



# SECTION 4

## ENVIRONMENTAL CONSEQUENCES OF PROPOSED ACTION AND ALTERNATIVES

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## Introduction: Section 4

### Organization and Definitions

Section 4 describes the direct, indirect, and cumulative environmental and social-cultural consequences of renewal of the Trans Alaska Pipeline System (TAPS) right-of-way (ROW) (the proposed action) and of expiration of the ROW (the no-action alternative). The projected impacts are well-understood because of the operational history of the project. Section 3 of this Environmental Report describes the existing environment, which includes TAPS.

To provide the basis for the projected impacts, Section 4.1 provides information on the mechanisms of impact, which include ground-impacting maintenance actions such as corrosion digs and workpad maintenance, and oil spills. The discussion on oil spills contains a detailed evaluation of the potential number, size, and location of possible spills. Section 4.2 details the mitigation measures that are already in place on TAPS to address known impacts.

The direct/indirect impacts of the proposed action and the no-action alternative are addressed in Sections 4.3 and 4.4, respectively. Section 4.5 discusses the cumulative impacts of both alternatives in light of other past, present, and reasonably foreseeable development. Finally, Section 4.6 identifies the unavoidable adverse impacts of the proposed action.

The three study areas are treated together in describing the affected environment, but impacts are analyzed separately in Section 4. [Note that the CEQ guidelines consider the terms *effect* and *impact* to be synonymous (40 CFR 1508.8).] The analysis of direct/indirect and cumulative effects follows as closely as possible the definitions provided by the Council on Environmental Quality (CEQ):

- **Direct effects** are “caused by the action and occur at the same time and place” (40 CFR 1508.7).
- **Indirect effects** are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects

on air and water and other natural systems, including ecosystems” (40 CFR 1508.7).

- **Cumulative impact** is “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7).

In accordance with these definitions, the direct effects are treated as those directly associated with TAPS as defined above, which includes the pipeline, pump stations, access roads, material sites, VMT, etc. Such effects include ground disturbance from maintenance actions, air emissions from pump stations, and wastewater discharges from ballast water treatment .

For this Environmental Report, the distinction between indirect effects and cumulative impacts is somewhat complex. It would be possible to consider the effects of the Alaska North Slope oil fields and the marine transportation link as indirect effects of TAPS ROW renewal. However, these are treated in the cumulative effects section for two reasons. First, developments on the North Slope require extensive permitting, have undergone NEPA reviews, and thus are considered separate actions from TAPS ROW renewal. The permitting for such developments usually includes an environmental assessment (EA) or environmental impact statement (EIS). Secondly, the marine transportation system, while integral to bringing ANS crude to market, is managed by a separate set of agencies and laws than TAPS itself. For example, the Oil Pollution Act of 1990 and U.S. Coast Guard regulations mandate how tankers operate in Prince William Sound and the Gulf of Alaska. Alyeska Pipeline Service Company provides tanker escort and spill response support in accordance with OPA 90, but the tankers are not under Alyeska control or the control of the Joint Pipeline Office, which regulates TAPS operation.

As a result, development of Alaska North Slope oil fields



and the marine transportation system are treated in Section 4.5 of this Environmental Report as separate actions from TAPS ROW renewal. It would be somewhat academic to debate whether their effects are treated as indirect effects of TAPS because they would not exist without TAPS or as cumulative effects since they are separate actions. It is important to adequately assess their separate and cumulative effects.

In general, Section 4.5 of this Environmental Report treats ANS and PWS effects as cumulative effects because these regions are not directly affected by TAPS as defined in Stipulation 1.1.1.22 of the Federal Grant. However, the specific approach for each technical discipline varies based on the requirements of the analysis. For example, the analysis of economic effects in Section 4.3 includes the effects of North Slope oil development and tanker transportation. The model used for this analysis considers the economics of the entire oil production and transportation system because they are inextricably tied together economically.

Sections 4.7 through 4.13 cover the following miscellaneous impact considerations required by CEQ guidelines and other guidance documents:

- Relationship Between Local Short-Term Uses and Maintenance and Enhancement of Long-Term Productivity,
- Irreversible and Irrecoverable Commitment of Resources,
- Energy Requirements and Conservation Potential
- Environmental Justice,
- Impact on Sacred Sites (with mitigation),
- Impact on Wetlands, and
- Invasive Species.

## Summary of Environmental Consequences

Most EAs and EISs deal largely or exclusively with future projects. The principal focus of this analysis is the continuation of a system that has been in operation since 1977. Because the system has been in operation for so many years, it is possible to extrapolate from prior experience to develop relatively accurate estimates of possible future effects. Estimates of the incremental effects resulting from future projects (e.g., gas commercialization) are more uncertain but are believed to be reliable nonetheless.

The direct, indirect, and cumulative impacts of both the proposed action and the no-action alternative will vary geographically and will depend on the implementation of mitigation and prevention measures. Section 4 focuses

primarily on the TAPS ROW, but also considers the potential impacts on the Alaska North Slope and Prince William Sound in the cumulative effects analysis. In general, as long as mitigation and prevention measures are implemented, the direct impacts of TAPS will be limited and manageable. TAPS activities are strictly regulated by the Joint Pipeline Office, other government agencies, and Alyeska policies. Indirect impacts associated with use of the TAPS ROW and adjacent areas by the public may be more substantial than direct impacts, but this activity is also regulated by government. The cumulative impacts — considering the ANS oil fields, tanker operations in Prince William Sound, and other actions — are more extensive because of the increased geographic scope and different types of developments. Following is a summary of important physical, biological, and social effects of both the proposed action and no-action alternative.

### Proposed Action

The proposed action involves continued operation of TAPS for an additional 30 years.

### Physical Characteristics

TAPS operation affects the terrestrial, aquatic, and atmospheric environments. Because the pipeline system has been in continuous operation since 1977 under stringent regulatory controls, its effects on the physical environment — terrestrial, air quality, and water quality — are familiar and can reasonably be expected to continue without significant change under the proposed action. Justification for predictions of low impact is detailed in the remainder of Section 4 and can be summarized in the following conclusions:

- The TAPS pipeline and related facilities already exist with known, observable impacts;
- Major changes to the pipeline system or to the affected physical environment are not expected during the ROW renewal period;
- New surface-disturbance areas associated with TAPS will be small and isolated;
- There would be no unavoidable adverse effect on the physical environment that would not be mitigated to the fullest extent technically feasible.

**Terrestrial Environment:** Continued operation of TAPS will impact some parts of the terrestrial environment because of maintenance activities, corrosion digs, construction projects for pipeline-related facilities, and the continued presence of a buried warm-oil pipeline in permafrost terrain. Maintenance since startup has caused localized



temporary land disturbance but has generally stabilized the ground in and adjacent to the ROW. Since nearly all maintenance activities occur on or along existing stabilized embankments, new major long-term changes to the terrestrial environment are not anticipated.

The pipeline will not affect seismicity, although seismic activity may impact the pipeline. However, seismic risk and mitigation measures to reduce this risk remain and are not expected to increase.

Global climate change may cause more warming on the ground surface, but subsurface permafrost thaw will not advance appreciably more than current projections and will be well within maintenance efforts anticipated for pipe support features.

The impact of the pipeline on the behavior of rivers and floodplains depends on whether river training structures are used and the type of structure used. Buried river crossings with no river training structures have little or no impact on the behavior of rivers. Bridged crossings have little or no impact, except for the local impact of the piers on flow.

**Water Resources:** Continued operation of TAPS will require continued use of water resources to support operations and maintenance activities. Wastewaters will continue to be treated, discharged, and assimilated by upland and freshwater receiving environments along the pipeline. Marine waters of Port Valdez will continue to be used to assimilate treated discharges from the VMT, including sanitary wastewater and ballast water. Wastewater discharges are strictly regulated, and there is no evidence that these discharges have negatively affected the physical environment. Discharges will continue to be regulated, and impacts are not expected.

**Atmospheric Environment:** TAPS throughput is in decline, and there is a strong likelihood that there will be a corresponding TAPS-wide net decrease in emissions and emission impacts. This prediction is supported by the results of several air quality permit applications and modeling studies, as well as the effect of plant improvements that have occurred at the pump stations and the VMT. Widespread point-source emissions are strictly regulated, and there is no evidence of deterioration in air quality as a result of TAPS. Future emissions are not expected to cause air-quality concerns.

**Cumulative Effects:** None of the potential physical cumulative effects is considered significant by this analysis. Other issues did not meet the intensity and probability criteria for significance because:

- TAPS pipeline and related facilities already exist;
- Major changes to the pipeline system or to the affected physical environment are not expected during

the ROW renewal period;

- New surface disturbance areas associated with TAPS will be small and isolated;
- Future North Slope development and potential gas commercialization projects would not cause significant disturbance to the physical environment, with the exception of the transitory construction disturbance.
- Pump stations, potential compressor stations, and marine terminals (VMT and LNG) would be widely separated, and their emissions would be relatively small and strictly regulated; and
- There would be no unavoidable adverse effect on the physical environment that would not be mitigated to the fullest extent technically feasible.

With continued regulatory compliance by TAPS and any associated future project, potential cumulative effects on physical resources are not expected to become significant issues during the life of the proposed action.

### Biological Resources

Biological resources potentially affected by continued TAPS operation include vegetation and wetlands, fish, birds, and terrestrial and marine mammals. If one examines the ecosystems impacted by the construction and operation of TAPS and associated activity for almost 30 years, their health and integrity is remarkable. With the exception of local impacts described in this section, the vegetation, fish, and wildlife along TAPS have not been impacted at the population level. TAPS can be viewed as another feature on the landscape, to which the flora and fauna have habituated. Even the ANS, with extensive oil fields, has a healthy community of flora and fauna. Populations of large and small mammals, birds, and fish are healthy despite development of the oil fields (Truett and Johnson, 2000). Likewise, Prince William Sound is a vibrant environment full of life, despite tanker traffic, operation of the VMT, and the *Exxon Valdez* oil spill in 1989. Some populations of seabirds and sea otters were reduced substantially by mortality from the oil spill. However, despite concerns over lingering toxicity from residual oil, populations are generally recovered or recovering. In all three areas — the TAPS ROW, the ANS, and Prince William Sound — there are local impacts, but overall, vegetation communities and fish and wildlife populations have fared well and will continue to thrive in the future.

**Vegetation and Wetlands:** Impacts include loss under gravel fill and changes from water impoundments and thermokarst. These impacts will not increase much in the TAPS ROW because no major new construction is antici-



pated. New oil and gas developments on the ANS will add to these impacts, but the footprints of new developments are relatively small. The cumulative loss of vegetation and wetlands is small relative to the overall land area along TAPS and on the ANS. Concerns over vegetation and wetlands often stem from their value as fish and wildlife habitat. The lack of negative population-level effects from TAPS and the ANS oil fields on fish and wildlife populations suggests that impacts have not included significant losses of habitat.

**Fish:** Impacts on fish include obstruction of movements in low water crossings or culverts along TAPS, injury or habitat loss from potential oil spills, and recreational fishing harvests. Obstruction of movements is a continuous problem because of the dynamic nature of the TAPS ROW and associated waterbodies. Adequate monitoring and maintenance of the low water crossings and culverts can mitigate this problem. Oil spills can impact fish, although the duration and extent of impacts are usually limited. The impacts of the *Exxon Valdez* oil spill on fish are widely debated, and the extent of impacts on populations is uncertain. Regardless, prevention of oil spills and rapid response when they occur are necessary to minimize impacts. With the tanker escort system and use of double-hulled tankers, the probability of a large marine spill has been reduced significantly. Sport and subsistence harvest of fish can reduce populations, and this may have occurred in some lakes along the TAPS ROW. Regulation and monitoring by the appropriate agencies is needed to manage this impact.

**Birds:** Increased predation on waterfowl by mammalian and avian predators may occur if predator populations increase due to access to garbage. This may have impacted colonial nesting geese and shorebirds on the ANS during the 1990s. This issue has been addressed with proper refuse management along TAPS, and is being addressed with new refuse management systems in the ANS oil fields. Oil spills, such as the *Exxon Valdez* oil spill, can kill large numbers of birds, and prevention and rapid response are very important. As indicated above, the Ship Escort/Response Vessel System (SERVS) in Prince William Sound and double-hulled tankers will minimize the probability of this impact during the proposed action period.

There are also positive impacts of habitat creation and enhancement on gravel structures and water impoundments.

**Terrestrial Mammals:** Important impacts include disturbance and displacement from preferred habitats, mortality from roadkills, increased predator numbers from access to anthropogenic foods, and sport hunting. Along the TAPS ROW, only the impacts of sport hunting appear important,

although harvest is well-regulated by government agencies to achieve population management objectives. The impact of highway and rail roadkills has not been large along the TAPS ROW. However, it is significant in Southcentral Alaska, and it would be prudent for regulatory agencies to consider mitigation measures for other areas, including that around TAPS, if traffic increases in the future. On the ANS, disturbance and displacement of caribou during the calving period is a potential impact. Although the Central Arctic herd has increased and maintained good calf productivity despite oil field development, there are concerns that at some point development will have a negative impact. Monitoring calving distributions and restricting certain activities can effectively mitigate this impact. Increased predator numbers are thought to have occurred on the ANS due to access to anthropogenic foods. Steps have been taken to prevent access to garbage and intentional feeding of bears, foxes, gulls, and ravens. Continued development of these practices is needed.

**Marine Mammals:** Important impacts include disturbance and displacement during offshore exploration and development, and mortality or injury from oil spills. Extensive monitoring of noise and marine mammal behavior and distribution during offshore operations is mandated in regulations, and mitigation measures have been implemented (e.g., restricting timing of operations) to minimize disturbance and displacement. Oil spills in the Beaufort Sea or Prince William Sound could potentially impact marine mammals, and as for birds and fish, prevention and rapid response are important.

### Social Systems

The renewal of the TAPS ROW will provide the opportunity to produce an additional 7 billion barrels of oil from the ANS oil fields, will increase the likelihood of commercializing some 30 trillion cubic feet of currently stranded gas, and result in great economic benefits for the U.S., the state of Alaska, local governments, and residents of Alaska. About 20 percent of current U.S. oil production flows through TAPS, and its continued operation will reduce the U.S. balance-of-payment deficit by approximately \$150 billion in 1998 dollars (based on U.S. Department of Energy energy price forecasts) during the renewal period. The economic projections do not include potential gas commercialization and are based on a low oil price of \$16 per barrel. Employment opportunities will be far greater than in the no-action alternative for Alaska Natives and non-Natives. Social change will continue with both positive and potentially negative effects. Subsistence resources could be affected if there is a large oil spill, but the SERVS system and



the phase-in of double-hull tankers greatly reduce the risk of such an event.

Effects on the economy (national, state, and local), environmental justice, sociocultural systems, subsistence, cultural resources, and environmental justice are summarized below.

**Economic Effects:** Renewal of the TAPS ROW would result in the continuation of substantial economic benefits at the national, state, and local levels. Crude production is expected to decline in the future as ANS fields are gradually depleted but, because the scale of operations is so large, economic benefits will be substantial. (Note that the economic analysis was based on an oil price of \$16 per barrel. If oil prices are higher, the impacts will increase proportionately.)

At the national level, future operation of TAPS (and ANS fields) means that an important source of domestic crude production — now accounting for approximately 20 percent of domestic crude production — will continue. The importance of ANS production will decrease as production declines, but is expected to be substantial. The cumulative value of ANS crude production is projected to be approximately \$150 billion in 1998 dollars (based on U.S. Department of Energy energy price forecasts) during the renewal period. Renewal of the ROW would decrease the balance-of-trade deficit by this amount.

ANS output generates federal revenues from income taxes, royalties, and other sources. Continued operation of the ANS fields is estimated to generate approximately \$10.8 billion in additional federal revenues. Because of the federal requirement for double-hull tankers, additional tankers will have to be built for the marine transportation link. These tankers must be U.S. flagged and built, and serviced by U.S. crews. It is estimated that purchase of replacement tankers for the ANS trade will generate 162,000 worker-months of employment at U.S. shipyards.

The State of Alaska receives revenues in the form of royalties and severance taxes on crude oil. Over the renewal duration, these revenues are estimated to total \$14.2 billion. These revenues are used to fund continuing state services and to contribute to the Permanent Fund. Since 1977, revenues from the oil and gas industry have accounted for the majority of contributions to Alaska's unrestricted General Fund revenues.

The property tax of North Slope oil-production-related facilities and TAPS continue to be an important source of local government revenues. Local government tax revenues from continued operation of these facilities is estimated to generate more than \$2 billion.

The oil and gas industry is a leading component of gross

state product and a major economic driver of the economy. Continued operation of TAPS and the ANS fields is essential to the Alaska economy and provides time for a gradual transition from a petroleum-based to a more diversified economy.

The above estimates do not include the potential economic benefits of various projects for commercialization of presently stranded ANS gas reserves. Each of the three gas commercialization options identified above could contribute significantly to the Alaska economy.

**Sociocultural Systems:** Sociocultural systems continue to evolve in response to many factors, including development of the oil and gas industry in Alaska. Effects have been both negative and positive (e.g., development of improved health care, growth in educational opportunities and attainment, expansion of specific programs for Alaska Natives). Social change is expected to continue whether or not the TAPS ROW is renewed. Renewal provides additional funds to the state and to local communities for maintenance of social programs, and creates employment opportunities.

**Subsistence:** Subsistence is important to many communities in Alaska, both for economic and sociocultural reasons. Continued operation of TAPS and ANS fields could adversely affect the availability of subsistence resources if there is a large spill in the future. The severity of these effects depends on the quantity of oil spilled, location, season, and other factors. The risk of a large spill from a tanker has been reduced by the SERVS system, by the mandated phase-in of double-hull tankers, and by the reduced volume of oil to be transported over the renewal period. Increased hunter access via the Dalton Highway could increase pressure on subsistence resources, but this issue will remain if the TAPS ROW is not renewed.

**Cultural Resources:** Adverse effects on cultural sites could result from ground-impacting activities and oil spills. Construction of the pipeline is long-since completed, and impacts associated with maintenance/repairs are not expected to be significant because most ground-impacting activities will occur on previously disturbed soils. Cumulative effects of continued ANS development and of gas commercialization could occur, although new technology has reduced the size of the footprint of exploration and production facilities and construction would be subject to provisions of Section 106 of the National Historic Preservation Act and its state equivalent.

**Environmental Justice:** Renewal of the ROW enables the continuation of the Permanent Fund Dividend — which has disproportionate benefits for large, low-income families — and continued revenue to state and local governments for maintenance of social programs. Disproportionately ad-



verse impacts on low-income or minority populations may occur if an oil spill impacts subsistence resources.

### **No-Action Alternative**

The no-action alternative involves the end of TAPS operation and the dismantling, removal, and restoration (DR&R) of TAPS facilities. DR&R of TAPS will also result in the end of the ANS oil production.

### **Physical Environment**

In the no-action alternative, it is assumed that above ground facilities related to TAPS will be removed during a 3-year period of DR&R. During that time, major activities will involve the physical removal of equipment and subsequent transportation to disposal sites. For a relatively short time, these activities will result in disruption to the terrestrial environment. These short-term impacts along the TAPS ROW include the potential for spills, increased use of heavy vehicles and traffic with attendant increase in emissions and dust, and increased water discharges from the work camps and from cleaning pipe and equipment. After DR&R, it is likely that some of the workpad, access roads, and the Dalton Highway will remain in place.

Short-term impacts to the physical environment can be identified and mitigated since the impacts are similar to those of original construction. Essentially, DR&R would be a large-scale construction project in reverse. Following the three-year DR&R effort, impacts would diminish to insignificance.

**Terrestrial Environment:** Potential short-term impacts to the terrestrial environment may be caused by construction associated with dismantling, by those items left in place, such as pipe in buried river crossings, or by modifications to the terrain that occurred during original construction and continue to have an effect.

Seismic hazards relating to an operating pipeline system would be eliminated, and the pipeline seismic risk is minimal during dismantling.

DR&R of TAPS will have no adverse effect on global warming. However, the increase of air temperature associated with global warming will have an impact on soil temperatures and thus may affect soils in permafrost terrain after the pipeline has been removed and the ground restored.

There is a potential for the lasting presence of the pipeline workpad, rehabilitated material sites, access roads, pump station sites, and other visible signs of the former pipeline system for approximately two decades after restoration. These visible signs will add to the visible presence

of future construction that might occur.

**Water Resources:** Cessation of operation of TAPS will require continued use of water resources along the ROW to support dismantling. Wastewaters will be produced at accelerated rates by virtue of the intensive labor effort involved. Freshwater receiving environments will have increased potential for adverse impacts from the large camp populations and extensive earth-moving activities involved in dismantling TAPS.

**Atmospheric Environment:** After DR&R, all TAPS-related air emissions would cease. For most facilities, the direct ambient impact levels would revert to pre-construction levels.

**Cumulative Effects:** No significant cumulative effects on the physical environment were identified.

### **Biological Resources**

The direct, indirect, and cumulative impacts of the no-action alternative will be different during the DR&R period and the post-TAPS period. As long as mitigation and prevention measures are implemented, the direct impacts of DR&R on biological resources will be limited and manageable. After DR&R, there will be no direct impacts of TAPS. Indirect impacts associated with use of the TAPS ROW and adjacent areas by the public may be more substantial, but this activity is regulated by government. The primary impact after DR&R may be increased pressure from sport and subsistence harvest (legal and illegal) because of decreased employment following the close of TAPS operations. The following paragraphs summarize the important impacts that warrant consideration under the no-action alternative.

With the exception of some disturbance during the DR&R period, the environment along TAPS, on the ANS, and in Prince William Sound will essentially return to its pre-oil-industry state through a combination of active restoration and natural ecosystem succession under the no-action alternative. The use of natural resources, primarily fish and wildlife, may increase following the closing of TAPS as employment and the state economy dramatically decline. Effective management will be necessary to ensure these resources are not over-harvested and fare as well after, as they have during, the operation of the pipeline.

A potentially important impact on fish, birds, terrestrial mammals, and marine mammals is increased harvest, legal and illegal, sport, subsistence, and commercial, after TAPS operations cease. The end of operations of the oil industry in the ANS oil fields, TAPS, and the VMT will be accompanied by significant reductions in statewide employment and incomes. This may increase the pressure on fish and wildlife if residents use wild foods to compensate for the



loss of income. This could include hunting of terrestrial mammals along TAPS and on the ANS, marine mammals in the Beaufort Sea and Prince William Sound, and waterfowl on the ANS. Sport, commercial, and subsistence fishing could also increase. If decreased state revenue results in less enforcement of fish and game regulations, this impact could be intensified. However, it is also possible that the human population (and fish and wildlife harvests) will decrease in response to the economic decline. Regulation and monitoring by the appropriate agencies is needed to manage this impact.

**Vegetation and Wetlands:** Important impacts on vegetation and wetlands include disturbance of vegetation during DR&R, introduction of exotic vegetation, and loss of vegetation under gravel fill left in place along the TAPS ROW and in the ANS oil fields. Along the TAPS ROW the primary impact will be disturbance of vegetation during DR&R. Revegetation of disturbed sites will result in a short-term impact, but also improvement of habitat for some wildlife species that use early-stage vegetation. The impact of introduction of exotic vegetation can be removed with the use of native plants for revegetation. The extent of impacts on the ANS depends on the amount of gravel fill left in place and whether it is revegetated. Because the amount of land covered with gravel is relatively small, this impact will not be significant.

**Fish:** Obstruction of fish movements in low water crossings or culverts during DR&R, and harvest of fish are potentially significant. Obstruction of movements, and habitat changes due to erosion, during and after DR&R could occur. Adequate design of restoration and monitoring during DR&R can mitigate this problem.

**Terrestrial Mammals:** An important impact on terrestrial mammals is disturbance and displacement during DR&R. DR&R activities can be timed to minimize impacts in sensitive areas, such as calving areas.

### Social Systems

Non-renewal of the TAPS ROW will have devastating effects to the economy of Alaska and will significantly impact the U.S. balance of trade. The opportunity to produce an additional 7 billion barrels of oil from the ANS oil fields will be eliminated. The likelihood of commercializing some 30 trillion cubic feet of currently stranded gas on the ANS will be significantly reduced without the oil production infrastructure. Lost revenues to the state of Alaska (\$14.2 billion), local governments (\$6.5 billion), and residents of Alaska will cause a severe drop in employment, loss of social services, and economic hardships. About 20 percent of current U.S. oil production flows through TAPS,

and without ROW renewal those reserves would be stranded, and the U.S. balance-of-trade deficit would increase by approximately \$150 billion in 1998 dollars (based on U.S. Department of Energy energy price forecasts) during the renewal period.

The economic projections are based on an oil price of \$16 per barrel and could be much more severe if oil prices are higher. Employment opportunities will decline dramatically, particularly for Alaska Natives. Social change will continue. The only potentially positive benefit will be the reduction of the potential impact of crude oil spills on subsistence resources, but this might be offset by the increased pressure on subsistence resources as the economy declines, and potentially, spills of refined products which would have to be brought into the state with the closure of in-state refineries.

Key effects of the no-action alternative include the following.

**Economic:** Selection of the no-action alternative would result in substantial adverse economic effects at the national, state, and local levels. DR&R activities would create some short-lived employment opportunities, one of the few positive elements in an otherwise bleak economic landscape.

At the national level, closure of TAPS and the ANS fields would result in lower federal revenues (e.g., from taxes and royalties), reduced self-sufficiency in crude petroleum, an increase in the balance-of-trade deficit, and adverse impacts on the domestic shipbuilding industry, as well as further losses in employment for domestic seafarers.

The state would receive sharply lower revenues (reduced by \$14.2 billion), lower economic activity, reduced employment, personal income, and net out-migration. A severe and prolonged economic contraction is projected to result, which is much more severe in terms of magnitude and duration than the recessions of 1976 and 1985. Indirect and multiplier effects of TAPS shutdown would be felt in many sectors of the state, property values would decline, mortgage defaults would probably increase, and the state would be forced to take draconian measures to bring revenues and expenditures into balance. The Permanent Fund Dividend would be eliminated, and significant pressures would be placed on state budgets, which ultimately would result in fewer and less generous social services.

Local revenues would fall because of the removal of a significant portion of the tax base and the elimination of certain state transfers. From 2004 to 2015, revenues to local governments would be over \$6.5 billion less than under the proposed action. Local governments also would face in-





tense pressures to reduce budgets (and, therefore, services) to bring these into line with revenues.

Economic impacts, as measured by employment and personal income, would be severe for residents of many communities, but particularly so for those on the North Slope and Valdez. Reduced revenues for the North Slope Borough would put pressure on municipal jobs, as well as eliminating those in the oil and gas industry.

The lack of infrastructure after DR&R of TAPS would foreclose gas commercialization in the foreseeable future, which would leave at least 30 trillion cubic feet of domestic gas reserves “stranded” on the ANS. Three refineries in Alaska (two near Fairbanks and one at Valdez), which presently use ANS crude, would be closed and the state would have to import crude oil and/or refined products to satisfy in-state demand.

**Sociocultural Systems:** Social change will continue even if the no-action alternative is selected. Closure of TAPS and ANS fields will not result in a restoration of the pre-oil culture. To the extent that social ills are related to economic ills, social problems are likely to be exacerbated. Moreover, reduced revenues at all levels of government are certain to reduce the scope and size of social programs designed to ameliorate social programs.

**Subsistence:** Effects of the no-action alternative on subsistence would be mixed. Closure of oil and gas facilities would eliminate the potential for oil spills on the North Slope or pipeline route, a potential benefit. (Because Alaska would have to import crude and/or refined products

to satisfy internal demand, the risk of some oil spills remains.) However, income losses would limit expenditures for arms, ammunition, boats, motors, snowmachines, and other equipment used for hunting and fishing. Moreover, income and employment losses may mean that there would be more pressure on subsistence resources because more persons would adopt the subsistence lifestyle out of economic necessity.

**Cultural Resources/Recreational/Wilderness:** The no-action alternative would reduce the potential for adverse impacts. DR&R activities, for example, would remove most visible traces of oil and gas development. Cessation of operations would eliminate possible impacts associated with oil spills of ANS crude.

**Environmental Justice:** The no-action alternative has environmental justice implications. On the positive side, the probabilities of adverse impacts on subsistence would be reduced (though not eliminated). However, there are also negative effects. Elimination of the Permanent Fund Dividend would have disproportionate adverse effects on large, low-income families, including those of Alaska Natives. The no-action alternative would result in adverse impacts on Native corporations. For example, the Arctic Slope Regional Corporation owns the subsurface rights on selected areas of the North Slope. Foreclosure of exploration and production activities on these lands would adversely impact this corporation and its Alaska Native shareholders.