

Chapter Nine: Conclusion, Summary, and Signatures

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Chapter Nine: Conclusion, Summary, and Signatures

DO&G is required by AS 38.05.035(e) and (g), to determine whether an oil and gas lease sale serves the state's best interests. As the acting director of DO&G, my responsibility is to make that determination for the North Slope Areawide Oil and Gas Lease Sale. In making this decision, I balanced the reasonably foreseeable positive and negative effects to determine whether the potential benefits exceed the potential negative effects and whether holding this sale is in the best interests of the state.

In this final finding analysis, DO&G considered the reasonably foreseeable potential effects, both negative and positive, that this sale could have on fish, wildlife, and human users of these resources, on the local economy and well-being, and on state revenue. DO&G analyzed the available socioeconomic, environmental, geological and geophysical data and comments submitted by local, state and federal agencies. The division has also considered the cumulative effects of development in the area.

The discussion throughout this final finding reflects the analysis of these issues. Below is a summary of this analysis.

A. Statewide and Local Fiscal Effects

1. Statewide Fiscal Effects

Effects – Oil and gas revenues, the majority of which came from North Slope production, comprised approximately 87 percent of the state's general fund unrestricted revenues in FY 2007. North Slope fields hold the vast majority of the state's known oil and gas reserves; however, oil and gas reserves are finite resources and North Slope production is declining. Even if the price of crude oil remains at present levels, general fund receipts will continue to decline (see Chapter Five). Hopefully, discovery and development of smaller, but important fields will temper the anticipated decline in revenues to the state treasury.

Most revenues generated from oil and gas activities go into the state's general fund, while some are set aside for the state permanent fund. Statewide, Alaskans receive direct and indirect benefits derived from general fund spending. Many funds, including oil and gas property taxes, are passed directly to borough and municipal governments. Funds can be passed directly to local governments through programs, while others are authorized specifically by the state legislature. Additionally, the energy industry is Alaska's largest industry, spending over two billion dollars annually in the state. The energy industry accounts for 12 percent of private jobs and has the highest average wage in Alaska.

When tracts are leased, a one-time increase in state income from bonus payments and an annual increase from rental payments will occur. The potential for additional revenue from royalties and taxes is unpredictable and the overall petroleum potential for the sale area is low to moderate. As exploration and development take place, the sale would add jobs to the state, regional and local economies. These jobs would not be limited to the petroleum industry, but would be spread throughout the trade, transportation, service, and construction industries. The number of jobs produced would depend on whether commercial quantities of oil and gas are discovered, and whether projects to develop those resources are initiated. Additionally, industry investment in environmental and wildlife studies, planning and design activities, materials acquisition, facility construction, seismic surveys, drilling, transportation, and logistics contributes to the well being of both the state and local economies.

Mitigation Measures – The statewide fiscal effects are anticipated to be positive and no mitigation measures were developed for this topic.

B. Effects on Municipalities and Communities

Effects – As exploration and development take place, the sale would add jobs to the regional and local economies. These jobs would not be limited to the petroleum industry, but would be spread throughout the trade, transportation, service, and construction industries. The number of jobs produced would depend on whether commercial quantities of oil and gas are discovered, their location, and whether projects to develop those resources are initiated. Discovery and development of commercial quantities of petroleum or natural gas in the sale area would also bring direct economic benefits to the North Slope Borough in the form of local property tax revenue. Additionally, industry investment in environmental and wildlife studies, planning and design activities, materials acquisition, facility construction, seismic surveys, drilling, transportation, and logistics contributes to the well being of both the state and local economies.

Mitigation Measures – The local fiscal effects are anticipated to be positive and no mitigation measures were developed for this topic.

Effects – As the host of the production center for the state’s oil and gas activities, the North Slope Borough is heavily influenced by the oil and gas industry. More than two thirds of all jobs in the borough are directly linked to the oil and gas industry or its support industries and the borough is a primary employer of residents in the communities. Non-residents, however, accounted for approximately 28 percent of the oil and gas industry’s workforce in 2004.

Additionally, approximately 96 percent of local tax collections come from oil producers. The borough relies on these tax revenues to provide public services to all of its communities. Depletion of existing reservoirs has lowered the assessed value of the properties and resulted in a decline in tax revenue. Hopefully, discovery and development of smaller, but important fields will temper the decline in revenues to the borough’s treasury.

Mitigation Measures – A plan of operations must describe efforts to minimize impacts on residential, commercial, Native allotments, subsistence use areas, and recreational areas and a copy of the proposed plan of operations must be submitted to all surface owners whose property will be entered. Facilities must be designed and operated to minimize sight and sound impacts in areas of high residential, commercial, recreational and subsistence use and important wildlife habitat. A plan of operations application must also describe the lessee’s past and prospective efforts to communicate with local communities and interested local community groups. To the extent they are available and qualified, lessees are encouraged to employ local and Alaska residents and contractors. Lessees shall submit, as part of the plan of operations, a proposal detailing the means by which the lessees will comply with the measure. The proposal must include a description of the operator’s plans for partnering with local communities to recruit and hire local and Alaska residents and contractors. The lessee is encouraged, in formulating this proposal, to coordinate with employment services offered by the State of Alaska and local communities and to recruit employees from local communities.

Effects – The overall health of Alaska Natives, including the North Slope Inupiat, has improved significantly since 1950 due to the combination of improved socio-economic status, housing, sanitation, and health care and infection control efforts. Despite these improvements, significant disparities remain between Alaska Natives and the general U. S. population as cancer, diabetes, social pathology, and chronic diseases are rapidly increasing. At present, no evidence exists to conclusively link rates of any of these problems to oil and gas development. The Alaska Inter-Tribal Council and the NSB have received grants to perform Health Impact Assessments (HIAs).

Mitigation Measures – The state is currently developing a policy regarding HIAs for large resource extraction projects. ADNR will have the opportunity to consider health impacts and mitigation measures in a supplemental finding once the Alaska Inter-Tribal Council and NSB complete their HIAs, and the state finalizes its HIA policy.

C. Cumulative Effects and their Mitigation

1. Effects on Water

Effects – Water quality characteristics that may be altered by oil and gas activities include: pH, total suspended solids, organic matter, calcium, magnesium, sodium, iron, nitrates, chlorine, and fluoride. Potential impacts that may alter surface water quality parameters include: accidental spills of fuel, lubricants, or chemicals; increases in erosion and sedimentation causing elevated turbidity and suspended solids concentrations; and oil spills.

Most drilling wastes are disposed of under ADEC's solid waste disposal program and re-injection is the preferred method of drilling fluid disposal. Most oilfield wastes are considered non-hazardous and waste fluids are recycled, filtered and treated before reinjection or disposal. The AOGCC insures proper and safe handling and disposal of drilling wastes.

Mitigation Measures – Exploration facilities must be constructed of ice. Impacts to important wetlands must be minimized and facilities must be sited in the least sensitive areas. Pipelines must utilize existing transportation corridors where conditions permit. The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. The removal of water from fish-bearing rivers, streams and natural lakes requires prior approval. Gravel mining within an active floodplain may be prohibited and mining of upland sites will be restricted to the minimum area necessary to develop the field. A fresh water aquifer monitoring well and quarterly water quality monitoring are required down gradient of a permanent storage facility. Drilling mud and cuttings cannot be discharged into lakes, streams, rivers or important wetlands. The method of disposal of drilling mud and cuttings requires permit approval and re-injection is the preferred method of drilling fluid disposal. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

2. Effects on Air

Effects – Activities associated with oil and gas exploration, development and production that are likely to affect air quality are emissions from construction, drilling and production. Air pollutants include nitrogen oxides, carbon monoxide, sulfur dioxide, particulate matter and volatile organic compounds (VOC). Trucks, heavy construction equipment and earth moving equipment would produce emissions, such as engine exhaust and dust. Sources of air emissions during drilling operations include rig engines, camp generator engines, steam generators, waste oil burners, hot-air heaters, incinerators, and well test flaring equipment. Emissions would also be generated during installation of pipelines and utility lines, excavation and transportation of gravel, mobilization and demobilization of drill rigs, and during construction of gravel pads, roads, and support facilities. These elevated levels of airborne emissions would be temporary and would diminish after construction phases are complete. The probability of a gas blowout from a pad is estimated to be low; however accidental emissions could result from gas blowouts and evaporation of spilled oil, and burning of spilled oil.

Mitigation Measures – ADNR has not developed mitigation measures for air quality because they are adequately covered under existing statutes and regulations. All industry emissions must comply with the Clean

Air Act (42 U.S.C. §§ 7401-7642) and state air quality standards. AS 46.03 provides for environmental conservation, including water and air pollution control, radiation and hazardous waste protection. 18 AAC 50 provides for air quality control, including permit requirements, permit review criteria, and regulation compliance criteria. 18 AAC 50.316 establishes preconstruction review for construction or reconstruction of major source of hazardous air pollutants.

3. Effects on Fish and Wildlife Habitats, Populations and their Uses

Effects on Land Habitat – During oil and gas development and production, various activities could cause impacts to vegetation in the sale area. These activities include construction and use of gravel pads, staging areas, roads, airstrips, and pipelines, excavation of material sites, and construction of ice roads and ice pads. Single season ice roads melt in spring and leave little, if any, trace. Winter seismic surveys could affect tundra vegetation depending on snow depth, vehicle type, traffic pattern, and vegetation type. Overland moves and seismic surveys could alter the thermal balance, and increase the risk of thermokarsting. Effects of constructing production pads, roads, and pipelines include direct loss of acreage due to gravel infilling, and loss of dry tundra habitat due to entrainment and diversion of water. A secondary effect of construction activities includes dust deposition. After an oil field is abandoned, rehabilitation will be required to restore areas impacted by oil and gas activities. If a natural gas blowout occurs, plants in the immediate vicinity may be destroyed. Spilled oil will affect tundra depending on time of year, vegetation, and terrain. Oil spilled on the tundra will migrate both horizontally and vertically. Long-term impacts may include habitat improvement due to restoration and rehabilitation of impacted sites.

Mitigation Measures – Exploration facilities must be constructed of ice. Impacts to important wetlands must be minimized and facilities must be sited in the least sensitive areas. Pipelines must utilize existing transportation corridors where conditions permit. The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. Gravel mining is restricted to the minimum area necessary to develop the field. Drilling mud and cuttings cannot be discharged into lakes, streams, rivers or important wetlands. The method of disposal of drilling mud and cuttings requires permit approval and re-injection is the preferred method of drilling fluid disposal. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids. All facilities must be removed and the site rehabilitated to the satisfaction of the Director.

Effects on Fish – Potential effects include degradation of stream banks and erosion; reduction of or damage to overwintering areas; habitat loss due to gravel removal, facility siting, and water removal; impediments to migration; and fish kills due to oil spills. Seismic activities are typically conducted during the winter months to minimize the effect on the environment. If a natural gas blowout occurs, some fish in the immediate vicinity might be killed. Oil spills are not be expected to have a measurable effect on freshwater or anadromous fish populations within and adjacent to the sale area. Long-term impacts may include habitat improvement due to restoration and rehabilitation of impacted sites.

Mitigation Measures – If ice thickness at a crossing is insufficient to protect the streambed and bank, lessees may be required to construct ice and/or snow bridges. Any removal of water from fishbearing waterways requires approval from the Alaska Department of Fish and Game (ADF&G) and lessees must use measures to avoid entrainment of fish. Lessees must locate, develop and rehabilitate gravel mine sites in accordance with ADF&G guidelines. Disposal of wastewater into fresh waterbodies is prohibited. The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. Continuous fill causeways are discouraged, and causeways, docks or other structures must maintain free passage of marine and anadromous fish. Lessees are required to have an approved oil discharge

prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Birds – Potential impacts to birds are more likely to occur after the exploration phase, as few resident species are present during winter when exploration occurs. Potential impacts include: habitat loss; barrier to movement; disturbance during nesting and brooding; change in food abundance and availability; and oil spills. Siting of onshore facilities, such as drill pads, roads, airfields, pipelines, housing, oil storage facilities, and other infrastructure, could eliminate or alter some preferred bird habitats, such as wetlands. Human activities such as air traffic and foot traffic near nesting waterfowl, shorebirds, and seabirds, could cause some species to temporarily abandon important nesting, feeding and staging areas. Impacts from an oil spill depend on the type of contact; direct contact with spilled oil by birds is usually fatal, ingestion from preening or consumption of oil-contaminated foods may reduce reproductive ability, and oil contamination of eggs by oiled feathers of parent birds significantly reduces egg hatching. In the remote event of a natural gas explosion and fire, birds in the immediate vicinity could be killed.

Mitigation Measures – Lessees must site permanent facilities outside of identified brant, white-fronted goose, snow goose, tundra swan, king eider, common eider, Steller’s eider, spectacled eider, and yellow-billed loon nesting and brood rearing areas. Permanent facilities must be sited minimum distances from stream and lakes. Lessees must comply with the USF&WS’ recommended protection measures for Spectacled eiders (or any other endangered or threatened species in the area) during the nesting and brood rearing periods and are advised to consider identified sensitive bird habitats when planning operations. Lessees must comply with the provisions of the “Yellow-billed Loon Conservation Agreement,” dated July 31, 2006 between the ADF&G, ADNR, USFWS, BLM and NPS that are applicable and appropriate to state lands. The North Slope Borough requires that vehicles, vessels, and aircraft that are likely to cause significant disturbance must avoid areas where sensitive species are concentrated. Horizontal and vertical buffers will be required where appropriate under local code. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Caribou – Potential impacts can occur at all phases, but most are likely to occur during development and production. Potential effects to caribou populations from the sale include displacement from insect relief and calving areas due to construction and operations or from oil spills. During construction, small groups of caribou may be temporarily displaced; however, the disturbance reaction would diminish after construction is complete and construction would not take place over the entire sale area at the same time. Cow and calf groups are most sensitive to human disturbance just prior to calving and during the post calving period. Motor-vehicle and aircraft traffic can also disturb caribou and the response of caribou to potential disturbance is highly variable--from no reaction to violent escape reactions. Reactions depend on: distance from human activity; speed of approaching disturbance source (altitude of aircraft) and frequency of disturbance; sex, age and physical condition of the animals; size of caribou group; and season, terrain, and weather. Direct habitat loss will result from construction of well pads, pipelines, roads, airfields, processing facilities, housing and other infrastructure. Alternatively, dust settling along roads in the spring leads to earlier snow melt and green-up of vegetation that caribou feed on. Caribou also use roads and gravel pads and the shade of pipelines and buildings as insect relief areas.

Mitigation Measures – Pipelines must be designed and constructed to avoid significant alteration of caribou and other large ungulate movement and migration patterns. At minimum, above-ground pipelines must be elevated seven feet and ADNR, with consultation from ADF&G, may require additional mitigative measures. Ramps or pipeline burial may also be required to facilitate caribou movement. Lessees must avoid siting facilities in sensitive habitats and wetlands. Gravel mining must be limited to the minimum necessary to develop a field efficiently. The Director may also impose seasonal restrictions on activities located in, or requiring travel through or overflight of, important caribou or other large ungulate calving and wintering areas

during the plan of operations stage. Lessees are advised in planning and design activities to consider the recommendations for oil field design and operations contained in the final report to the Alaska Caribou Steering Committee. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Muskoxen and Moose – Direct habitat loss will result from construction of well pads, pipelines, roads, airfields, processing facilities, housing and other infrastructure. Displacement from preferred habitat could have a negative effect on muskoxen populations. The magnitude of the effect is difficult to predict, but would likely be related to the magnitude and duration of the displacement. Very little moose habitat is expected to be lost as a result of post-sale activities because of mitigation measures. Primary sources of disturbance to muskoxen include seismic activity, vehicle traffic, and aircraft. Moose adapt readily and habituate to the presence of human activity and are not easily disturbed. An oil spill may result in oil contamination of individual animals in the immediate vicinity, contamination of habitats, and contamination of some local food sources. If a natural gas explosion and fire occurred on land or very near the coast, muskoxen or moose in the immediate vicinity could be killed or displaced.

Mitigation Measures – Pipelines must be designed and constructed to avoid significant alteration of caribou and other large ungulate movement and migration patterns. At minimum, above-ground pipelines must be elevated seven feet and ADNR, with consultation from ADF&G, may require additional mitigative measures. Additionally, lessees are advised that aircraft should avoid muskoxen concentrations. Alteration of river banks, except for approved permanent crossings, will be prohibited. Except for approved stream crossings, equipment must not be operated within willow stands (*Salix* spp.). To the extent practicable, facilities will not be sited within 1/2 mile of the banks of the Colville, Canning, Kavik, Shaviovik, Kadleroshilik, Sagavanirktok and Kuparuk Rivers. Gravel mining must be limited to the minimum necessary to develop a field efficiently. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Brown Bear – Direct habitat loss will result from construction of well pads, pipelines, roads, airfields, processing facilities, housing and other infrastructure. Primary sources of disturbance include seismic activity, vehicle traffic, and aircraft. Seismic activity that occurs in winter may disturb denning bears. During exploration and development, human activity may attract foraging bears, especially to refuse disposal areas. The potential effects of oil spills on brown bears include contamination of individual animals, contamination of coastal habitats, and contamination of some local food sources. If a natural gas explosion and fire occurs on land or very near the coast, brown bear in the immediate vicinity could be killed or displaced.

Mitigation Measures – Lessees must use appropriate methods of garbage and putrescible waste disposal to minimize attracting bears. Before commencement of any activities, lessees must consult with ADF&G to identify the locations of known brown bear den sites. Exploration and production activities must not be conducted within one-half mile of occupied brown bear dens. Gravel mining must be limited to the minimum necessary to develop a field efficiently. For projects in proximity to areas frequented by bears, lessees are required to prepare bear interaction plans designed to minimize interactions between humans and bears. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Furbearers – Activity during exploration and development may attract foraging foxes and wolves, especially to refuse disposal areas. Habitat destruction would primarily affect foxes through destruction of den sites; however, foxes have been known to use culverts and other construction materials for denning. Displacement of wolverines from local areas of development is unlikely. The potential effects of oil

spills include contamination of individual animals, contamination of habitats, and contamination of some local food sources. If a natural gas explosion and fire occurs on land or very near the coast, animals in the immediate vicinity could be killed or displaced.

Mitigation Measures – Exploration facilities must be temporary and must utilize ice roads and pads. Lessees must use appropriate methods of garbage and putrescible waste disposal to minimize attracting wolves, wolverines, and foxes. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Polar Bear – Potential impacts to polar bears include disruption of denning, attraction to areas of activity, ingestion of oil, oil contamination, and adverse interaction with humans. The primary sources of noise disturbance would come from air and marine traffic; however seismic activities and low-frequency noise from drilling operations would also be a source of noise. However, studies have shown that polar bears can tolerate high levels of noise and disturbance without measurable adverse effects. Some polar bears could be killed as a result of human-bear encounters near industrial sites and settlements associated with oil and gas development. The potential effects of oil spills include contamination of individual animals, contamination of habitats, and contamination of some local food sources. Modeling of hypothetical oil spills has shown a very low risk of polar bears contacting oil.

Mitigation Measures – Lessees should avoid use of aircraft over areas where species that are sensitive to noise and movement are concentrated. Lessees must use appropriate methods of garbage and putrescible waste disposal to minimize attracting bears. Before commencement of any activities, lessees must consult with USFWS to identify the locations of known polar bear den sites. Exploration and production activities must not be conducted within one mile of occupied polar bear dens. For projects in proximity to areas frequented by bears, lessees are required to prepare bear interaction plans designed to minimize interactions between humans and bears. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

Effects on Other Marine Mammals – Potential impacts to other marine mammals (ringed, spotted and bearded seals, and walrus) can occur during all phases. Some pinnipeds could be temporarily displaced by construction activities associated with causeway construction. Onshore development near the coast could also disturb a small number of pinnipeds. The primary sources of noise and disturbance of pinnipeds would come from marine traffic, air traffic, and geophysical surveys. A secondary source would be low frequency noises from drilling operations. Direct contact with spilled oil by pinnipeds may result in mortalities.

Mitigation Measures – Continuous fill causeways are discouraged. Causeways, docks or other structures must be designed, sited, and constructed so as to maintain free passage of marine and anadromous fish, and shall not cause significant changes to nearshore oceanographic circulation patterns and water quality characteristics. Causeways may not be located in river mouths or deltas. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

4. Effects on Subsistence Uses

Effects – Direct effects on subsistence uses may include: increased access and land use limitations; less privacy; immediate effects of oil spills; and potential increase in wage earning opportunities to supplant subsistence activities. Indirect effects include: the potential reduction in local fish and wildlife populations due to development; increased travel distance and hunting time required to harvest resources; potential reductions in harvest success rates; increased competition for nearby subsistence resources; improvements in community

transportation, trade, and utilities infrastructure; and increased revenues to local government through petroleum revenue taxes. Alteration of the physical environment may affect migration, nesting, breeding, calving, denning and staging of animals that are sensitive to oil and gas development activities. As new discoveries are made, the number of development-related facilities will increase, and portions of the developed areas could be closed to public access, reducing the area available for subsistence activities. If subsistence hunters are displaced from traditional hunting areas, they might have to travel greater distances and spend more time harvesting resources. At the same time, increased public access to hunting, fishing, and trapping areas, due to construction of new roads, could increase competition between user groups for subsistence resources.

Mitigation Measures – Lease-related use will be restricted when the Director determines it is necessary to prevent conflicts with local subsistence activities. Restrictions may include alternative site selection, seasonal restrictions or other technologies deemed appropriate by the Director. Lessees must conduct an inventory of traditional use sites in the area for activity and ensure that archaeological resources are preserved. Lessees must include a program in any development plan to educate oil field workers about community values, customs, lifestyles, and laws protecting cultural resources in the sale area. Traditional and customary access to subsistence areas shall be maintained unless reasonable alternative access is provided. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids. Prior to submitting a plan of operations, lessees must consult with the potentially affected communities and the borough and make reasonable efforts to assure that activities are compatible with subsistence hunting and fishing activities. Lessees are advised to bring local residents into their operations planning process.

5. Effects on Cultural and Historic Resources

Effects – Potential impacts include disruption of culture and disturbance of historic and archeological sites. Damage to archaeological sites can include: direct breakage of cultural objects; damage to vegetation and thermal regime, leading to erosion and deterioration of organic sites; and shifting or mixing of components in sites resulting in loss of association between objects. Also, crews at archeological or historic sites could damage or destroy sites by collecting artifacts. Oil spills can have an indirect effect on archaeological sites by contaminating organic material. Disturbance to historical and archaeological sites might occur as a result of activity associated with accidents, such as an oil or gas well blowout or explosion. Cumulative effects on archaeological sites from oil and gas exploration, development, and production are expected to be low.

Mitigation Measures – Lessees are required to conduct training for all employees and contractors on environmental, social, and cultural concerns in the area of activity. Prior to ground disturbing activities, lessees must conduct an archaeological inventory. If any objects are discovered at any time, they must be reported and appropriate protective measures taken. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids. Lessees are advised to bring local residents into their operations planning process.

D. Specific Issues – Effects Related to Oil and Gas Exploration, Development, Production and Transportation

1. Geophysical Hazards

Effects – The primary geophysical hazards within the sale area include earthquakes, faulting, shore-ice movement, permafrost and frozen-ground phenomena, waves, coastal erosion, seasonal flooding, over-pressured sediments, and shallow gas deposits and hydrates. These geohazards could impose constraints to exploration, production, and transportation activities associated with possible petroleum development, and should be considered prior to the siting, design and construction of any facilities. Thick permafrost beneath most of the area may cause the earthquake response of sediments to be more like bedrock, which would limit amplification effects and would also tend to prevent earthquake-induced ground failure, such as liquefaction. Ice push has the potential to alter shorelines and nearshore bathymetry, which in the longer term may pose a threat to nearshore facilities with increased erosion. Ground settlement, due to thawing, occurs when tundra overlying permafrost is disturbed or when a heated structure is placed on the ground underlain by shallow, ice-rich permafrost, and the proper engineering measures are not taken to adequately support the structure and prevent the building heat from melting the ground ice. Seasonal flooding of lowlands and river channels is extensive along major rivers that drain into the sale area. Encountering over-pressured sediments while drilling can result in a blow-out or uncontrolled flow.

Mitigation Measures – It is standard industry practice that facility siting, design, and construction be preceded by site-specific, high-resolution, shallow seismic surveys that reveal the location of potentially hazardous geologic faults. All structures in the proposed sale area should be built to meet or exceed the Uniform Building Code requirements for seismic zone 1. Design parameters to mitigate the effects of ice push are similar to those employed to resist sea ice and coastal erosion forces. These include concrete armoring, berm construction, and coastal facility set-backs. Frozen-ground problems are successfully mitigated through siting, design, and construction; in addition, ADNR regulates winter travel across the tundra. Erosion rates, river bank and shoreline stability, and the potential impacts of waves and storm surge must all be considered in determining facility siting, design, construction, and operation. Pre-development planning should include hydrologic and hydraulic surveys, as well as flood-frequency analyses. Blow-out prevention equipment is required for all wells and surface and sub-surface safety valves are required to automatically shut-off flow to the surface.

The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. Continuous fill causeways are discouraged, and causeways, docks or other structures must not be located in river mouths or active stream channels on river deltas. All pipelines, including flow and gathering lines, must be designed, constructed and maintained to assure integrity against climatic conditions, geophysical hazards, corrosion, and other hazards. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

2. Likely Methods of Transportation

Effects – Elevated or buried flow, gathering, and common carrier pipelines would carry petroleum from wellheads to processing centers, and eventually into TAPS and a large gas pipeline, if constructed. Elevated pipelines can restrict caribou and other wildlife movements, especially if accompanied by a road with

regular vehicle traffic. Buried pipelines have little impact on wildlife, but cannot be visually inspected and must be designed to avoid thawing of frozen soil.

Mitigation Measures – The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. Continuous fill causeways are discouraged, and causeways, docks or other structures must not be located in river mouths or active stream channels on river deltas. All pipelines, including flow and gathering lines, must be designed, constructed and maintained to assure integrity against climatic conditions, geophysical hazards, corrosion, and other hazards. Pipelines must be designed and constructed to avoid significant alteration of caribou and other large ungulate movement and migration patterns. At minimum, above-ground pipelines must be elevated seven feet and ADNR, with consultation from ADF&G, may require additional mitigation measures. Ramps or pipeline burial may also be required to facilitate caribou movement. Lessees must avoid siting facilities in sensitive habitats and wetlands. Lessees are advised in planning and design activities to consider the recommendations for oil field design and operations contained in the final report to the Alaska Caribou Steering Committee. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

3. Oil Spill Risk, Prevention, and Response

Effects – The risk of a spill exists any time crude oil or petroleum products are handled. Oil spills associated with the exploration, development, production, storage and transportation of crude oil may occur from well blowouts or pipeline or tanker accidents. Petroleum activities may also generate chronic low volume spills involving fuels and other petroleum products associated with normal operation of drilling rigs, vessels and other facilities for gathering, processing, loading, and storing of crude oil. Spills may also be associated with the transportation of refined products to provide fuel for generators, marine vessels and other vehicles used in exploration and development activities.

Mitigation Measures – Each well has a blowout prevention program that is developed before the well is drilled. Leak detection systems and effective emergency shut-down equipment and procedures are essential in preventing discharges of oil from any pipeline which might be constructed in the sale area. Once a leak is detected, valves at both ends of the pipeline, as well as intermediate block valves, can be manually or remotely closed to limit the amount of discharge.

The siting of facilities is prohibited within 500 feet of all fish-bearing waterbodies, with an increased buffer along the banks of certain rivers. Continuous fill causeways are discouraged, and causeways, docks or other structures must not be located in river mouths or active stream channels on river deltas. All pipelines, including flow and gathering lines, must be designed, constructed and maintained to assure integrity against climatic conditions, geophysical hazards, corrosion, and other hazards. Pipelines must be designed to facilitate the containment and cleanup of spilled fluids. Secondary containment must be provided for the storage of fuel or hazardous substances. Storage sites must be protected from leaking or dripping fuel. During fuel or hazardous substance transfer, secondary containment or a surface liner must be used. Vehicle refueling cannot occur within the annual floodplain. A fresh water aquifer monitoring well and quarterly water quality monitoring is required down gradient of a permanent storage facility. Lessees are required to have an approved oil discharge prevention and contingency plan (C-Plan) prior to commencing operations and pipeline gravel pads must be designed to facilitate the containment and cleanup of spilled fluids.

E. Bidding Methods and Lease Terms

The selection of the bidding method, minimum bid, and term of the lease are based on the department's pre-sale analysis of economic, engineering, geological, and geophysical data. The bidding

method selected best secures revenues for the state without creating disincentives to industry. The bidding methods and lease terms are described in Chapter Eight.

F. Summary and Signatures

No activity may occur without proper authorization from the appropriate permitting agencies. When specific activities are proposed, more detailed information such as site, type, and size of facilities will be known, in addition to the historical project data. Except for some very limited types of proprietary information, permit applications are public information and most permitting processes include public comment periods. DO&G will give public notice for plans of operation for exploration or development. Additional terms may be imposed in any subsequent permits when applied for if additional issues are identified at that time.

Developing the state's petroleum resources is vital to the state economy and the wellbeing of its citizens. With the mitigation measures presented in this final finding imposed on licenses and plans of operation, and additional project-specific and site-specific mitigation measures imposed in response to specific proposals, the petroleum resources of the sale area can most likely be explored and developed without significantly affecting fish and wildlife populations or traditional human uses. The state has sufficient authority from general constitutional, statutory and regulatory empowerments, the terms of the lease agreement, and plan of operations permit terms to ensure that lessees conduct their activities safely and in a manner that protects the integrity of the environment and maintains opportunities for subsistence uses.

On the basis of the facts and issues presented at this time, the foregoing findings, applicable laws and regulations, and the documents reviewed during preparation of this final finding, I conclude that the potential benefits of the North Slope Areawide Oil and Gas Lease Sale, as conditioned, outweigh the possible adverse impacts, and that the lease sale will best serve the interests of the state of Alaska.

A person affected by this decision who provided timely written comments may request reconsideration, in accordance with 11 AAC 02. Any reconsideration request must be received by August 4, 2008, and may be mailed or delivered to Thomas E. Irwin, Commissioner, Department of Natural Resources, 550 W. 7th Avenue, Suite 1400, Anchorage, Alaska 99501; faxed to 1-907-269-8918; or sent by electronic mail to dnr.appeals@alaska.gov. If reconsideration is not requested by that date or if the commissioner does not order reconsideration on his own motion, this decision goes into effect as a final order and decision on August 15, 2008. Failure of the commissioner to act on a request for reconsideration within 30 days after issuance of this decision is a denial of reconsideration and is a final administrative order and decision for purposes of an appeal to Superior Court. The decision may then be appealed to Superior Court within a further 30 days in accordance with the rules of the court, and to the extent permitted by applicable law. An eligible person must first request reconsideration of this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court. A copy of 11 AAC 02 may be obtained from any regional information office of the Department of Natural Resources.



Kevin R. Banks, Acting Director

July 15, 2008

Date

I concur with the director that the North Slope Areawide Oil and Gas Lease Sale 3 is in the best interests of the state.



Thomas E. Irwin, Commissioner

July 15, 2008

Date