field	Discovery	Play Group	Reserves	
			Oil (MMbo)	Gas (Bcfg)
Discovered Fields in NPR-A				
Umiat	1946	Brookian Topset	70	Unknown
Fish Creek	1949	Brookian Topset	Unknown	Unknown
South Barrow	1949	Beaufortian	None	26
Simpson	1950	Brookian Topset	12	Unknown
Meade	1950	Brookian Topset	Unknown	20
Wolf Creek	1951	Brookian Topset	Unknown	Unknown
Gubik	1951	Brookian Topset	Unknown	600
Square Lake	1952	Brookian Topset	Unknown	58
East Barrow	1974	Beaufortian	None	13
Walakpa	1980	Beaufortian	Unknown	32-180
Sikulik	1988	Beaufortian	None	12
New Discovery Wells in NPR-A				
Rendezvous A	2000	Proprietary	Test 360 bopd and 6.6 MMcfgpd	
Spark 1	2000	Proprietary	No Test Rates Announced	
Spark 1A	2000	Proprietary	Test 1,550 bopd and 26.5 MMcfgpd	
Moose's Tooth C	2001	Proprietary	No Test Rates Announced	
Lookout 1	2001	Proprietary	No Test Rates Announced	
Rendezvous 2	2001	Proprietary	No Test Rates Announced	
Fields Adjacent to NPR-A				
East Umiat	1963	Brookian Topset	Unknown	4
Colville River Unit-Satellite (Fiord)	1992	Beaufortian	55	Unknown
Alpine	1994	Beaufortian	500	60
Tabasco	1995	Brookian Topset	30	Unknown
Tarn	1997	Brookian Turbidities	42	39
Meltwater	2000	Brookian Turbidities	52	32 (est)

Key:
Bcfg = Billion cubic feet of gas.
bopd = barrels oil per day.

Mmbo = Million barrels of oil.
MMcfgpd = Millions cubic feet gas per day,

Sources:
Kornbrath et al., 1997; Bird, 1991; Alaska, Department of Natural Resources, 2000, *Pl/Dwight's Plus Drilling Wire*, 2001a, b, c; Gingrich, 2001.

Table III-02
Potential Hazardous Materials Sites and Abandoned Oil and Gas Exploration Wells in NW NPR-A

Site Name	Latitude	Longitude	Township	Range	Section	Meridian
Potential Hazardous Materials Sites						
Peard Bay DEW Station (LIZ C)	70°15.00N	158°15.00W	17 N	24 W	19	UM
Cape Simpson DEW (POW A)	71°04.00N	154°44.00W	20 N	11 W	26	UM
Skull Cliff Loran Annex DEW	70°02.00N	157°18.00W	18 N	21 W	--	UM
Elson Lagoon	--	--	23 N	18 W	--	UM
Abandoned Oil and Gas Exploration Wells						
Avak Test Well #1	71° 15.035N*	156° 28.064W*	22 N	17 W	20	UM
East Oumalik	69° 47.475N	155° 32.566W	5 N	15 W	13	UM
East Simpson #1	70° 55.060N	154° 37.300W	18 N	10 W	18	UM
East Simpson #2	70° 58.425N	154° 40.257W	19 N	11 W	23	UM
East Topagoruk Test Well #1	70° 34.689N	155° 23.305W	14 N	14 W	12	UM
Iko Bay Test Well #1	71° 10.287N*	156° 10.434W*	21 N	16 W	16	UM
Knifeblade Test Well #1	69° 09.067N*	154° 53.350W*	3 S	12 W	36	UM
Knifeblade 2 & 2a Test Wells	69° 08.316N*	154° 44.196W*	4 S	12 W	2	UM
Kuyanak Test Well #1	70° 55.863N*	156° 04.090W*	18 N	16 W	10	UM
Meade Test Well #1	70° 02.498N	157° 29.382W	8 N	22 W	19	UM
North Simpson Test Well #1	71° 03.190N	154° 58.439W	20 N	12 W	26	UM
Oumalik Test Well #1	69° 50.495N	155° 58.272W	6 N	16 W	30	UM
Peard Bay Well Site	70° 42.912N	159° 00.257W	16 N	28 W	25	UM
Simpson Test Well #1	70° 57.158N	155° 21.677W	19 N	11 W	32	UM
Simpson Core Test #1	70° 55.700N*	155° 17.367W*	18 N	13 W	10	UM
Simpson Core Test #2	70° 55.650N*	155° 17.500W*	18 N	13 W	10	UM
Simpson Core Test #3	70° 55.642N*	155° 17.500W*	18 N	13 W	10	UM
Simpson Core Test #4	70° 55.767N*	155° 15.867W*	18 N	13 W	10	UM
Simpson Core Test #5	70° 56.283N*	155° 16.750W*	18 N	13 W	3	UM
Simpson Core Test #6	70° 55.967N*	155° 18.550W*	18 N	13 W	9	UM
Simpson Core Test #7	70° 55.812N*	155° 18.150W*	18 N	13 W	9	UM
Simpson Core Test #8	70° 56.717N*	155° 17.633W*	18 N	13 W	3	UM
Simpson Core Test #9	70° 57.450N*	155°17.517W*	19 N	13 W	34	UM
Simpson Core Test #10	70° 57.717N*	155° 17.533W*	19 N	13 W	34	UM
Simpson Core Test #11	70° 58.817N*	155° 17.533W*	19 N	13 W	22	UM
Simpson Core Test #12	70° 58.317N*	155° 17.500W*	19 N	13 W	27	UM
Simpson Core Test #13	70° 58.979N	154° 38.429W	19 N	11 W	24	UM
Simpson Core Test #14	70° 58.813N	154° 39.333W	19 N	11 W	24	UM
Simpson Core Test #14a	70° 58.791N	154° 39.538W	19 N	11 W	24	UM
Simpson Core Test #15	70° 58.894N	155° 38.970W	19 N	11 W	24	UM
Simpson Core Test #16	70° 59.000N*	155° 37.867W*	19 N	11 W	24	UM
Simpson Core Test #17	70° 59.200N*	155° 38.550W*	19 N	11 W	24	UM
Simpson Core Test #18	70° 59.633N*	155° 40.217W*	19 N	11 W	23	UM
Simpson Core Test #19	70° 59.267N*	155° 42.950W*	19 N	11 W	22	UM
Simpson Core Test #20	70° 59.817N*	155° 35.317W*	19 N	10 W	19	UM

Site Name	Latitude	Longitude	Township	Range	Section	Meridian
Simpson Core Test #21	70° 00.483N*	154° 36.900W*	19 N	11 W	13	UM
Simpson Core Test #22	70° 59.533N*	154° 36.250W*	19 N	10 W	19	UM
Simpson Core Test #23	71° 02.067N*	154° 38.033W*	19 N	11 W	19	UM
Simpson Core Test #24	71° 01.767N*	154° 37.017W*	19 N	10 W	6	UM
Simpson Core Test #25	71° 56.167N*	154° 42.200W*	18 N	11 W	3	UM
Simpson Core Test #26	70° 55.919N	154° 42.684W	18 N	11 W	11	UM
Simpson Core Test 27	70° 55.893N	154° 41.649W	18 N	11 W	11	UM
Simpson Core Test #28	70° 59.273N	154° 36.201W	19 N	11W	19	UM
Simpson Core Test #29	70° 55.53N	154° 42.990W	18 N	11 W	11	UM
Simpson Core Test #30	70°55.571N	154° 42.320W	18 N	11 W	11	UM
Simpson Core Test #31	69°50.302N	155° 59.397W	19 N	11 W	36	UM
South Meade Test Well #1	70°36.53N	156° 53.23W	15 N	19 W	31	UM
South Simpson Test Well #1	70°48.412N	152° 58.915W	17 N	12 W	22	UM
Square Lake Test Well #1	69°31.828N	153° 06.170W	2 N	6 W	2	UM
Titaluk #1	69°25.350N	154° 34.067W	1 N	11 W	26	UM
Topagoruk Test Well #1	70°37.391N	155° 55.257W	15 N	16 W	25	UM
Tulageak Test Well #1	71°11.345N*	155° 44.228W*	21 N	14 W	7	UM
Tunalik Test Well #1	70°11.814N*	161° 04.319W*	10 N	36 W	20	UM
West Dease Test Well #1	71°09.524N	155° 37.983W	21 N	14 W	21	UM

Notes:

* Latitude/Longitude data are NAD27. All other data are WGS84 (NAD 83).

-- Not available or not applicable.

Table III-03
Onshore Climate of Alaska's North Slope

Activity	Arctic Foothills	Arctic Inland	Arctic Coast
Distance and Elevation			
Distance to the ocean (km)	150 to 300	200 to 150	<20
Elevation (m)	300 to 1,000	50 to 400	<50
Air Temperature (°C)			
Mean diurnal amplitude	10 to 15	8 to 14	4 to 8
Range (extreme low-high)	-0 to + 30	-65 to + 35	-50 to + 26
Mean annual	-8.6	-12.4 ± 0.4	-12.4 ± 0.4
Annual amplitude	16.8	21.1 ± 0.5	17.5 ± 1.2
Degree-Day (°C-day)			
Freeze	4,000	5,300 ± 70	4,930 ± 150
Thaw	800	930 ± 160	420 ± 120
Precipitation (mm) [1]			
Snow	156	126	113
Rain	168	103	85
Annual total	324	229	198
Seasonal Snow Cover			
Average starting date	27 Sept.	1 Oct.	27 Sept.
Range	11 Sept. to 15 Oct.	19 Sept. to 12 Oct.	4 Sept. to 14 Oct.
Average duration (days)	243	236	259
Range (extreme)	226 to 261	198 to 260	212 to 288
Average maximum thickness (cm)	--	43	32
Range (extreme)	--	28 to 70	10 to 83
Thaw Season			
Average starting time	28 May	25 May	6 June
Range (extreme)	18 May to 15 June	28 April to 6 June	26 May to 19 June
Average length (days)	122	129	106
Range (extreme)	104 to 139	105 to 167	77 to 153

Note:
[1] Natural Resources Conservation Service, 1994.

Key:
cm = Centimeters.
km = Kilometers.
m = Meters.
mm = Millimeters.
°C = Degrees Celsius.

Source:
Zhang, Osterkamp, and Stamnes, 1996.

Table III-04
Ambient Air Quality Standards for North Slope Alaska

Pollutant [1]	Average Time Criteria					
	Annual	24 hr	8 hr	3 hr	1 hr	30 min
Total Suspended Particulates [2]	60 [3]	150	*	*	*	*
Class II [4]	19 [3]	37	*	*	*	*
Carbon Monoxide	*	*	10,000	*	40,000	*
Ozone [5]	*	*	*	*	235 [6]	*
Nitrogen Dioxide	100 [7]	*	*	*	*	*
Class II [4]	25 [7]	*	*	*	*	*
Inhalable Particulate Matter (PM_{10}) [8]	50 [9]	150 [10]	*	*	*	*
Class II [4]	17	30	*	*	*	*
Lead	1.5 [11]	*	*	*	*	*
Sulfur Dioxide	80 [7]	365	*	1,300	*	*
Class II [4]	20 [7]	91	*	512	*	*
Reduced Sulfur Compounds [2]	*	*	*	*	*	50

Notes:
[1] All-year averaging times not to be exceeded more than once each year, except that annual means may not be exceeded.
[2] Alaska, Department of air-quality standard.
[3] Annual geometric mean.
[4] Class II standards refer to the Prevention of Significant Deterioration (PSD) Program. The standards are the maximum increments in pollutants allowed above previously established baseline concentrations.
[5] The State ozone standard compares with national standards for photochemical oxidants, which are measured as ozone.
[6] The 1-hour standard for ozone is based on a statistical rather than a deterministic allowance for an "expected exceedance during a year."
[7] Annual arithmetic mean.
[8] PM^{10} is the particulate matter less than 10 micrometers in aerodynamic diameter.
[9] Attained when the expected annual arithmetic mean concentration, as determined in accordance with 40 CFR 50 subpart K, is equal to or less than 50 µg/m³.
[10] Attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³, as determined in accordance with 40 CFR 50, subpart K, is equal to or less than 1.
[11] Maximum arithmetic mean averaged over a calendar quarter.

Key:
* No standards have been established.
µg/m³ = Micrograms per cubic meter.

Sources:
Alaska, Department of Environmental Conservation, 1982; 80, 18, AAC 50.010, 18 AAC 50.020; 40 CFR 52.21 (43 FR 26388); 40 CFR 50.6 (52 FR 24663); 40 CFR 51.166 (53 FR 40671).

Table III-05
Measured Air Pollutant Concentrations [9] at Prudhoe Bay, Alaska (1986-1996)

Pollutant [1]	Monitor Sites				National Standards [6]	Class II Increments [7]
	A [2]	B [3]	C [4]	D [5]		
Ozone						
Annual Max. 1 hr	115.8	180.3	115.6	100.0	235	—
Nitrogen Dioxide						
Annual	26.3	11.9	16.0	4.9	100	25
Inhalable Particulate Matter (PM_{10})						
Annual	—	—	10.5	—	50	17
Annual Max. 24 hr	29.3	—	25.0 [8]	—	150	30
Sulfur Dioxide						
Annual	2.6	—	5.2	2.6	80	20
Annual Max. 24 hr	10.5	—	26.2 [8]	13.1	365	91
Annual Max. 3 hr	13.1	—	44.5	55.0	1,300	512
Carbon Monoxide						
Annual Max. 8 hr	—	—	1,400	—	10,000	—
Annual Max. 1 hr	—	—	2,500 [8]	—	40,000	—

Notes:
[1] Lead was not monitored.
[2] Site CCP (Central Compressor Plant), Prudhoe Bay monitoring program, selected for maximum pollutant concentrations. All data is for years 1992-1996.
[3] Site Pad A (Drill Pad A), Prudhoe Bay monitoring program, site of previous monitoring, selected to be more representative of the general area or neighborhood. All data is for years 1992-1996.
[4] Site CPF-1 (Central Processing Facility), Kuparuk monitoring program, selected for maximum pollutant concentrations. Ozone, nitrogen dioxide, and sulfur dioxide are for years 1990-1992; PM_{10} and carbon monoxide data is for 1986-1987.
[5] Site DS-1F, Kuparuk monitoring program site selected to be representative of the general area or neighborhood. All data is for years 1990-1992.
[6] Applicable National Ambient Air Quality Standards. See Table III-08 for more specific definitions of air-quality standards.
[7] Class II PSD Standard Increments.
[8] Second highest observed value (in accordance with approved procedures for determining ambient-air quality).
[9] Micrograms per cubic meter.

— No data available.

Sources:

ERT Company, Inc., 1987; Environmental Science and Engineering, 1987; ENSR, 1996, as cited in U.S. Army Corps of Engineers, 1999.

Table III-06
NW NPR-A Land Cover Classifications

Minor Categories of Land Cover		Percent of NW NPRA covered by Category
Categories		
Water	**>80% Water**	
Ice	≥60% ice	2.3
Clear Water	depth >1 m and no turbidity	7.6
Turbid Water	depth ≤1 m or turbid	6.8
Aquatic	**>50% but <80% water and >10 cm deep**	
Carex aquatilis	>15% *Carex aquatilis*	2.0
Arctophila fulva	>15% *Arctophila fulva*	0.6
Flooded Tundra	**>25% but <50% water and <10 cm deep**	
Low Centered Polygons	≥5% sedge/grass	5.9
Non-Patterned	<5% sedge/grass	4.0
Wet Tundra	**>10% but <25% water**	6.4
Moist Tundra	**<10% water, <40% shrub (mostly sedges, grasses, rushes and moss/peat/lichen)**	
Sedge/Grass Meadow	≥50% sedge/grass and <40% tussock	6.6
Tussock Tundra	≥40% tussock cotton grass	23.5
Moss/Lichen	≥50% moss and/or lichen	1.7
Shrub	**<5% water and >40% shrub**	
Dwarf	≤30 cm in height	27.0
Low	>30 cm but <1.5 m in height	4.1
Tall	≥1.5 m in height	0.0
Barren Ground	**0-30% vegetation**	
Sparsely Vegetated	10-30% vegetated	0.3
Dunes/Dry Sand	<10% vegetation and <10% wet sand, mud, or rock	0.4
Other	<10% vegetation and <10% wet sand, mud, or rock	0.7

Key:
cm = Centimeter.
m = Meter.
≥ = Equal to or greater than.
> = Greater than.
≤ = Equal to or less than.
< = Less than.
% = Percent.

Table III-07
Occurrence and Representative Abundance and Density of Selected Birds in NW NPR-A

Common Name	Status[1]	Presence on the ACP [2]	Estimated Northern ACP Population Index [3]	Estimated Proportion Observed in Northern NW NPR-A in Mid-June (percent)[4]	Estimated Northern ACP Density Index (birds/km^2)[5]
Loons/Waterfowl					
Red-throated Loon	C	early June – late September	3,065	70	0.09
Pacific Loon	C	late May – late September	27,366	70	0.68
Yellow-billed Loon	U	mid May – mid September	2,898	59	0.03
Tundra Swan	C	mid May – early October	9,961	52	0.20
White-fronted Goose	C	mid May – mid September	120,202	59	2.20
Brant	FC	late May – early September	9,750	30	0.12
Canada Goose	FC	early June – mid September	18,758	11	0.32
Northern Pintail	A	late May – mid September	226,612	61	1.77
Scaup	C	late May – mid-September	33,074	68	0.12
Common Eider	C	late May – late October	2,682	31	0.01
King Eider	A	late May – October	12,884	42	0.42
Long-tailed Duck	A	late May – October	110,896	66	1.08
Scoters	C	late May – early September	11,253	25	0.01
Passerines					
Common Raven	U	Resident	66	—	0.002
Lapland Longspur	A	mid May – early September	—	—	24.3 - 64.2
Raptors					
Arctic Peregrine Falcon	U	mid April – mid September	—	—	—
Gyrfalcon	U	Resident	100	—	—
Rough-legged Hawk	U	late April – early October	600-1,000	—	—
Snowy Owl	FC	Resident	858	68	0.03
Seabirds					
Glaucous Gull	C	early May – November	17,575 [6]	62	0.40
Sabine's Gull	FC	late May – early September	11,096 [6]	65	0.21
Arctic Tern	C	late May – early September	22,330 [6]	68	0.31
Jaegers	FC	late May – mid September	7,102	61	0.14
Other					
Ptarmigan	C	Resident	—	—	4.0 - 9.0

Notes:

[1] Status: A = Abundant; C = Common; FC = Fairly Common; U = Uncommon;

[2] Resident = Present throughout the year.

[3] Database: Most species, average for late June-early July 1986-2002 Breeding Pair Survey area (Mallek, Platte, and Stehn, 2003); Common eider, nearshore area 1999-2002 (Dau and Hodges, 2003); King eider, Snowy owl, Common raven, mid-June average 1993-2002, Eider Survey area (Larned, Stehn, and Platte, 2003); Peregrine falcon, Gyrfalcon, Rough-legged hawk, 1999 (non-Colville River sightings; Ritchie and Wildman, 2000) and 2001 (Colville

River sightings; Swem, 2001, pers. commun.).

[4] Values calculated from mid-June Eider Survey data of Larned et al. (2001) except common eider from Dau and Hodges (2003). The Northwest NPR-A Planning Area = 60% of the total ACP eider survey area.

[5] June indices in Eider Survey area (Larned et al., 2001) except ptarmigan, longspur.

[6] 1992-2002 data.

Key:

ACP = Arctic Coastal Plain

km^2 = Square kilometer

— Data not available.

Sources:

Dau and Hodges, 2003; Larned et al., 2001; Larned, Stehn, and Platte, 2003; Mallek, Platte, and Stehn, 2003; Ritchie and Wildman, 2000; Swem, 2001, pers. commun.

Table III-08
Chronology of Activities for Selected Birds Nesting on the Arctic Coastal Plain in NW NPR-A

Species or Group	Arrival in NW NPR-A	Egg Laying	Hatch	Brood Rearing	Adult Molt	Fall Migration
Loons	late May-early June	mid June-late June	mid July-late July	mid July-early September	Winter	late August-September
Tundra Swan	mid May-late May	late May-early June	late June-mid July	late June-mid September	mid July-August	late September-early October
Brant	late May-early June	early June-late June	late June-mid July	late June-early September	mid July-mid August [1]	mid August-early September
Greater White-fronted Goose	mid May-early June	late May-mid June	late June-early July	late June-late August	mid July-early August [2]	mid August-mid September
Northern Pintail Males	late May	mid June-late June	early July-late July	early July-early September	mid July-early August	early August-mid September [4]
King Eider	mid May-late May	mid June-early July	early July-late July	early July-early August	early July-early August [5]	early August-late October [5]
Long-tailed Duck	late May	late June-early July	mid July-late July	mid July-early September	late July-early September [3]	late September-October

Notes:
1 Nonbreeding, failed breeder, molt migrant: late June-early August.
2 Nonbreeding young of the previous year and failed breeders molt in late June.
3 Includes males, nonbreeders, failed breeders, and females with broods.
4 Male pintails depart early July-early August.
5 Males stage in Beaufort Sea for 2-3 weeks before molt-migration starts in mid July; females stage in Beaufort Sea mid-July to late August before they depart in early August.

Sources:
Austin and Miller, 1995; Burgess and Stickney, 1994; Dickson, Suydam, and Balogh, 2000; Ely and Dzubin, 1994; Johnson and Herter, 1989; King, 1998, pers. comm.; Limpert and Earnst, 1994; North, 1994

Table III-09
Breeding Status and Population of Shorebirds in NW NPR-A

Species	Status	Abundance on ACP	Density (birds/km2)
Black-bellied Plover	B	U	3.2- 6.3
Lesser Golden-Plover	B	U	0.0-1.3
Bar-tailed Godwit	B	U	0.0-1.2
Red-necked Phalarope	B	C	4.2-9.7
Red Phalarope	B	U	4.0-20.6
Long-billed Dowitcher	B	U	0.0-3.7
Stilt Sandpiper	B	R	--
Ruddy Turnstone	B	U	0.0-0.2
Dunlin	B	U/C	0.5-21.1
Semipalmated Sandpiper	B	C	6.9-7.0
Baird's Sandpiper	B	U/FC	--
Pectoral Sandpiper	B	C	22.9-24.1
Buff-breasted Sandpiper	B	R	--

Note:
-- Data not available.

Key:
A = Abundant
B = Breeding
C = Common
FC = Fairly Common
R = Rare
U = Uncommon

Sources:
Derksen, Rothe, and Eldridge, 1981; Johnson and Herter, 1989; Pitelka, 1974.

Table III-10
Southcentral Alaska and Fairbanks Employment Estimates (1995-2000)

Region	Employment Estimates (in thousands) (Nonagricultural Wage and Salary Employment)					
	1995	1996	1997	1998	1999	2000
Anchorage-Matanuska Region	131	132	135	141	144	148
Kenai Peninsula Borough	16	16	16	17	17	--
Fairbanks North Star Borough	31	31	32	33	33	34
Three-area subtotal	178	179	183	191	194	199 [1]
Total	**261**	**264**	**269**	**275**	**278**	**284**

Notes:
[1] Assumes 17,000 employed in Kenai Peninsula Borough.
-- Data not available as of November, 2001.

Source:
Alaska Department of Labor and Workforce Development, Research and Analysis Section.

Table III-11
North Slope Borough Area Employment by Industry [1] for Years 1990-1998 [2] (Nonagricultural Wage and Salary Employment)

Industries	1990	1991	1992	1993	1994	1995	1996	1997	1998
Total Industries	9,185	9,208	8,400	8,823	9,570	9,114	9,149	9,102	9,404
Mining	5,126	5,018	4,411	4,213	4,617	4,436	4,431	4,158	4,753
Construction	373	484	387	361	623	415	344	354	371
Manufacturing	0	0	0	0	0	2	3	7	8
Transportation, Communication, & Utilities	362	364	241	238	378	403	428	440	435
Wholesale Trade	0	0	0	0	0	0	0	0	0
Retail Trade	252	205	213	487	522	481	524	540	567
Finance, Ins., R.E.	183	177	167	166	166	145	143	175	177
Services	976	1,031	1,008	1,308	949	804	890	1,046	1,035
Government	1,901	1,929	1,964	2,040	2,315	2,428	2,385	2,293	2,068
Federal	107	98	78	57	70	78	43	38	28
State	32	64	60	59	58	58	57	52	56
Local	1,762	1,767	1,827	1,925	2,187	2,293	2,286	2,204	1,983
Miscellaneous	0	0	5	0	0	0	1	1	1
Total (without mining)	**4,059**	**4,190**	**3,989**	**4,610**	**4,953**	**4,678**	**4,718**	**4,854**	**4,651**

Notes:
[1] In the NSB mining is completely oil and gas industry employment.
[2] Data for 1999 and 2000 not available as of November 2001.

Source:
Alaska Department of Labor and Workforce Development, Research and Analysis Section.

Table III-12
North Slope Borough Employment by Employer and by Community [1]

Employer	*NSB**		Anaktuvuk Pass		Atqasuk		Barrow		Kaktovik	
	Employed	%**	Employed	%	Employed	%	Employed	%	Employed	%
Village Corporation [2]	413	17	16	20	5	9	81	5	15	20
NSB School District	296	12	16	20	5	9	176	11	7	9
NSB Government	998	41	36	45	34	61	671	44	35	46
City Government	59	2	0	0	0	0	30	2	4	5
State and Federal Government	74	3	2	3	2	4	53	3	3	4
All Other Employees	606	25	10	13	10	18	530	34	12	16
Total (without mining)	**2,476**	**100** [3]	**80**	**100** [3]	**66**	**100** [3]	**1,541**	**100** [3]	**76**	**100** [3]

Employer	Nuiqsut		Point Hope		Point Lay		Wainwright	
	Employed	%	Employed	%	Employed	%	Employed	%
Village Corporation [2]	35	27	71	32	6	8	48	20
NSB School District	8	6	33	15	16	20	28	12
NSB Government	38	31	61	27	44	55	70	29
City Government	7	7	9	4	1	2	0	0
State and Federal Government	3	2	6	3	2	3	9	4
All Other Employees	35	28	42	19	11	14	84	35
Total (without mining)	**124**	**100** [3]	**132**	**100** [3]	**80**	**100** [3]	**235**	**100** [3]

Notes:
[1] Results represent only those individuals responding to the census survey.

[2] Includes Arctic Slope Regional Corporation.

[3] Percentages may not total 100 because of rounding.

Key:

* **=** North Slope Borough area.

****** **=** Percent of survey respondents only.

Source:

North Slope Borough, 1999**.**

Table III-13
1998 NSB* Employment by Employer and Employee Ethnicity [1]

Employer	Inupiat	Caucasian	Other Minorities	Total
Federal Government	17	11	11	39
State Government	9	19	7	35
City Government	43	8	6	57
NSB Government	509	217	151	877
NSB School District	134	108	47	289
NSB CIP	82	23	7	112
Oil Industry	10	4	2	16
Private Construction	44	14	8	66
ASRC or Subsidiary	90	26	16	132
Village Corporations	225	33	17	275
Financial/Insurance	0	1	0	1
Transportation	14	17	12	43
Communications	0	4	1	5
Trade	14	9	12	35
Service	28	36	19	83
Ilisagvik College	21	36	12	69
Other	171	68	45	285
Total	*1,411*	*634*	*373*	*2,418*

Notes:
[1] Results include only those individuals responding to the census survey.
* North Slope Borough area.

Key:
ASRC = Arctic Slope Regional Corporation.
CIP = Capital Improvement Program.

Source:
North Slope Borough, 1999

Table III-14
1998 North Slope Labor Force by Community

Employment Status	Total NSB* Labor Force	Anaktuvuk Pass	Atqasuk	Barrow	Kaktovik	Nuiqsut	Point Hope	Point Lay	Wainwright
Labor Force	3,823	147	98	2,508	141	176	356	100	374
Permanent/Full-time	2,114	58	45	1,565	62	85	134	50	140
Temporary/Seasonal	523	21	11	287	19	56	53	20	54
Part-time	222	12	8	91	8	13	57	9	32

Note:
* North Slope Borough area.

Source:
North Slope Borough, 1999.

Table III-15
1998 North Slope Borough Unemployment and Underemployment by Community

Employment Status	NSB*	Percent of North Slope Borough Labor Force							
		Anaktuvuk Pass	Atqasuk	Barrow	Kaktovik	Nuiqsut	Point Hope	Point Lay	Wainwright
Unemployment (%)	16	7	40	10	15	10	23	16	13
(The number of people who believed they were underemployed)									
Underemployment (%)	13	7	6	12	14	27	17	12	5
(Those who worked less than 40 weeks in 1998)									
Underemployment (%)	27	23	44	24	41	62	46	39	33

Note:
* North Slope Borough area.

Source:
North Slope Borough, 1999.

Table III-16
1998 Annual Household Subsistence Expenditure by Ethnicity in the North Slope Borough

Amount (in dollars)	Number of Households			
	Inupiat	Caucasian	Other Minorities	Total
0	90	11	7	108
1 to 500	139	20	11	170
501 to 1,000	103	12	10	125
1,001 to 2,000	82	6	7	95
2,001 to 4,000	97	9	1	107
4,001 to 6,000	97	10	2	109
6,001 to 8,000	78	3	0	81
8,001 to 10,000	43	2	1	46
10,001 or More	112	6	1	119
Total	**841**	**79**	**40**	**960**

Note:
Results include only those households responding to the census survey and to the question, "During the recent calendar year, what is your best estimate of the money you spent for subsistence activities?"

Source:
North Slope Borough, 1999.

Table III-17
Percentages of Edible Pounds of Subsistence Resources for Point Lay, Wainwright, Barrow, Atqasuk, and Nuiqsut

Resource	Percent of Edible Pounds of Specific Resources						
	Point Lay	Wainwright	Barrow		Atqasuk	Nuiqsut	
	1994-95	1994-95	1962-82	1980-90	1994-95	1993	1994-95
Bowhead Whale	0.0	29.0	21.3	37.7	—	28.7	0.0
Caribou	17.1	23.7	58.2	26.6	57.0	30.6	58.0
Pacific Walrus	4.2	33.6	4.6	9.0	2.0[2]	0.0	—
Bearded Seal	2.1	3.7	4.3	2.4	—	2.7	2.0[3]
Hair Seal	2.1	1.1	4.3	2.4	—	2.7	2.0[3]
Beluga Whale	60.4	0.0	0.5	0.0	—	0.0	—
Polar Bear	0.6	1.7	0.3	1.5	—	0.0	—
Moose	2.2	0.0	0.3	3.4	—	1.6	5.0
Dall Sheep	0.0	0.0	0.0	*	—	0.0	—
Muskox	0.0	0.0	—	—	—	0.0	—
Small Land Mammals	—[4]	—[4]	0.1	*	—[4]	*	—[4]
Birds[5]	5.4	2.1	0.9	3.5	3.0	1.5	5.0
Fish	2.7	4.9	6.6	11.3	37.0	33.7	30.0
Vegetation	0.2	—	—	—	1.0	1.4	*
Total Harvest (in pounds)	**107,321**	**351,581**	**928,205**	**702,660**	**—[6]**	**267,818**	**—[6]**
Per Capita Harvest (in pounds)	890.1	751.24	540.0	233.10	—	741.75	—

Notes:
[1] Averaged for the period.
[2] Ringed and bearded seals provided 2%.
[3] Represents all marine mammals harvested in 1994-95: 1 polar bear and 23 ringed seals.
[4] Not harvested for food.
[5] Birds and eggs.
[6] Not calculated in report.

Key:
* = less than 0.1 percent.
— = Data not available.

Sources:
Stoker, 1983, as cited by ACI/Braund, 1984; S.R. Braund and Associates, 1989b; State of Alaska, Department of Fish and Game, 1995b; Brower and Opie, 1997a,b; Opie, Brower, and Bates, 1997.

Table III-18
North Slope Subsistence Resources by Common Name, Inupiaq Name, and Scientific Name

Resource	Inupiaq Name	Scientific Name	Location PL[1]	W[2]	B[3]	K[4]	N[5]
Marine Mammals							
Bearded seal	Ugruk	*Erignathus barbatus*	√	√	√	√	√
Ringed seal	Natchiq	*Phoca hispida*	√	√	√	√	√
Spotted seal	Qasigiaq	*Phoca largha*	√	√	√	√	√
Ribbon seal	Qaigulik	*Phoca fasciata*	√	√	√	√	—
Beluga whale	Quilalugaq	*Delphinapterus leucas*	√	√	√	√	—
Bowhead whale	Agviq	*Balaena mysticetus*	√	√	√	√	√
Polar bear	Nanuq	*Ursus maritimus*	√	√	√	√	√
Walrus	Aiviq	*Odobenus rosmarus*	√	√	√	√	—
Terrestrial Mammals							
Caribou	Tuttu	*Rangifer tarandus*	√	√	√	√	√
Moose	Tuttuvak	*Alces alces*	—	√	√	√	√
Brown bear	Aklaq	*Ursus arctos*	√	√	√	√	√
Dall sheep	Imnaiq	*Ovis dalli*	—	√	√	√	√
Musk ox	Uminmaq	*Ovibus moschatus*	—	√	—	√	√
Arctic fox (Blue)	Tigiganniaq	*Alopex lagopus*	√	√	√	√	√
Red fox [6]	Kayuqtuq	*Vulpes fulva*	√	√	√	√	√
Porcupine	Qinagluk	*Erethizon dorsatum*	—	√	√	—	—
Ground squirrel	Siksrik	*Spermophilus parryii*	√	√	√	√	√
Wolverine	Qavvik	*Gulo gulo*	√	√	√	√	√
Weasel	Itigiaq	*Mustela erminea*	—	√	—	√	√
Wolf	Amaguk	*Canis lupus*	√	√	√	√	√
Marmot	Siksrikpak	*Marmota broweri*	√	√	—	√	√
Fish							
Salmon (ns)	—	—	√	√	√	√	√
Chum	Iqalugruaq	*Oncorhynchus keta*	√	√	√		√
Pink (humpback)	Amaqtuuq	*Oncorhynchus gorbuscha*	—	√	√	√	√
Silver (coho)	Iqalugruaq	*Oncorhynchus kisutch*	—	—	—	—[7]	—
King (chinook)	—	*O. tshawytscha*	—	—	—	—	—
Sockeye	—	*Oncorhynchus*	—	—	—	—	—
Fish (continued)							
Other coastal fish	—	—	—	—	—	—	—
Capelin	Pagmaksraq	*Mallotus villosus*	—	—	—	—	—
Rainbow smelt	Ilhuagniq	*Osmerus mordax*	√	√	√	—	√
Arctic cod	Iqalugaq	*Boreogadus saida*	—	√	√	√	√
Tomcod	Uugaq	*Eleginus gracilis*	√	√	√	√	—
Flounder (ns)	Nataagnaq	*Liopsetta glacialis*	—	—	—	—	—
Birds							
Snowy owl	Ukpik	*Nyctea scandiaca*	—	√	—	—	√
Red-throated loon	Qaqsraupiagruk	*Gavia stellata*	√	√	√	—	—
Tundra swan	Qugruk	*Cygnus columbianus*	—	√	—	√	√
Eider	—	—	—	—	—	—	—
Common eider	Amauligruaq	*Somateria mollissima*	√	√	√	√	√
King eider	Qinalik	*Somateria spectabilis*	√	√	√	√	√
Spectacled eider	Tuutalluk	*Somateria fischeri*	√	√	√	—	—
Steller's eider	Igniqauqtuq	*Polysticta stelleri*	√	√	√	—	—
Other ducks (ns)	Qaugak	—	—	√	√	√	—
Pintail	Kurugaq	*Anas acuta*	√	√	—	√	—
Long-tailed ducks	Aaqhaaliq	*Clangula hyemalis*	√	√	√	√	—
Surf scoter	Aviluktuq	*Melanitta perspicillata*	—	√	√	—	—
Goose	—	—	—	—	—	—	—
Brant	Niglingaq	*Branta bernicla n.*	√	√	√	√	√
White-fronted g.	Niglivialuk	*Anser albifrons*	√	√	√	√	√
Snow goose	Kanuq	*Chen caerulescens*	√	√	√	√	√
Canada goose	Iqsragutilik	*Branta canadensis*	√	√	√	√	√
Ptarmigan (ns)	Aqargiq	*Lagopus sp.*	—	√	√	√	√
Willow ptarmigan	Nasaullik	*Lagopus lagopus*	√	√	√	—	—
Other Resources							
Berries (ns)	—	—	√	√	√	√	√
Blueberry	Asiaq	*Vaccinium*	√	√	√	—	—

(red)		*nerka*								*uliginosum*					
Whitefish (ns)	Aanaakliq	*Coregonus sp.*	—	√	√	√	—	Cranberry	Kimminnaq	*Vaccinium vitis-idaea*	—	√	√	—	—
Round w.f.	Aanaakliq	*Prosopium cylindraceum*	—	√	√	—	—	Salmonberry	Aqpik	*Rubus spectabilis*	—	√	√	—	—
Broad w.f.	Aanaakliq	*Coregonus nasus*	—	√	√	√	√	**Bird eggs (ns)**	Mannik	—	√	√	√	√	—
Humpback w.f.	Pikuktuuq	*Coregonus clupeaformis*	—	√	√	√	√	Gull eggs	—	—	—	√	—	√	—
Least cisco	Iqalusaaq	*Coregonus sardinella*	—	√	√	√	√	Geese eggs	—	—	—	√	—	√	—
Bering,Arctic cisco	Qaaktaq	*Coregonus autumnalis*	√	√	√	√	√	Eider eggs	—	—	—	√	√	√	—
Other freshwater fish								**Greens/roots (ns)**	—	—	—	√	√	√	√
Arctic grayling	Sulukpaugaq	*Thymallus arcticus*	√	√	√	√	√	Wild rhubarb	Qunulliq	*Oxyric digyna*	—	√	√	—	—
Arctic char	Iqalukpik	*Salvelinus alpinus*	√	√	√	√	√	Wild chives	Quagaq	*Allium schoenoprasum*	—	√	√	—	—
Burbot (Ling cod)	Tittaaliq	*Lota lota*	—	√	√	√	√	Clams	Imaniq	—	√	√	√	—	—
Lake trout	Iqaluaqpak	*Salvelinus narnaycush*	—	√	√	√	√	Crab	Puyyugiaq	—	√	√	—	√	√
Northern pike	Siulik	*Esox lucius*	—	√	√	—	—	Wood	—	—	—	—	—	√	√
—	—	—	—	—	—	—	—	Fresh water	Imiq	—	—	√	√	—	—
—	—	—	—	—	—	—	—	Fresh water ice	Sikutaq	—	—	√	√	—	—
—	—	—	—	—	—	—	—	Sea ice	Siku	—	—	√	√	—	—

Notes:

[1] Point Lay resources used 1987.

[2] Wainwright resources used 1987–1990.

[3] Barrow resources used 1987–1990.

[4] Atqasuk resources used 1992–1993.

[5] Nuiqsut resources used 1993.

[6] Red fox (Cross, Silver).

[7] Harvest of silver, king, and sockeye salmon is rare.

An unchecked box might mean a resource was not used or, especially in the case of “Other Resources,” the resource might have been used but use was reported as “berries” rather than “blueberries” for example.

Key:

ns = Nonspecified.

w.f. = Whitefish.

— = Not available or not applicable.

Source:

S.R. Braund and Associates and University of Alaska, Anchorage, Institute of Social and Economic Research, 1993; Pedersen,1995a,b; S.R. Braund and Associates.,1996.

Table III-19
Proportion of Inupiat Household Food Obtained from Subsistence

All Surveyed Households in the North Slope Borough				
Proportion *	**1977**	**1988**	**1993**	**1998**
None	13	20	18	2
Less Than Half	42	31	25	29
Half	15	14	15	22
More Than Half	30	35	42	47

Note:
***** Measured in percent.

Source:
North Slope Borough, 1999.

Table III-20
Participation in Successful Resource Harvests by Percentage of Households in Barrow and Nuiqsut

Resource	Percentage of Households	
	Barrow [1]	Nuiqsut [2]
Marine Mammals	76	37
Terrestrial Mammals	77	76
Fish	60	81
Birds	65	76
Bowhead Whale	75	5
Walrus	29	0
Bearded Seals	46	7
Ringed Seals	19	31
Spotted Seals	1	2
Polar Bear	7	2
Caribou	77	74
Moose	7	10
Brown Bear	0	8
Dall Sheep	3	0
Wolverine	1	16
Arctic Fox	5	13
Red Fox	*	23
Whitefish (all species)	54	74
Grayling	21	65
Arctic Char	5	31
Salmon (all species)	16	36
Burbot	10	57
Geese	40	73
Eiders	52	36
Ptarmigan	26	45

Total Households	**87%**	**90%**

Notes:
[1] Resources used from 1987-1990.
[2] Resources used in 1993.
* Less than 0.1%.

Sources:
S.R. Braund and Associates and UAA, ISER, 1993; Pedersen, 1995a, b; S.R. Braund and Associates, 1996.

Table III-21
1992 Point Lay Subsistence-Harvest Participation Rates and Resources

Activity	Number of Households				Percentage of Households			
	Often	Sometimes	Vacation	Not At All	Often	Sometimes	Vacation	Not at All
Fall Whaling	2	2	0	36	5	5	0	90
Fish	23	13	0	4	58	33	0	10
Helped Whaling Crew	9	5	0	26	23	13	0	65
Hunt Caribou	31	5	0	4	78	13	0	10
Hunt Moose, Bear or Sheep	6	13	1	20	15	33	3	50
Hunt Seal	24	6	0	10	60	15	0	25
Hunt Walrus	19	11	0	10	48	28	0	25
Hunt Waterfowl and Eggs	25	10	0	5	63	25	0	13
Make Sleds or Boats	12	18	0	10	30	45	0	25
Pick Berries	14	11	0	15	35	28	0	38
Sew Skins, Make Parkas	7	8	0	25	18	20	0	63
Spring Whaling	7	4	0	29	18	10	0	73
Trap	4	7	0	29	10	18	0	73

Note:
Households participating in survey (n = 40). Total households = 58.

Source:
Fuller and George, 1992.

Table III-22
1989 Wainwright Subsistence-Harvest Summary

Subsistence Resource	Total Number Harvested	Edible Pounds Harvested			Household Participation [1] (by percent)
		Total (in lbs)	Household Harvest (Mean lbs)	Per Capita (in lbs)	
Marine Mammals					
Total Marine Mammals	— [2]	243,595	2,047.01	520.50	78.0
Bowhead Whale	2	102,132	858.25	218.23	66.0
Pacific Walrus	153	118.370	994.71	252.93	37.0
Polar Bear	12	5,952	50.02	12.72	8.0
Bearded Seal	74	13,025	109.45	27.83	34.0
Ringed Seal	86	3,612	30.35	7.72	28.0
Spotted Seal	12	505	4.24	1.08	6.0
Terrestrial Mammals					
Large Land Mammals	713	83,387	700.73	178.18	66.0
Brown Bear	2	200	1.68	0.43	2.0
Caribou	711	83,187	699.05	177.75	66.0
Small Land Mammals/Furbearers	47	2	0.02	0.00	—
Arctic Fox	8*	0	0.00	0.00	6.0
Red Fox	22*	0	0.00	0.00	2.0
Land Otter	1*	0	0.00	0.00	1.0
Parka Squirrel	7	2	0.02	0.00	1.0
Weasel	9*	0	0.00	0.00	4.0
Wolf	2*	0	0.00	0.00	2.0
Wolverine	7*	0	0.00	0.00	2.0
Fish					
Total Fish	64,567	17,385	146.09	37.15	62.0
Total Salmon	180	1,044	8.77	2.23	7.0
Chum Salmon	68	415	3.49	0.89	4.0
Chum Salmon (other gear)	51	306	2.57	0.65	5.0
Chinook Salmon	9	162	1.36	0.35	4.0
Pink Salmon	52	161	1.35	0.34	4.0
Total Non-salmon	64,387	16,341	137.32	34.92	—
Rainbow Smelt	54,083	6,490	54.54	13.87	53.0
Pacific Tom Cod	134	134	1.13	0.29	1.0
Flounder	4	2	0.02	0.00	3.0
Sculpin	7	5	0.04	0.01	2.0
Burbot	51	203	2.35	0.73	10.0
Grayling	3,006	2,405	20.21	5.14	28.0
Total Whitefish	7,102	7,102	59.68	15.18	23.0
Cisco	7,102	7,102	59.68	15.18	—
Bering Cisco	426	426	3.58	0.91	3.0
Least Cisco	6,676	6,676	56.10	14.26	22.0
Birds					
Total Birds and Eggs	2,735	7,211	60.60	15.41	57.0
Migratory Birds	2,539	7,075	59.45	15.12	—
Ducks	1,099	1,648	13.85	3.52	48.0
Eider	1,097	1,646	13.83	3.52	48.0
Common Eider	29	44	1.37	0.09	7.0
King Eider	816	1,225	10.29	2.62	36.0
Spectacled Eider	246	369	3.10	0.79	26.0
Steller's Eider	3	5	0.04	0.01	3.0

Subsistence Resource	Total Number Harvested	Edible Pounds Harvested			Household Participation [1] (by percent)
		Total (in lbs)	Household Harvest (Mean lbs)	Per Capita (in lbs)	
Unknown Eider	3	5	0.04	0.01	1.0
Oldsquaw	2	4	0.03	0.01	1.0
Geese	1,439	5,425	45.59	11.59	45.0
Brant	700	2,100	17.65	4.49	36.0
Canada Geese	2	10	0.08	0.02	1.0
Snow Geese	7	31	0.26	0.07	4.0
White fronted	730	3,286	27.61	7.02	29.0
Seabirds and Loons	1	4	0.03	0.01	1.0
Ptarmigan	196	137	1.15	0.29	15.0

Notes:
[1] Percentage of households participating in subsistence harvest.
[2] Not calculated in report.
* Not eaten.
Number of households in the sample = 119
Number of households in the community = 119.
— = Data not available

Source:
State of Alaska, Department of Fish and Game, 1995b, 1996.

Table III-23
Annual Beluga Whale Harvest for Point Lay, Wainwright, and Barrow (1980-2001)

Year	Number of Whales		
	Point Lay	Wainwright	Barrow
1980	[20] [1]	--	--
1981	[20] [1]	--	--
1982	28 [2]	--	--
1983	[20] [1]	--	--
1984	[20] [1]	--	--
1985	[20] [1]	--	--
1986	[20] [1]	--	--
1987	22 [3] [35] [4]	47	0
1988	40	3	0
1989	16	0	1
1990	62	0	0
1991	35	5	1
1992	24 [5]	0	0
1993	77	0	2
1994	56	0	5
1995	31	0	0
1996	41	0	2
1997	3	4	8
1998	48	38	1
1999	47	3	1
2000	0	0	1
2001	34	23	1

Notes:
[1] Average harvest 1980-1986; Lowry et al., 1989.
[2] Braund and Burnham, 1984.
[3] Data reported to the Alaska Beluga Whale Committee (ABWC) 2002.
[4] Data from interviews in the Point Lay Case Study, Impact Assessment, 1989.
[5] Fuller and George, 1997 ABWC 2002.
[ ] = estimate derived from interviews with residents.
-- = Data not available.

Source:
ABWC, 2002.

Table III-24
1987 Point Lay Subsistence-Harvest Summary

Subsistence Resource	Number Harvested	Edible Pounds Harvested			Household Participation (Percent)[2]
		Total (lbs)[1]	Household Harvest (mean lbs)	Per capita (lbs)	
Marine Mammals					
Total Marine Mammals	—[3]	76,853	1,787.27	637.41	79.6
Beluga Whale	—	64,929*	1,509.98	538.52	74.0
Pacific Walrus	6	4,603	107.04	38.18	19.0
Polar Bear	1	661	15.38	5.48	3.1
Bearded Seal	13	2,341	54.44	19.42	26.7
Ringed Seal	49	2,078	48.32	17.23	27.0
Spotted Seal	53	2241	52.12	18.59	29.2
Terrestrial Mammals					
Large Land Mammals	167	21,309	495.56	176.74	71.8
Brown Bear	4	427	9.92	3.54	9.9
Caribou	157	18,418	428.33	152.76	71.8
Moose	5	2,464	57.31	20.44	15.6
Small Land Mammals/Furbearers	292	117	2.72	0.97	29.2
Arctic Fox	0	0	0.00	0.00	0.0
Red Fox	0	0	0.0	0.00	0.0
Marmot	0	0	0.00	0.00	0.0
Parka Squirrel	285	117	2.72	0.97	22.7
Weasel	0	0	0.00	0.00	0.0
Wolf	0	0	0.00	0.00	0.0
Wolverine	7*	0	0.00	0.00	6.5
Fish					
Total Fish	2,807	2,983	69.38	24.74	49.1
Total Salmon	147	425	9.88	3.52	26.4
Chum Salmon	40	242	5.64	2.01	19.5
Pink Salmon	107	182	4.24	1.51	16.4

Total Nonsalmon	2,660	2,559	59.50	21.22	49.1
Herring	27	5	0.11	0.04	3.1
Smelt	265	37	0.86	0.31	6.8
Flounder	192	96	2.35	0.73	7.0
Arctic Char	167	552	12.83	4.58	23.3
Grayling	1,985	1,786	41.54	14.81	36.6
Broad Whitefish	24	83	1.92	0.69	5.6
Birds					
Total Birds and Eggs	3,531	5,836	135.73	48.40	77.4
Migratory Birds	1,871	5,327	123.88	44.18	77.4
Ducks	933	1,399	32.54	11.60	65.2
Eider	702	1,054	24.50	8.74	65.2
Oldsquaw	221	331	7.69	2.75	19.3
Pintail	10	15	0.34	0.12	5.6
Geese	3,944	16,289	17.38	5.40	13.0
Brant	499	2,096	48.73	17.38	55.9
Canada Geese	435	1,826	42.46	15.14	52.8
Seabirds and Loons	4	7	0.15	0.06	3.4
Murre	4	7	0.15	0.06	3.4
Ptarmigan	473	331	7.70	2.75	51.6
Eggs	1,188	178	4.14	1.48	54.2

Notes:
[1] Household harvests were unknown but were estimated from the known community harvest. This introduces an artificially high variance into the total pounds statistics.
[2] Percentage of households participating in subsistence harvest.
[3] Not calculated in report.
* Not eaten.
— Data not available.
Number of households in the sample (n = 25). Number of households in the community = 43.

Source:

State of Alaska, Department of Fish and Game, 1995b, 1996.

Table III-25
Annual Walrus Harvest for Point Lay, Wainwright, and Barrow (1982-2001)

Year	Number of Walrus		
	Point Lay	Wainwright	Barrow
1982	--	--	--
1983	10-15 [1]	--	--
1984	--	--	--
1985	--	--	--
1986	--	--	--
1987	6 [2]	--	54 [3]
1988	0	0 [59] [4]	1 [62] [5]
1989	0	43 [153] [6]	11 [101] [7]
1990	0	0	7
1991	0	32	23
1992	0	33 [82] [8]	22 [206] [9]
1993	1	44	31
1994	1	68	16
1995	4	83	10
1996	4	23	8
1997	0	48	35
1998	8	69	22

1999	8	48	17
2000	5	34	17
2001	3	65	--

Notes:
[1] Braund and Burnham, 1984.
[2] CPDB, 1996.
[3, 4, 5, 6, 7] Braund, 1993.
[8, 9] Fuller and George, 1997.
Some cells display two harvest numbers. Brackets indicate estimates derived from interviews with residents. The differences in harvest numbers are based on the differences in interview data vs. tagging data. Not all walrus ivory is tagged and there is always a discrepancy between tagged numbers based on reporting and harvested numbers based on interviews with hunters (Braund, 1993).
[ ] Indicate estimate derived from interviews with residents.

Source:
USDOI, Fish and Wildlife Service, 1997, 2002.

Table III-26
Annual Polar Bear Harvest for Point Lay, Wainwright, Barrow, and Nuiqsut (1983 to 2001)

Harvest Season[1]	Number of Polar Bear [2]			
	Point Lay	Wainwright	Barrow	Nuiqsut
1983/84	8	33	27	0
1984/85	0	18	31	1
1985/86	7	8	13	4
1986/87	1	13	21	5
1987/88	2	9	14	1
1988/89[3]	2	15	29 (30)	3 (2)
1989/90	1	9	14	0
1990/91	2	6	11	0
1991/92	2	3	22 (23)	2
1992/93	2	8	26	0
1993/94	1	10	27 (26)	5
1994/95	1	6	9 (11)	1
1995/96	1	14	19 (16)	1
1996/97	6	8	39 (32)	0
1997/98	3	6	17 (15)	2
1998/99	0	2	16 (11)	3 (2)
1999/00	3	4	18 (13)	7 (5)
2000/01	1	10	25	4

Key:
[1] Harvest season is July 1 to June 30.
[2] Numbers are reported number of bears harvested annually. Numbers in parentheses are number of bear tags actually collected by FWS annually.
[3] Atqasuk also harvested 2 bears during the 1988/89 season.

Sources:
Schliebe, Amstrup, and Garner,

Table III-27
Annual Bowhead Whale Subsistence Harvest for Wainwright, Barrow, and Nuiqsut (1982-2001).

Year	Number of Whales		
	Wainwright	Barrow[1]	Nuiqsut[2]
1982	2	0	1
1983	2	2	1
1984	2	4	0
1985	2	5	1 [3]
1986	3	8	1
1987	4	7	1
1988	4	11	0
1989	2	10	2
1990	4	11	1
1991	4	13	2
1992	0	22	2
1993	4 + 1 stinker	6	3
1994	4	16	0
1995	5	16	4
1996	3	24	2
1997	3	30	3
1998	3	25	4
1999	5	24	3
2000	5	18	4
2001	6	28	3

Notes:
[1] Atqasuk whalers participated in the subsistence bowhead hunt by joining Barrow whaling crews.
[2] Before 1982 most Nuiqsut hunters who wanted to hunt whales went spring whaling with one of the other coastal villages.
[3] According to ADF&G (1993a), two Nuiqsut households worked on a successful Barrow whaling crew and received shares equivalent to one-tenth of a whale each (whale weight = 19,625 lbs).

Sources:
Stoker, 1983, as cited in ACI/Braund, 1984; State of Alaska, Dept. of Fish and Game, 1993a,b; George et al., 1993; Gusey, 1993; Philo et al., 1994; Stoker and Krupnik, 1993; Alaska Eskimo Whaling Commission, 1993, 1994, 1995; S.R. Braund and Associates, 2002; Impact Assessment, Inc., 1990a.

Table III-28
Species Harvested by Barrow Residents (1987-1990)

Species Harvested by Barrow Residents (1987-1990) Species	Numbers of Animals Harvested			
	Year 1	Year 2	Year 3	3-YearAverage
Bowhead whale	7	11	10	9
Pacific Walrus	84	61	101	81
Bearded Seal	236	179	109	174
Ringed Seal	466	388	328	394
Spotted Seal	2	4	4	3
Polar Bear	12	11	39	21
Beluga Whale	0	0	0	0
Caribou	1,595	1,533	1,656	1,595
Moose	52	53	40	48
Dall Sheep	12	12	9	11
Brown Bear	1	1	0	1
Porcupine	5	0	0	2
Ground Squirrel	24	0	17	14
Wolverine	4	2	1	2
Arctic Fox	192	146	48	129
Red Fox	8	4	2	5
Wolf	0	0	0	0
Ermine	0	0	0	0
Whitefish	27,366	20,628	38,053	28,683
Nonspecified	5,108	173	0	1,760
Round	2,122	721	16	953
Broad-rivers/lakes	10,579	11,431	30,047	17,352
Humpback	1,225	647	3,648	1,840
Least Cisco	7,024	7,505	2,929	5,819
Arctic Cisco	1,309	151	1,413	958
Grayling	12,664	8,684	8,392	9,914
Arctic Char	38	76	135	83
Burbot	1,086	392	550	676
Lake Trout	153	72	216	147
Northern Pike	2	0	10	4
Salmon	196	80	2,089	788
Nonspecified	66	3	439	169
Chum	11	5	529	182
Pink	12	1	261	92
Silver	103	70	828	334
King	4	1	31	12
Capelin	3,960	0	346	1,435
Rainbow Smelt	97	0	1,480	526
Arctic Cod	0	7,945	17,018	8,321
Arctic Flounder	0	0	0	0
Tomcod	0	194	0	65
Sculpin	0	11	0	4
Geese	2,873	3,334	3,943	3,384
Nonspecified	329	69	34	144
Brant	127	221	973	440
White-Fronted	2,417	3,035	2,932	2,795

Species Harvested by Barrow Residents (1987-1990) Species	Numbers of Animals Harvested			
	Year 1	Year 2	Year 3	3-YearAverage
Snow	0	8	4	4
Canada	0	1	1	1
Eiders	5,173	4,499	8,590	6,087
Ptarmigan	2,454	1,350	329	1,378
Other Birds	79	0	9	30

Source:
Adapted from S.R. Braund and Associates, 1993b.

Table III-29
1989 Barrow Subsistence-Harvest Summary

Subsistence Resource	Number Harvested	Edible Pounds Harvested			Household Participation [1] (percent)
		Total (lbs)	Household Harvest (mean lbs)	Per capita (lbs)	
Marine Mammals					
Total Marine Mammals	591	508,181	542.35	168.50	45.0
Bowhead Whale	10	377,647	403.04	125.21	45.0
Beluga Whale	0	0	0.00	0.00	0.0
Pacific Walrus	101	77,987	83.23	25.86	13.0
Polar Bear	39	19,471	20.78	6.46	4.0
Bearded Seal	109	19,152	20.44	6.35	11.0
Ringed Seal	328	13,774	14.70	4.57	11.0
Spotted Seal	4	151	0.16	0.05	--
Terrestrial Mammals					
Large Land Mammals	1,705	214,676	229.11	71.18	39.0
Brown Bear	0	0	0.00	0.00	0.0
Caribou	1,656	193,744	206.77	64.24	39.0
Moose	40	20,014	21.36	6.64	6.0
Dall Sheep	9	918	0.98	0.30	2.0
Small Land Mammals/Furbearers	68	7	0.01	0.00	2.0
Arctic Fox	48*	0	0.00	0.00	--
Red Fox	2*	0	0.00	0.00	--
Marmot	0	0	0.00	0.00	0.0
Mink	0	0	0.00	0.00	0.0
Parka Squirrel	17	7	0.01	0.00	x
Weasel	0	0	0.00	0.00	0.0
Wolf	0	0	0.00	0.00	0.0
Wolverine	1	0	0.00	0.00	x
Fish					
Total Fish	68,287	118,471	126.44	39.28	61.0
Total Salmon	2,088	12,244	13.07	4.06	10.0
Total Non-salmon	66,199	106,226	113.37	35.22	13.0
Smelt	1,825	247	0.26	0.08	2.0
Cod	17,018	3,404	3.63	1.13	5.0
Burbot	550	2,202	2.35	0.73	7.0
Char	350	1,239	1.32	0.41	5.0
Grayling	8,393	6,714	7.17	2.23	9.0
Total Whitefish	38,054	92,399	98.61	30.64	18.0
Broad Whitefish	30,047	78,921	84.23	26.17	--
Cisco	2,929	2,929	3.13	0.97	3.0
Humpback Whitefish	3,648	9,119	9.73	3.02	10.0
Birds					
Total Birds and Eggs	12,869	29,446	31.43	9.76	41.0
Migratory Birds	12,539	29,215	31.18	9.69	37.0
Ducks	8,589	12,883	13.75	4.27	37.0
Eiders	8,585	12,877	13.74	4.27	37.0
Long-Tailed Duck	2	4	0.00	0.00	0.0
Goose	3,944	16,289	17.38	5.40	13.0

Subsistence Resource	Number Harvested	Edible Pounds Harvested			Household Participation [1] (percent)
		Total (lbs)	Household Harvest (mean lbs)	Per capita (lbs)	
Brant	973	2,920	3.12	0.97	4.0
Snow Geese	4	19	0.02	0.01	0.0
White-fronted	2,932	13,193	14.08	4.37	12.0
Seabirds and Loons	3	9	0.01	0.00	x
Ptarmigan	329	231	0.25	0.08	5.0
Bird Eggs	--	--	--	--	--

Notes:
[1] Percentage of households participating in subsistence harvest.
* Not eaten.
[x] Percent harvested = less than 0.1%.
-- Data not available.
Number of households in sample (n=101). Number of households in the community = 937.

Table III-30
1988 Atqasuk Subsistence Participation Levels by Household [1]

Household Ethnicity	Level of Subsistence Participation [2]			
	Minimal	Moderate	Active	All HH's
Average HH Income ($)				
Inupiat HH's	26,250	17,500	30,556	—
Non-Inupiat HH's	85,000	57,500	45,000	—
All HH's	43,529	27,500	32,000	36,431
Cases	17	4	20	41
Average HH Size (# Persons per HH)				
Inupiat HH's	4.2	4.5	4.8	—
Non-Inupiat HH's	3.2	2.0	2.0	—
All HH's	3.9	4.0	4.6	4.3
Cases	17	5	23	45
Average Meat & Fish Consumption From Own HH Subsistence (by percent)				
Inupiat HH's	13.8	35.0	78.1	—
Non-Inupiat HH's	6.0	25.0	75.0	—
All HH's	11.5	33.0	77.8	47.8
Cases	17	5	23	45
Average Meat & Fish Consumption From Other HH Subsistence (by percent)				
Inupiat HH's	12.9	5.0	17.7	—
Non-Inupiat HH's	0.0	0.0	0.0	—
All HH's	9.1	4.0	20.5	14.4
Cases	17	5	23	45
Average Meat & Fish Harvested And Given Away (by percent)				
Inupiat HH's	5.4	10.0	18.3	—
Non-Inupiat HH's	2.0	0.0	45.0	—
All HH's	4.4	8.0	20.7	13.1
Cases	17	5	23	45
Average Proportion of HH Income Spent in Village (by percent)				
Inupiat HH's	77.5	62.5	82.6	—
Non-Inupiat HH's	13.0	25.0	65.0	—
All HH's	58.5	55.0	81.1	69.7
Cases	17	5	23	45

Notes:
[1] Total available households = 55.

[2] Degree of subsistence participation based on how much meat and fish consumed from own household subsistence activity. Levels of subsistence defined as:

Minimal = under 20% meat and fish from own HH subsistence.

Moderate = 20% to 40% meat and fish from own HH subsistence.

Active = over 40% meat and fish from own HH subsistence.

Key:

HH = Household Harvest.

Source:
Adapted from: Impact Assessment, Inc., 1990, citing North Slope Borough, Department of Planning and Community Services, Census of Population.

Table III-31
Atqasuk Subsistence Harvest by Month (July 1, 1994 to June 30, 1995)

Subsistence Resource	Numbers of Animals Harvested												Total 51 HH's	Estimated. Total 56 HH's
	1994						1995							
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
Fish														
Arctic Char	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Arctic Cisco	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Broad Whitefish	0	100	1,050	130	0	0	0	0	0	0	0	350	1,630	1,790
Burbot	0	0	10	130	22	0	0	0	0	0	0	0	162	178
Rainbow Trout	0	0	0	15	0	0	0	0	0	0	0	0	15	16
Grayling	100	850	2,078	2,463	225	0	0	0	0	0	0	0	5,716	6,276
Silver Salmon	0	0	0	10	0	0	0	0	0	0	0	0	10	11
Humpback Whitefish	0	13	150	112	150	0	0	0	0	0	0	75	500	549
Least Cisco	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Northern Pike	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Whitefish Unidentified	0	88	100	1,087	125	0	0	0	0	0	0	0	1,400	1,537
Terrestrial Mammals														
Caribou	31	43	43	25	22	7	1	9	2	0	3	1	187	205
Moose	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Wolf	0	0	0	1	0	0	0	0	1	0	0	0	2	2
Wolverine	0	0	0	0	3	0	0	4	3	0	0	0	19	11
Small Land Mammals														
Arctic Fox	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Ground Squirrel	0	0	0	0	0	0	0	0	0	0	6	0	6	7
Red Fox	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Birds														
Geese Unidentified	0	0	0	0	0	0	0	0	0	0	168	0	168	184
Eider Unidentified	0	0	0	0	0	0	0	0	0	0	12	0	12	13
White fronted Goose	0	0	0	0	0	0	0	0	0	0	76	0	76	83
Canada Goose	0	0	0	0	0	0	0	0	0	0	2	0	2	2
Brant	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Ptarmigan	0	0	0	0	0	0	0	0	0	0	16	0	16	18
Marine Mammals														
Ringed Seal	4	0	0	0	0	0	0	0	0	0	0	0	4	4
Bearded Seal	4	0	0	0	0	0	0	0	0	0	0	0	4	4
Berries														
Salmonberries (gallon)	0	72	0	0	0	0	0	0	0	0	0	0	72	79
Cranberries (gallon)	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Blueberries (gallon)	2	0	10	0	0	0	0	0	0	0	0	0	12	13

Source: Opie, Bower, and Bates 1997.

Table III-32
1993 Nuiqsut Subsistence-Harvest Summary

Subsistence Resource	Number Harvested	Edible Pounds Harvested		
		Total (lbs)	Household Harvest (Mean lbs)	Per capita (lbs)
Marine Mammals				
Total Marine Mammals	113	85,216	936.44	236.01
Bowhead Whale	3	76,906	845.12	213
Polar Bear	1*	0	0.00	0.00
Bearded Seal	6	1,033	11.35	2.86
Ringed Seal	98	7,277	79.96	20.15
Spotted Seal	4*	0	0.00	0.00
Terrestrial Mammals				
Large Land Mammals	691	87,306	959.40	241.80
Brown Bear	10*	734	8.06	2.03
Caribou	672	82,169	902.95	227.57
Moose	9	4,403	48.38	12.19
Muskox	0	0	0.00	0.00
Dall Sheep	0	0	0.00	0.00
Small Land Mammals/Furbearers	599 [s]	84	0.92	0.23
Arctic Fox	203	0	0.00	0.00
Red Fox	63	0	0.00	0.00
Marmot	0	0	0.00	0.00
Mink	0	0	0.00	0.00
Parka Squirrel	336	84	0.92	0.23
Weasel	10	0	0.00	0.00
Wolf	31	0	0.00	0.00
Wolverine	19	0	0.00	0.00
Fishes				
Total Fish	71,898	90,490	994.39	250.62
Total Salmon	272	1,009	11.08	2.79
Total Non-salmon	71,626	89,481	983.30	247.83
Smelt	304	42	0.46	0.12
Cod	62	7	0.07	0.02
Burbot	1,416	5,949	65.37	16.48
Char	618	1,748	19.20	4.84
Grayling	4,515	4,063	44.65	11.25
Total Whitefish	64,711	77,671	853.53	215.12
Cisco	51,791	34,943	383.98	96.78
Arctic Cisco	45,237	31,666	347.97	87.70
Least Cisco	6,553	3,277	36.00	9.08
Birds				
Total Birds and Eggs	3,558	4,325	47.53	11.98
Migratory Birds	2,238	3,540	38.90	9.80
Ducks	772	1,152	12.66	3.19
Eiders	662	1,059	11.63	2.93
Geese	1,459	2,314	25.43	6.41
Brant	296	356	3.91	0.99
Canada Goose	691	830	9.11	2.30
White-fronted	455	1,092	12.00	3.02
Swan	7	73	0.80	0.20

Subsistence Resource	Number Harvested	Edible Pounds Harvested		
		Total (lbs)	Household Harvest (Mean lbs)	Per capita (lbs)
Ptarmigan	973	681	7.48	1.89

Notes:
* Not eaten.
s Some not eaten.
Number of households in sample = 62. Number of households in the community = 91.

Source:
State of Alaska, Dept. of Fish and Game, 1995b.

Table III–33
Nuiqsut Subsistence Harvest by Month (July 1, 1994 to June 30, 1995)

Subsistence Resource	Numbers of Animals/Foods Harvested												Total 71 HH's	Estimated. Total 83 HH's
	1994						1995							
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
Fish														
Arctic Char	0	8	0	0	0	0	0	0	0	0	0	0	8	8
Arctic Cisco[1]	0	0	37	5,737	2,400	1,050	262	0	0	0	0	0	9,486	9,842
Broad Whitefish	1,535	25	75	855	500	0	0	0	0	0	0	130	3,120	3,237
Burbot	0	0	0	9	76	3	0	0	0	0	0	0	88	91
Fish Unidentified	0	0	0	0	0	0	0	0	0	0	0	75	75	78
Grayling	0	24	225	110	84	0	0	0	0	0	0	2	445	462
Humpback Salmon	10	0	0	0	0	0	0	0	0	0	0	0	10	10
Humpback Whitefish[1]	0	0	0	150	25	0	0	0	0	0	0	0	175	182
Least Cisco	0	0	0	0	0	750	0	0	0	0	0	0	750	778
Northern Pike	0	0	0	0	0	0	0	0	0	0	0	18	18	19
Whitefish Unidentified	0	0	0	50	425	0	0	0	0	0	0	0	475	493
Terrestrial Mammals														
Caribou	63	32	6	80	13	4	9	5	13	7	2	15	249	258
Moose	1	1	1	1	0	0	1	0	0	0	0	0	5	5
Wolf	0	0	0	0	1	1	3	0	12	1	0	0	18	19
Wolverine	0	0	0	0	1	1	2	1	1	2	0	0	8	8
Small Land Mammals														
Arctic Fox	0	0	0	0	0	1	1	1	3	0	0	0	6	6
Fox Unidentified	0	0	0	0	4	0	0	0	0	0	0	0	4	4
Red Fox	0	0	0	0	0	1	1	1	1	1	0	0	5	5
Marine Mammals														
Polar Bear	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Ringed Seal	2	10	0	0	0	0	0	0	0	6	0	5	23	24
Birds														
Tundra Swan	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Geese Unidentified	0	0	0	0	0	0	0	0	0	0	409	48	457	474
Eider Unidentified	0	0	0	0	0	0	0	0	0	0	50	40	90	93
Ptarmigan	0	0	0	0	0	0	0	0	0	33	23	0	56	58
Sandhill Crane	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Berries														
Salmonberries (gallon)	0	9	0	0	0	0	0	0	0	0	0	0	9	9
Cranberries (gallon)	0	0.5	—	0	0	0	0	0	0	0	0	0	0.5	1
Blueberries (gallon)	0	2.5	—	0	0	0	0	0	0	0	0	0	2.5	3
Blackberries (gallon)	0	0.5	—	0	0	0	0	0	0	0	0	0	0.5	1

Notes:
[1] The harvest of arctic cisco and humpback whitefish is underrepresented: one household provided evidence of a significant but unquantifiable harvest by saying that "sled loads" were harvested "every couple of days during October and November."

Sources: Brower and Opie, 1997; Brower and Hepa, 1998.

Table III-34
Status of Entitlements for Atqasuk, Barrow, and Wainwright

Type	Amount (acres)	Interim Conveyed Acreage	Patented Acreage	Remaining Entitlement (acres)	Remaining Selected (acres)
Atqasuk Entitlements					
12(a)	69,120	0.00	56,744	14,111.46 [1]	1,391
12(b)	3,834	0.00	0.00	3,834	0.00
Barrow Entitlements					
12(a)	6	140,862.65 [2]	18,842.49 [3]	935.35 [3]	0.00
12(b)	54,530	54,530	--	0.00	0.00
Wainwright Entitlements					
12(a)	115,200	0.00	111,429.34 [4]	3,770.66 [5]	4,041.10
Technical Corrections Act of 1992 Replacement Lands	2,713.81	0.00	0.00	2,713.81	5,110.00
12(b)	55,670.12	--	55,670.12	0.00	0.00

Notes:
[1] A total of 1,735.46 acres was credited for the title recovery of Native Allotments. This is added to the remaining entitlement figure in the above table. The Federal Government currently owns the subsurface estate.
[2] Pursuant to the NARL Agreement, this figure represents Barrow's full entitlement for 12(a).
[3] Based upon the Technical Corrections Act of 1992, an acreage credit of 935.35 acres occurred as a result of the title recovery actions. Barrow also received the subsurface estate for sand and gravel on 68,053 acres for surface acres selected by ASRC under the Gas Field Transfer Act. At present, the Federal Government owns the subsurface, excluding sand and gravel and natural gas, under the village-selected lands and conveyed lands in the Barrow area.
4 This had 2,713.81 acres subtracted for the title recovery of Native Allotments that are being replaced per the Technical Corrections Act of 1992.
[5] This total will have 39.99 acres added once the Native Allotment title recoveries are complete for F-15473 Parcel D.

Table III-35
NW NPR-A Wilderness Units and Acreage

Wilderness Unit	Acres [1]
(A) Peard River	979,560
(B) Chipp River	1,714,627
(C) Meade River	1,622,443
(D) Kuk River	978,171
(E) Icy Cape	261,078
(F) Mountains	2,051,289
(G) Foothills	737,526

Note:
[1] Public lands that have wilderness characteristics

Table III-36
Scenic Quality Ratings for NW NPR-A

Unit	Type	Name	Rating
SQ01	Coastline	Chukchi Coast	Class B [1]
SQ02	Coastline	Elson Lagoon and Dease Inlet	Class B
SQ03	Coastline	Beaufort Sea Coast	Class C [2]
SQ04	Coastline	Barrow	Class C
SQ05	Wet Plains	Large Water Bodies	Class C
SQ06	Wet Plains	Oriented Lakes	Class B
SQ07	Wet Plains	Remaining Wet Plains	Class C
SQ08	Plains	Dry Plains	Class C
SQ10 [3]	Ridges	Eastern Portion	Class C
SQ12 [3]	Colville River Valley	Middle Colville	Class A [4]

Notes:
[1] Class B SQRU has a moderate amount of visual variety, contrast, and harmony.
[2] Class C SQRU has little visual variety, contrast, and harmony.
[3] These units are correctly identified from the 105c Study as applied to the Planning Area.
[4] Class A SQRU has a great deal of visual variety, contrast, and harmony.

Key:
SQ = Scenic Quality.

Table III-37
Land Use Sensitivity Levels for NW NPR-A

Name	Use	# Use	PI	Adj	SA	OF	OR
Inholdings and Camps	H	L	M	L	L	--	L
River Routes	H	M	H	L	L	--	M
Transportation Corridors	H	L	H	L	L	--	M
Coastal Plain	H	M	H	L	L	--	M

Key:
Use = Type of use.
#Use = Amount of use.
PI = Public Interest.
Adj = Adjacent land use.
SA = Special Area.
OF = Other Factors.
OR = Overall Rating.
H = High.
M = Medium.
L = Low.

Source:
Visual Resource Inventory BLM Manual Handbook 8410-1.

Table III-38
Rivers in NW NPR-A Eligible for Designation as Wild and Scenic

River Name	Outstandingly Remarkable Values [1]
Alatakruk	(Kuk tributary) Subsistence, Fisheries, Wildlife
Alaktak	Subsistence, Fisheries, Wildlife
Avak	Essential to ecological function of the largest lagoon and barrier beach system in the North American Arctic.
Avalik	(Kuk tributary) Subsistence, Fisheries, Wildlife
Chipp	Subsistence, Fisheries, Wildlife
Colville	Recreation, Wildlife Viewing, Geology, Archeology
Inaru	Subsistence
Ivisaruk	(Kuk tributary) Subsistence, Fisheries, Wildlife
Kaolak	(Kuk tributary) Subsistence, Fisheries, Wildlife
Ketik	(Kuk tributary) Subsistence, Fisheries, Wildlife
Kigalik	Cultural
Kuk	Subsistence, Fisheries, Wildlife, Cultural
Kungok	(Kuk tributary) Subsistence, Fisheries, Wildlife
Meade	Subsistence, Fisheries, Wildlife
Nokotkek	Essential to ecological function of the largest lagoon and barrier beach system in the North American Arctic.
Ongoravik	Essential to ecological function of the largest lagoon and barrier beach system in the North American Arctic.
Oumalik	Subsistence, Fisheries, Wildlife
Titaluk	Subsistence, Fisheries, Wildlife
Topogoruk	Subsistence, Fisheries, Wildlife
Tunalik	Essential to ecological function of the largest lagoon and barrier beach system in the North American Arctic.
Usuktuk	Subsistence, Fisheries, Wildlife
Maybe Creek	Cultural

Note:
[1] BLM has identified the appropriate classification as "scenic" because of the level of development (mainly subsistence cabins and camps), although this does not mean that scenery is an Outstandingly Remarkable Value (ORV). In fact, none of the eligible rivers in the Planning Area have scenery as an ORV. Refer to Section III.C.10 for more detailed descriptions of the values and potential restrictions on development that are required to protect rivers.

Table III-39
Economic Oil and Gas Resources in NPR-A
Undiscovered, Risked, Economically Recoverable Resources

Play No.	Name	Oil Resources NE + NW NPR-A (Bbbl)		Gas Resources NE + NW NPR-A (Tcf)		Fraction in NW NPR-A	Oil Resources NW NPR-A (Bbbl)		Gas Resources NW NPR-A (Tcf)	
		$18 Oil price	$30 Oil price	$2.56 Gas price	$4.27 Gas price	—	$18 Oil price	$30 Oil price	$2.56 Gas Price	$4.27 Gas price
1	Endicott-BA	0.004	0.256	0.004	0.433	0.19	0.001	0.049	0.001	0.082
2	Endicott-AP	—	—	—	—	1.00	—	—	—	—
3	Ellesmerian gas	—	—	—	0.005	0.71	—	—	—	0.004
4	Lisburne-BA	—	0.047	0.001	0.081	0.00	—	—	—	—
5	Lisburne-AP	—	—	—	—	1.00	—	—	—	—
6	Sadlerochit-BA-east	0.017	0.286	0.019	0.495	0.46	0.008	0.132	0.009	0.228
7	Sadlerochit-AP-east	—	—	—	—	1.00	—	—	—	—
8	Beaufortian-BA-east	0.113	4.184	0.188	8.689	0.30	0.034	1.255	0.056	2.607
9	Beaufortian-AP-east	—	0.016	—	0.257	0.46	—	0.007	—	0.118
10	Beaufortian gas	—	—	—	—	1.00	—	—	—	—
11	Brookian turbidites-east	—	0.158	—	0.755	0.35	—	0.055	—	0.264
12	Brookian gas	—	—	—	—	1.00	—	—	—	—
13	Brookian topset-east	—	0.014	—	0.073	0.36	—	0.005	—	0.026
14	Brookian foldbelt	—	0.539	—	3.350	0.80	—	0.431	—	2.680
15	Sag River/Shublik-west	—	—	—	—	0.10	—	—	—	—
16	Sadlerochit-AP-west	—	—	—	—	1.00	—	—	—	—
17	Beaufortian-BA-west	—	0.002	—	0.040	0.70	—	0.001	—	0.028
18	Beaufortian-AP-west	—	—	—	—	1.00	—	—	—	—
19	Brookian turbidites-west	—	—	—	—	0.90	—	—	—	—
20	Brookian topset-west	—	—	—	—	0.90	—	—	—	—
21	Endicott/Lisb thrust belt	—	—	—	—	0.00	—	—	—	—
22	Beaufort detached fold	—	—	—	—	1.00	—	—	—	—
23	Fortress Mountain	—	0.195	—	1.652	0.77	—	0.150	—	1.272
Total		0.134	5.697	0.212	15.830	—	0.043	2.085	0.066	7.309
Percent of total		—	—	—	—	—	31%	37%	31%	46%

Notes:
BA = Barrow Arch.
AP = Arctic Platform.
Bbbl = Billion barrels.
NE = Northeast.
NW = Northwest.
NPR-A = National Petroleum Reserve-Alaska
Tcf = Trillion cubic feet

Table III-40
Field Survey Data for Rivers in NW NPR-A

Site No.	Stream Site	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)	Site at River Mile	Physiographic Province	Channel Substrate	Riparian Vegetation	Bank Full Discharge (cfs)	Bank Full Depth (ft)	Bank Full Width (ft)	Bank Full (Width/ Depth)
1	Inaru River near the mouth	70.7842	157.0747	32	Coastal Plain	Sand	Grass/Tundra	20,000	11.6	398	34
2	Meade River below Nigisaktuvik River	70.6772	156.9933	37	Coastal Plain	Sand	Grass/Tundra	65,000	10.3	1,276	124
3	Meade River above Agutirock Creek	70.1942	157.0689	115	Coastal Plain	Sand/Gravel	Grass/Willows	50,000	13.4	835	62
4	Nigisaktuvik River	70.3628	158.1006	40	Coastal Plain	Sand	Grass/Willows	4,000	5.8	210	36
5	Usuktuk River	70.2561	156.8130	52	Coastal Plain	Sand	Grass/Tundra	25,000	9.3	400	43
6	Lower Topagoruk River	70.4181	155.8111	61	Coastal Plain	Sand	Grass/Tundra	50,000	11.9	620	52
7	Upper Topagoruk River	69.9925	156.1378	127	Foothills	Gravel/Cobbles	Willows	6,000	7.9	119	15
8	Lower Oumalik River	70.3086	155.1139	14	Coastal Plain	Sand	Grass/Tundra	25,000	9.3	400	43
9	Upper Oumalik River	69.8581	155.3922	110	Foothills	Sand	Willows	10,000	11.6	135	12
10	Chipp River	70.3444	154.9294	61	Coastal Plain	Sand	Grass/Tundra	ND	10	459	46
11	Alaktak River	70.5175	155.0194	38	Coastal Plain	Sand	Grass/Tundra	ND	6.8	358	53
12	Ikpikpuk River below Chipp River	70.3644	154.8689	48	Coastal Plain	Sand	Grass/Tundra	ND	11.1	1,154	104
13	Ikpikpuk River below Fry Creek	69.7669	154.6639	121	Foothills	Gravel/Cobbles	Willows	33,000	12.6	341	27
14	Ikpikpuk River above Bronx Creek	69.6163	154.8975	156	Foothills	Sand/Gravel	Willows	13,000	6.4	438	68
15	Bronx Creek	69.6577	155.0323	12	Foothills	Sand/Gravel	Willows	3,000	4.5	118	26
16	Lower Titaluk River	69.7822	155.1250	45	Foothills	Gravel/Cobbles	Grass/Willows	21,000	10.3	297	29
17	Upper Titaluk River	69.5293	155.7243	118	Foothills	Gravel/Cobbles	Willows	20,000	10.1	233	23
18	Kigalik River	69.2498	154.9710	67	Foothills	Gravel/Cobbles	Willows	16,000	9.2	197	21
19	Upper Maybe Creek	69.2475	153.9833	22	Foothills	Sand/Gravel	Willows	4,000	5.1	135	26
20	Ikpikpuk River below Titaluk River*	70.1367	154.6417	75	Coastal Plain	Sand	Grass/Willows	45,000	8.1	1,120	138
21	Colville River above Killik River*	69.0033	153.9060	184	Foothills	Gravel/Cobbles	Willows	200,000	12.8	1,460	114
22	Meade River at Atqasuk*	70.4888	157.4111	65	Coastal Plain	Sand/Gravel	Grass/Willows	8,700	3.8	470	124

Notes:
cfs = Cubic feet per second.
ft = Feet.
ND = Not Determined.

Sources:
BLM Field Surveys 2001-2002.
*Childers et al., 1979.

Table IV-01
Projected North Slope Oil Production and World Crude Oil Prices

Year	North Slope Production[1] (MMbpd)	Oil Prices[2] (in year 2000$/bbl)
2000	1.045	28.22
2005	1.084	21.31
2010	0.961	21.86
2015	0.888	22.39
2020	0.723	22.93
2025	0.509	23.49
2030	0.315	24.05
2034	0.208	24.52

Notes:
[1] U.S. Dept. of Energy, 2001a, in USDOI, BLM, 2002.
[2] Derived from the U.S. Dept. of Energy Annual Energy Outlook forecast (U.S. Dept. of Energy, 2001b). Prices are deflated by using the domestic product implicit price deflator (Bureau of Economics Analysis, 2001).

Key:
$/bbl = Dollars per barrel.
MMbpd = Million barrels per day.

Table IV-02
Exploration and Hypothetical Development Schedule for the First Commercial Oil Project in Northwest NPR-A

Year	Exploration Wells		Delineation Wells		Exploration/Delineation Rigs		Production Pads		Production and Service Wells		Production Rigs		Staging Bases		Oil Production MMbbl/yr		Pipeline Miles	
	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev
2002	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2003	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2004	Sale	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2005	--	1	--	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--
2006	1	1	--	1	1	1	--	--	--	--	--	--	--	--	--	--	--	--
2007	1	1	1	2	1	2	--	--	--	--	--	--	--	--	--	--	--	--
2008	1	2	--	2	1	2	--	--	--	--	--	--	--	--	--	--	--	--
2009	--	2	--	1	--	2	--	--	--	--	--	--	--	--	--	--	--	--
2010	1	2	1	--	1	2	--	--	--	--	--	--	--	--	--	--	--	--
2011	1	2			1	2	--	--	--	--	--	--	--	--	--	--	--	50
2012	--	2	--	--	--	2	--	1	--	--	--	--	--	--	--	--	--	50
2013	1	2	--	--	1	2	--	1	--	12	--	1	--	--	--	19	--	35
2014	--	1	--	--	--	1	--	1	--	36	--	2	--	--	--	28	--	--
2015	--	--	--	--	--	--	--	--	--	36	--	2	--	--	--	38	--	--
2016	--	--	--	--	--	--	--	--	--	36	--	2	--	--	--	38	--	--
2017	--	--	--	--	--	--	--	--	--	20	--	2	--	--	--	38	--	--
2018	--	--	--	--	--	--	--	--	--	10	--	1	--	--	--	38	--	--
2019	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	34	--	--
2020	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	30	--	--
2021	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	26	--	--
2022	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	23	--	--
2023	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	20	--	--
2024	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	18	--	--
2025	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	16	--	--
2026	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	14	--	--
2027	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13	--	--
2028	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	12	--	--

Year	Exploration Wells		Delineation Wells		Exploration/Delineation Rigs		Production Pads		Production and Service Wells		Production Rigs		Staging Bases		Oil Production MMbbl/yr		Pipeline Miles	
	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev	Expl[1]	Expl/[2] Dev
2029	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	10	--	--
2030	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	9	--	--
2031	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	8	--	--
2032	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7	--	--
2033	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	6	--	--
2034	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	5	--	--
2035	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
2036																		
Totals	**6**	**16**	**2**	**6**	**6**	**17**	**0**	**3**	**--**	**150**	**0**	**10**	**1**		**0**	**450**	**0**	**135**

Notes:

[1] Exploration only. This reflects an $18/bbl of oil scenario.

[2] Exploration and Development. This reflects a $30/bbl of oil scenario.

- The assumptions used in the above table are:
- Table reflects two levels of activity. The initial level represents oil and gas exploration corresponding to prices at or below $18/bbl of oil and $2.56/Mcf of gas. Commercial development would not be economic at these low prices in the high-cost area of Northwest NPR-A.
- The second level of activity represents the development schedule for the first commercial oil project discovered as a result of the 2004 lease sale.
- Exploration well totals include both dry wells and discoveries.
- Rig totals are maximum number operating in any single year.
- Production to service well ratio is 1:1.
- It is assumed that gas associated with oil recovery will be reinjected until a major transportation system is constructed to move the gas from the North Slope.
- A likely staging base is in the coastal area near Smith Bay.
- Peak production rates are given as millions of barrels per year.
- Pipeline miles do not include in-field flow lines ¦¡ only sales oil gathering lines to the KRU. Pipeline miles are for right-of-way corridors that could include several individual pipelines (sales-oil, gas, product/fuel, seawater).

Key:

-- = Not applicable.
Expl = Exploration.
Dev = Development.
KRU = Kuparuk River Unit.

Table IV-03
Development Timeframe for a Typical Oil Field

Project Phase	Duration of Activity (years)	Activities
Exploration	1 to 10	• seismic surveys to define prospects • well-site surveys and permitting • drill exploration wells
Discovery	1 to 4	• produceable well determination • drill delineation well(s) • additional seismic survey (3-D) • reservoir appraisal and engineering studies • project design and environmental studies • permit applications
Development	3 to 6	• establish construction base camp • set up environmental monitoring programs • install gravel pads for facilities • design and build production modules • begin drilling development wells • install pipelines and pump stations • install production facilities and hookup
Production	10 to 30	• continue development-well drilling • production ramp-up (2 to 5 years) • peak production plateau (3 to 8 years) • production declines • well workovers (every 3 to 5 years) • infill drilling (well spacing reduced) • tertiary recovery methods employed • wells progressively shut in • economic limit reached
Abandonment	2 to 5	• plug and abandon wells • remove production equipment • dismantle facilities • decommission pipeline • site restoration and revegetation • phase out environmental monitoring

Table IV-04
Resource[1] Estimates for the First Sale under each Alternative[2]

Alternative	$18/bbl Oil Price (MMbbl)	$30/bbl Oil Price (MMbbl)	$4.27/Mcf Gas Price[3] (Tcf)	Number of Fields[4]
A	0	735		5
B	0	630		4
C	0	0		0
PA	0	630		4
FEP[5]	0	1,050		7

Notes:

[1] Resources are economic oil and gas pools expected to be leased, discovered, developed, and produced as a result of the next lease sale in the Northwest NPR-A Planning Area.

[2] Assumes that 50% of economic resources are leased and discovered as a result of the first sale.

[3] Assumes that 2/3 of the economic gas resources is associated with oil and 1/3 is in non-associated gas pools.

[4] Number of fields includes both large stand-alone fields with processing facilities and satellite fields that share facilities.

[5] Full Economic Potential is not analyzed as an alternative in the IAP/EIS, but is presented in this table as additional information.

Key:

PA = Preferred Alternative
FEP = Full Economic Potential
Mcf = Thousand cubic feet
MMbbl = Million barrels
Tcf = Trillion cubic feet

Table IV-05
Activities for the First Sale under each Alternative (at Low[1] and High[1] per/bbl Prices) [6]

Alternative	Exploration Wells[2]		Delineation Wells		Exploration/ Delineation Rigs[3]		Production Pads		Production and Service Wells[4]		Production Rigs		Staging Bases[5]		Peak Oil Production (MMbbl/yr)		Peak Gas Production (Bcf/yr)
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	
A	6	16	2	24	1	4	0	8	0	270	0	6	1	2	0	59	128
B	5	12	2	18	1	3	0	6	0	232	0	4	1	2	0	50	110
C	1	4	1	2	1	1	0	0	0	0	0	0	0	0	0	0	0
PA	5	12	2	18	1	3	0	6	0	232	0	4	1	2	0	50	110
FEP[7]	8	22	2	34	1	4	0	10	0	386	0	8	1	2	0	68	146

Notes:
1 Low is $18/bbl; high is $30/bbl.
2 Exploration well totals include both dry wells and discoveries.
3 Rig totals are maximum number operating in any single year.
4 Production-to-service well ratio is 2:1.
5 Staging bases are on the northern coast and Umiat.
6 See Table IV-29 for pipeline corridor information.
7 Full Economic Potential (FEP) is not analyzed as an alternative in the IAP/EIS, but is presented in this table as additional information.

Key:
PA = Preferred Alternative
FEP = Full Economic Potential
MMbbl = Million barrels
Bcf/yr = Billion cubic feet per year

Table IV-06
Resource[1] Estimates for all Sales under each Alternative[2]

Alternative	$18/bbl Oil Price (MMbbl)	$30/bbl Oil Price (MMbbl)	$4.27/Mcf Gas Price[3] (Tcf)	Number of Fields[4]
A	0	1,470	5.10	0 - 10
B	0	1,260	4.40	0 - 8
C	0	0	0	0
PA	0	1,260	4.40	0 - 8
FEP[5]	0	2,100	7.30	0 - 14

Notes:

[1] Resources are economic oil and gas pools expected to be leased, discovered, developed, and produced as a result of multiple lease sales in the Northwest NPR-A Planning Area.

[2]Assumes 100% of economic resources are leased and discovered as a result of multiple sales.

[3] Assumes that 2/3 of the economic gas resources is associated with oil and 1/3 is in non-associated gas pools.

[4] Number of fields includes both large stand-alone fields with processing facilities and satellite fields that share facilities.

[5] Full Economic Potential is not analyzed as an alternative in this IAP/EIS, but is presented in this table as additional information.

Key:

PA = Preferred Alternative.
FEP = Full Economic Potential.
Mcf = Thousand cubic feet.
MMbbl = Million barrels.
Tcf = Trillion cubic feet.

Table IV-07 Activities for All Sales under each Alternative (at Low[1] and High[1] per/bbl Prices) [6]

Alternative	Exploration Wells[2]		Delineation Wells		Exploration/ Delineation Rigs[3]		Production Pads		Production and Service Wells[4]		Production Rigs		Staging Bases[5]		Peak Oil Production (MMbbl/yr)		Peak Gas Production (Bcf/yr)
	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	
A	18	48	6	48	1	3	0	16	0	540	0	12	1	3	0	59	128
B	15	36	6	36	1	3	0	12	0	464	0	8	1	3	0	50	110
C	3	12	2	4	1	2	0	0	0	0	0	0	0	0	0	0	0
PA	15	36	6	36	1	3	0	12	0	464	0	8	1	3	0	50	110
FEP[7]	24	72	6	64	1	3	0	22	0	772	0	16	1	3	0	68	146

Notes:

[1] Low is $18/bbl; high is $30/bbl.

[2] Exploration well totals include both dry wells and discoveries.

[3] Rig totals are the maximum number operating in any single year.

[4] Production-to-service well ratio is 2:1.

[5] Staging bases are on the northern coast and Umiat.

[6] See Table IV-29 for pipeline corridor information.

[7] Full Economic Potential (FEP) is not analyzed as an alternative in the IAP/EIS, but is presented in this table as additional information.

Key:

PA = Preferred Alternative.

FEP = Full Economic Potential.

MMbbl = Million barrels.

Bcf/yr = Billion cubic feet per year.

Table IV-08
Past Development: 2001 Production and Reserve Data

Unit or Area	Field	Type (Oil or Gas)	Discovered	Production[1]			Reserves[2]		
				Began	Gas (Bcf)	2001 Oil (MMbbl)[1]	Production to	Oil (MMbbl)[1]	Gas (Bcf)
Duck Island									
	Endicott	O	1973	1987	—[4]	10.96	Endicott	177[3]	—[4]
	Sag Delta North[2]	O	1989	1989	—[4]	—[3]	Endicott	—	—[4]
	Sag Delta[2]	O	1976	1989	—[4]	—[3]	Endicott	—	—[4]
	Eider	O	1998	1998	—[4]	0.66	Endicott	4	—[4]
	Ivishak	O	—	—	—[4]	0.14	Endicott	—	—[4]
Prudhoe Bay									
	Prudhoe Bay	O	1967	1977	—[4]	194.24	Prudhoe	2,454	—[4]
	P Bay Satellites	O	—	—	—[4]	0	Prudhoe	144	—[4]
	Lisburne	O	1968	1981	—[4]	3.68	Lisburne	33	—[4]
	Niakuk	O	1985	1994	—[4]	7.02	Lisburne	49	—[4]
	West Beach	O	1976	1994	—[4]	0.12	Lisburne	5	—[4]
	N. Prudhoe Bay	O	1970	1993	—[4]	18.69	Lisburne	1	—[4]
	Pt. McIntyre	O	1988	1993	—[4]	1.74	Lisburne	208	—[4]
	Midnight Sun	O	1998	1999	—[4]	1.35	Prudhoe	11	—[4]
	Aurora	O	1999	2001	—[4]	0.42	Prudhoe	38[6]	—[4]
	Borealis	O	1999	2001	—[4]	1.31	Prudhoe	63[6]	—[4]
	Polaris	O	1999	2001	—[4]	0.07	Prudhoe	49[6]	—[4]
Kuparuk River									
	Kuparuk River	O	1969	1981	—[4]	68.27	Kuparuk	814	—[4]
	Tabasco	O	1992	1998	—[4]	1.32	Kuparuk	24	—[4]
	Tarn	O	1992	1998	—[4]	8.05	Kuparuk	46	—[4]
	West Sak	O	1969	1998	—[4]	2.0	Kuparuk	100	—[4]
	Meltwater	O	—	2001	—[4]	0.15	Kuparuk	52[6]	—[4]
	Palm	O	—	2002	—[4]	—	Kuparuk	35	—[4]

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Table IV-08
Past Development: 2001 Production and Reserve Data (continued)

Unit or Area	Field	Type (Oil or Gas)	Discovered	Production[1]			Reserves[2]		
				Began	Gas (Bcf)	2001 Oil (MMbbl)[1]	Production to	Oil (MMbbl)[1]	Gas (Bcf)
Milne Point									
	Milne Point	O	1969	1985	—[4]	15.27	Milne Pt.	260[5]	—[4]
	Cascade[5]	O	1993	1996	—[4]	—	Milne Pt.	—[5]	—[4]
	Schrader Bluff	O	1969	1991	—[4]	3.82	Milne Pt.	99	—[4]
	Sag River	O	1968	1994	—[4]	0.25	Milne Pt.	7	—[4]
Badami									
	Badami	O&G	1990	1998	—[4]	0.67	TAPS	8	—[4]
Colville River									
	Alpine	O	1994	2000	—[4]	28.69	Kuparuk	398	—[4]
	Nanuq	O	—	2001	—[4]	0.02	Kuparuk	40	—[4]
Northstar									
	Northstar	O	1984	2001	—[4]	1.27	TAPS	175	—[4]
NPR-A[1]									
	East Barrow	G	1974	1981	0.086	—	Barrow	—	5
	South Barrow	G	1949	1950	0.042	—	Barrow	—	4
	Walakpa	G	1980	1993	1.348	—	Barrow	—	24
All Units or Areas Total				**—**	**1.475**	**370.16**	—	**5,294**	**33**

Notes:
[1] Production information is from State of Alaska, Oil and Gas Conservation Commission (2002). Includes oil and natural gas liquids.
[2] Reserves were estimated by subtracting 2000 and 2001 production (State of Alaska Oil and Gas Conservation Commission, 2001 and 2002) from the reserve data in State of Alaska, Dept. of Natural Reources (2000).
[3] Endicott includes Endicott, Sag Delta and Sag Delta North.
[4] Associated gas used as fuel for facilities or reinjected.
[5] Cascade is included in Milne Point.
[6] Reserve estimates for Aurora, Borealis, Meltwater, and Polaris are from *PI/Drilling Wire Plus,* 2001a, 2002, 2001b and 2001c, respectively.

Key:
— = Not applicable or not available.
MMbbl = Million barrels.
Bcf = Billion cubic feet.

Table IV-09
Past Development: Infrastructure and Facilities

Unit or Area Field	Gravel Roads, Pads, & Airstrips (acres)	Pipelines: Gathering, Common Carrier, Unspecified (miles)			Gravel Mines		Wells [4]	Pads	Reserve Pits		Prod. Centers	Camps Base and Const.	Facilities & Plants: Power Topping Gas Seawater	Docks and Cause-ways	Airports And Airstrips	Roads (miles)	River Crossing
		G	C	U	Num.	Acres			Num.	Acres							
Duck Island																	
Endicott	392 [2]	3	26	—	1 [2]	179 [2]	129	2 [1]	0 [2]	0 [2]	0	0 [1]	3 [1]	2 [1]	0 [1]	15 [1]	1 [1]
Prudhoe Bay																	
Prudhoe Bay	4,590 [2]	—	—	145	6 [2]	726 [2]	1,764	38	106 [2]	560 [2]	6 [1]	4 [1]	4 [1]	2 [1]	2 [1]	200 [1]	3 [1]
Lisburne	213 [2]	50	—	—	0 [2]	0 [2]	80	5 [1]	10 [2]	16 [2]	1 [1]	1 [1]	1 [1]	0 [1]	0 [1]	18 [1]	—
Niakuk	22 [2]	5	—	—	0 [2]	0 [2]	19	—	0 [2]	0 [2]	—	—	—	—	—	—	—
West Beach	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
N. Prudhoe Bay	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—
Pt. McIntyre	33 [2]	12	—	—	0 [2]	0 [2]	84	–	0 [2]	0 [2]	—	—	—	—	—	—	—
Aurora	0	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0
Borealis	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Polaris	—	—	—	—	—	—	—	1	0	0	0	0	0	0	0	—	0
Kuparuk River																	
Kuparuk River	1,435 [2]	97	37	—	5 [2]	564 [2]	996	34 [1]	126 [2]	161 [2]	3 [1]	2 [1]	4 [1]	1 [1]	1 [1]	94 [1]	5
West Sak	—	—	—	—	0	0	17	—	0	0	0	0	0	0	0	—	0
Palm	5	0	0	—	—	—	18	1	0	0	0	0	0	0	0	—	0
Meltwater	78	10	1	—	—	—	26	1	0	0	0	0	0	0	1	10	0

Table continues on next page

Table IV-09
Past Development: Infrastructure and Facilities (continued)

Unit or Area Field	Gravel Roads, Pads, & Airstrips (acres)	Pipelines: Gathering (G), Common Carrier (C), Unspecified (U) (miles)			Gravel Mines		Wells [4]	Pads	Reserve Pits		Prod. Centers	Camps Base and Const.	Facilities & Plants: Power Topping Gas Seawater	Docks and Cause-ways	Airports And Airstrips	Roads (miles)	River Crossing
		G	C	U	Num.	Acres			Num.	Acres							
Milne Point																	
Milne Point	205 [2]	30	10	—	1 [2]	43 [2]	182	4 [1]	20 [2]	19 [2]	1 [1]	0 [1]	2 [1]	0 [1]	0 [1]	19 [1]	1 [1]
Cascade	31 [2]	—	—	—	0 [2]	0 [2]	—	—	0 [2]	0 [2]	—	—	—	—	—	—	—
Schrader Bluff	—	—	—	—	—	—	52	—	—	—	—	—	—	—	—	—	—
Sag River	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—
Badami	85 [2]	—	—	—	1 [2]	89 [2]	10	2	0 [2]	0 [2]	1	1	0	1	1	4.5	5
Alpine	97	—	—	—	0	0	150	2	0	0	1	2	—	0	1	3	5
West of Kuparuk																	
Tarn [3]	72.8	—	—	—	—	—	—	—	0	0	0	0	0	0	0	10	2
Northstar	18	—	—	—	—	—	—	—	0	0	1	1	0	0	0	0	0
Totals	**7,126**	**—**	**—**	**—**	**14**	**—**	**—**	**90**	**262**	**756**	**13**	**110**	**14**	**6**	**5**	**364**	**22**
NPR-A																	
East Barrow	—	—	—	—	—	—	4	—	—	—	—	—	—	—	—	—	—
South Barrow	—	—	—	—	—	—	19	—	—	—	—	—	—	—	—	—	—
Walakpa	—	—	—	—	—	—	9	—	—	—	—	—	—	—	—	—	—

Notes:

[1] Eg&G Idaho, Inc. (1991).

[2] BP Exploration (Alaska) Inc. (1996).

[3] U.S. Army Corps of Engineers, Public Notice of Application for Permit Reference Number 4-970705.

[4] Alaska Oil and Gas Conservation Commission 1998 Annual Report. Meltwater (*Petroleum New Bulletin*, 2000), Nanuq (*Petroleum News Bulletin*, 2001), and Palm wells estimated using a 2-MMbbl recovery typical of Kuparuk reservoir satellites.

— = Not available, unknown, or not applicable.

Table IV-10
Present Fields: Estimated Reserve Data

Unit or Area	Field	Type (Oil or Gas)	Discovered	Status	Oil Reserves (MMbbl)
Colville River	CD North (Fiord)	Oil	1992	Present Development	50
Colville River	CD South (Nanuq)	Oil	1996	Present Development	38
Prudhoe	Orion (NW Eileen)	Oil	-	Present Development	50
Total for All Units or Areas					**138**

Key:
MMbbl = Million barrels.

Table IV-11
Present Fields: Proposed Infrastructure and Facilities for Development

Known Units									Facilities/Plants						
			Gravel Mines				Reserve Pits								
Unit/Field	Gravel Roads, Pads, and Airstrips (acres)	Pipelines (miles)	Number	*Acres*	Wells	Pads	Number	Acres	*Prod. Centers*	CampsBase and Const.	*Power ToppingGas Seawater*	Docks and Cause-ways	*Airportsand Airstrips*	Roads (miles)	River Crossings
Colville River/CD North	40	7	1	45	40	1	0	0	0	0	0	0	1	0	0
Colville River/CD South	40	4	0	0	40	1	0	0	0	0	0	0	0	3.8	0
Prudhoe/Orion	-	5	0	0	60	1	0	0	0	0	0	0	0	-	0

Key:
- = Not available.

Source:
Nanuq (*Petroleum News Bulletin*, 2001)

Table IV-12
Reasonably Foreseeable Future Development: Estimated Resources

Area/Group	Pool	Type (Oil & Gas)	Discovered	Facility Location	Oil Resource Group Totals (MMbbl)
Western Group	Spark/Rendezvous	Gas & Oil	2000	Onshore	
	Kalubik	Oil	1992	Offshore	
	Thetis Island	Oil	1993	Offshore	
Group Total					250
Central Group (Northstar)	Gwyder Bay	Oil	1969	Offshore	
	Pete's Wicked	Oil	1997	Onshore	
	Sandpiper	Gas & Oil	1986	Offshore	
	Liberty	Oil	1983	Offshore	
Group Total					320
Eastern Group (Badami)	Mikkelson	Oil	1978	Onshore	
	Sourdough	Oil	1994	Onshore	
	Liberty	Oil	1983	Offshore	
	Yukon Gold	Oil	1994	Onshore	
	Pt. Thompson	Gas & Oil	1977	Onshore	
	Flaxman Island	Oil	1975	Offshore	
	Stinson	Oil	1990	Offshore	
	Hammerhead	Oil	1985	Offshore	
	Kuvlum	Oil	1987	Offshore	
Group Total					1,000
Offshore Subtotal					1,070
Onshore Subtotal					500
Total					**1,570**

Notes:

[1] Resource estimates are assumed for purposes of cumulative effects analysis only.

[2.] Accurate oil volumes for individual fields generally are unavailable as these discoveries have not been adequately delineated or studied for their development potential. Most of these discoveries are presently noncommercial and will require new technology or higher oil prices to be economic. It is possible that many of these pools will remain undeveloped. Future development likely would occur in conjunction with the infrastructure for the fields shown in parentheses.

[3.] Resource estimates for Hemi Springs and Ugnu are not included in the above table, but they are included in the 2.0 billion barrels expected to be produced from satellites, pools, and enhanced recovery in existing fields. Gas resources are not listed because commercial production from the North Slope will require a new gas transportation system to reach outside markets.

[4]. The oil volume, including the Point Thompson pool, is largely condensate recovered with associated gas production wells. It is assumed that produced gas will be used for field operations (fuel) or be reinjected into reservoirs in nearby oil fields to optimize oil production. Reinjected gas could be recovered at some later date when a transportation system for North Slope gas is constructed.

Key:

MMbbl = Million barrels.

Source:

USDOI, MMS, Alaska OCS Region.

Table IV-13
Reasonably Foreseeable Future Development: Estimated New Infrastructure [1]

Group[2]	Pads	Footprint (acres)	Wells	Production Facilities	Base Camps	Docks	Airstrips	Roads	Pipeline (miles)
Western Group	4	120	131	1	1	1	0	0	38
Central Group	3	60	87	0	0	0	0	0	22
Eastern Group	10	316	343	6	4	2	3	12	131
Southern Group	1	25	20	0	0	0	0	12	12

Notes:

[1] Development assumptions:

- Industry will minimize permanent (gravel and sand) roads by using ice roads.
- New pipelines from satellite fields will tie into pipelines from main fields (Alpine, Northstar, Badami, and Kuparuk River).
- Number of pads and wells is estimated from resource volumes.
- Production pad footprints are estimated from number of pads, connecting roads, landfalls/docks, and airstrips.
- Hemi Springs and Ugnu are considered to be examples of satellite development and enhanced oil recovery, respectively, and will be developed using existing infrastructure of the Prudhoe Bay and Kuparuk River fields.

[2] For the list of the oil and gas pools in each group see Table IV-12.

Source:
USDOI, MMS, Alaska OCS Region.

Table IV-14
North Slope Oil and Gas Production (1969 to December 2001)

Production To Date	Oil[1] (Bbbl)	Gas (Bcf)	Reference
Onshore	13.256	40.24	State of Alaska, AOGCC (2002)
Offshore	0.429	0	
Total	**13.625**	**40.24**	

Note:
[1] Oil includes crude and natural gas liquids.

Key:
Bbbl = Billion barrels.
Bcf = Billion cubic feet.

Source:
USDOI, MMS, Alaska OCS Region.

Table IV-15
Summary of Reserve and Resource Estimates Used in the Cumulative Analysis

Production Activity	Oil (Bbbl)	Contribution to Total North Slope Resources by Volume of Oil (%)	NW NPR-A IAP/EIS Reference Tables
Low End of the Range (Past and Present)	5	7.4	Table IV-08, Table IV-10, Table IV-16
Middle Portion (Past, Present, and Reasonably Foreseeable)	11	3.5	Table IV-08, Table IV-10, Table IV-12, Table IV-16
High End (Past, Present, Reasonably Foreseeable, and Speculative)	15	2.4	Table IV-16

Source:
USDOI, MMS, Alaska OCS Region.

Key:

Bbbl = Billion barrels.

Table IV-16
Production, Reserves, and Resource Estimates Used in the Cumulative Analysis [1]

Timeframes and Field or Area	Oil (Bbbl)	Gas (Bcf)
Past and Present (total)	5.432	33 [2]
Onshore–past (Prudhoe Bay, Kuparuk River, Milne Point, Badami, Colville River & NPR-A)	4.938	33 [2]
Offshore–past (Duck Island Unit and Northstar)	0.356	
Onshore–present (CD North, CD South, and Orion)	0.138	
Reasonably Foreseeable Future (total)	5.62	— [3]
Discovered Onshore	0.500	
Discovered Offshore	1.070	
Undiscovered Offshore (Beaufort Sea Sales 186, 195, and 202)	1.380 [6a]	
Undiscovered Onshore	2.300 [5]	
Undiscovered Onshore (NW NPR-A Multiple Sales)	0.370	
Speculative (total)	3.59	32,800 [4]
Onshore	2.67 [5]	
Offshore	0.92 [6b]	
Total	**14.642**	**32,834**

Notes:
[1] Production and reserve data are as of July 2002.
[2] Gas production to date is from Barrow gas fields supplied for local use to the Barrow community.
[3] All gas production from existing oilfields is used by facilities for fuel or reinjected for reservoir pressure maintenance. No gas production is transported and marketed outside the North Slope.
[4] Future production of natural gas assumes that a transportation system will eventually be constructed to move North Slope gas resources to outside markets. All proposed systems are uneconomic under current conditions.
[5] Includes 2.0 billion barrels in unnamed satellite fields and enhanced oil recovery from existing oil fields. Also includes 0.300 and 0.370 billion barrels estimated for NE and NW NPR-A multiple sales, respectively.
[6a] Includes 50% of the mid-point undiscovered resources between the base case ($18.00/bbl) and high case ($30.00/bbl) of the 2000 Beaufort Sea Assessment (MMS).
[6b] Includes the remaining 50% of the mid-point undiscovered offshore resources recoverable between $18.00 and $30.00 per barrel of 2000 Beaufort Sea Assessment (MMS).

Key:
Bbbl = Billion barrels.
Bcf = Billion cubic feet.

Source:
USDOI, MMS, Alaska OCS Region.

Table IV-17
Oil Spill Scenario Assumptions for Alternative A, Alternative B, and the Preferred Alternative

EIS Section	Source of Spill	Type of Oil	Size of Spill (bbl)	Assumed Number of Spills		Receiving Environment
Small Spills [1] (< 500 bbl) Onshore and Offshore				**Alt A**	**Alt B and Preferred Alt**	
IV. C IV. D IV. E V.	Operational Spills from All Sources	Diesel or Crude		130	112	Ice, Tundra, Snow, Gravel Pad, Water
		Refined	0.7	323	277	
Large Spills (≥ 500 bbl) Onshore or Offshore				**Alt A**	**Alt B and Preferred Alt**	
IV. C IV. D IV. E IV. F V.	Pipeline	Crude	50	1	1	Ice, Tundra, Snow, Gravel Pad, Water
	Platform/Gravel Pad	Crude	90			
	Storage Tank/Gravel Pad	Diesel	90			
Very Large Spills (≥ 120,000 bbl)				**Alt A**	**Alt B and Preferred Alt**	
IV. J	Platform Blowout	Crude	120,000	--	--	Ice, Tundra, Snow, Gravel Pad, Water

Notes:
[1] See Table App 9-07 for distribution of small crude spills from Alternative A, Alternative B, and the Preferred Alternative.
-- Not applicable.

Key:

EIS = Environmental Impact Statement.
bbl = Barrels.
Alt = Alternative.
≥ = Greater Than or Equal To.
< = Less Than.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table IV - 18
Estimates for Speculative Oil and Gas Resources

Area	Oil (Bbbl)	Gas (Tcf)	Study/Source
Beaufort Shelf	1.8 – 3.2	—	USDOI, MMS (2000)– Update Assessment for 2002-2007 OCS Program.
Beaufort-MacKenzie River Delta	1.0	9.0	National Energy Board, Canada, *Probabilistic Estimates of Hydrocarbon Volumes in the MacKenzie Delta and Beaufort Sea Discoveries.*
NPR-A	0 – 5.6	—	USGS Fact Sheet 045-02, 2002.
Arctic National Wildlife Refuge	0 – 6.3	—	USGS ANWR Assessment Team, Open-file Report 98-34.
North Slope-State lands	4.0	—	Informal industry estimates of oil recoverable through enhanced recovery technology and from new, small satellite fields near existing North Slope infrastructure.
	—	32.8	Discovered but undeveloped gas reserves, mainly associated with existing oil fields (Sherwood and Craig, 2000).
Chukchi Shelf	1.0 – 6.1	—	USDOI, MMS (2000)– Update Assessment for 2002-2007 OCS Program.

Notes:
1. The resource estimates for the Beaufort Shelf (USDOI, MMS, 2000) and Northern Alaska (U.S. Geological Survey, 1995) are mean undiscovered volumes that are economically recoverable at oil prices between $18 and $30 per barrel. Economic resources represent a small fraction of the total recoverable petroleum endowment, much of which is in pools too small or too remote to be economic under the current modeling assumptions. It is impossible to accurately predict the timing of commercial discoveries or future production volumes for speculative resources. Resource estimates often change with new information or modeling assumptions. For example, a new Geological Survey assessment (1998) reports that more economic oil may occur in the small coastal plain of the Arctic National Wildlife Refuge than previously estimated (in the U.S. Geological Survey done in1995) for all of Northern Alaska.

2. For the cumulative case, regional exploration in Arctic Alaska is not complete and development may be delayed long into the future. The hope for giant oil fields will continue to draw leasing and exploration activities in the future. However, it is unreasonable to speculate on the timing and infrastructure needed to produce resources that have not been discovered. More than 30 trillion cubic feet of gas have been discovered on the North Slope and remain undeveloped because of the lack of a regional transportation infrastructure and market. This huge proven resource base will likely be produced before major exploration efforts are focused on undiscovered gas resources in other onshore areas or in the Beaufort Sea off Alaska.

Key:
Bbbl = Billion barrels.
Tcf = Trillion cubic feet.
— = Not available of not applicable.

Sources:
USDOI, MMS, 2000; U.S. Geological Survey, 1995, 1998; National Energy Board of Canada, 1998.

Table IV-19
Assumed Large (≥500 barrels) Crude Oil Spills for Life of the Northwest NPR-A

Alternative	Crude Oil at $18/bbl					
	First Sale			Multiple Sales		
	Estimated Number of Spills	Estimated Total Spill Volume (bbl)	Percent Chance of One or More Spills	Estimated Number of Spills	Estimated Total Spill Volume (bbl)	Percent Chance of One or More Spills
No Action	0	0	<0.5	0	0	<0.5
A	0	0	<0.5	0	0	<0.5
B	0	0	<0.5	0	0	<0.5
C	0	0	<0.5	0	0	<0.5
Preferred Alternative	0	0	<0.5	0	0	<0.5
Alternative	**Crude Oil at $30/bbl**					
	First Sale			**Multiple Sales**		
	Estimated Number of Spills	**Estimated Total Spill Volume (bbl)**	**Percent Chance of One or More Spills**	Estimated Number of Spills	**Estimated Total Spill Volume (bbl)**	**Percent Chance of One or More Spills**
No Action	0	0	<0.5	0	0	<0.5
A	1	500 or 900	38	1	500 or 900	38
B	1	500 or 900	33	1	500 or 900	33
C	0	0	<0.5	0	0	<0.5
Preferred Alternative	1	500 or 900	33	1	500 or 900	33

Note:
The estimated number of oil spills is based on the estimated volume of resources multiplied by the Alaska North Slope spill rate. See Appendix 9 for a detailed explanation.

Key:
bbl = Barrel(s).
≥ = Greater Than or Equal To.
< = Less Than.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table IV-20
Assumed Small (<500 barrels) Crude/Refined Oil Spills for Life of Northwest NPR-A

Alternative	Crude Oil at $18/bbl									
	First Sale					Multiple Sales				
	Estimated Number of Spills		Estimated Total Spill Volume (bbl)		Percent Chance of One or More Spills	Estimated Number of Spills		Estimated Total Spill Volume (bbl)		Percent Chance of One or More Spills
	Crude	Refined	Crude	Refined		Crude	Refined	Crude	Refined	
No Action	0	0	0	0	<0.5	0	0	0	0	<0.5
A	0	0	0	0	<0.5	0	0	0	0	<0.5
B	0	0	0	0	<0.5	0	0	0	0	<0.5
C	0	0	0	0	<0.5	0	0	0	0	<0.5
Preferred Alternative	0	0	0	0	<0.5	0	0	0	0	<0.5
Alternative	***Crude Oil at $30/bbl***									
	First Sale					***Multiple Sales***				
	Estimated Number of Spills		Estimated Total Spill Volume (bbl)		Percent Chance of One or More Spills	Estimated Number of Spills		Estimated Total Spill Volume (bbl)		Percent Chance of One or More Spills
	Crude	Refined	Crude	Refined		Crude	Refined	Crude	Refined	
No Action	0	0	0	0	0	0	0	0	0	0
A	130	323	393	226	> 99.9	130	323	393	226	> 99.9
B	112	277	336	194	> 99.9	112	277	336	194	> 99.9
C	0	0	0	0	0	0	0	0	0	0
Preferred Alternative	112	277	336	194	> 99.9	112	277	336	194	> 99.9

Notes:
The estimated number of oil spills is based on the estimated volume of resources multiplied by the Alaska North Slope spill rate. See Appendix 9 for a detailed explanation.

Key:

bbl = Barrel(s).

≥ = Greater Than or Equal To.

< = Less Than.

Source:

USDOI, MMS, Alaska OCS Region, 2002.

Table IV-21
Effects of Alternative A on Employment and Personal Income by Place of Residence with Oil at $18/bbl[1]

Phase of Activity	Employment Expressed in Annual Average Jobs			Total Personal Income Expressed in Annual Average in Millions of Constant 1999 $		
	Direct Workers	Indirect & Induced Workers	Total	Direct Workers	Indirect & Induced Workers	Total
North Slope Borough [2]						
Exploration Phase	2	1	3	0.2	0.1	0.3
Southcentral Alaska [3] and Fairbanks North Star Borough						
Exploration Phase	27	13	40	2.1	0.4	2.5

Notes:

[1] $18 per barrel of oil.
[2] Communities in the North Slope Borough, but not the worker enclaves.
[3] Southcentral Alaska includes the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough.

Source:
MMS, "Arctic IMPAK: 1st Step Model" and "Arctic IMPAK: 2nd Step Model."

Table IV-22
Effects of Alternative A on Employment and Personal Income by Place of Residence with Oil at $30/bbl[1]

Phase of Activity	Employment Expressed as Annual Average Jobs			Total Personal Income Expressed as Annual Average in Millions of Constant 1999 $		
	Direct Workers	Indirect & Induced Workers	Total	Direct Workers	Indirect & Induced Workers	Total
North Slope Borough [2]						
Exploration Phase	4	1	5	0.4	0.1	0.5
Development Phase	60	20	80	4.8	2.0	6.8
Production Phase	9	3	12	0.6	0.3	0.9
Southcentral Alaska [3] and Fairbanks North Star Borough						
Exploration Phase	52	26	78	4.2	0.8	5.0
Development Phase	800	400	1,200	64.0	12.0	76.0
Production Phase	340	170	510	27.0	5.0	33.0

Notes:

[1] $30 per barrel.
[2] Communities in the North Slope Borough, but not worker enclaves.
[3] Southcentral Alaska includes the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough.

Source:
MMS, "Arctic IMPAK: 1st Step Model" and "Arctic IMPAK: 2nd Step Model."

Table IV-23
Impacts of Oil Spills on Types of Vegetation

Major and Minor Categories of Land Cover in NW NPR-A	Percent of Category Impacted by Oil Spills
Water	
Ice	0.0
Clear Water	0.0
Turbid Water	0.0
Aquatic	
Carex aquatilis	2.4
Arctophila fulva	0.7
Flooded Tundra	
Low Centered Polygons	7.1
Nonpatterned	4.8
Wet Tundra	7.7
Moist Tundra	
Sedge/Grass Meadow	7.9
Tussock Tundra	28.2
Moss/Lichen	2.0
Shrub	
Dwarf	32.4
Low	4.9
Tall	0.0
Barren Ground	
Sparsely Vegetated	0.4
Dunes/Dry Sand	0.5
Other	0.8

Table IV-24
Pipelines — Trans-Alaska Pipeline System and Future Natural Gas Pipeline Projects

Name	Estimated Pipeline Length (miles)	Project Characteristics and Status
		Active Pipeline Project
Trans-Alaska Pipeline System (TAPS)	800	**Characteristics** Key transportation link for all North Slope oil fields. Since start-up in 1977 TAPS has carried nearly 13 billion barrels of oil. The pipeline corridor that runs between Prudhoe Bay and Valdez contains approximately 16.3 square miles. The Dalton Highway (Haul Road) was constructed parallel to the pipeline between Prudhoe Bay and Livengood. In 1988, TAPS throughput came close to its design capacity of 2 million barrels per day. Present throughput is approximately 1.0 million barrels per day. TAPS' lower operational limit is estimated at between 200,000 and 400,000 barrels per day. **Regulatory Requirements** TAPS 30-year Lease Renewal Environmental Impact Statement out for public comment as of October, 2002. **Current Status** If oil production from northern Alaska cannot be sustained above minimum throughput, TAPS will not be able to operate, shutting in all North Slope oil production.
Future Natural Gas Pipeline Projects		
Trans-Alaska Gas System (TAGS)	800	**Characteristics** The TAGS plan consists of: 1. a LNG-grade pipeline substantially parallel to TAPS from Prudhoe Bay to Valdez, 2. a LNG plant at Anderson Bay near Valdez, and 3. a fleet of new LNG carriers. LNG would be transported to Japan and other Pacific Rim countries. Project design recently scaled back to a 30-inch pipeline able to transport 7 million tons annually. **Regulatory Requirements** BLM completed an EIS and granted a federal right-of-way in 1988. A Presidential finding and an export license are in place. A separate EIS, conducted by FERC, covers the Anderson Bay terminal. A conditional State of Alaska right-of-way lease was renewed in 1999 for 10 years. **Current Status** Stalled because of no commitment from the North Slope gas producers, lack of delivery contracts to Asian buyers, and high construction costs.

Table continues on next page

Table IV-24
Pipelines — Trans-Alaska Pipeline System and Future Natural Gas Pipeline Projects (continued)

Name	Estimated Pipeline Length (miles)	Project Characteristics and Status
Future Natural Gas Pipeline Projects (continued)		
Alaska Natural Gas Transportation System (ANGTS)[1]	2,102	**Characteristics** Connects Alaska North Slope gas production through Canada to markets primarily in the U.S. via a high-pressure pipeline. Parallels TAPS as far as Delta Junction in interior Alaska and then crosses Yukon Territory to connect to existing pipelines in Alberta and the Lower 48. **Regulatory Requirements** BLM completed an EIS and issued a federal grant of right-of-way in 1980. An existing 1978 treaty between the United States and Canada sanctions the proposal. Associated Canadian permits and approvals are in place. The Alaska Natural Gas Transportation Act (ANGTA) of 1976 — in concert with the Presidential Decision of 1977 — provided for the construction of a gas pipeline along the Alaska Highway route. The project has a conditional Federal Energy Regulatory Commission (FERC) certificate. **Current Status** Project proponents have twice begun (but subsequently suspended) the process to secure a State of Alaska right-of-way lease. Downward revisions to construction costs and the recent increase in gas prices into the $3-4 per million cubic foot range make this project more appealing today. Variations to routes are currently being considered.
Arctic Resources, Northern Gas Pipeline Project	326 offshore 874 onshore	**Characteristics** 52-inch, high-pressure gas pipeline would run offshore from Prudhoe Bay in Alaska to the Mackenzie delta in Northwest Territory and then south through the Mackenzie River Valley to the existing gas pipeline network in northern Alberta. The 326- mile offshore portion would be trenched in 30-60 feet of water. The 874-mile onshore portion also would be buried. Designed to deliver 2.5 billion cubic feet per day to markets primarily in the United States. **Regulatory Requirements** FERC approval, an EIS, a federal right-of-way and a State Lease would be required for this project. **Current Status** Commitments of gas producers and gas buyers have not yet been obtained, nor have the regulatory requirements been met. Requires a consortium of gas producers, pipeline companies, and Native corporations in both Alaska and Canada.

Table IV-24
Pipelines —Trans-Alaska Pipeline System and Future Natural Gas Pipeline Projects (continued)

Name	Estimated Pipeline Length (miles)	Project Characteristics and Status
Future Natural Gas Pipeline Projects (continued)		
Natural Gas to Liquids Conversion[2]	Will use existing TAPS Pipeline	**Characteristics** GTL is an attractive option because it will use the existing TAPS pipeline (extending its life and lowering future tariffs) and produce clean-burning fuels to meet more stringent Environmental Protection Agency emission standards for vehicles. At present, the overall cost of a full-scale gas to liquids project is comparable to a similar sized LNG project. As an emerging technology, new cost-reduction breakthroughs are expected for gas to liquids processing, improving the economic potential for future gas to liquid projects. **Regulatory Requirements** Monitoring emission levels of CO2 and NOx. Waste waters are discarded to a leach field monitored by well sampling. Distillation by-products (salts) are transported and treated in Anchorage by Emerald Services. **Current Status** All of the major North Slope gas owners (BP-Amoco, Exxon-Mobil, and Phillips-Alaska) are studying the feasibility of various gas commercialization projects. British Petroleum is presently constructing a $70 million prototype GTL plant at Nikiski, Alaska. The plant is scheduled to be operational in 2002. ExxonMobile has also advocated the GTL concept.

Notes:
[1] Thomas et al., 1996.
[2] *Alaska Report*, 1997.

Table IV-25
Future Lease Sales

Sale	Proposed Sale Dates	Area/Description	Resources or Hydrocarbon Potential
Federal			
5-Year OCSProgram Sales 186, 195, 202	2003 2005 2007	As much as 9.9 million acres in the Beaufort Sea from the Canadian border on the east to Barrow on the west (*Federal Register,* 2001c).	0.46 to 1.38 Bbbl Oil (Estimated)
Northeast NPR-A	Approximately every two years		
Northwest NPR-A	To Be Determined	As much as 9.98 million acres of the Northwest NPR-A Planning Area (*Federal Register,* 2001d).	0 to 0.735 Bbbl Oil (Estimated)
State of Alaska			
North Slope Areawide	Oct 2002 Oct 2003 Oct 2004 Oct 2005 Oct 2006	As much as 5,100,000 acres of state-owned lands between the Canning and Colville Rivers and north of the Umiat Base Line (about 69° 20' N.).	Moderate to High
Beaufort Sea Areawide	Oct 2002 Oct 2003 Oct 2004 Oct 2005 Oct 2006	Unleased State-owned tide and submerged lands between the Canadian border and Point Barrow and some coastal upland acreage along the Beaufort Sea between the Staines and Colville rivers. The gross proposed sale area exceeds 2,000,000 acres. The State of Alaska was scheduled to hold its first areawide sale in the Beaufort Sea on October 13, 1999. This sale was delayed pending the outcome of the British Petroleum-Amoco and ARCO-Phillips mergers and related uncertainties in future lease holdings.	Moderate to High
North Slope Foothills Areawide	May 2003 May 2004 May 2005 May 2006	State-owned lands lying between the NPR-A and the Arctic National Wildlife Refuge south of the Umiat Baseline and north of the Gates of the Arctic National Park and Preserve. The gross proposed sale area exceeds 7,000,000 acres.	Moderate

Key:
Bbbl = Billion barrels.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table IV-26
Discharge Conditions for a Well Blowout

Discharge Category	Volume of Oil (Barrels)				
	Day 1	Day 2	Day 3	Day 15	15-Day Totals
Well's Discharge Volume	8,000	8,000	8,000	8,000	120,000
Evaporation (30%)[1]	-2,400 [3]	-2,400 [3]	-2,400 [3]	-2,400 [3]	-36,000 [3]
Fall out to Gravel Island	2,800	2,800	2,800	2,800	84,000
Oil Remaining on Gravel Pad	-2,800 [3]	-600 [2, 3]	0 [2]	0 [2]	-3,400 [3]
Oil Draining to Ground from Gravel Pad	0	2,200	2,800	2,800	38,600
Oil Falling to Ground	2,800	2,800	2,800	2,800	42,000
Total Oil to the Ground	**2,800**	**5,000**	**5,600**	**5,600**	**80,600**

Notes:
[1] Evaporation was calculated using a 330-barrel per hour rate and Alpine crude oil characteristics in the Sintef Oil Weathering Model (Reed et al., 2001).
[2] After hour 26, the gravel pad is saturated with oil and all subsequent oil falling on the gravel pad drains to the ground. The gravel pad is assumed to be a 5-acre area.
[3] Negative numbers represent volume that was not included in the model because the amounts do not drain to the ground where they may affect sensitive environmental resources.

Source:
Compilation of several oil discharge prevention and contingency plans on the North Slope.

Table IV-27
Results of Colville Delta Exploration Wells

Well Name	Operator	Surface Location	Completion Date	Flow Rate bopd [1]	Net Pay (feet)	API Gravity
Colville State #1	Sinclair	T12N R7E 25	03/08/66	Oil Show	30	—
Kookpuk #1	Union	T11N R7E 19	03/10/67	—	0	—
Colville Delta State #1	Gulf	T13N R6E 9	04/22/70	—	0	—
Nechelik #1	Sohio	T12N R5E 18	03/17/82	Oil Show	50	—
Colville Delta #1	ARCO	T13N R7E 17	04/07/85	1,070	110	25
Colville Delta #1A	ARCO	T13N R7E 17	04/26/85	50 Mcf gas/day	110	—
Colville Delta #2	ARCO	T13N R7E 23	03/16/86	500	90	28
Colville Delta #3	ARCO	T13N R7E 33	03/31/86	961	70	33
Colville Delta #25-1	ARCO	T13N R6E 25	03/03/86	159	90	25
Fiord #1	ARCO	T12N R5E 2	04/18/92	1,065	50	32
Kalubik #1	ARCO	T13N R7E 11	05/01/92	1,200	120	28
Fiord #2	ARCO	T12N R5E 24	03/07/94	Well data not released		
Till #1	ARCO	T12N R5E 32	03/18/93	—	0	—
Kuupik #3	ARCO	T13N R6E 22	04/14/93	100	66	27
Colville River #1	ARCO	T11N R6E 17	04/17/93	—	0	—
Bergschrund #1	ARCO	T12N R5E 32	04/14/94	Well data not released		
Alpine #1B*	ARCO	T11N R4E 1	03/23/96	Well data not released		
Alpine #3*	ARCO	T12N R4E 25	03/11/96	Well data not released		
Alpine State #1	ARCO	T11N R4E 1	02/16/95	Well data not released		
Alpine State #1A	ARCO	T11N R4E 1	03/01/95	Well data not released		
Bergschrund #2	ARCO	T11N R5E 9	02/27/96	Well data not released		
Bergschrund #2A	ARCO	T11N R5E 9	04/17/96	Well data not released		
Fiord #3	ARCO	T12N R5E 25	04/04/95	Well data not released		
Fiord #3A	ARCO	T12N R5E 25	04/15/96	Well data not released		
Nanuk #1	ARCO	T11N R5E 19	03/24/96	Well data not released		
Neve #1	ARCO	T11N R4E 14	04/23/96	Well data not released		
Temptation #1	ARCO	T12N R4E 16	04/04/96	Well data not released		
Temptation #1A	ARCO	T12N R4E 16	04/23/96	Well data not released		
Alpine #2	ARCO	T11N R5E 9	- - - - PROPOSED WELL - - - -			
Neve #1A	ARCO	T11N R4E 14	- - - - PROPOSED WELL - - - -			
Neve #1B	ARCO	T11N R4E 14	- - - - PROPOSED WELL - - - -			
Nuiqsut #1	ARCO	T11N R4E 8	- - - - PROPOSED WELL - - - -			

Notes:
[1] Unless otherwise noted.

Key:
BPD = barrels per day.
Mcf = thousand cubic feet.
— = Not available, unknown, or not applicable.

Table IV-28
Summary of Selected Non-Oil and Gas-Related Management Activities [1]

Activity	Alternative			
	No Action	**A**	**B**	**C**
Aircraft Use [2]				
Point-to-Point	regular but not daily	occasional	regular but not daily	regular but not daily
Wildlife Aerial Surveys	14 days during June and July	21 days during June and July	21 days during June and July	21 days during June and July
Other Aerial Surveys	occasional	several 2- to 3-week periods	several 1- to 2-week periods	several 1- to 2-week periods
Excavation and Collection				
Research/Archeological	£ 1 acre disturbed	6 acres disturbed	4 acres disturbed	2 acres disturbed
Ground Activities [3]				
Large Camps [4]	6 weeks	12 weeks	12 weeks	12 weeks
Small Camps	3 weeks	6–12 weeks	6-12 weeks	6–12 weeks
Overland Moves	20–60 trips	20–60 trips	20–60 trips	20–0 trips
Recreation (Colville River float trip parties)[5]	5 with SRP's [6] 3 casual parties	5 with SRP's 3 casual parties	5 with SRP's 3 casual parties	5 with SRP's 3 casual parties

Notes:
[1] All estimates are for levels of annual activity.
[2] This does not include use that is associated directly with oil and gas development or recreation; assumes that fixed-wing aircraft and helicopters are used; assumes that use occurs almost exclusively in summer.
[3] Camps in this category are not associated directly with oil and gas development or recreation; assumes that all camps occur in summer.
[4] Large camps are at least 15 persons and may have 5,000 gallons of fuel. Camps are likely to be located at Umiat, Lonely, Ivotuk, Inigok, and sites near the headwaters of the Kiligwa and Meade Rivers.
[5] Average of 4 persons per party.
[6] Special Recreation Permits, i.e. guided, regulated by BLM.

Table IV-29
Pipeline Scenarios for Alternative A, Alternative B, and Preferred Alternative

Area	Oil Pipelines		Gas Pipelines				Total New Pipeline Routes (miles)
	New Routes		New Routes		Pipelines Using Same Routes and/or Infrastructure as Oil Pipelines		
	Elevated Field Gathering Pipelines (miles)	Elevated Trunk Pipelines (miles)	Elevated Field Gathering Pipelines (miles)	Buried Trunk Pipelines (miles)	Elevated Field Gathering Pipelines (miles)	Buried Trunk Pipeline (miles)	
First Sale - Alternative A							
State Lands	--	35	--	--	--	70	35
NE NPR-A	--	100	--	--	--	100	100
NW NPR-A	70	25	--	--	70	25	95
Total	**70**	**160**	--	--	**70**	**195**	**230**
Multiple Sales - Alternative A							
State Lands	--	120	--	0	0	70	120
NE NPR-A	----	125	--	100	--	100	225
NW NPR-A	170	125	--	100	170	25	395
Total	**170**	**370**	--	**200**	**170**	**195**	**740**
First Sale - Alternative B and Preferred Alternative							
State Lands	--	35	--	--	--	70	35
NE NPR-A	--	100	--	--	--	100	100
NW NPR-A	45	25	--	--	45	25	70
Total	**45**	**160**	--	--	**45**	**195**	**205**
Multiple Sales - Alternative B and Preferred Alternative							
State Lands	--	120	--	--	--	70	120
NE NPR-A	--	125	--	100	--	100	225
NW NPR-A	115	125	--	100	115	25	340
Total	**115**	**370**	--	**200**	**115**	**195**	**685**

Notes:
-- = Not applicable.

Pipeline mileage does not include in-field flowlines, only gathering lines to central facilities and overland main lines to the existing pipeline network on State lands. Pipeline mileage is for right-of-way corridors that could hold both oil- and gas-sales lines and service lines (product/fuel, seawater, communication).

Table IV-30
Effects of Preferred Alternative on Employment and Personal Income by Place of Residence with Oil at $18/bbl[1]

Phase of Activity	Employment Expressed in Annual Average Jobs			Total Personal Income Expressed in Annual Average in Millions of Constant 1999$		
	Direct Workers	Indirect & Induced Workers	Total	Direct Workers	Indirect & Induced Workers	Total
North Slope Borough [2]						
Exploration Phase	2	1	3	0.2	0.1	0.3
Southcentral Alaska [3] and Fairbanks North Star Borough						
Exploration Phase	24	12	36	1.9	0.4	2.3

Source:
MMS, "Arctic IMPAK: 1st Step Model" and "Arctic IMPAK: 2nd Step Model."

Notes:
[1] $18 per barrel.
[2] Communities in the North Slope Borough, but not the worker enclaves.
[3] Southcentral Alaska includes the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough.

Table IV-31
Effects of Preferred Alternative on Employment and Personal Income by Place of Residence with Oil at $30/bbl[1]

Phase of Activity	Employment Expressed as Annual Average Jobs			Total Personal Income Expressed as Annual Average in Millions of Constant 1999$		
	Direct Workers	Indirect & Induced Workers	Total	Direct Workers	Indirect & Induced Workers	Total
North Slope Borough [2]						
Exploration Phase	4	1	5	0.4	0.1	0.5
Development Phase	54	18	72	4.3	1.8	6.1
Production Phase	8	3	11	0.5	0.3	0.8
Southcentral Alaska [3] and Fairbanks North Star Borough						
Exploration Phase	47	23	70	3.8	0.7	4.5
Development Phase	720	360	1,080	58.0	11.0	69.0
Production Phase	306	154	460	24.3	4.5	28.8

Source:
MMS, "Arctic IMPAK: 1st Step Model" and "Arctic IMPAK: 2nd Step Model."

Notes:
[1] $30 per barrel.
[2] Communities in the North Slope Borough, but not worker enclaves.
[3] Southcentral Alaska includes the Municipality of Anchorage, the Matanuska-Susitna Borough, and the Kenai Peninsula Borough.

Table V-01
Protective Allocations for Rivers Eligible but not Suitable for Designation as Components of the National Wild and Scenic Rivers System.

River Name	River Protection under Preferred Alternative
Alatakruk	Deferral Area/Native Land Management
Allaktak	Coastal Area/No Facilities within Buffer Area.
Avak	Deferral Area
Avalik	No Facilities within Buffer Area.
Chipp	Coastal Area/No Facilities within Buffer Area.
Inaru	No Facilities within Buffer Area.
Ivisaruk	Deferral Area
Kaolak	Deferral Area
Ketik	Deferral Area
Kigalik	No Facilities within Buffer Area.
Kuk	Deferral Area
Kungok	Deferral Area
Meade	Coastal Area/No Facilities within Buffer Area.
Nokotkek	Deferral Area/Kasegaluk Lagoon Special Area
Ongoravik	Deferral Area/Kasegaluk Lagoon Special Area
Oumulik	No Facilities within Buffer Area.
Titaluk	No Facilities within Buffer Area.
Topogoruk	No Facilities within Buffer Area.
Tunalik	Deferral Area/Kasegaluk Lagoon Special Area
Usuktuk	No Permanent or Temporary Facilities within Buffer Area.
Maybe Creek	No Permanent or Temporary Facilities within Buffer Area.

Table App 7-01
Undiscovered, Risked, Conventionally Recoverable Oil and Gas Resources for Northwest and Northeast NPR-A Planning Areas (2002)

Play No.	Name	UAI	Oil Endowment (MMbo)[1]			Gas Endowment (Tcfg)			Oil Pools, 3 Largest (mean, MMbo)			Gas Pools, 3 Largest (mean, Bcfg)		
			F95	Mean	F05	F95	Mean	F05	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
1	Endicott-Barrow Arch	UBWA0100	157	334	600	0.302	0.573	0.916	103	62	42	196	120	81
2	Endicott-Arctic Platform	UBWA0200	2	9	18	0.032	0.122	0.238	2	2	2	54	27	22
3	Ellesmerian-Gas Belt	UBWA0300	-	30[2]	78[2]	-	1.209	3.017	Gas	Gas	Gas	263	156	135
4	Lisburne-Barrow Arch	UBWA0400	59	161	341	0.165	0.373	0.686	59	31	19	148	78	49
5	Lisburne-Arctic Platform	UBWA0500	-	1	4	-	0.017	0.076	2	1	1	28	16	11
6	Sadlerochit/Sag River-Barrow Arch-East	UBWA0600	480	949	1776	0.919	1.708	3.004	310	167	106	605	327	210
7	Sadlerochit-Arctic Platform-East	UBWA0700	-	56	152	-	0.489	1.376	28	20	14	315	130	117
8	Beaufortian-Barrow Arch-East	UBWA0800	3574	4755	6359	6.658	10.425	17.293	634	441	385	2861	854	713
9	Beaufortian- Arctic Platform-East	UBWA0900	-	192	382	-	2.107	4.871	41	27	24	988	293	224
10	Beaufortian-Gas Belt	UBWA1000	1[2]	7[2]	18[2]	0.043	0.304	0.814	Gas	Gas	Gas	143	53	34
11	Brookian Turbidites-Arctic Platform-East	UBWA1100	378	609	897	1.706	3.157	5.559	75	73	30	729	342	219
12	Brookian-Gas Belt	UBWA1200	-	8[2]	34[2]	-	0.322	1.346	Gas	Gas	Gas	174	115	100
13	Brookian Topset-Arctic Platform-East	UBWA1300	59	139	244	0.346	0.815	1.668	28	25	9	307	132	71
14	Brookian Foldbelt	UBWA1400	354	830	1633	2.347	5.484	10.970	242	179	70	1185	924	545
15	Sag River/Shublik-Barrow Arch-West	UBWA1500	-	9	35	-	0.087	0.298	10	7	5	98	26	22
16	Sadlerochit-Arctic Platform-West	UBWA1600	-	5	23	-	0.087	0.384	9	8	None	150	105	90
17	Beaufortian-Barrow Arch-West	UBWA1700	13	57	128	0.123	0.509	1.397	19	9	4	263	90	41
18	Beaufortian-Arctic Platform-West	UBWA1800	17	64	163	0.287	1.188	3.040	5	2	2	521	193	127

Play No.	Name	UAI	Oil Endowment (MMbo)[1]			Gas Endowment (Tcfg)			Oil Pools, 3 Largest (mean, MMbo)			Gas Pools, 3 Largest (mean, Bcfg)		
			F95	Mean	F05	F95	Mean	F05	Rank 1	Rank 2	Rank 3	Rank 1	Rank 2	Rank 3
19	Brookian Turbidites-Arctic Platform-West	UBWA1900	-	34	65	-	0.390	0.710	6	3	2	85	44	35
20	Brookian Topset-Arctic Platform-West	UBWA20000	-	33	81	-	0.412	1.067	11	4	3	205	78	52
21	Endicott/Lisburne Thrust Belt	UBWA2100	**Not in Northwest or Northeast NPR-A Planning Area**											
22	Beaufortian-Deep Detached Foldbelt	UBWA2200	-	30	86	-	0.422	1.067	9	7	5	145	87	70
23	Fortress Mountain Formation-Deep Detached Foldbelt	UBWA2300	301	789	1386	3.103	7.109	11.733	180	142	115	1791	951	883
FASPAG Aggregation-All Plays			**6,817**	**9,101**	**11,817**	**23.002**	**37.309**	**56.213**	-	-	-	-	-	-

Notes:
[1] Includes natural gas liquids.
[2] 100% natural gas liquids.

Key:
Bcfg = Billion cubic feet of gas.
MMbo = Million barrels of oil.
Tcfg= Trillion cubic feet of gas.
F95 = 95% chance for exceeding indicated volume.
F05 = 5% chance for exceeding indicated volume.

Source:
USDOI, MMS and BLM.

Table App 7-02
Economic Oil and Gas Resources in NPR-A:
Undiscovered, Risked, Economically Recoverable Resources

Play No.	Name	Oil Resources NE + NW NPR-A (Bbbl)		Gas Resources NE + NW NPR-A (Tcf)		Fraction in NW NPR-A	Oil Resources NW NPR-A (Bbbl)		Gas Resources NW NPR-A (Tcf)	
		$18 Oil Price	$30 Oil Price	$2.56 Gas Price	$4.27 Gas Price		$18 Oil Price	$30 Oil Price	$2.56 Gas Price	$4.27 Gas Price
1	Endicott-BA	0.004	0.256	0.004	0.433	0.19	0.001	0.049	0.001	0.082
2	Endicott-AP	—	—	—	—	1.00	—	—	—	—
3	Ellesmerian gas	—	—	—	0.005	0.71	—	—	—	0.004
4	Lisburne-BA	—	0.047	0.001	0.081	0.00	—	—	—	—
5	Lisburne-AP	—	—	—	—	1.00	—	—	—	—
6	Sadlerochit-BA-east	0.017	0.286	0.019	0.495	0.46	0.008	0.132	0.009	0.228
7	Sadlerochit-AP-east	—	—	—	—	1.00	—	—	—	—
8	Beaufortian-BA-east	0.113	4.184	0.188	8.689	0.30	0.034	1.255	0.056	2.607
9	Beaufortian-AP-east	—	0.016	—	0.257	0.46	—	0.007	—	0.118
10	Beaufortian gas	—	—	—	—	1.00	—	—	—	—
11	Brookian-turbidites-east	—	0.158	—	0.755	0.35	—	0.055	—	0.264
12	Brookian gas	—	—	—	—	1.00	—	—	—	—
13	Brookian topset-east	—	0.014	—	0.073	0.36	—	0.005	—	0.026
14	Brookian foldbelt	—	0.539	—	3.350	0.80	—	0.431	—	2.680
15	Sag R/Shublik-west	—	—	—	—	0.10	—	—	—	—
16	Sadlerochit-AP-west	—	—	—	—	1.00	—	—	—	—
17	Beaufortian-BA-west	—	0.002	—	0.040	0.70	—	0.001	—	0.028
18	Beaufortian-AP-west	—	—	—	—	1.00	—	—	—	—
19	Brookian turbidites-west	—	—	—	—	0.90	—	—	—	—
20	Brookian topset-west	—	—	—	—	0.90	—	—	—	—
21	Endicott/Lis thrust belt	—	—	—	—	0.00	—	—	—	—
22	Beaufort detached fold	—	—	—	—	1.00	—	—	—	—
23	Fortress Mountain	—	0.195	—	1.652	0.77	—	0.150	—	1.272
Total		0.134	5.697	0.212	15.830	—	0.043	2.085	0.066	7.309
Percent of total		—	—	—	—	—	31%	37%	31%	46%

Key:
Bbbl = Billion barrels.
NE = Northeast.
NW = Northwest.
NPR-A = National Petroleum Reserve-Alaska.
Tcf = Trillion cubic feet.

Table App 9-01
North Slope Facility and Pipeline Crude Oil Spills > 500 Barrels (1985-2000)

Spill Date	Facility Type	Facility Operator	Oil Type	Spill Location	Spill Cause	Low Spill Quantity (bbl)	High Spill Quantity (bbl)
07/28/89	Production Processing	Conoco, Inc.	Crude Oil	Milne Point Unit, CPF	Facility Tank Leak-overfill	825	925
08/25/89	Pipeline	ARCO Alaska, Inc.	Crude Oil	Kuparuk River Unit, Drill Site 2-U	Pipeline Leak-corrosion of block valve	340	510
12/10/90	Production Well Site	ARCO Alaska, Inc.	Crude Oil	Lisburne Unit, Drill Site L-5	Facility Explosion	—	600
08/17/93	Production Processing	ARCO Alaska, Inc.	Crude Oil/ Produced Water	Kuparuk River Unit, CPF 1	Facility Tank Leak-Corrosion	—	675
09/26/93	Production Processing	BP Exploration (Alaska)	Crude Oil	Prudhoe Bay Unit, Gathering Center 2	Facility Tank Leak-overflow from pump failure	—	650
08/21/00	Production Processing	BP Exploration (Alaska)	Crude Oil/ Produced Water	Prudhoe Bay Unit, Gathering Center 2	Facility Tank Leak-overflow from control system failure	700	715

Key:

bbl = Barrels.

CPF = Central Processing Facility.

— = Information unavailable.

Source:

Hart Crowser, Inc., 2000; BP Exploration (Alaska), Inc., 2001; State of Alaska, Dept. of Environmental Conservation, 2001.

Table App 9-02
Trans-Alaska Pipeline Spills ≥ 500 Barrels Based on Reported High Quantity from June 1977 to December 2001

Record Source	*Spill Date*	Facility Type	Facility Operator	Spill Name	Oil Type	Spill Location	Spill Cause	Low Spill Quantity (bbl)	High Spill Quantity (bbl)
APSC ADEC UNK JPO	08/08/77	Pipeline Pump Station	APSC	Pump Station 8	Crude	TAPS Pump Station 8 (TAPS MP 489.2)	Facility Explosion [1,2,3] Unspecified [5]	300 [1,2,3,5]	4,762 [2]
APSC ADEC UNK JPO	08/19/77	Pipeline	APSC	Check Valve 7	Crude	TAPS MP 26 (Check Valve 7)	Pipeline Leak – equipment damage [1,2,3] Human Error [5]	1,000 [1,2,3,5]	1,800 [1] 2,620 [2]
APSC UNK JPO	12/15/78	Pipeline	APSC	Steele Creek	Crude	TAPS MP 457	Pipeline Leak – intentional sabotage [1,3] Unspecified [5]	11,905 [1,3,5]	16,000 [1]
APSC ADEC UNK JPO	06/10/79	Pipeline	APSC	Atigun Pass	Crude	TAPS MP 166 (N. side of Atigun Pass)	Pipeline Leak – line break [1,2,3,5]	1,500 [1,2,5]	7,143 [2] 5,267 [3]
APSC ADEC UNK JPO	06/15/79	Pipeline	APSC	Little Tonsina	Crude	TAPS MP 734	Pipeline Leak – line break [1,2,3,5]	300 [2,3,5]	4,000 [1,2]
APSC ADEC UNK BLM JPO OSIR	01/01/81	Pipeline	APSC	Check Valve 23	Crude	TAPS MP 114.6 (Check Valve 23)	Pipeline Leak – leaking valve	1,000 [2]	1,500 [1,3,4,5] 2,000 [6] 2,381 [2]
APSC ADEC	04/20/96	Pipeline	APSC	Check Valve 92	Crude	TAPS MP 539.7 (Check Valve 92)	Pipeline Leak – loose fitting	800 [1,2]	811 [1]
APSC ADEC	10/04/01	Pipeline	APSC	TAPS MP 400	Crude	TAPS MP 400	Pipeline Leak- Intentional Sabotage – bullet hole	6,800 [1,2]	6,800 [1,2]

Key:
[1] APSC = Alyeska Pipeline Service Company.
[2] ADEC = Alaska Department of Environmental Conservation.
[3] UNK = Unknown.
[4] BLM = Bureau of Land Management.
[5] JPO = Joint Pipeline Office.
[6] OSIR = Oil Spill Intelligence Report.
bbl = Barrel.

Source:
Hart Crowser, Inc., 2000.

Table App 9-03
TAPS Tanker Spills ≥ 1,000 bbl (1977 through 1999)

Date	Vessel	Location	Destination	Amount (bbl)
08/29/78	*Overseas Joyce*	Balboa Channel	Perth Amboy, New Jersey	1,816
06/07/80	*Texaco Connecticut*	Panama Canal Zone	Port Neches, Texas	4,047
12/12/81	*Stuyvesant*	Gulf of Tehuantepec	Panama	3,600
12/21/85	*ARCO Anchorage*	Puget Sound	Cherry Point, Washington	5,690
01/09/87	*Stuyvesant*	Gulf of Alaska, British Columbia	Puerto Armuelles, Panama	15,000
07/02/87	*Glacier Bay*	Cook Inlet, Alaska	Nikiski, Alaska	4,900
10/04/87	*Stuyvesant*	Gulf of Alaska, British Columbia	Puerto Armuelles, Panama	14,286
01/03/89	*Thompson Pass*	Port of Valdez	Panama	1,700
03/24/89	*Exxon Valdez*	Prince William Sound, Alaska	Long Beach, California	240,500
02/07/90	*American Trader*	Huntington Beach, California	Long Beach, California	9,929
02/22/91	*Exxon San Francisco*	Fidalgo Bay, Washington	Anacortes, Washington	5,000

Key:
bbl =Barrel(s).

Sources:
Anderson and Lear, 1994; Anderson, 2000; Anderson and LaBelle, 2000.

Table App 9-04
Alaska North Slope Historic Large and Small Crude Oil Spills: Estimated Spill Rates

Spill Size Category	Spill Volume	Number of Spills	Mean Spill Size (bbl)	Production (Crude Oil) (Bbbl)	Spill Rate (Spills/Bbbl Crude-Oil Produced)
Small Crude-Oil Spills: <500 bbl, (1989-2000)	135,127 gal[1] (3,217 bbl)	1,178 [1]	2.7	6.6 [2]	178
Large Crude-Oil Spills: ≥500 bbl (1985-2000)	171,150 gal[1] (4,075 bbl)	6 [1]	680	9.36 [2]	0.64

Notes:

[1] Oil-spill databases are from the State of Alaska, Department of Environmental Conservation in Anchorage, Juneau, and Fairbanks; BP Exploration (Alaska) Inc.; and ARCO.

[2] North Slope production data is derived from the Trans-Alaska Pipeline System throughput data from Alyeska Pipeline Services Company.

Key:

bbl = Barrel(s).
Bbbl = Billion barrels.
gal = Gallon.
< = Less Than.
≥ = Greater Than or Equal To.

Source:

USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-05
Large Crude Oil Spills Estimated Over the Production Life of the Northwest NPR-A

Crude Oil at $18/bbl					
Alternative	**Resources (Bbbl)[1]**	**Spill Rate (Spills/Bbbl)**	**Assumed Spill Size (bbl)**	**Estimated Mean Number of Spills**	**Estimated Total Spill Volume (bbl)**
First Sale					
No Action	0.0	0.64	500 or 900	0	0
A	0.0	0.64	500 or 900	0	0
B	0.0	0.64	500 or 900	0	0
C	0.0	0.64	500 or 900	0	0
Preferred Alternative	0.0	0.64	500 or 900	0	0
Multiple Sales					
No Action	0.0	0.64	500 or 900	0	0
A	0.0	0.64	500 or 900	0	0
B	0.0	0.64	500 or 900	0	0
C	0.0	0.64	500 or 900	0	0
Preferred Alternative	0.0	0.64	500 or 900	0	0
Crude Oil at $30/bbl					
Alternative	**Resources (Bbbl)[1]**	**Spill Rate (Spills/Bbbl)**	**Assumed Spill Size (bbl)**	**Estimated Mean Number of Spills**	**Estimated Total Spill Volume (bbl)**
First Sale					
No Action	0.0	0.64	500 or 900	0	0
A	0.735	0.64	500 or 900	0.47	500 or 900
B	0.630	0.64	500 or 900	0.40	500 or 900
C	0.0	0.64	500 or 900	0	0
Preferred Alternative	0.630	0.64	500 or 900	0.40	500 or 900
Multiple Sales					
No Action	0.0	0.64	500 or 900	0	0
A	0.735	0.64	500 or 900	0.47	500 or 900
B	0.630	0.64	500 or 900	0.40	500 or 900
C	0.0	0.64	500 or 900	0.0	0
Preferred Alternative	0.630	0.64	500 or 900	0.40	500 or 900

Note:

[1]The estimated mean number of oil spills is based on the estimated resource volumes multiplied by the spill rate.

Key:

bbl = Barrel(s).

Bbbl = Billion barrels.

Source:

USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-06
Small Crude Oil Spills Estimated Over the Production Life of the Northwest NPR-A

Crude Oil at $18/bbl					
Alternative	**Resources (Bbbl)[1]**	**Spill Rate (Spills/Bbbl)**	**Assumed Spill Size (bbl)**	**Estimated Mean Number of Spills**	**Estimated Total Spill Volume (bbl)**
First Sale					
No Action	0.0	178	3	0	0
A	0.0	178	3	0	0
B	0.0	178	3	0	0
C	0.0	178	3	0	0
Preferred Alternative	0.0	178	3	0	0
Multiple Sales					
No Action	0.0	178	3	0	0
A	0.0	178	3	0	0
B	0.0	178	3	0	0
C	0.0	178	3	0	0
Preferred Alternative	0.0	178	3	0	0
Crude Oil at $30/bbl					
Alternative	**Resources (Bbbl)[1]**	**Spill Rate (Spills/Bbbl)**	**Assumed Spill Size (bbl)**	**Estimated Mean Number of Spills**	**Estimated Total Spill Volume (bbl)**
First Sale					
No Action	0.0	178	3	0	0
A	0.735	178	3	130	393
B	0.630	178	3	112	336
C	0.0	178	3	0	0
Preferred Alternative	0.630	178	3	112	336
Multiple Sales					
No Action	0.0	178	3	0	0
A	0.735	178	3	130	393
B	0.630	178	3	112	336
C	0.0	178	3	0	0
Preferred Alternative	0.630	178	3	112	336

Note:
[1] The estimated mean number of oil spills is based on the estimated resource volumes multiplied by the spill rate.

Key:
bbl = Barrel(s).
Bbbl = Billion barrels.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-07
Small Crude-Oil Spills: Assumed Size Distribution during Production Life of the Northwest NPR-A for First Sale and Multiple Sales

Size [1]	Estimated Number of Spills[2] under Alternative A	Estimated Number of Spills[2] under Alternative B	Estimated Number of Spills[2] under Preferred Alternative
First Sale ($18--$30-/bbl)			
<1 bbl			
≤1 gal	0 – 25	0 – 20	0 – 20
>1 gal and ≤5 gal	0 – 46	0 – 41	0 – 41
>5 gal and <1 bbl	0 – 26	0 – 22	0 – 22
Total	**0 – 97**	**0 – 83**	**0 – 83**
≥1 bbl and < 500 bbl			
≥1 bbl and ≤5 bbl	0 – 27	0 – 23	0 – 23
>5 and ≤25 bbl	0 – 05	0 – 03	0 – 03
>25 and<500 bbl	0 – 02	0 – 02	0 – 02
Total	**0 – 34**	**0 – 28**	**0 – 28**
Total Volume	**0 – 393 bbl**	**0 – 336 bbl**	**0 – 336 bbl**
Size [1]	**Estimated Number of Spills[2] under Alternative A**	**Estimated Number of Spills[2] under Alternative B**	**Estimated Number of Spills[2] under Preferred Alternative**
Multiple Sales ($18-$30/bbl)			
<1 bbl			
≤1 gal	0 – 25	0 – 20	0 – 20
>1 gal and ≤5 gal	0 – 46	0 – 41	0 – 41
>5 gal and <1 bbl	0 – 26	0 – 22	0 – 22
Total	**0 – 97**	**0 – 83**	**0 – 83**

≥1 bbl and < 500 bbl			
≥1 bbl and ≤5 bbl	0 – 27	0 – 23	0 – 23
>5 and ≤25 bbl	0 – 05	0 – 03	0 – 03
>25 and <500 bbl	0 – 02	0 – 02	0 – 02
Total	**0 – 34**	**0 – 28**	**0 – 28**
Total Volume	**0 – 393 bbl**	**0 – 336 bbl**	**0 – 336 bbl**

Notes:

[1] Spill-size distribution is allocated by multiplying the total estimated number of spills by the fraction of spills in that size category from the State of Alaska, Department of Environmental Conservation database.

[2] Estimated number of spills is rounded to the nearest whole number.

[3] There are no assumed small crude oil spills and therefore no distribution for the No Action Alternative and Alternative C.

Key:
bbl = Barrel.

gal = Gallon.

Source:

USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-08
Small Refined-Oil Spills: Estimated Spill Rate for the Alaska North Slope (1989-2000)

Spill Category	Spill Volume[1]	Number of Spills[1]	Mean Spill Size (bbl)	Production (Crude Oil) (Bbbl)[2]	Spill Rate Spills/Bbbl Crude Oil Produced)
Small Refined-Oil Spills	2,243 bbl (94,195 gal)	2,915	0.7	6.6	440

Note:
[1] Oil-spill databases are from the State of Alaska, Department of Environmental Conservation in Anchorage, Juneau, and Fairbanks, BP Exploration (Alaska) Inc., and ARCO.
[2] North Slope production data is derived from the TAPS throughput data from Alyeska Pipeline Company.

Key:
bbl = Barrel.
Bbbl = Billion barrels.
gal = Gallon.

Source: USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-09
Small Refined-Oil Spills <500 bbl Estimated Over the Production Life of Northwest NPR-A: by Alternative

Alternative	Resources (Bbbl)[1]	Spill Rate (Spills/Bbbl)	Assumed Spill Size (bbl)	Estimated Mean Number of Spills[1]	Estimated Total Spill Volume (bbl)
First Sale ($18-$30/bbl)					
No Action	0.0 – 0.0		0.7[2]	0 – 0	0 – 0
A	0.0 – 0.735		0.7[2]	0 – 323	0 – 226
B	0.0 – 0.630		0.7[2]	0 – 277	0 – 194
C	0.0 – 0.0		0.7[2]	0 – 0	0 – 0
Preferred Alternative	0.0 – 0.630		0.7[2]	0 – 277	0 – 194
Multiple Sales ($18-$30/bbl)					
No Action	0.0 – 0.0		0.7[2]	0 - 0	0 - 0
A	0.0 – 0.0		0.7[2]	0 -323	0 - 226
B	0.0 – 0.0		0.7[2]	0 - 277	0 - 194
C	0.0 – 0.735		0.7[2]	0 - 0	0 - 0
Preferred Alternative	0.0 – 0.630		0.7[2]	0 – 277	0 – 194

Notes:
[1] The fractional estimated mean spill number and volume are rounded to the nearest whole number.
[2] The mean spill size for refined spills on the Alaska North Slope 1989-2000. Equivalent to 29 gallons.

Key:
bbl = Barrel(s).
Bbbl = Billion barrels.
< = Less Than.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-10
Fate and Behavior of a Hypothetical 500-bbl Oil Spill from Lagoon Pipelines in Alternative A, Alternative B, and the Preferred Alternative[1, 2]

Features	Summer Spill [3]				Meltout Spill [4]			
Time After Spill in Days	1.0	3.0	10.0	30.0	1.0	3.0	10.0	30.0
Oil Remaining (percent)	75.4	68.0	44.0	38.0	77.0	71.9	64.3	57.6
Oil Dispersed (percent)	0.6	2.0	8.0	22.0	0.0.0	0.1	0.7	2.4
Oil Evaporated (percent)	24.0	30.0	36.0	40.0	23.0	28.0	35.0	40.0
Thickness (mm)	3.1	1.9	1.1	1.0	4.6.0	2.7	1.5	1.0
Discontinuous Area (km^2)[5]	1.0	5.0	25.0	103.0	1.0	7.0	17.0	134.0
Estimated Coastline Oiled (km)[6]		17				16		

Notes:
[1] No spills are estimated for any alternative at the $18/bbl price and the No Action Alternative and Alternative C at the $30/bbl price.
[2] Calculated with the Sintef oil-weathering model Version 2.0 of Reed et al. (2000) and assuming an Alpine crude type.
[3] Summer (July through September) assumes: 12-knot wind speed, 2 degrees Celsius, and 0.4-meter wave height.
[4] Spill is assumed to occur in May into first-year ice, pools 2 centimeters thick on ice surface for 2 days at 0 degrees Celsius before meltout into 50% ice cover, 11-knot wind speed, and 0.1-meter wave heights.
[5] Calculated from Equation 6 of Table 2 in Ford (1985) and is the discontinuous area of a continuing spill or the area swept by an instantaneous spill of a given volume. Ice dispersion occurs for about 30 days before meltout.
[6] Calculated from Equation 17 of Table 4 in Ford (1985) and is the result of stepwise multiple regression for length of historical coastline affected.

Key:
km = Kilometer.
km^2 = Square kilometer.
mm = Millimeter.

Source:
USDOI, MMS, Alaska OCS Region, 2002.
Meltout Spill[4]

Table App 9-11
Fate and Behavior of a Hypothetical 900-bbl Oil Spill from a Lagoon Facility in Alternative A, Alternative B, and the Preferred Alternative[1, 2]

Features	Summer Spill [3]				Meltout Spill [4]			
Time After Spill in Days	1	3	10	30		3	10	30
Oil Remaining (percent)	75.5	68.4	57.9	40	76.9	71.8	64	56.5
Oil Dispersed (percent)	0.5	1.6	6.1	20	0.1	0.2	1	3.5
Oil Evaporated (percent)	24	30	36	40	23	28	35	40
Thickness (mm)	4.1	2.5	1.5	1	6.1	3.9	1.9	1.2
Discontinuous Area (km^2) [5]	1	7	34	140	2	9	43	181
Estimated Coastline Oiled (km) [6]		22				21		

Notes:
[1] No spills are estimated for any alternative at the $18/bbl price and the No Action Alternative and Alternative C at the $30/bbl price.
[2] Calculated with the Sintef oil-weathering model Version 2.0 of Reed et al. (2000) and assuming an Alpine crude type.
[3] Summer (July through September) assumes: 12-knot wind speed, 2 degrees Celsius, and 0.4-meter wave height.
[4] Spill is assumed to occur in May into first-year ice, pools 2 centimeters thick on ice surface for 2 days at 0 degrees Celsius before meltout into 50% ice cover, 11-knot wind speed, and 0.1-meter wave heights.
[5] Calculated from Equation 6 of Table 2 in Ford (1985) and is the discontinuous area of a continuing spill or the area swept by an instantaneous spill of a given volume. Ice dispersion occurs for about 30 days before meltout.
[6] Calculated from Equation 17 of Table 4 in Ford (1985) and is the result of stepwise multiple regression for length of historical coastline affected.

Key:

km = Kilometer.
km^2 = Square kilometer.
mm = Millimeter.

Source:

USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-12
Oil Spill Rates and Spill-Size Categories used to Estimate Large Crude Oil Spills for the Cumulative Analysis

Location	Beaufort OCS		Alaska North Slope 1985-2001		TAPS (Pipeline) 1985-2001		TAPS (Tanker) 1977-1999	
	Spill Rate (Spills/Bbbl)	Size Category (bbl)	Spill Rate (Spills/Bbbl)	Size Category (bbl)	Spill Rate (Spills/Bbbl)	Size Category (bbl)	Spill Rate Spills/Bbbl)	Size Category (bbl)
Offshore	0.23[1]	≥1,000	-	-	-	-	0.88[2]	≥1,000
Onshore		-	0.64	≥500	0.21	≥500	-	-

Notes:
[1] Bercha Group Inc., 2002; Anderson, 2002.
[2] Anderson and LaBelle, 2000.

Key:
≥ = Greater Than or Equal To.
TAPS = Trans-Alaska Pipeline System.
bbl = Barrel(s).
Bbbl = Billion barrels.
OCS = Outer Continental Shelf.
— = Not Applicable.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-13
Resources and Reserves used to Estimate Large Crude Oil Spills for the Cumulative Analysis

Categories	Reserves and Resources (Bbbl)		
	Total	Onshore	Offshore
North Slope [2] Past and Present Production			
Past Production	5.294	4.938	0.356
Present Production	0.138	0.138	—[1]
Total	**5.432**	**5.076**	**0.356**
North Slope [2] Reasonably Foreseeable Future Production			
Discovered	1.570	0.500	1.070
Undiscovered	3.680	2.300	1.380
Total	**5.250**	**2.800**	**2.450**
North Slope [2] Past, Present and Reasonably Foreseeable Production			
North Slope Subtotal	**10.682**	**7.876**	**2.806**
NW NPR-A	**0.370**	**0.370**	**—**
Total	**11.052**	**8.246**	**2.806**

Notes:
[1] No present offshore production.
[2] Without Northwest NPR-A.
— = Not applicable.

Key:
Bbbl = Billion barrels.

Source:
USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-14
Cumulative Oil-Spill-Occurrence Estimates ≥500 bbl and ≥1,000 bbl over Assumed 15-20 Year Production Life of Northwest NPR-A

Spill Location and Timeframe	Crude-Oil Spills					
	Reserves and Resources (Bbbl)	Spill Rate (Spills/Bbbl)	Size Category	Assumed Size (bbl)	Most Likely Number	Estimated Mean Number of Spills
Offshore						
Past, Present, and Reasonably Foreseeable	2.81	0.23	≥ 1000 bbl	—	0	0.65
Northwest NPR-A Planning Area	—	0.23	≥ 1000 bbl	—	—	—
Total	**2.81**	**0.23**	≥ 1000 bbl	**—**	**0**	**0.65**
Onshore						
Past, Present, and Reasonably Foreseeable	7.88	0.64	≥ 500 bbl	500–900	5	5.04
Northwest NPR-A Planning Area	0.37	0.64	≥ 500 bbl	500–900	0	0.24
Total	**8.25**	**0.64**	≥ 500 bbl	500–900	**5**	**5.28**
TAPS (Pipeline)						
Past, Present, and Reasonably Foreseeable	10.68	0.21	≥ 500 bbl	4,400	2	2.24
Northwest NPR-A Planning Area	0.37	0.21	≥ 500 bbl	4,400	0	0.08
Total	**11.05**	**0.21**	≥ 500 bbl	4,400	**2**	**2.24**
TAPS (Tanker)						
Past, Present, and Reasonably Foreseeable	10.68	0.88	≥ 1,000 bbl	Table App 9-15	9	9.40
Northwest NPR-A Planning Area	0.37	0.88	≥ 1,000 bbl	Table App 9-15	0	0.32
Total	**11.05**	**0.88**	≥ 1,000 bbl	Table App 9-15	**9**	**9.72**

Note:
The Alaska Dept. of Environmental Conservation database has no significant crude oil spills on the North Slope resulting from well blowouts and no facility or onshore pipeline spills greater than 1,000 barrels for the years 1985-2000.

Key:
bbl = Barrel(s).
Bbbl = Billion barrels.
— = Data not available or not applicable.

Source: USDOI, MMS, Alaska OCS Region, 2002.

Table App 9-15
Estimated Number of Trans-Alaska Pipeline System Tanker Spills, Assumed Sizes and Estimated Volumes

Size Category (bbl)	Estimated Number	Assumed Size (bbl)	Total Volume (bbl)
≤6,000	6	4,000	24,000
>6,000and ≤15,000	2	13,000	26,000
>15,000	1	250,000	250,000
Total	9	—	294,000

Notes:
The distribution of the number of spills is based on the percentage of the number of spills in a similar size category from historic Trans-Alaska Pipeline System tanker spills listed in Table App9-03. The table indicates that 63% are ≤6,000 barrels; 27% are > 6,000 and ≤15,000 barrels; and 9% are >15,000 barrels.

Key:
bbl = Barrel(s).
≤ = Less Than or Equal To.
> = Greater Than.

Source:
USDOI, MMS, Alaska OCS Region, 2002.