4.8 Irreversible and Irretrievable Commitment of Resources

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4.8.1 Crude Oil and Gas

Most environmental impact statements (EISs) associated with minerals development (see, e.g., BLM and MMS, 1998; MMS, 1987a, b, 1990, 1991, 1998; USACE, 1997) note that implementation of a preferred development alternative leads to the irretrievable consumption of resources (e.g., crude oil produced as a result of the development). In this case, the amount of crude oil that is ultimately consumed (and, therefore, irretrievably committed) in the event that the proposed action is selected is numerically equal to the cumulative TAPS throughput over the period from 2004 through 2034 discussed in other sections of this report (e.g., Section 4 and Appendix A). The total crude production in the baseline throughput assumption over the years from 2004 to 2034 is approximately 7 billion bbl. For comparison, cumulative throughput of the Trans Alaska Pipeline System (TAPS) over the period from 1977 to 1998 was approximately 12.5 billion bbl.

However, it is also important to note that selection of the no-action alternative is likely to lead to virtually the same outcome, albeit for different reasons. This is because if TAPS were dismantled, then the remaining oil and perhaps gas (see below) on the Alaska North Slope (ANS) would not be economically recoverable (given present or foreseeable costs and prices) because a new pipeline would have to be constructed to transport resources to markets. The proceeds from future ANS production would have to be sufficiently large to fund construction of another pipeline and field infrastructure as well as the operating costs of the production and transportation system. The decision to redevelop ANS reserves and recreate the production and transportation infrastructure would be conceptually identical to the original decision faced by the oil industry 30 years ago. However, the quantity of the reserves would be smaller (because more than 12.5 billion bbl has already been produced) and the cost of construction of a new pipeline would be substantially greater. It is unlikely that future economic conditions would justify a decision to redevelop ANS reserves if the no-action alternative were selected. Thus, the crude oil (and possibly gas as well) would be "stranded" (physically available, but not economically viable to produce) if the no-action alternative were selected.

The key difference between the outcomes associated with the proposed and the no-action alternatives is that if TAPS continues operations, these resources will be irretrievably committed because they are consumed directly (with attendant benefits), whereas if TAPS were dismantled these resources would be irretrievably committed because economic redevelopment would not be feasible and otherwise recoverable resources would be lost. Dismantling of TAPS virtually forecloses future oil and gas development on the ANS for the foreseeable future.

What is at stake here is not only the crude oil included in the baseline throughput projection over the life of the lease, but also possible additional resources (noted in the cumulative effects discussion) that might become available in the future. For example, as part of an analysis of five National Energy Strategy (NES) oil fields (Thomas et al., 1993) it was noted that "an important factor affecting the future of these fields and all future development on the North Slope is the continued operation of TAPS." As another example, there have been numerous proposals to develop the more than 30 trillion cubic feet (tcf) of ANS natural gas (CERA, 1999a), including the El Paso System (FPC, 1976), the Alaska Natural Gas Transportation System (ANGTS) (BLM, 1976), and Yukon Pacific Corporation's Trans Alaska Gas System (TAGS) (BLM and USACE, 1988). However, aside from minor amounts of natural gas liquids (NGLs) that are blended with crude oil for transport in TAPS, this gas is not marketed. Most proposals for development of ANS gas have included the construction of one or more pipelines (and possibly marine transportation links). To date, none of these proposals has proven eco-

nomically viable, in part because of the economic barrier arising from the capital costs required to create another transportation system.

However, more recent analyses (Thomas et al., 1996) indicate that use of gas-to-liquids (GTL) conversion technology may prove economically attractive. The essential idea (refer to the discussion on cumulative effects for additional detail) is to use this technology to convert natural gas to hydrocarbon liquids and to use the existing TAPS infrastructure for transportation. Whether or not this technology proves commercially attractive, it serves as another example of a possible option that would be foregone in the event that the right-of-way of TAPS is not renewed and the pipeline dismantled. In short, there is a clear "option value" for TAPS. Closure, decommissioning, and removal of TAPS results in an irretrievable commitment of resources.

4.8.2 Physical Environment

4.8.2.1 Water Resources

Short- and long-term effects of ANS development on water resources are discussed in several EISs, including that developed for NPR-A (BLM and MMS, 1998). As noted in the NPR-A EIS,

> "construction activities that disturb stream banks or lake shorelines, temporary blockages of natural channels, and removal of gravel would cause short-term increases in erosion and sedimentation. Water removal could cause short-term changes in aquatic habitat. Permanent gravel roads and pads, airstrips, pipelines, and facilities constructed adjacent to or crossing streams and lakes would have long-term effects on water resources. Removal of these structures from streams and lakes after production ceases would restore drainage patterns and natural sedimentation processes."

Some of these same effects could result from ongoing TAPS maintenance activities.

4.8.2.2 Water Quality

Considering direct, indirect, and cumulative effects, water quality would be affected by permitted discharges from exploration, development, production and terminal operations, turbidity from offshore construction activities, and oil spills on the ANS, pipeline corridor, or Valdez Marine Terminal (VMT) areas. (These effects have been noted in several EISs, such as those prepared for NPR-A (BLM and MMS, 1998) and the Beaufort Sea Planning Area Oil and Gas Lease Sale 170 (MMS, 1998).) Additionally, thermokarst erosion along gravel roads and pads could result in degraded water quality that would last beyond the life of the fields (see, e.g., BLM and MMS, 1998). Water quality would be impacted for the duration of these activities and for some time afterward. However, there would be no irreversible or irretrievable effects on water quality if the proposed action is selected.

4.8.2.3 Air Quality

Considering direct, indirect, and cumulative effects, air quality would be affected by well drilling, construction activities, production, pipeline, and terminal operations. There would be no irreversible or irretrievable effects on air quality if the proposed action is selected.

4.8.3 Biological Environment

4.8.3.1 Vegetation

Considering direct, indirect, and cumulative effects, vegetation would be affected by well drilling, construction activities, production, pipeline, and terminal operations. Oil spills would also result in adverse, if temporary impacts. The authors of the NPR-A EIS (BLM and MMS, 1998) believe that burial of vegetation under gravel fill could produce lasting impacts and note that "the potential recovery of vegetation on these pads would take such a long time that, from a human perspective, this may be considered an irretrievable commitment of vegetation resources." However, the physical area covered by gravel fill areas is only a small fraction of the ANS area. There would be little or no irreversible or irretrievable effects on vegetation if the proposed action is selected.

4.8.3.2 Fish

Considering direct, indirect, and cumulative effects, fish could be disturbed by seismic surveys, vessel and aircraft traffic, construction and drilling activities, oil spills and/or degradation/loss of habitat from facility developments. Large oil spills, associated with ANS offshore facilities or VMT or marine transportation operations could result in greater impacts [e.g., lethal to a large portion of some near shore fish populations (MMS, 1996a, 1998)]. However, the

effects of even large spills are expected to be temporary (<7 years, see, e.g., MMS, 1996a). Fish populations are not expected to experience any irreversible and irretrievable effects if the proposed action is selected.

4.8.3.3 Birds

Considering direct, indirect, and cumulative effects, it is possible that various bird populations would be adversely affected by disturbance due to noise, movement of aircraft and vessels, and losses and/or deterioration of habitat due to facility developments. Oil spills, either on the ANS or in near the VMT could contaminate coastal wetlands (salt marshes) and other habitat and result in the loss of many thousands of birds. However, in keeping with the findings of other EISs (MMS, 1996a, 1998; BLM and MMS, 1998), these losses are not expected to be irretrievable.

4.8.3.4 Mammals

Terrestrial mammals such as caribou would be subjected to direct, indirect, and cumulative effects resulting from planned activities (e.g., noise, movement of motor vehicles, and aircraft, habitat loss caused by facility development) and inadvertent events (e.g., oil spills). In keeping with the findings of recent EISs (e.g., MMS, 1996a, 1998; BLM and MMS, 1998) it is not believed likely that permanent (irretrievable) losses will result.

Marine mammals, such as seals, walruses, polar bears, and belukha whales would be subject to direct, indirect, and cumulative effects noted in each of the above paragraphs. In keeping with the findings of recent EISs (e.g., MMS, 1996a, 1998; BLM and MMS, 1998) it is not believed likely that permanent (irretrievable) losses will result.

4.8.3.5 Endangered and Threatened Species

It is possible that bowhead whales could be subjected to direct, indirect, and cumulative effects of disturbance as a result of planned or inadvertent ANS activities. A large offshore oil spill in the Beaufort Sea (see MMS, 1996a, 1998; BLM and MMS, 1998) might result in lethal effects to a few individuals, with the population recovering within 1 to 3 years (<1 generation). It is unlikely that such effects would lead to permanent (irreversible) losses of bowhead whales.

It is also possible that Spectacled Eiders and Steller's Eiders could also be impacted. Facility siting for new ANS developments could result (BLM and MMS, 1998) in permanent (irreversible) loss of an insignificant portion of available eider-nesting habitat. Any substantial eider mortality is considered irreversible if the population status is declining as at present.

4.8.4 Social Systems

4.8.4.1 Economy

The economic benefits of the proposed action are discussed at length in other sections of this report. Following the convention established in other ANS EISs (see e.g., MMS, 1996a, 1998), it is customary to note that the commitment of human resources would be irretrievable and irreversible.

4.8.4.2 Cultural Resources

Cultural resources are nonrenewable. Oil spills and other activities have the potential to damage these resources, resulting in an irretrievable commitment of resources.

4.8.4.3 Recreational and Visual Resources

Recreational and visual resources can be adversely impacted by planned and inadvertent activities. However, upon completion of dismantling, removal, and restoration (DR&R) activities, these effects will disappear. Therefore, there is not anticipated to be any irreversible or irretrievable commitment of resources.

4.8.4.4 Subsistence Harvest Patterns

As discussed at length in Sections 3 and 4, subsistence is a key feature of the lifestyle of Alaska Natives. Disruption of subsistence harvest patterns, such as might occur with one or more large oil spills, would result in a significant negative impact. In recent EISs (see e.g., MMS, 1996a, 1998; BLM and MMS, 1998) the inability to harvest sufficient quantities of subsistence resources is viewed as an irreversible and irretrievable effect. This said, the analyses presented in this report conclude that such disruptions would be temporary, rather than permanent, if the proposed action were selected.

4.8.4.5 Sociocultural Systems

The direct, indirect, and cumulative effects of the proposed action are discussed at length in the section on cumulative effects. There it is argued that social changes — some adverse and others beneficial — are taking place which may have irreversible and irretrievable effects. However, ANS oil development is only one of many causes of these social changes. Perhaps more to the point, selection of the no-action alternative will probably not prevent additional social changes from occurring. Indeed, selection of the no-action alternative is certain to create significant and adverse economic — and social — effects.

4.8.5 Resources Used in Construction and Operations

The construction and operation of TAPS required large amounts of pipe, gravel, fuel, etc. These materials are essentially gone because the majority will not be salvaged during DR&R. During DR&R, gravel will not be recovered and only a small portion of the pipe will be salvaged. Relatively small amounts of pipe and gravel will be used in the future and these too will be irretrievably committed.