4A.4.1 Socio-Cultural Characteristics

The socio-cultural characteristics of the North Slope communities of Nuiqsut, Barrow, Anaktuvuk Pass, and Atqasuk have been described in Section 3.4.1. These communities are small (Barrow is the largest with a population of 4,581) and primarily populated with Alaska Natives. These communities strive to maintain their traditional subsistence way of life but have adapted to and use a number of modern technologies. The communities are separated by relatively long distances and only one, Nuiqsut, is in close proximity to the CPAI – Development Plan Area. Members of the other communities are known to interact with Nuiqsut and use portions of the Plan Area for subsistence activities.

4A.4.1.1 Alternative A – CPAI Development Plan Impacts on Socio-Cultural Characteristics

Social Organization

As described in Section 3.4.1, the social organization of North Slope communities is based on kinship, marriage, and alliance groups formed by such characteristics as age, sex, ethnicity, community, and trade. Social organization is also based on the cultural values of the community including sharing, mutual support, and cooperation.

Factors that are likely to cause stress or change to the social organization of the four communities include the following:

- Influx of non-native residents not associated with an existing kinship group
- Influx of non-resident temporary workers
- Increased interaction between residents and oil industry workers
- Change in subsistence uses
- Reduction or disruption of harvest production
- Availability of new technologies (transportation, energy production, educational, etc.)
- Increased or variable personal and family annual income

Construction and operation of Alternative A – CPAI Development Plan is not expected to result in the significant influx of new, non-Native population. Oil industry construction and operations personnel will be housed in work camps or at centralized industry facilities co-located at industry production facilities. Because industry will provide worker housing, demand for housing in Nuiqsut is not expected to increase as a result of the proposed oil development.

The construction of winter ice roads near Nuiqsut and a new hotel at Nuiqsut could increase interaction between residents and oil industry workers. However, non-resident industry workers are not expected to seek leisure time activities or other services in Nuiqsut or the other communities to any significant degree. Industry practice is to have workers work 12 hour shifts for several weeks then be transported off the North Slope during their off days. Industry housing includes eating, exercise, and entertainment facilities so there would be no demand from industry workers for these services in Nuiqsut. In addition, the limited availability of ground transportation to industry workers is expected to minimize visits to Nuiqsut. No increase in visits by industry workers to Barrow, Atqasuk, or Anaktuvuk Pass is expected.

Disruption of subsistence harvest patterns and uses could affect community social organization. The sharing of subsistence foods is essential to the maintenance of family ties, kinship networks, and community well being. Disruption of subsistence-harvest patterns could alter these cultural values and affect community social structure. For the system of sharing to operate properly, some households must consistently produce a surplus of

subsistence goods. For this reason, the supply of subsistence foods in the sharing network is more sensitive to harvest disruptions than the actual harvest and consumption of these foods by primary producers. Thus, when disturbance to the subsistence harvest occurs, it could disrupt the community culture. Subsistence is a cyclical activity, and harvests vary from year to year, sometimes substantially. Numerous different species are hunted to compensate for a reduced harvest of a particular resource in any one year. However, multiyear disruptions to some important resources such as the caribou or the bowhead whale could have substantial effects on sharing networks and subsistence-task groups.

Subsistence harvest and use impacts under Alternative A – CPAI Development Plan are described in detail in Section 4A.4.3. This analysis found that threats to subsistence harvest success are likely as a result of the following factors:

- Displacement or deflection of subsistence resources from customary harvest locations
- Reduced access to customary harvest areas where oil industry facilities are located due to perceived restrictions on hunting techniques, especially the use of firearms, and hindrance to passage during winter along raised road berms and pipelines
- Preference for animals not habituated to industry facilities

As a result of these effects on traditional subsistence use areas, especially those near Nuiqsut, subsistence hunters will likely travel farther and spend more time away from the community pursuing subsistence harvest activities. They also will have increased direct economic costs for subsistence resulting from increased fuel consumption, and maintenance and repair of equipment. This could increase a problem some North Slope residents perceive that cash employment takes hunters away from the community, which can lead to their missing short-term subsistence opportunities.

Effects on subsistence harvest and use, and any associated stress to community social organization, are most likely to occur in the community of Nuiqsut because of its proximity to the Plan Area. While community members of Barrow, Atqasuk, and Anaktuvuk Pass all pursue subsistence activities in the Plan Area, they take a larger proportion of their subsistence harvest from other areas not directly affected and thus are less likely to experience subsistence related disruption to their social organization.

Potential changes to the cultural organization of Nuiqsut could occur as a result of implementation of Alternative A – CPAI Development Plan. These changes, to the extent that they would occur, would most likely be related to increased stress in the community as a result of changes in subsistence in the pattern and success of subsistence hunting. Changes to community social organization are not likely to occur as a result of the presence of additional industry workers in the region.

Community comment on Social Organization Impacts - North Slope Inupiat continue to express concern about the differences in how they and the dominant culture relate to the land and waters. Rex Okakok from Barrow expressed the problem when he stated:

> "Our land and sea are still considered and thought by outsiders to be the source of wealth, a military arena, a scientific laboratory, or a source of wilderness to be preserved, rather than as a homeland of our Inupiat." (USDOI, MMS 1987c)

Economic Organization

As described in Section 3.4.1, the economic organization of Nuiqsut, Barrow, Anaktuvuk Pass, and Atqasuk is composed of a mixed cash and subsistence economy. Impacts to the subsistence economy (e.g., subsistence harvest and use) are described in Section 4A.4.3.

The cash economy of the potentially affected communities includes the wage income of community members, income derived by businesses owned by community members, and royalty and tax revenues and other distribution that flow to each community. Little increase in wage income is expected to occur under Alternative A – CPAI Development Plan. Increases in personal or family income resulting from increased Native corporation dividend distributions could occur.

As noted in the previous discussion of Social Organization, little increase in contact between non-resident industry workers and the local population, and, by inference, local businesses providing local services, is expected. Therefore, only a minimum increase in local business income would be expected. However, many of the contractors hired by the oil industry to support exploration, drilling, and production on the North Slope are Native corporations (ASRC et al.), subsidiaries of such corporations, or otherwise affiliated with such corporations through joint ventures and other relationships. As previously noted, over $250 million dollars in contract fees were received by the Kuukpik (the Nuiqsut Village Corporation) during development of CD-1 and CD-2. To the extent that these companies are successful bidders for contracts during construction and operation, significant local economic benefits are expected to result from implementation of Alternative A – CPAI Development Plan.

Institutional / Community Services

Because oil industry workers (with the exception of current local residents) are not expected to seek housing in Nuiqsut or the other North Slope communities or seek to utilize education, health or other community services, no impact on the existing community institutions or the services they provide would be likely to occur. Current residents who do use these services are not expected to create an incremental increase in service demand as a result of industry employment should it occur.

Community Health and Welfare

Residents of North Slope communities, including the communities likely to be impacted by the proposed Alternative A – CPAI Development Plan, have documented increased rates of crime, drug abuse, domestic violence and child abuse, and other community welfare pathologies. While these health and welfare problems have increased over the time of oil industry development on the North Slope, they have not been directly linked to oil industry activity. Their occurrence is symptomatic of changes in community social organization, economy, and increased access to technology and sources of cash income. No direct impacts to community health and welfare are expected to occur as a result of implementation of Alternative A – CPAI Development Plan. To the extent that changes in the subsistence harvest place stress on other elements of community structure, indirect impacts on community health and welfare could occur.

Population and Employment

Figure 3.4.1.7-1 shows trends in population growth for each of the four communities. Each community is expected to grow independent of the proposed project, although at modest rates. Indirect economic impacts under Alternative A – CPAI Development Plan could provide the impetus for some additional population growth in addition to the trend; however, the amount of this growth will likely be small.

Employment opportunities for local residents, especially Alaska Natives, as a result of Alternative A – CPAI Development Plan could occur either as direct jobs for industry or as new jobs created as a result of increased local economic activity (so-called “induced employment”).

Employment of Alaska Natives in oil-related jobs on the North Slope has been low. In spite of this limited participation, community and NSB leaders continue to seek implementation of programs that would result in increased hiring of local residents, especially Alaska Natives. The NSB has attempted to facilitate Native employment in the oil industry at Prudhoe Bay and has expressed concern that industry has not done enough to accommodate training of unskilled laborers or to accommodate their cultural need to participate in subsistence

hunting. The NSB also is concerned that even though recruitment efforts are made and training programs are available, industry recruits workers using methods more common to Western industry practices. Suggestions have been made that industry-hiring practices be modified to become more Inupiat-appropriate. One North Slope operator, BPXA, has instituted its Itqanaiyagvik hiring and training program, designed to put more Inupiat into the oil field workforce. It is a joint venture with the ASRC and its oil-field subsidiaries and is coordinated with the NSB and the North Slope Borough School District. Other initiatives are an adult "job-shadowing" program and an effort called Alliances of Learning and Vision for Under Represented Americans, developed with the University of Alaska (BPXA 1998d).

As a result of continued industry and NSB efforts, some increase in employment of local residents in industry jobs is expected to occur, but the number employed is expected to be small.

The industry practice of providing work site housing and importing a significant segment of the workforce to the project site means that development-induced local employment is likely to be small especially as they translate into employment of Alaska Natives.

4A.4.1.2 Alternative A – FFD Plan Impacts on Socio-Cultural Characteristics

Complete development of Alternative A – FFD would result in additional well pads, roads, and other facilities. To the extent that socio-cultural impacts are related to the number and extent of facilities developed, impacts from FFD would be generally greater than under Alternative A- CPAI Development Plan.

Social Organization

Impacts of Alternative A – FFD would be the same as, or in some instances greater than, the impacts of Alternative A-CPAI. FFD would affect a much greater area of traditional subsistence use near Nuiqsut causing greater disruption of subsistence harvest activities. In particular, FFD could reduce the use and harvest of subsistence resources in the Colville River area, a key subsistence use area for Nuiqsut. As community members avoid or are displaced from traditional use areas, they will travel farther and into the subsistence use areas of other communities. This displacement could result in competition for resources between communities, extended absences of community members from their home village and increased costs to pursue subsistence resources. To the extent that such disruption of subsistence harvest patterns and use occurs, it could stress the community social organization and could lead to changes in underlying cultural values.

Economic Organization

Impacts to the cash economy could be significantly greater under the full-field alternative depending on the extent of FFD. As described in the impact analysis found in Section 4A.4.2 on Regional Economy, the flow of revenues to the NSB and village corporations is correlated to oil production and price. Under FFD, oil production could be 4.5 to 10 times greater that Alternative A – CPAI Development Plan. To the extent that production generates revenues that flow to the community or community-based organizations, greater benefits would occur under FFD.

Enhancement of the cash economy from wage employment or income to local businesses providing local services is expected to be the same as under Alternative A – CPAI Development Plan.

Institutional / Community Services

Alternative A – FFD is not expected to increase demand for community services beyond what could occur under Alternative A – CPAI Development Plan. Without changes in demand for community services, changes to community institutions, other than those that would otherwise occur, are not expected.

Community Health and Welfare

No direct impacts to community health and welfare are expected as a result of FFD. To the extent that changes in subsistence harvest place stress on other elements of community structure, indirect impacts on community health and welfare could occur. Section 4A.4.3 describes impacts to subsistence harvest and uses for FFD. Since subsistence impacts are more likely under FFD, impacts to community health and welfare, to the extent that they would occur, are also more likely under FFD.

Population and Employment

No changes to population growth rates or increased population as a result of migration of industry workers are expected as result of FFD. Any increases in direct or induced employment that would occur would likely be the same as under the CPAI Development Plan.

4A.4.1.3 Alternative A – Summary of Impacts (CPAI and FFD) on Socio-Cultural Characteristics

Nuiqsut

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

Barrow, Atqasuk, and Anaktuvuk Pass

- To the extent that subsistence hunters of these communities rely on subsistence use areas in the Plan Area, there could be some effect on subsistence harvest in Barrow, Atqasuk, and Anaktuvuk Pass. However, the extent of these impacts is likely to be small and not sufficient to impact community social organization. Under FFD, impacts to subsistence harvest and use are expected to be greater, increasing the potential that changes to community social organization could occur.
- Economic benefits are expected to occur as a result of village corporate participation in construction and operations contracting. The impacts are expected to be greater under FFD.
- No direct incremental impacts to community health and welfare are expected as a result of the proposed project or the Full-Field Alternative. To the extent that changes in community social organization occur, changes in community health and welfare could also occur. These impacts, to the extent that they occur, are more likely to occur under FFD.

- Minimal employment of Barrow residents is expected during construction and operation under Alternative A – CPAI Development Plan or FFD. No change in the population growth rate is expected.

4A.4.1.4 Potential Mitigation Measures (CPAI and FFD) for Socio-Cultural Characteristics

Direct impacts to the socio-cultural characteristics of Nuiqsut, Barrow, Atqasuk, and Anaktuvuk Pass are generally related to changes in subsistence harvest and uses, and economic benefits from revenue streams produced by oil production. Additional revenue is expected to accrue from contracting by North Slope-based Native corporations. Without intervention, employment opportunities for local residents are expected to be minimal. Indirect impacts include potential effects on community health and welfare.

Potential mitigation measures for both CPAI Development Plan Alternative A and the FFD Alternative A are as follows:

- Mitigation measures to lessen the impacts to subsistence harvest and uses as discussed in Section 4A.4.3.
- No direct and immediate impacts are expected to community social organization, community services, or community health and welfare as a result of direct project impacts. If impacts in these sectors of community life occur as an indirect result of project development, such impacts are likely to occur over a longer time period and incrementally. A number of indicators of overall community welfare have been identified in previous studies prepared for the Kuukpikmuit Subsistence Oversight Panel (CRA 2002). CPAI would assist in continued monitoring of the indicator on a periodic basis to provide additional information to community leaders and appropriate social, health, and law enforcement organizations on overall community welfare. Such information could then be used to prioritize budgeting of community and NSB resources to address selected community welfare issues.
- To the extent practicable, appropriate job training and recruiting programs should be implemented to encourage industry employment of local residents to increase wages earned in the local community.

4A.4.2 Regional Economy

This section addresses the economic impacts associated with the ASDP. The analysis focused on the income and employment that would result from construction and operation of facilities in the CPAI Development Plan Alternative A and FFD Alternative A.

The proposed project is expansion of an existing project rather than an entirely new project. It is close to a North Slope Native village—Nuiqsut. Impacts have already been occurring for several years as a result of the initial Alpine Development Project at CD-1 and CD-2. The direct economic impacts from the CPAI Development Plan Alternative A would both create new economic activity and extend the economic life of the existing Alpine Development Project farther into the future.

All of the economic "impacts" that have been identified are in fact increased revenues and income that are expected to accrue to the state, the NSB, and Nuiqsut (including through Nuiqsut's Native corporation). In Section 4A.4.3, Subsistence Harvest and Uses, impacts to subsistence hunting and gathering are discussed. These impacts also could have an economic consequence; however, the economic consequences have not been given a value because the loss of subsistence harvest or increased cost of subsistence harvest has not been determined.

4A.4.2.1 Production

The existing Alpine Development Project has been producing oil and related economic activity since 2000. Without the proposed project, production from CD-1 and CD-2 would continue to provide jobs and revenues. However, without the ASDP, the level of production and related economic activity from the Alpine Development Project would increase slightly between 2003 and 2008 and then decline after that point.

The economic impacts of Alternative A would be derived from royalties, taxes, and other payments related to production and employment income from construction and operation. For North Slope communities and the State of Alaska, the larger components are royalties, taxes, and other payments related to production. Implementation of Alternative A would be expected to extend the life of the ASDP to approximately 2015 before production falls below current levels. CPAI's plans to extend production capacity for the Alpine processing facility from the current capacity of 105,000 barrels of oil per day would increase to 130,000 barrels per day in 2004 to 2005 (see Table 2.3.11-1, Potential Schedule for Processing Facility Expansion).

Figure 4A.4.2-1 shows the projected oil production from the existing Alpine Field (CD-1 and CD-2) and the proposed ASDP (CD-3 through CD-7). The data used to portray oil production in Figure 4A.4.2-1 were developed by the State of Alaska (Alaska Department of Revenue [ADR] 2003a). Analysts with the ADR forecast oil production throughout Alaska as an integral part of their annual state revenue estimate that is used by the Alaska legislature in developing the budget. The areas on this graph that exceed the projected processing capacity are due to the production model used in the projections. Under actual operating conditions, the production would be reduced to remain within the processing capacity limit.

Production estimates for the wells and additional production facilities assumed to accrue as part of FFD Alternative A are presented in Table 4A.4.2-1 for a 20-year period. The last line in Table 4A.4.2-1 shows the total production for each of the production units, including production for years not included in the table.

TABLE 4A.4.2-1 PROJECTED OIL PRODUCTION FOR EXISTING, CPAI DEVELOPMENT PLAN, AND FFD SCENARIO: 2003 THROUGH 2023 (IN THOUSANDS OF BARRELS)

YEAR	CD-1 and CD-2	CD-3	CD-4	CD-5	CD-6	CD-7	NPR-A Full-Field[a]
2001	40,000						
2002	96,000						
2003	98,000						
2004	100,000						
2005	103,000						
2006	103,000						
2007	103,000	20,000	14,000				
2008	103,000	20,000	14,000				10,000
2009	90,000	20,000	14,000		2,500		12,000
2010	73,800	17,600	11,900		20,000		20,000
2011	61,254	15,488	10,115		20,000		9,600
2012	51,453	13,629	8,598	16,000	20,000	20,000	22,680
2013	43,735	11,994	7,394	16,000	17,000	20,000	33,644
2014	37,612	10,555	6,433	15,000	14,450	20,000	62,915
2015	32,723	9,288	5,661	13,350	12,283	17,600	71,932
2016	28,796	8,174	5,038	11,748	10,563	14,960	83,942
2017	25,628	7,193	4,534	10,338	9,190	12,716	92,121
2018	23,066	6,401	4,081	9,096	8,087	10,936	227,647
2019	20,759	5,761	3,673	8,006	7,197	9,514	231,877
2020	18,891	5,185	3,306	7,045	6,478	8,372	235,341
2021	17,191	4,667	2,975	6,200	5,830	7,451	238,016
2022	15,643	4,200	2,707	5,456	5,247	6,706	240,237
2023	14,392	3,780	2,464	4,856	4,722	6,036	242,080
Total production[b]	**475.4**	**76.0**	**50.3**	**60.0**	**71.8**	**73.6**	**1,657.8**

Source: ADR, Tax Division. Unpublished files from Spring 2003 Revenue Sources Book.

Notes:

[a]FFD in this table is based upon assumptions provided by the BLM.

[b]This figure shows the total estimated production in millions of barrels over the life of the production area, including years past 2022.

Figure 4A.4.2-2 also shows the effect of adding the projected FFD Alternative A under the BLM's production assumptions. A map showing the projected locations for FFD was shown in Figure 2.4.1.2-1. This figure shows 22 hypothetical production areas (CD-8 through CD-29) and two hypothetical processing facility/production areas (APF-2 and APF-3).

The BLM estimates an average of 50 million barrels (MMbbl) (with a range of 25 MMbbl to 150 MMbbl) for CD-8 through CD-29 and an average of 250 MMbbl (with a range of 150 million to 300 million) for the two processing/production pads. Further, the BLM estimates the timing for development of one of the processing/production units in 15 years with the second to follow in another 10 years (BLM 2003).

To estimate production for FFD Alternative A, the BLM assumed that each of the 22 hypothetical production pads (CD-8 through CD-29) would have an average production of 50 MMbbl. To this was added two times the projected production from APF-2 and APF-3 (250 MMbbl), resulting in a total production from the FFD alternative of 1.6 billion barrels.

Production streams for FFD under the BLM assumptions were developed using the method described above. To determine the timing of production, production pads in the FFD had to be linked to specific processing facilities; the production pads were assumed to be brought online in different years. These groupings were made based on the proximity or each production pad to the most likely processing area. Thus, it was projected that production from CD-8, CD-10, CD-11, CD-12, CD-13, CD-14, CD-15, CD-16, CD-18, CD-19, CD-20, CD-21, and CD-22 would go to the existing Alpine CPF at CD-1. It appears that most of this production also would be outside the boundary of the NPR-A. The production from CD-9, CD-17, CD-23, CD-24, and CD-26 would go to APF-2, and the production from CD-25, CD-27, CD-28, and CD-29 would go to APF-3.

Figure 4A.4.2-2 shows the estimated production from FFD Alternative A resulting from the BLM assumptions. The additional production from FFD is presented by increment grouped by processing facility: APF-1, APF-2, and APF-3. The gap between peak production for APF-2 and APF-3 is due to the hypothetical timing of the production assumptions. It is most likely that under actual production conditions the operating companies would work to schedule production so that this gap would not exist. The production assumptions shown in Figure 4A.4.2-2 provide the basis for determining the economic effects of FFD Alternative A.

As illustrated in Figure 4A.4.2-2, the addition of the FFD results in much higher average production per year and significant extension of production into the future. Figure 4A.4.2-1 shows that by 2023, production under the CPAI Development Plan Alternative A would fall to less than 40,000 barrels per day, or less than 30 percent of the peak production of 145,000 barrels per day. Figure 4A.4.2-2 shows that FFD production would not decline to this level until 2042.

4A.4.2.2 Alternative A – CPAI Development Plan Impacts on Regional Economy

Revenues

Royalty and Tax Impacts

As demonstrated in Section 3.4.2, the State of Alaska depends heavily upon oil royalties and taxes to fund its annual operating budget. The State funds approximately 80 percent of its general fund unrestricted revenues from petroleum revenue, and 35 percent or more of all state revenues are derived from the oil industry (ADR, 2003).

Figure 4A.4.2-1 showed that oil production and revenues from the Alpine Field would begin to decline in 2008 without the ASDP. The increased production from Alternative A shown in Figure 4A.4.2-1 would contribute both state and federal tax revenues on an annual basis. Table 4A.4.2-2 shows the projected state and federal revenues for the period from 2003 through 2020 for the CPAI Development Plan Alternative A. These estimates are based on the revenue model used by the ADR to forecast state revenues. The model is dependent upon a number of assumptions, the most important of which are level of production and forecasted wellhead value for oil. The production estimates used for both CPAI Development Plan Alternative A and FFD Alternative A are illustrated in Figures 4A.4.2-1 and 4A.4.2-2. The ADR publishes estimated projections of future oil prices as an integral component of their annual spring and fall revenue forecast for the state. The current oil price forecast by the Alaska Department of Revenue is shown in Table 4A.4.2-3. To the extent that future oil prices differ from these projections, revenue projections based on this projection are subject to underestimation or overestimation.

TABLE 4A.4.2-2 SUMMARY OF STATE AND FEDERAL REVENUES[a] FOR CD-3 THROUGH CD-7

Year	State Royalty	State Oil Production Tax	Federal Royalty
2003	$0.0	$0.0	$0.0
2004	$0.0	$0.0	$0.0
2005	$0.0	$0.0	$0.0
2006	$0.0	$0.0	$0.0
2007	$25.0	$0.0	$0.0
2008	$24.9	$0.0	$0.0
2009	$26.1	$0.5	$1.1
2010	$30.7	$4.2	$9.1
2011	$29.7	$4.4	$11.2
2012	$43.0	$9.9	$26.9
2013	$38.6	$7.1	$24.7
2014	$34.9	$5.4	$22.9
2015	$30.0	$2.8	$19.5
2016	$25.6	$1.5	$16.5
2017	$21.9	$0.7	$13.9
2018	$18.9	$0.3	$11.9
2019	$16.3	$0.1	$10.1
2020	$14.2	$0.0	$8.8

Source: calculated by ResourcEcon from Dept. of Revenue data

Notes:

[a]Revenues are shown in millions of dollars.

TABLE 4A.4.2-3 PROJECTED OIL PRICES

Fiscal Year	Market Price – U.S. West Coast $/barrel	Wellhead Value $/barrel
2004	$25.28	$18.72
2005	$21.67	$14.99
2006	$22.00	$15.15
2007	$22.00	$15.05
2008	$22.00	$15.01
2009	$22.00	$15.05
2010	$22.00	$14.96
2011	$22.00	$14.77
2012	$22.00	$14.83
2013	$22.00	$14.69
2014	$22.00	$14.53
2015	$22.00	$14.34
2016	$22.00	$14.11
2017	$22.00	$13.87
2018	$22.00	$13.63
2019	$22.00	$13.21
2020	$22.00	$12.97

Source: Alaska Department of Labor. Oil price forecasts used in the State Revenue Forecast, Spring 2003.

Royalty tax payments from within the NPR-A are treated differently from those from other state or federal lands, and Alternative A includes a portion of the ASDP within the boundaries of the NPR-A (CD-5 at least partially and CD-6 and CD-7 entirely). Federal law establishes a requirement that 50 percent of lease sale revenues, royalties, and other revenues would be paid to the State of Alaska. However, that payment is conditional upon the use of the state's share for (a) planning, (b) construction, maintenance, and operation of essential public facilities, and (c) other necessary provisions of public service. The law stipulated further that the State should give priority to use by subdivisions of the state most severely impacted by development of oil and gas leased under the section (ADCED 2003).

In the period between 1987 through 1996, when the program became inactive because of lack of revenue from the NPR-A, $9.7 million was allocated to community projects in the region. With new lease sales in the NPR-A in 1999, the program became active again, providing $31.4 million in grants to communalities for 1999, 2001, and 2002. There are current applications for a total of $53.2 million for projects by the communities of Anaktuvuk Pass, Atqasuk, Barrow, the NSB, Nuiqsut, and Wainwright. During the program, Nuiqsut has received just under $9 million for community projects. The NPRA Impact Mitigation Program provides direct economic support from oil development within the NPR-A to communities within the region.

Property Tax

The property tax for the ASDP would be based on the assessed valuation of the facilities developed on site. The annual levy is based on the full and true value of property taxable under AS 43.56. For production property, the full and true value is based on the replacement cost of a new facility, less depreciation. The depreciation rate is based on the economic life of the proven reserves. Pipeline property is treated differently from production facilities. It is valued on the economic value of the property over the life of the proven reserves. Typically, the economic value is based on the present value of all future income streams from the pipeline.

The state property tax rate is 20 mills. A local tax is levied on the state's assessed value for oil and gas property within a city or borough and is subject to local property tax limitations. The 2002 property tax rate for the NSB was 18.5 mills (ADCED 2003) leaving the state portion of the property tax at 1.5 mills.

The NSB is also heavily dependent upon oil revenue from property taxes. In 2001, 95.44 percent of property taxes received by the NSB came from BPXA, Phillips Alaska, Alaska Pipeline Services Company, Nabors Alaska Drilling, and Halliburton Company (NSB 2001).

The NSB faces a declining property tax base because of depreciation of petroleum-production related facilities that comprise most of the assessed valuation. The real property assessed valuation for the NSB has declined from $11.5 billion in 1992 to 9.4 billion in 2001 (NSB 2001). The ASDP Alternative A would help expand assessed property valuation and resultant taxes to the borough.

An estimate for the potential property tax revenues from Alternative A can be calculated using a unit factor estimate of $0.50 per barrel (ADR 2003b). Using the point estimate of $0.50 per barrel, we can calculate the property tax value from the production figures in Table 4A.4.2-1. The estimated property tax, using the per barrel unit factor, is shown in Table 4A.4.2-4.

TABLE 4A.4.2-4 PROJECTED PROPERTY TAX REVENUES – CPAI DEVELOPMENT PLAN ALTERNATIVE A

Year	CD-3 through CD-7 Daily Production[1]	Estimated Property Tax	
		North Slope Borough	State of Alaska
2007	34,000	$5,739,625	$465,375
2008	34,000	$5,739,625	$465,375
2009	34,000	$5,739,625	$465,375
2010	49,500	$8,356,219	$677,531
2011	45,603	$7,698,356	$624,191
2012	78,227	$13,205,695	$1,070,732
2013	72,388	$12,219,999	$990,811
2014	66,438	$11,215,565	$909,370
2015	58,182	$9,821,849	$796,366
2016	50,483	$8,522,161	$690,986
2017	43,971	$7,422,854	$601,853
2018	38,601	$6,516,331	$528,351
2019	34,151	$5,765,116	$467,442
2020	30,386	$5,129,537	$415,908
2021	27,123	$4,578,701	$371,246
2022	24,316	$4,104,845	$332,825
2023	21,858	$3,689,904	$299,181

Notes:

[1] Daily production in barrels.

This analysis shows NSB revenues derived from the proposed development of CD-3 through CD-7. They would be expected to increase from approximately $5.7 million annually in 2007 when this revenue stream begins to $13.0 million in 2012, when it would peak. It would decline to $3.7 million in 2023, the last year estimated. Incremental revenue to the State of Alaska would be $0.465 million in 2007, rise to approximately $1.1 million in 2012, and then decline to $0.3 million in 2023. These revenues represent an incremental increase approximately 2 percent to 4 percent of total NSB revenues (based on 2001 revenues – See discussion in Section 3.4.2). Increased property tax revenue would represent an incremental increase in tax revenue to the state on the order of a portion of 1 percent.

Capital Expenditures

Indirect economic impacts would result from project capital expenditures. Detailed information on the capital expenditure for the CPAI Development Plan Alternative A is not currently available; however, a gross estimate of labor expenditures for Alternative A of $116.5 million was made (see following section). Oil industry projects are typically composed of 50 percent labor cost and 50 percent materials costs. Assuming that half of the total project expenditure would be labor would suggest that the capital expenditures related to Alternative A might be expected to exceed $100 million. These expenditures would occur over an approximately 20-year period.

Most materials and capital equipment would likely be purchased outside of Alaska and would be shipped to the job site. However, some portion of the total capital expenditures would be made within Alaska, mostly in Anchorage and Fairbanks. Expenditures in Anchorage or Fairbanks might include construction of a module or project supplies. Limited expenditures might be made within Barrow or Nuiqsut. Such expenditures would likely be provision of goods and services to support construction activities**.**

Employment

Project-related employment from CPAI Development Plan Alternative A would consist of construction employment and operations employment. Construction income and earnings would be one of the most easily visible effects of the project. These impacts also are sequentially the first economic impact to be realized. For large remote projects such as the ASDP, as much as half of the total project expense is typically directed to labor costs.

Many of the construction workers hired would need skills and experience in drilling and pipeline construction. Most of the workers would be hired through union halls in Alaska for the respective tasks. However, most of the workers might come from out of state, because Alaska does not have a resident work force with the range of skills necessary. As discussed later in this section, CPAI has had some success in providing employment opportunities for residents of Nuiqsut; however, in total these opportunities reflect a relatively small number of jobs. (See discussion in Section 3.4.1.6 – Population and Employment)

Table 4A.4.2-5 summarizes drilling manpower for CPAI Development Plan Alternative A. Construction crews would be housed at production pads, the Kuparuk Operations Center, or temporary camps. Small temporary camps could also be used during drilling operations.

Manpower requirements reflect a maximum of 60 personnel residing at the temporary drilling camp at each of the four road-connected pads in the CPAI Development Plan. Winter drilling at CD-3 would require an additional 15 people, for 75 personnel at that roadless location.

TABLE 4A.4.2-5 DRILLING MANPOWER REQUIREMENTS

Time Period	CPAI Development Plan Manpower Required
Summer 2004	0
Winter 2004–2005	75
Summer 2005	60
Winter 2005–2006	75
Summer 2006	60
Winter 2006–2007	75
Summer 2007	60
Winter 2007–2008	75
Summer 2008	60
Winter 2008–2009	75
Summer 2009	60
Winter 2009–2010	75
Summer 2010	60
Winter 2010–2011	75

Source: Table 2-3, CPAI 2003n

CPAI estimated that a total of 3,000,000 man-hours would be expended between 2004 and 2010 for construction and operation of CD-3 through CD-7. The total work force is projected to peak at over 500 workers in 2006. Engineering and design work for the alternative are anticipated to require 500,000 man-hours. Offsite fabrication, which could occur in Fairbanks, Anchorage, or Nikiski, is estimated to require 250,000 man-hours (CPAI, RFI #85 response).

The Alaska Department of Labor shows statewide average wages for all oil-related manufacturing of $31.24 for June 2003 (ADOL 2003a). The product of this wage rate and the estimate of 3,000,000 man-hours cited above results in a total project labor expenditure of $93.7 million.

Similarly, based on the average civil engineer wage rate of $32.50 within Alaska for oil-related jobs and the man-hour estimate of 500,000, the projected total labor expenditure for engineering and design is estimated to be $16.2 million. Based on the average Alaska wage rate for plumbers, pipefitters, and steamfitters of $26.51, and the estimate of 250,000 hours for fabrication, the estimated labor expenditure for this category totals $6.6 million (ADOL 2003b).

The specific profile of employment and skill area for Alternative A is not yet available. Typical job skill categories for similar projects include the following: laborers, teamsters, operators, general foremen, welders, welder's helpers, heavy duty mechanics, auto weld technicians, office engineers, office clerks and technicians, truck mechanics, project managers, field engineers, project engineers, office managers, safety managers, fitters, electricians, security guards, medics, and welder repair.

Most construction jobs are likely to be filled by workers from outside the region or from outside Alaska. The current level of participation by residents of the NSB in petroleum-related employment is relatively limited. In the 2000 census, there were 2,990 males and 1,348 females in the workforce for the communities comprising the NSB. The job category of mining, which includes petroleum-related employment, included 33 jobs in 2000, 30 of which were filled by Alaska Native residents of the NSB. There were 207 workers residing in the NSB communities working in construction, 139 of whom were Alaska Natives. Among female workers, there appeared to be very little participation in petroleum-related jobs in 2000 (ADOL 2003c).

Operations personnel for Alternative A would be based at production pads. Anticipated staffing levels were shown in Table 2.3.3-2 (Section 2). There would be 22 jobs associated with operations for CD-3 through CD-7. Total annual operations labor expenditures for these workers are not available.

Section 3 described a number of jobs and economic activity in Nuiqsut as a result of the existing Alpine Development Project. These job opportunities include participation in joint venture companies to provide oilfield services, direct employment, funding of subsistence panel and research jobs, and others. These employment opportunities are important to the residents of the community, particularly given the residents' relatively low opportunity for employment.

Local Economic Activity

A number of economic impacts to Nuiqsut and other local communities were described in Section 3.4.1. The impacts discussed include direct employment and earnings to residents; funding for the Kuukpikmuit Subsistence Oversight Panel, increased economic activity at Nuiqsut businesses such as the Kuukpik Hotel, and revenues to the Nuiqsut Village Corporation resulting from joint-venture business activities in the region.

Without a continuing and increased oil industry, these effects would begin to decline slowly, beginning in 2008. New economy activity represented by the CPAI Development Plan Alternative A is expected to increase the level of local economic activity over the current level, and those impacts would be extended many years into the future.

In addition, because some of the facilities of the CPAI Development Plan Alternative A would be within the NPR-A, the local communities would receive direct funding assistance through the NPR-A Impact Mitigation Program. The expenditures under this program were described in Section 3 and would be substantially expanded under this alternative.

4A.4.2.3 Alternative A – Full Field Development Plan Impacts on Regional Economy

Estimates of the amount and timing of production related to FFD Alternative A were discussed in Section 4A.4.2.2.

Revenues

Royalty and Tax Impacts

The economic effects from royalty and tax payments can be determined only if the specific location relative to BLM-managed lands is known (that is, whether oil is derived from federal or non-federal land). Because the description of FFD is hypothetical, it was assumed that impacts of FFD would be generally proportional to production in each year. In 2012, for example, the full-field production under BLM assumptions is 4.5 times that of the assumptions of the ADR for development of CPAI's proposal. The ratio changes from year to year, but full-field production under BLM assumptions increases over time. In 2023, the full-field production under BLM assumptions is 10 times that of the CPAI's proposal assumptions of the ADR.

Capital Expenditures

There currently are no estimates for capital expenditures for the FFD Alternative A.

Employment

Table 4A.4.2-5 summarizes the drilling manpower requirements for CPAI's proposal. FFD assumes a one-rig drilling program, so manpower intensity would be the same but the duration of drilling activities would increase. The FFD one-rig program would continue an additional 1 to 2 years per additional production pad, depending on whether drilling is in winter only or year-round.

There is currently no estimate available for total project employment for FFD Alternative A.

Local Economic Activity

Increases in employment and income to village corporations from contracts provided during construction and operations are expected to be similar or greater than the levels achieved under CPAI Development Plan Alternative A. However, the portion of tax and royalty revenues and the availability of grants that are proportional to production would be substantially higher under FFD Alternative A.

4A.4.2.4 Alternative A – Summary of Impacts (CPAI and FFD) on Regional Economy

- CPAI Development Plan Alternative A would provide an incremental increase in federal, state, and local tax revenues. This increase would be on the order of 2 to 4 percent (of 2001 revenues) for the NSB. It would be less than 1 percent of state tax revenues. Increased revenues under FFD Alternative A could be 4.5 to 10 times the annual revenue estimated for the CPAI Development Plan, depending on production in any given year.
- The NSB would benefit from the expanded property tax base that would help fund government services to residents.
- The NSB and village corporations also would experience increased economic activity in the region, increased opportunity for direct employment of local residents, and increased opportunity for grants under the NPR-A Impact Mitigation Program. As a result of this program, oil lease sale fees and royalties from the NPR-A have a disproportionately large beneficial effect on communities in the region.
- There could be economic impacts to subsistence harvesting activities from Alternative A resulting from increased travel costs and increased travel times. The more densely developed FFD scenario for Alternative A would likely exacerbate these impacts (see discussion in Section 4A.4.3, Subsistence.).

4A.4.2.5 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Regional Economy

Currently, very few residents of the region obtain employment in the oil industry. Job training, educational funding, and future employment programs could help to mitigate loss of opportunity for participants in the traditional subsistence lifestyle.

4A.4.3 Subsistence

4A.4.3.1 Alternative A – CPAI Development Plan Impacts on Subsistence

Construction Period

Under Alternative A, CPAI proposes to use two gravel mines: the existing ASRC Mine Site and the Clover Potential Gravel Source. Excavation would take place in the winter and involve the use of pneumatic drills, earthmovers, and blasting. The ASRC Mine Site would require an ice bridge across the Colville River. The ASRC Mine Site is located within the current Nuiqsut use area for wolf and wolverine, winter and summer caribou, fish, and moose. The Clover Potential Gravel Source is located within the current Nuiqsut use area for wolf and wolverine, winter caribou, fish, and moose. Barrow residents occasionally use the mine areas for the harvest of winter caribou, wolf, and wolverine, and Anaktuvuk Pass residents occasionally use these areas for the harvest of fish and caribou. Noise, lights, traffic, and blasting during construction at the proposed mines would divert, displace, or both divert and displace caribou (Section 4A.3.4) and furbearers (Section 4A.3.4), resulting in decreased availability of these resources to hunters near these locations. Fish availability in the

areas near the proposed mines would decrease as noise and vibration from traffic and gravel extraction divert fish from their habitats and because changes in water levels in adjacent connected lakes and streams caused by gravel extraction could result in a decline in overwintering fish habitat (Section 4A.3.2.1). A North Slope Inupiat hunter who has observed wildlife displacement associated with gravel pits said,

"These gravel pits that are being used to support these activities, the gravel pits, the geese, when they're migrating from the Lower 48s, from out there, they are now going to these gravel pits. They're not following their usual migration anymore. I watched that first hand also over a period of time. So those animals over there are being displaced, is what I'm saying. And I got to see that firsthand over a period of time." (Frederick Tukle Sr. 2001 Liberty Scoping, Barrow)

The proposed five satellite drilling and production pads would divert key subsistence resources (caribou, wolves, and wolverines) and consequently decrease resource availability in currently used subsistence areas in the vicinity of the five pads. The construction of the proposed production pads would reduce access within current subsistence use areas as hunters avoid construction areas because of perceived regulatory barriers and safety concerns with shooting around industrial development.

Gravel pad placement would affect waterfowl nesting habitat and nesting areas (CD-4, CD-5, CD-6, and CD-7) (Section 4A.3.3). Production pad CD-4 would be located within 1,000 feet of the Nigliq Channel and a subsistence fish camp. The Nigliq Channel area is an important historical and current subsistence use area for fish, waterfowl, and caribou. This area is especially important for the subsistence winter fish harvests (Figures 3.4.3.2-13 and 3.4.3.2-14). The proposed location for CD-6 is within the previously stipulated 3-mile sensitive area around Fish Creek and within the documented winter subsistence use area for caribou, wolf, and wolverine. The Fish Creek area is proportionately the area with the highest use for Nuiqsut's winter harvest of caribou (Figure 3.4.3.2-6), and 25 percent of Nuiqsut's caribou harvest for 1993, 1994–1995, 2001, and 2002 come from the Fish and Judy creeks area (Figure 3.4.3.2-7). Fish Creek is also an important Nuiqsut harvest area for geese (more than 45 percent) (Figure 3.4.3.2-15), and more than half of wolves harvested by Nuiqsut hunters come from the Fish and Judy Creek areas (Figure 3.4.3.2-21). Production pads CD-3 and CD-4 would be within the current Nuiqsut use area for eider, seal, wolf, wolverine, fish, and winter and summer caribou. Production pad CD-4 also would be within the current Nuiqsut use area for moose. Production pads CD-5, CD-6, and CD-7 would be located within the current Nuiqsut use area for wolf, wolverine, and winter caribou. Production pads CD-5 and CD-6 would be located within the current Nuiqsut use area for moose (Figures 3.4.3.2-1 through 3.4.3.2-4, 3.4.3.2-8, 3.4.3.2-17, and 3.4.3.2-23). Frank Long Jr. of Nuiqsut, a hunter and head of the Kuukpik Subsistence Oversight Panel, stated during ASDP scoping, "… in the area that CD-5, 6, and 7, especially 7, is a hunting area where we do our hunting inland and with furbearing animals. And CD-6 is the one that's close to the Fish Creek area which we do fishing during the summer." In short, the proposed production pads would be located in key subsistence harvest areas in both the Fish-Judy Creeks Facility Group and the Colville River Delta Facility Group.

Construction of roads could alter or restrict movements of key subsistence species such as caribou, wolves, and wolverine. Construction of bridges and ice roads could affect the availability of fish in the Nigliq Channel and area lakes by reducing overwintering habitats (Section 4A.3.2.1). The proposed Nigliq Channel bridge is located in a key subsistence harvest area for fish, and construction would occur during the key winter harvest season. As depicted in Figure 3.4.3.2-11, 55 percent of fish are harvested in October. More than half of Nuiqsut's subsistence fish are harvested along the Nigliq Channel (Figure 3.4.3.2-13). Ice roads are also noted for accumulating garbage, which attracts some species.

As one interviewed hunter noted, "People that use the ice road leave trash, and animals eat that trash. Caribou and polar bears—have trash inside of them. Seals—plastic pop rings. Within the last 5 years, on the ice road, [I] see a lot of trash all over." (Stephen R. Braund & Associates 2003a Field Interviews)

Ice roads also have been noted to be grounded to the bottom of waterways, changing the normal patterns of break-up and reducing fish habitat. One resource user described his recent hunting trip by boat: "A few days

ago [late June], the ice was out 7 miles; we followed it to Thetis Island. Usually the ice is out around Thetis Island, but the ice road was intact and it kept the ice from going out. We almost got boxed in." (SRB&A 2003a, Field Interviews)

During pipeline construction, availability of subsistence resources, especially caribou, would be reduced along the construction corridor and hunter access would be reduced as hunters avoid shooting near workers and equipment. Effects from construction are expected to last 2 years and are expected to be primarily local in extent. Pipeline construction would affect local availability of key subsistence resources (caribou, waterfowl, fish, wolves, wolverine, and seals) because of displacement and would occur in seasonal and general use areas for key subsistence resources. Subsistence access would be affected as subsistence users avoid construction areas because of perceived regulatory barriers and safety concerns with shooting around industrial development. Subsistence hunters consequently would travel farther at greater costs and effort. The key resources are harvested during more than one season each year; they have been used for multiple generations, and the affected areas are used for multiple resources each year. Effects from construction would occur in key geographic areas relative to other areas of subsistence availability and would pertain to individual subsistence users, groups of users, and the overall pattern of Nuiqsut subsistence uses.

Operation Period

The operation of the gravel mines would be intermittent following the completion of the construction phase. The mines would be open and gravel stockpiled as needed for maintenance of the pads, roads, airstrips, and boat ramps. The effects of subsequent mine operation would depend on the season and extent of use. Spring and summer use could disturb or deflect waterfowl, fish, and caribou from the area; winter use could deflect caribou, wolf, and wolverine from the area.

The operation of facilities on the gravel pads would have a number of effects on subsistence uses. The gravel pads themselves create habitat for arctic foxes, which could den in the loose gravel. There is little perceived advantage in having more foxes available, however, as stated by elder Bessie Ericklook in 1979.

> "Trapping was abundant east of here. Now, we don't go over because of the oilfield. Just recently, it is known that the foxes are very dirty, discolored, and rabid in that area. Trapping is done elsewhere." (SRB&A 2003b, MMS 1979 [Nuiqsut])

Vibration and noise from operations would deflect terrestrial mammals, fish, and waterfowl from the immediate area and make them less available to subsistence harvesters at those locations. According to interviewed hunters, "The vibration of horizontal drilling bothers animals and makes them afraid. The migration route of the Central Arctic (caribou) herd (CAH) changed because of this." (SRB&A 2003a, Field Interviews)

Section 4A.3.4 describes how caribou at Prudhoe Bay use gravel pads for insect relief. Although the use of gravel pads could improve population levels, it changes the value of the caribou to subsistence users, who view these habituated caribou as contaminated and not behaving correctly. Frank Long Jr. stated in the Nuiqsut ASDP scoping, "We will have the same problem we did in the Prudhoe Bay and the Kuparuk area with our caribou. Right now I call our caribou that are existing around here that don't go nowhere our 'industrial dope addict caribou.' They already sick and nobody's doing anything about them." Sick caribou have been harvested by local hunters, as noted by one interviewed hunter, "I've seen a few sick caribou, with green meat, pus in joints, bare spots. Hard to say what the cause is…" (SRB&A 2003a, Field Interviews). Inupiat hunters prefer fast, healthy caribou, instead of habituated caribou, which are perceived to move slower. One hunter stated, "Fast ones are the healthy ones, they are worth taking home." (SRB&A 2003a, Field Interviews)

Subsistence hunters have expressed a preference for hunting away from industrial activity areas for safety reasons. Therefore, the production pads near the Nigliq Channel and Fish Creek areas would reduce subsistence access to traditionally important subsistence uses at those locations. Isaac Nukapigak noted in the 2003 ASDP scoping in Nuiqsut:

> "The stipulation that's been part of the Northeast Integrated Action Plan EIS where there's seventy-nine stipulations that have been implemented by BLM having a buffer zone in these sensitive—very sensitive area that, you know, lakes and streams, where that's our channel, you know, that's what we depend on to navigate to our subsistence resource to gather." (2003 ASDP Nuiqsut Scoping Transcripts)

Airstrip operation would disturb and temporarily displace subsistence species (caribou and spotted seals) from airstrip and landing areas. According to area studies and scoping testimony, low-altitude flights (helicopter and scientific survey flights) divert subsistence species from air transport corridors and survey transects (see Section 4A.3.4). Nuiqsut mayor Rosemary Ahtuangaruak described the displacements of subsistence species by aircraft and its effect on hunters:

> **"**When I went camping last year, I waited 3 days for the herd, to have a helicopter to divert them away from us. When they were diverted, we went without. We have had to deal with harassment. We had over flights three times while trying to cut the harvest. It is disturbing. The next year we had a helicopter do the same thing, but it was worse. They were carrying a sling going from Alpine to Meltwater, another oilfield. It went right over us three times. The herd was right there and it put us at risk. I had my two young sons with me and it made me very angry. What am I to do when the activities that have been handed down for thousands of years to our people are being changed by the global need for energy?" (Mayor Rosemary Ahtuangaruak 2003 ASDP Scoping, Nuiqsut)

Another Nuiqsut resident made a similar observation:

> **"**These wildlife folk that see it—they've witnessed, I guess they are wildlife folks, that walk in the country and looking at birds and things in the Colville River Delta, maybe the east side, down by Ulumniak (ph), that's next to—not far from the old Nuiqsut site, they're monitoring these birds and go to and fro to these places with a chopper—upsets, disrupts, displaces—perhaps some of their only opportunity to go get their game, especially caribou, in the area are scared and may their run off because of these impediments that arrive are not natural. Naturally, they would walk along the coast where they're at and be able to harvest their caribou." (Ruth Nukapigak 1998 NPR-A Scoping, Nuiqsut)

Referring to the effect of aircraft on wildlife, Nuiqsut residents stated, "Sometimes the aircraft from Alpine chase the caribou up the river," and "Helicopters are flying around when we are doing caribou and geese hunts. Before Alpine, there was complete silence." (SRB&A 2003a, Field Interviews)

Interviewed hunters correlate aerial activity with subsistence resource deflection. One hunter stated, "It varies whether we have a lot of activities going on. When there are a lot of activities going on, we hardly see any or they [caribou] change their migration route. Oil and gas, airplanes, helicopters, bird survey people—airplane, floatplanes. Either there are less caribou or they are changing migration with activities. I don't know which." (SRB&A 2003a, Field Interviews)

Therefore, local hunters report that aircraft operation affects the availability of subsistence resources in usual hunting areas.

Roads during the operational period would affect terrestrial mammals and waterfowl through deflection and habitat loss (See Sections 4A.3.4 and 4.A.3.3). Vehicular traffic, including large trucks hauling cranes and other equipment and road maintenance equipment on access roads and pads, could deflect waterfowl during the operational phase of the applicant's proposed action. Disturbance of waterfowl has been documented most often within 50 meters of roads; however, some disturbance has been reported for birds as far as 150 to 210 meters from roads. Deflection of birds from their usual habitat would affect the availability of birds as a subsistence resource. Waterfowl also would be subjected to disturbances related to aircraft and boat traffic, noise

from facilities, and pedestrian traffic during the summer breeding season, especially during the pre-nesting period. Terrestrial mammals would be disturbed and displaced by vehicle traffic on the roads between CD-1 and CD-4 and CD-2 and CD-7. Activity on the facility pads and airstrips could disturb caribou. Use of the Alternative A roads by local residents in addition to industry would result in higher levels of traffic and increased disturbance and deflection. Inupiat hunters have observed the effect of roads and pipelines in Prudhoe Bay, Kuparuk, and other locations, and one hunter summarized these observations by saying,

> "The Prudhoe Bay spine road is like a gate: the caribou get corralled in the area by roads, traffic, pipeline reflections, and staging. They get confused. They are scared to cross the pipelines, they are as scary as a grizzly bear would be to the animals. Some caribou are driven south, others are driven to the coast. If more roads are built, then there will be more blockage of the caribou. They will get stuck in the oil fields like a corral. The ones stuck south stay south and get little insect relief, while those going north get to the beach and the coast and get relief." (SRB&A 2003a, Field Interviews)

Leonard Lampe, president of the Native Village of Nuiqsut, expressed his belief of the effect of increased traffic on caribou, when he said,

> **"**I believe because of the increase as well on the Dalton Highway, the increase of traffic in the Prudhoe Bay, Kuparuk area, also the near-shore development of North Star, all the activity happening at North Star area as well as Endicott, I feel cause of all the traffic between Fairbanks and Endicott, much more increased traffic that caribou are hesitant to cross the main roads because of all the traffic. I feel that has something to do with the caribou migration as well, because of increased traffic as well as air, not just ground, as well as air, seismic operations happening all over." (Leonard Lampe 1997 NPR-A Scoping, Nuiqsut)

Ice roads built and used during operations would continue to draw off water from area lakes. Water removal from lakes could potentially affect the fish populations, especially in late winter when water volumes are lowest under the ice cover and water quality and dissolved oxygen concentrations are low. Excessive water withdrawal or disturbance at this time could potentially eliminate fish populations in these lakes (Section 4A3.2). The elimination of lake fish populations would affect availability of fish as a subsistence resource in key use areas. A Barrow resident expressed the importance of lakes to the Inupiat when he said,

> "These deep lakes are very crucial to us. And, those are the prime targets that you are looking at for your water source. Because, in the shallow areas, the fish don't over-winter in the shallow lakes. They over-winter in the deep water, because they freeze to the bottom of the lake six to seven feet sometimes in the course of a year." (Arnold Brower Jr. 1982, NPR-A Scoping, Barrow)

The bridge over the Nigliq Channel and other smaller bridges would have an effect on subsistence during operation similar to that for construction. Pilings in the channel would have the potential to change the distribution of river sediments and debris, causing transportation problems as people in boats try to pass under the bridge while fishing in the channel or en route to other harvest locations. As shown in Figure 3.4.3.2-10, fishing effort in the Nigliq Channel sites in net-days is dramatically higher than fishing effort in the Colville River outer delta and main channel sites, further emphasizing the importance of fishing on the channel. Seals could be disturbed if they are hauled out in the area during high-traffic periods as noted in 4A.3.4. Residents are also concerned about the bridge being washed out, especially if the pipeline, as in this alternative, goes across the channel on the bridge. Isaac Nukapigak in the 2003 ASDP scoping testimony for Nuiqsut observed, "The bridge, you know, that's another thing that I, myself, also be very concerned about because that is our transportation corridor that we utilize to go out and hunt our fish and our furbearers, you know, marine mammals hunting." (2003 ASDP Nuiqsut Scoping Transcripts)

Should the channel be made non-navigable to small boats because of siltation, the difficulty of accessing resources by boat along the channel would increase. These resources include marine mammals, waterfowl, fish, and caribou, all of which are harvested in large proportion by boat in or near the Nigliq Channel, Nigliq Delta, and Fish and Judy creeks.

Under Alternative A, a new pipeline would be in operation between CD-1 and the production pads. Pipelines would be a minimum of 5 feet above the tundra and would cross several drainages. Although caribou will cross under pipelines elevated at least 5 feet, they more readily cross under higher pipelines. Crossing of the road and pipeline combination during the winter could alter caribou movement because of reduced clearance or the creation of a visual barrier, especially along east-west oriented pipelines such as the pipeline segment between CD-5 and CD-6. Although the proposed pads and pipelines would alter caribou movement in industrial activity areas, they would not affect the overall caribou population and would result in only minor changes in herd distribution. However, at the local scale, where hunters have customary hunting areas, minor shifts in caribou availability can affect subsistence users' access to caribou. The caribou could not be where the hunter usually harvests them in the number and condition that hunters would anticipate without the industrial activity.

Interviews (SRB&A 2003a, Field Interviews), scoping comments, and public testimony (including scoping for Point Thomson, ASDP, and several hearings for NPR-A) have indicated that hunters believe that pipelines deflect both caribou and hunters as well as affect the direction of herd movement and size. A North Slope Inupiat expressed this view when he said,

> "If you—with these animals already being displaced, now it's starting to be from Cross Island to Teshekpuk that I've noticed these animals, over a period of time, going away. And then there—right now, we're having a real hard time 'cause of the pipelines from Oliktok to Kuparuk. There's a 13-mile pipeline that's about three-feet high that, itself, already has displaced our caribous in the village. We already had a hard time with the geese already going away from these facilities. I watched these firsthand over a 15-year period, and this is what got me to move from Nuiqsut to Barrow, is observing these oil activities that's occurring. In addition to this 13-mile pipeline I'm talking about, with the new discoveries that already occurred south of the Kuparuk field, we have about another over 10-mile pipeline again, that that's three feet high. And then you look at the caribous when they—when they're trying to get to the ocean side, they're always migrating, keeping away from these bugs and everything. They stop right at Oliktok. They—we don't see those anymore, these thousands of migrating caribous. Now, at the same time, we're seeing hundreds." (Frederick Tukle Sr. 2001 Liberty Scoping, Barrow)

Subsistence users do not believe that a minimum pipeline height of 5 feet is adequate for caribou passage, unless something, such as insects or predators, is motivating the caribou. Several Nuiqsut hunters related the following scenario:

> **"**Caribou follow the pipeline from Meltwater; caribou follow it up and go around. They follow it until it stops and start to follow it down [to get around it]. Some caribou have a hard time crossing the Meltwater pipeline. Some of pipeline is too low—four to five feet; it needs to be seven to eight feet for caribou to get to calving grounds and the ocean where it is cooler." (SRB&A 2003a)

One Nuiqsut resident stated,

> **"**We don't go down that way to caribou hunt because of the pipeline in there; it is a big obstruction. A lot of times they [caribou] are on the pipeline side and we don't shoot. They [industry] tell us it is OK to shoot, but common sense says not to shoot into pipeline!" (SRB&A 2003a)

Pipelines hinder subsistence access in two ways: subsistence users cannot cross the pipelines if snow conditions have caused the height of the pipeline to be too low and subsistence users often must follow pipelines for some distance to find adequate clearance for passage when traveling by all-terrain vehicles, snowmobiles, or boats (1997 NPR-A Scoping Nuiqsut) and subsistence users' reluctance to shoot around pipelines. A Nuiqsut hunter expressed the difficulty of crossing pipelines:

> "Well the recommendation from the community for outside development was either bury a good portion of the pipeline or elevate it high enough. I mean 5 feet is not adequate in the wintertime. There's no way that you can cross, even with a snowmobile. You have to follow the pipeline in order to get to an area where you can you can finally cross it. It could take you an additional 10 miles of the quickest route that you might be able to come home on, but because of the height of the pipeline and the snowdrifts, that makes it that much harder, and I do think that the caribou have that same problem as like we do." Morkill (BLM employee), commented: "So it's a barrier to the people too." (Isaac Nukapigak 1997 NPR-A Scoping, Nuiqsut)

Subsistence users carefully observe caribou reactions to pipelines, and one hunter stated, "Some [caribou] get used to pipelines, but it takes years. Shiny pipes and pipes that vibrate feel like a living thing to the caribou and it scares them." (SRB&A 2003a, Field Interviews)

Other hunters observed changes in the Nuiqsut area in response to existing development, noting that "Most caribou don't cross Nigliq to Fish Creek anymore. There is noise, activity, traffic, and pipelines." (SRB&A 2003a, Field Interviews)

Hunters believe that caribou could also be traveling in smaller herds because of issues with crossing pipelines. One hunter observed,

> "Caribou movement patterns have changed. The herd splits along the pipeline where they used to go straight through, and they congregate in smaller groups spread further apart. Main parts of the herd split either north or south of Alpine, all trying to head towards insect relief." (SRB&A 2003a, Field Interviews)

In summary, industrial development in the Fish and Judy creeks and Colville River Delta areas would reduce the availability of and access to more than half of the harvest of fish, caribou, wolves, wolverines, geese, and eiders at Nuiqsut. Subsistence harvests would not be reduced to the same extent, but subsistence access would be affected as subsistence users avoid industrial areas because of perceived regulatory barriers and safety concerns with shooting around industrial development. To avoid industrial areas, hunters would hunt elsewhere and would travel farther at greater cost and effort. Currently harvest locations are based on local knowledge of resources and their abundance at traditional harvest areas. Moving to another area to avoid development means harvesters would more heavily use areas with presumably fewer and less densely distributed subsistence resources. These changes to subsistence use patterns would require increased investments in time, money, fuel, and equipment. It is likely that Nuiqsut hunters would not have the same rate of harvest success if access to these traditionally used areas is altered. These effects would last for the life of the applicant's proposed action (30 years); in other words, for multiple hunter generations. The key resources in this area are harvested during more than one season each year; they have been used for multiple generations; and the affected areas are used for multiple resources each year. Effects of the applicant's proposed action would occur in key geographic areas relative to other areas of subsistence availability and would pertain to individual subsistence users, groups of users, and the overall pattern of Nuiqsut subsistence uses.

4A.4.3.2 Alternative A – FFD Plan Impacts on Subsistence

Effects caused by the FFD scenario are analyzed in a more general way than those for the CPAI Development Plan because of the hypothetical nature of the scenario. This assessment addresses the potential effects to sub

sistence uses of 24 locations (2 processing facilities and 22 production pads). For assessment of effects to subsistence from the FFD scenario, the Plan Area is divided into groups: the Colville River Delta Facility Group, the Fish-Judy Creeks Facility Group, and the Kalikpik-Kogru Rivers Facility Group. The Alternative A FFD scenario is discussed in Section 2.4.1.2 and shown in 2.4.1.2-1.

Colville River Delta Facility Group

Subsistence uses are especially concentrated in the Nigliq Channel and the main Colville River channel. Forty-one percent of Nuiqsut's caribou harvest came from this area (Section 3.4.3), primarily in summer. The Colville River Delta is an important fish harvest area in spring, summer, and fall, with October the primary harvest month. Seals are harvested in the Colville River Delta in spring, summer, and fall, and the area accounts for 28 percent of the Nuiqsut eider harvest, 16 percent of the geese harvest, and 35 percent of the wolverine harvest. Several cabins and subsistence camps in the Colville River Delta (both the Nigliq and main channels) serve as a base for subsistence activities such as fishing. Subsistence user comments reflect this usage:

> **"**All the way down to the mouth of Nagaluk (ph) they put their nets. It's true that during the summer, that (Inupiaq), they put nets there, yes, but for whitefish, this is – this Nagaluk (ph) River is what they use the most. And then if they cannot do it there when the bay opens up, they go through the fish screen and use that area also for fishing. The Ublutuoch River which is really close from here and it bends like crazy like a snake, there's no fishing there. They don't fish there. It's the Fish Creek area is what they use…" (Nelson Ahvakana 1998 NPR-A, Nuiqsut)

Nuiqsut residents associate existing Alpine development with reduced fish harvests in the Colville River Delta. One resident said,

> **"**I pull nets for cisco in October north of Nuiqsut on the Nigeluk channel. Fishing has slowed down since Alpine went online. I don't even bother to fish much unless other people are getting a lot because the effort is not worth the gas money I have to spend." (SRB&A 2003a, Field Interviews)

Development in the Colville River Delta Facility Group area would affect current subsistence use of eider and geese, berries, seal, wolf, wolverine, fish, winter and summer caribou, and moose. The FFD of the Colville River Delta area would have the same effect on subsistence uses as the Alternative A CPAI Development Plan, but the effect on subsistence use would increase as development and industrial activity increases.

This area also is used occasionally by residents of Barrow and Anaktuvuk Pass for the harvest of subsistence resources such as fish, caribou, wolf, and wolverine, and, consequently, subsistence of these communities could be affected, though to a much lower level than Nuiqsut's subsistence use. Anaktuvuk Pass people could fish in the Colville River Delta when visiting relatives in Nuiqsut. Several Barrow families have relatives living in Nuiqsut, and people move back and forth between the two communities. Barrow residents have ancestral ties to areas between Barrow and Nuiqsut, and Barrow residents continue to return to those areas for subsistence activities. Barrow hunters hunt in the area for caribou, moose, and furbearers, primarily wolf and wolverine, in recent times. The Colville River Delta is on the eastern edge of Barrow's subsistence use area. There is no known current use of the Colville River Delta area by Atqasuk residents.

Fish-Judy Creeks Facility Group

The Fish and Judy creeks area is a heavy subsistence use area for Nuiqsut, as noted 20 years ago in a Barrow hearing, "On your briefs, here, you have failed to point out the area of Fish Creek, one of the most important rivers that we have for the people of Nuiqsut. As a subsistence area, it is hunted and fished very heavily." (Sam Taalak 1982, NPR-A Testimony, Barrow)

Fishing occurs in summer and winter; caribou are harvested year-round (primarily in summer by using boats); and the area accounts for 25 percent of the Nuiqsut caribou harvest, 63 percent of the geese harvest, 55 percent of the wolf harvest, and 15 percent of the wolverine harvest. Hunters harvest wolf and wolverine in the November-to-April time period with the use of snowmobiles. Moose hunting (August) by boat and berry picking (fall) also occurs in the area. Nuiqsut residents have subsistence cabins, camp sites, drying racks, and tent platforms in this area and use the cabins and camps as a base for conducting several subsistence activities at the same time (fish and caribou in summer and fall and berry picking in fall near camps and cabins). The camp sites and cabin are shared among family and friends, and their use is traced back several generations by family. People know and value the history of the camps and cabins, including a new structure on an old site. Hunters noted that the elders located these cabins and camps in strategic places where multiple resources are available.

Development in the Fish-Judy Creeks Facility Group area would affect current subsistence use of geese, berries, wolf, wolverine, fish, winter and summer caribou, and moose. The FFD of the Fish and Judy creeks area would have the same effect on subsistence uses as the Alternative A CPAI Development Plan, but the effect on subsistence use would increase as development and industrial activity increases. The Fish and Judy creeks area is an important Nuiqsut subsistence use area for key subsistence resources.

This area is also used by residents of other communities for the harvest of subsistence resources such as fish, caribou, wolf, and wolverine, though the impact to their subsistence use would be less than that for the residents of Nuiqsut. Barrow hunters occasionally use the Fish and Judy creeks area for caribou, wolf, wolverine, and fox. The hunters usually travel in winter by snowmobile and make use of cabins and camps near Teshekpuk Lake and along the Ikpikpuk and Chipp Rivers as a base for snowmobile travel. Anaktuvuk Pass people also make periodic subsistence use of the Fish and Judy Creeks area. These uses are primarily associated with caribou harvest failures at Anaktuvuk Pass and when visiting relatives in Nuiqsut. To the extent that the FFD Plan affects Nuiqsut harvest patterns, it could affect sharing, trading, and gifting with Anaktuvuk Pass residents, and it could reduce an emergency reserve hunting option for Anaktuvuk Pass. In addition, Nuiqsut hunters could go farther south for furs and caribou, thus competing with Anaktuvuk Pass hunters, or farther west, thus competing with Barrow and Atqasuk hunters. Atqasuk hunters make occasional use of the Fish and Judy creeks area. This use is primarily in winter by snowmobile for wolf and wolverine, with incidental harvest of caribou. Furbearer hunting requires a large travel and hunting area, and with development, hunters could travel farther and enter the traditional territory of other communities.

Kalikpik-Kogru Rivers Facility Group

The Kalikpik and Kogru rivers area is less important as a Nuiqsut subsistence use area for key subsistence resources than are the Colville River Delta and Fish and Judy creeks areas. However, Nuiqsut subsistence harvesters use the Kalikpik and Kogru rivers area for caribou in summer and winter if they are not found closer to the community, for geese in spring, wolf and wolverine in winter, fish, berries, and eider and seal hunting trips. There are two reported subsistence camps in the Kalikpik and Kogru rivers area. It is possible that additional camps exist in this area.

Development in the Kalikpik-Kogru Rivers Facility Group area would affect current Nuiqsut subsistence use of eiders, geese, berries, wolf, wolverine, fish, and winter and summer caribou. The FFD of the Kalikpik and Kogru rivers area would have the same effect on subsistence uses as Alternative A CPAI Development Plan, but the effect on subsistence use would increase as development and industrial activity increases.

The Kalikpik and Kogru rivers area is occasionally used by residents of other communities for the harvest of subsistence resources, including caribou, wolf, and wolverine. Barrow hunters occasionally use the area for caribou if they are not found closer to Barrow. The Kalikpik and Kogru rivers area is a historical subsistence use area for several Barrow families. Atqasuk hunters occasionally use the Kalikpik and Kogru rivers area for wolf and wolverine, primarily in winter by snowmobile. This area is “homeland” for several families. In the past, they traveled to this area in summer by boat for caribou, waterfowl, and fish. There is no known current use of the Kalikpik and Kogru rivers area by Anaktuvuk Pass residents.

4A.4.3.3 Alternative A – Summary of Impacts (CPAI and FFD) on Subsistence

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

The FFD would affect key subsistence resources (caribou, fish, waterfowl, wolf, wolverine, and geese) and would occur in seasonal and concentrated subsistence use areas (the Colville River Delta and the Fish and Judy creeks area) for these key subsistence resources. Nuiqsut residents, as well as residents of other North Slope communities, have harvested and used resources in these specific areas for multiple generations and currently harvest multiple resources during several seasons each year in these areas. Effects from construction and operation would occur in key geographic areas relative to other areas of subsistence availability and would pertain to Nuiqsut individual subsistence users, groups of users, and the overall pattern of community subsistence uses. Competition for key resources among Nuiqsut, Anaktuvuk Pass, Barrow, and Atqasuk would increase if Nuiqsut hunters expand from traditional subsistence use areas close to Nuiqsut to farther outlying areas.

4A.4.3.4 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Subsistence

The following mitigation measures should be considered:

1. To the degree possible, pipeline should be buried to avoid creating barriers to caribou. In particular, pipeline sections should be buried between CD-2 and CD-7 to increase crossing success. (See potential mitigation measure discussion in 4a.3.4.1.)

2. Where burial is not possible, pipelines should be elevated more than 5 feet (e.g., 7 feet) to allow unimpeded crossings by caribou

3. Establish a committee of local subsistence users, agency personnel, and CPAI. The committee could meet on a regular basis (such as quarterly or semiannually) and serve as a vehicle to accomplish the following:

    - Provide information about CPAI's development in the ASDP area to communities and interested subsistence users
    - Identify community and user concerns, including ways in which oil development and subsistence uses could conflict
    - Identify topics for research, develop research plans, and oversee research implementation
    - Review data and identify options for resolving these issues
    - Establish an implementation plan to resolve issues
    - Work to resolve the issues in a mutually satisfactory manner

4. Consider FFD in phases such that development of new pads would occur in concert with decommissioning of early development of CPAI.

4A.4.4 Environmental Justice

Evaluation of the demographic characteristics of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut in Section 3.4.4 found that the populations of each of these communities qualified as minority populations and require evaluation for disproportionate impacts.

Disproportionate impacts under the guidelines for environmental justice evaluations are circumstances where direct and indirect project impacts could affect minority or low-income population groups to a greater extent than the general population. If such disproportionate impacts are found to occur then mitigation measures are identified that reduce, avoid, or eliminate these impacts.

The evaluation of disproportionate impacts normally occurs in a circumstance where a number of diverse population groups could be impacted by a proposed project that is in or near a major urban center. The evaluation seeks to determine if the minority or low-income groups among all of the affected groups are affected to a greater degree. In this case, potentially affected North Slope residents live in communities that are from 57 to 94 percent minority. Thus, impacts caused by the proposed CPAI development or FFD that are likely to impact residents in the Plan Area are also likely to be disproportionate impacts under Environmental Justice criteria. This does not mean all project impacts are disproportionate impacts; only those that would directly or indirectly affect North Slope residents would be considered disproportionate impacts.

4A.4.4.1 Alternative A – Disproportionate Impacts (CPAI and FFD) on Environmental Justice

The impacts identified in each resource area have been reviewed to determine if they are also "disproportionate impacts" to local residents, especially in Nuiqsut. These impacts have been listed in Table 4A.4.4-1 "Alternative A – Potential Disproportionate Impacts. Within this table, both direct and indirect impacts were identified using the following criteria:

- Direct Impacts—have a direct impact on identified minority or low-income populations; impacts would be expected to directly affect the health, welfare, and cultural stability of the affected population. An example would be contamination of a resource such as water used directly by the affected population.
- Indirect Impacts—impacts on the viability or availability of resources essential for daily use of minority or low-income populations. As example might be environmental contamination that causes increased disease or contamination of fish or animals used in the daily diet. The contamination is an indirect impact.

Impacts to resources that do not have a direct or indirect linkage as described above are noted as "none identified" in Table 4A.4.4-1.

TABLE 4A.4.4-1 ALTERNATIVE A – POTENTIAL DISPROPORTIONATE IMPACTS

Resource Category	Alternative A – CPAI Development Plan		FFD	Project Features, Procedures, and Mitigation
	Direct Impacts	Indirect Impacts		
Spills	Spills could impact water quality and wildlife affecting subsistence harvest.	Spills could impact water quality and wildlife affecting subsistence harvest.	Same as Alternative A-CPAI	See Section 4.4.5: Spill prevention, detection, and cleanup measures.
PHYSICAL				
Terrestrial	None Identified	None Identified		
Aquatic	None Identified	To the extent that impacts to water quality during construction could impact water quality subsistence resources and subsistence harvest could be impacted.	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.2.2: Proper disposal of wastes. Facility design to minimize erosion. Construction during winter. BMPs during construction and operation.
Atmospheric - Environmental	Potential increase in PM emissions; if concentrations in Nuiqsut increase potential health impacts.	To the extent that aircraft noise deflects subsistence resources subsistence harvest activities could be disrupted.	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.2.3,: Continue monitoring at Nuiqsut. Avoid aircraft operations near subsistence harvest activities.
BIOLOGICAL				
Terrestrial Vegetation & Wetland	None Identified	To the extent that impacts to wetlands affect subsistence resources, impacts to subsistence harvest could result.	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.3.2,: Minimize disturbance to wetlands and permafrost.

TABLE 4A.4.4-1 ALTERNATIVE A – POTENTIAL DISPROPORTIONATE IMPACTS (cont'd)

Resource Category	Alternative A – CPAI Development Plan		FFD	Project Features, Procedures, and Mitigation
	Direct Impacts	Indirect Impacts		
Fish	None identified	To the extent that impacts to abundance, distribution, and health of subsistence species occurs, subsistence harvest could be affected.	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.3.3: Avoid impacts to surface water bodies. Develop gravel extraction sites to avoid fish over-wintering and spawning areas. Design standards for river/stream crossings. Proper scheduling and control of water withdrawals.
Birds	None identified	To the extent that impacts to abundance, distribution, and health of subsistence species occurs, subsistence harvest could be affected. Impacts to abundance and distribution could affect subsistence harvest. (See discussion 4A.3.4)	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.3.4: Measures to limit project personnel from bird use areas. Measures to reduce disturbance during nesting and rearing.
Spills	Spills could impact water quality and wildlife affecting subsistence harvest.	Spills could impact water quality and wildlife affecting subsistence harvest.	Same as Alternative A-CPAI	See Section 4.4.5: Spill prevention, detection, and cleanup measures.

TABLE 4A.4.4-1 ALTERNATIVE A – POTENTIAL DISPROPORTIONATE IMPACTS (cont'd)

Resource Category	Alternative A – CPAI Development Plan		FFD	Project Features, Procedures, and Mitigation
Mammals	None identified	To the extent that impacts to abundance, distribution, and health of subsistence species occurs, subsistence harvest could be affected. Impacts to abundance and distribution could affect subsistence harvest. (See discussion 4A.3.5)	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.4.5: Measures to protect predators. Design criteria to minimize impacts on herbivore movement in the Plan Area. Selective controls on the movement of vehicles.
Threatened & Endangered Species	None identified	To the extent that impacts to abundance, distribution, and health of subsistence species occurs, subsistence harvest could be affected. Impacts to abundance and distribution could affect subsistence harvest.	Same types of potential impacts as Alternative A-CPAI; increased potential due to larger development area.	See Section 4A.3.6: Measures to limit project personnel from bird use areas. Measures to reduce disturbance during nesting and rearing.
Socio-Cultural	To the extent that income benefits accrue to local residents, expendable income is increased.	See "Subsistence Harvest & Use"	Same as those identified under Alternative A - CPAI	See Subsistence harvest and Use below.
Regional Economy	Revenues from oil production to NSB and village corporations.	None identified	Same as those identified under Alternative A - CPAI	Mitigation not required

TABLE 4A.4.4-1 ALTERNATIVE A – POTENTIAL DISPROPORTIONATE IMPACTS (cont'd)

Resource Category	Alternative A – CPAI Development Plan		FFD	Project Features, Procedures, and Mitigation
Subsistence Harvest & Use	Displacement and avoidance of subsistence resources could affect subsistence harvest.	Impacts to subsistence harvest could affect community social organization, health, and welfare.	Same as those identified under Alternative A - CPAI	See Section 4A.4.3; Prohibit company workers from hunting/fishing in Plan Area. Establish community, industry, agency coordination group to identify address specific project subsistence effects.
Cultural Resources	None identified	Loss of cultural resources from construction could impact maintenance of cultural traditions.	Same as those identified under Alternative A - CPAI	See Section 4A.4.5; Maintain buffers around known resource sites. Review ice road routes prior to use.
Land Use & Coastal Zone	None identified	None identified		
Recreation	None identified	None identified		
Visual	None identified	None identified		
Transportation	None identified	None identified		

4A.4.4.2 Alternative A – Summary of Impacts (CPAI and FFD) on Environmental Justice

Table 4A.4.4-1 shows direct and indirect impacts under Alternative A – CPAI Development Plan and impacts under Alternative A – FFD. The most prevalent impacts found are the potential direct and indirect impacts related to subsistence harvest and use. Other impacts identified as potentially disproportionate include spill impacts, potential water quality, air quality, and aircraft noise impacts.

Impacts to subsistence harvest and use would arise from impacts to the availability of subsistence species in traditional use areas or a decrease in subsistence hunting success. The reduction in subsistence hunting success in turn reduces the availability of Native foods to the community. Since the Native community is the only community that depends to a significant degree on Native foods, this impact, to the extent that it occurs, falls disproportionately on the Native population. Also, as discussed in Section 4A.4.3, displacement of subsistence hunters from traditional subsistence use areas by oil industry facilities also means greater time spent traveling longer distances to other subsistence use areas. It could also mean that local hunters from Nuiqsut could come in competition with hunters from other villages when they use the same traditional subsistence use areas.

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

As discussed in the water quality section (see Section 4A.2.2), impacts to water quality can occur as a result of spills or construction-induced erosion.

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

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

4A.4.4.3 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Environmental Justice

Table 4A.4.4.1 summarizes project features, procedures, and potential mitigation measures that have been identified for each resource with potentially disproportionate impacts. The items listed in this table are summaries of the more detailed descriptions given in the resource impacts sections. It should be noted that the impacts identified for minority and low-income populations do not consider the application of potential mitigation; thus, the residual impacts that would occur after mitigation are not known. To the extent that the application of the identified potential mitigation measures do not reduce or avoid the impacts identified, some disproportionate impacts to minority and low-income populations would occur.

4A.4.5 Cultural Resources

This section discusses locations of cultural resources in relation to Alternative A facilities and actions and the direct and indirect impacts to the resources likely to be affected by the construction and operation of the proposed project alternative. Indirect effects on cultural resources could include increased access to and close proximity of project components to culturally sensitive areas. Under Alternative A, known cultural resources are within 1 mile of various components.

4A.4.5.1 Alternative A – CPAI Development Plan Impacts on Cultural Resources

Construction and operation of CPAI's proposed Alternative A would occur in the vicinity of known cultural resources. For proposed satellite site CD-3, the nearest cultural resource is HAR-052 (Table 3.4.5-2), which contains a tent ring or sod house foundation and is approximately 1 mile east of the production pad and approximately 1/2 mile east of the proposed airstrip. Construction and operation of the proposed CD-3 production pad would have negligible direct and indirect effects on known cultural resources.

In the surrounding area of proposed pad CD-4, according to NSB TLUI data, one documented cultural resource from the first half of the twentieth century, TLUIHAR-083 (HAR-156) (Table 3.4.5-2), is less than 1/4 mile (approximately 625 feet) west of the proposed rights-of-way (ROW). However, the AHRS states that this site is located approximately 1/2 mile west of the proposed ROW; thus, the nearest cultural resource to CD-4 is TLUIHAR-082 (Table 3.4.5-2), which is currently undescribed and is less than 1/4 mile (approximately 1,100 feet) from the production pad. Direct effects to known cultural resources could include damage to or destruction of the resource during construction of the proposed production pad. Indirect effects could include damage to the resource caused by erosion, traffic, or looting. The integrity of unknown subsurface, surface, and aboveground cultural resources could be significantly affected by construction activities**,** though these impacts could be avoided through consultation as required under Section 106 of the NHPA.

As yet undocumented TLUIHAR-087 (Table 3.4.5-2) is less than 1 mile north of the proposed pipeline ROW constructed between CD-6 and CD-5. No documented cultural resources are in the immediate vicinity of this alternative's pads, roads, and pipelines west of the Nigliq Channel. CPAI's development project west of the channel could have negligible direct or indirect effects on known cultural resources.

The nearest documented cultural resource to the ASRC Mine Site is HAR-055, which is less than 1/4 mile northwest of the gravel mine. There are no documented cultural resources in the vicinity of the Clover Site. No direct or indirect effect on known cultural resources would occur from the construction and operation of the existing ASRC Mine site or the proposed Clover Site gravel mine. However, the construction of these gravel mines would involve significant ground-disturbing activities, which could affect unknown surface and subsurface cultural resources. As described in Section 2, ice roads and pads would be developed for transporting gravel from the gravel mines to the production pads**,** as well as in support of construction, drilling, and operations at CD-3. These ice roads could affect unknown surface or aboveground cultural resources.

4A.4.5.2 Alternative A – FFD Plan Impacts on Cultural Resources

Impacts to cultural resources also could occur under the FFD alternative, which includes 22 hypothetical production pads and 2 hypothetical processing facilities in addition to the five pads proposed under CPAI Alternative A.

The locations of a hypothetical pad, pad footprint, roads, airstrips, ROWs, or pipeline within 1/4 mile of a cultural resource could result in direct and indirect effects to cultural resources. Impacts resulting

from construction and operation of these FFD facilities could include damage to or destruction of the resource during construction or damage to the resource caused by erosion, traffic, or looting. Impacts to cultural resources for the FFD Alternative are discussed by facility groups of the Plan Area in the following sections.

Colville River Delta Facility Group

There are nine known cultural resource sites in this facility group. These resources could be affected if proposed facilities were constructed in these locations. For example, if hypothetical production pad CD-21 were placed over HAR-008 and HAR-160, which are in the area designated for CD-21, the cultural value of these two sites could be destroyed. Similarly, there is one cultural resource TLUI-86 in the area identified for proposed CD-20, two cultural resource sites (TLUIHAR-084 [HAR-169] and HAR-054) in the area identified for proposed CD-12, and four documented cultural resources (TLUIHAR-077, TLUIHAR-079, HAR-158 and TLUI-61) in the area identified for proposed CD-15. These sites and other cultural sites in the facility group, however, are small and, through Section 106 consultation, it is anticipated that construction impacts could be avoided. No documented cultural resources are in the immediate vicinity of the CD-11, CD-14, and CD-19 production pads.

Fish-Judy Creeks Facility Group

There are seven known cultural resource sites in this facility group. These resources could be affected if proposed facilities were constructed in these locations. There is one cultural resource, HAR-044, in the area identified for proposed CD-10, one cultural resource (TLUI-54) in the area identified for proposed CD-8, one cultural resource (TLUI-78) in the area identified for proposed CD-9, and four cultural resources (HAR-038, HAR-39, HAR-053, and TLUIHAR-041) in the area identified for the proposed APF-2 processing facility. In addition, the CD-18 hypothetical production pad, northwest of Ocean Point, lies in an area of the Colville River Delta that contains many cultural resources and paleontological sites. No documented cultural resources are in the immediate vicinity of the CD-13, CD-16, CD-17, CD-18, CD-22, CD-23, CD-24, and CD-26 production pads. Through Section 106 consultation, it is anticipated that construction impacts could be avoided to the known cultural sites.

Kalikpik-Kogru Rivers Facility Group

There are ten known cultural resource sites in the Kalikpik-Kogru Rivers Facility Group. These resources could be affected if proposed facilities were constructed in these locations. There are six cultural resources (HAR-002, HAR-014, HAR-025, TLUIHAR-059, TLUIHAR-060, and TLUIHAR-061 [HAR-007]) in the area identified for proposed CD-29, one cultural resource (TLUIHAR-062) identified in the area approximately 3/4 mile from the proposed pipeline/road ROW between CD-28 and CD-29, and three cultural resources (HAR-009, HAR-048, and HAR-049) within 1 mile of the proposed pipeline/road ROW between CD-27 and APF-3. Through Section 106 consultation, it is anticipated that construction and operation impacts would be avoided. No documented cultural resources are in the immediate vicinity of the proposed CD-25, CD-27, and CD-28 production pads and the APF-3 processing facility.

4A.4.5.3 4A.4.Alternative A – Summary of Impacts (CPAI and FFD) on Cultural Resources

Under Alternative A (CPAI Development Plan), cultural resources are situated in the vicinity of the production pads, the road/pipeline ROW, and the ASRC Mine Site. Under Alternative A (FFD), cultural resources are located in each of the three facility groups and the ROWs. Any project facility or pad within 1/4 mile of a cultural resource could result in direct effects including damage to or destruction of the resource during construction of the proposed well pad**,** though construction impacts—at least to known cultural resources—could be avoided through section 106 consultation. Under Alternative A of the CPAI Development Plan, one cultural resource (TLUIHAR-082) is less than 1/4 mile

from the CD-4 production pad, and one cultural resource (HAR-055) is less than 1/4 mile from the ASRC Mine Site. Under Alternative A FFD, cultural resources are within the affected areas of production pads (CD-12, CD-15, CD-20, and CD-21) and ROWs (CD-15 to CD-13) in the Colville River Delta Facility group; production pads (CD-8, CD-9, CD-10 and CD-18) and the processing facility (APF-2) in the Fish-Judy Creeks Facility Group; and a production pad (CD-29) and ROWs (CD-28 to CD-29 and CD-27 to APF-3) in the Kalikpik-Kogru Rivers Facility Group. The CD-15 to CD-13 ROW extends through the village of Nuiqsut (TLUI-61), and one cultural resource (TLUIHAR-062) is less than 1/4 mile from the CD-28 to CD-29 ROW. Indirect effects could include damage to the resource caused by inadvertent oil spills, subsequent cleanup activities or looting. The integrity of subsurface, surface, and aboveground cultural resources could be significantly affected by construction activities. Unknown or undocumented cultural resources could be situated in the proposed ROWs or footprints of Alternative A and FFD components.

4A.4.5.4 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Cultural Resources

Prior to construction of ice roads, CPAI would perform an evaluation and assessment of possible cultural resources in the immediate areas of the proposed ice roads.

CPAI would coordinate with SHPO to provide a cultural resources management plan for the sites less than 1/4 mile from proposed project components to address the issue of potential site damage as a result of development activities, including inadvertent damage, vandalism, spills, and site monitoring.

If cultural resources are discovered as a result of construction, development, or operation activities under the proposed CPAI plan, activity would be stopped until the SHPO is consulted and an evaluation of the resource can be carried out.

4A.4.6 Land Uses and Coastal Management

4A.4.6.1 Alternative A – CPAI Development Plan Impacts on Land Uses and Coastal Management

Land Ownership and Uses

Under Alternative A, development of the proposed facilities for the Plan Area would occur on lands owned by the federal government and the state, as well as on Native selected land. Native selected and Kuukpik land selections, however, are administered by the BLM until patented by selected individuals. Implementation of the ASDP under Alternative A would not change ownership status on lands within the Plan Area, but would occur under negotiated leases.

As described in Section 3, most of the Plan Area is currently undeveloped with the exception of the existing Alpine oil production pads and the village of Nuiqsut. With the exception of the Alpine development, oil development is concentrated to the east of the Plan Area and to the northeast of the village of Nuiqsut. Development under Alternative A would represent an increase in the total area developed within the ASDP Area. The CPAI Development Plan under Alternative A calls for development of approximately 270 acres, including production pads, roadways, airstrips, and pipelines. This would result in a quadrupling of the total number of acres developed for oil production activities within the Plan Area.

The BLM established various Special Areas, Special Management Zones (SMZ), and LUEAs within the NPR-A to provide additional protections to various subsistence, recreational, ecological, historic, and scenic resources. Although designated, SMZs and LUEAs are not legislative designations and carry no regulatory authority. Special Areas, however, do carry legislative designations and development in these areas would require special attention to design to ensure protection of the natural habitat. Activity under Alternative A would include development of a production pad, road, and pipeline

within these LUEA buffer areas, special management zones, and special areas. Under Alternative A, CD-6 access roads and pipelines would be constructed within the 3-mile buffer around Fish Creek stipulated for no permanent oil and gas surface facilities except for essential transportation crossings. The potential impacts to fish resources and subsistence activities from construction of oil and gas facilities adjacent to Fish Creek are discussed in detail in Sections 4A.3.2 and 4A.4.3, respectively. Construction of CD-6 and associated roads and pipelines within the 3-mile Fish Creek buffer would require that CPAI obtain a waiver of the no permanent facilities restriction from BLM. Approval for minimal development within the Fish Creek buffer area would be necessary for CPAI to implement the proposed plan. No other Special Areas or LUEAs would be directly affected under Alternative A.

Development of the proposed roads and airstrips would provide more access to these developed areas, particularly during summer months. This improved access is not expected to substantially change areas used for subsistence or recreation, since access would be restricted to oil industry personnel and local residents. Potential indirect effects to subsistence and recreation would increase due to access, activity, and noise. Effects to subsistence and recreation are discussed further in Sections 4.A.4.3 and 4.A.4.7. Other permitted uses within the ASDP Area, such as scientific studies, communications and navigation-related uses, and overland re-supply transport between villages, are not expected to be affected by the proposed development.

Coastal Zone Management

Development proposed under Alternative A includes construction and operation of five satellite production pads, as well as roadways, pipelines, and an airstrip. Although most of these facilities would be on federal lands that are not considered to be within the coastal zone, CPAI does propose development on state lands outside the NPR-A that are within the coastal zone. Because development on federal lands must comply with coastal programs to the extent possible, this section evaluates all of the proposed development against the state and local district coastal zone standards, regardless of whether the development occurs on federal lands. Standards of the Alaska Coastal Management Program (ACMP) include statewide standards found in regulation (6 AAC 80.040 – 6 AAC 80.150) and the enforceable policies of the affected coastal district, the NSB.

Alaska Coastal Management Program

The ACMP provides standards and guidance for development occurring within the coastal zone to ensure that there is a balance between development and the protection of valuable coastal resources. The state requirements in 6 AAC 80 address, but are not limited to, coastal development, recreation, development of energy facilities, transportation and utility routes, mining and mineral processing, habitats, preservation of historical resources, air and water quality, and solid-waste disposal.

Coastal Development (6 AAC 80.040)

The Coastal Development standard requires that water-dependent uses or water-related uses have priority within coastal areas. Activities and uses that are not water-dependent or water-related only are permitted if no feasible and prudent inland alternatives exist.

The areas identified for development within the NPR-A have been set back from the coast both to maximize oil development and to minimize effects on coastal resources. Setbacks and buffers have also been established along important river and lake habitats within the area. CPAI's proposed production and support facilities proposed within the NPR-A primarily avoid these setback areas. One production pad with associated roadway and pipeline is proposed within the setback area around Fish Creek. Facilities to be developed outside of NPR-A would include two production pads, a roadway, pipelines, and an airstrip. These facilities would lie within the Colville River Delta.

Although oil production pads and their support infrastructure are not water-dependent or water-related, oil development must occur where the oil resources exist. To access these resources, production pads must be constructed near the resource and transportation facilities must be constructed to transport the oil resource to national markets. Because the oil production and transportation facilities must be located in proximity to the oil resource, there is no feasible or prudent inland alternative to development of oil production and transport facilities within this coastal area. The CPAI-proposed production pads have been designed to minimize potential effects to coastal resources, and development of access roads would be limited in the area closest to the coast (CD-3). In addition, stipulations on development within the NPR-A require that there continues to be access to the coastal resources used for subsistence and for transport of supplies for the local village; therefore, development of these facilities is not expected to displace other important coastal uses.

Geophysical Hazard Areas (6 AAC 80.050)

The Geophysical Hazard Areas consistency standard requires that districts and state agencies identify any known geophysical hazard areas and that any proposed developments in these areas incorporate measures to minimize property damage and protect against loss of life.

Possible geophysical hazards within the ASDP Area include permafrost, floods, ice gouging, and earthquakes. The facilities proposed under Alternative A specifically address the geophysical hazards identified in the ASDP Area. Roads and pipelines were situated to take advantage of ridges to reduce flood hazards where possible. Road, bridge, and pipeline designs have incorporated measures to maintain the permafrost and natural drainage patterns and to protect the built structures from flood events, scour, ice jams, and storm surges. These measures are expected to adequately mitigate the geohazards likely to be encountered in the area.

Recreation (6 AAC 80.060)

The Recreation statewide standard requires that coastal districts designate areas for recreation use if (1) the area receives significant use by persons engaging in recreational pursuits or is a major tourist destination, or (2) the area has potential for high-quality recreational use because of physical, biological, or cultural features. The standard also requires that districts and state agencies give priority to maintaining and, where appropriate, increasing public access to coastal water.

The ASDP Area is in a remote part of the state and is not a major tourist destination. There are some recreational uses of the area. Development proposed under Alternative A of the ASDP would be consistent with NPR-A stipulations requiring continued access to coastal resources for subsistence users, recreation users, and other traditional land uses. These stipulations should reduce any potential conflicts between the proposed development and other public uses of coastal resources.

Energy Facilities (6 AAC 80.070)

The ACMP states that the siting and approval of major energy facilities must be based, to the extent feasible and prudent, on 16 criteria within the energy facilities standard. These criteria primarily relate to reducing the potential for adverse effects to environmental and social resources. For example, the criteria stipulate that facilities minimize the probability of spills along shipping routes to protect important fishery, marine mammal, and waterfowl habitats from contamination. Another criteria calls for facility design to allow free passage and movement of fish and wildlife, with due consideration of historic migratory patterns. The criteria also call for protection of scenic, recreational, and cultural values. The state criteria also address consolidation of facilities.

The ASDP under Alternative A is consistent with the criteria in the energy standard in that facilities would be consolidated to the greatest extent possible, facilities would be sited and designed to minimize the potential to affect environmental resources, and the oil would be transported to Valdez by

pipeline, reducing the potential for contamination of valuable coastal habitats. The proposed development calls for housing of all personnel to be at the existing Alpine housing facility except during drilling and construction, when personnel would be housed in temporary camps. Roads, pipelines, and other facilities would maintain existing drainage patterns and would minimize effects on wildlife habitat and migration routes. Development of the proposed facilities would affect some wetlands and other high-value habitats, but the facilities have been sited and designed to reduce the impact to these resources to the greatest extent possible.

Transportation and Utilities (6 AAC 80.080)

The Transportation and Utilities statewide standard requires that all transportation and utility routes and facilities must be sited, designed, and constructed to comply with district programs. The standard also states that they must be situated inland from beaches and shorelines unless the route or facility is water-dependent or no feasible or prudent inland alternative exists to meet the need for the route or facility.

The development proposed under Alternative A includes roadways connecting most production sites to the processing facility at CD-1, as well as pipelines from the production satellites to the processing facility. Where possible, the roads and pipelines would be collocated. All utilities would be consolidated onto the pipelines, including electric power, fuel, water, and produced products. The road and pipeline to the CD-4 production satellite would follow the route of the existing oil product pipeline that connects the existing Alpine facility to the pipelines at Kuparuk. The roads, bridges, and pipelines have been designed and sited to minimize potential adverse effects to coastal resources to the extent feasible. These facilities are located inland from the coast, but do cross wetlands and creeks within the ASDP Area. The production satellite proposed within the lower Colville River Delta would be accessed by air to avoid road construction within the lower delta.

Mining and Mineral Processing (6 AAC 80.110)

The ACMP standards for mining and mineral processing require these activities to be designed and conducted in a manner compatible with the other coastal standards, as well as adjacent uses and activities (6 AAC 80.110 [a]). The ACMP standards also restrict extraction of sand and gravel from coastal waters, intertidal areas, barrier islands, and spits, unless no feasible and prudent alternative to coastal extraction exists that would meet public need for the sand and gravel (6 AAC 80.110 [b]).

Mining and extraction of sand and gravel is essential for development of oil production and transportation infrastructure within the ASDP Area. As stated in Section 2.4, Alternative A proposes extraction of gravel for use during construction and development of the facilities proposed under Alternative A, including gravel roads connecting many of the facilities, gravel production pads, and gravel airstrips. Gravel sources for the development proposed under Alternative A include the currently permitted ASRC Mine Site and potentially a new site, the Clover Potential Gravel Source, on the western edge of the Colville River Delta Sub-Area, southwest of the proposed CD-4 production site. Importing gravel from outside the North Slope for development activities in this area would not be economically feasible. The gravel sites used have, or would be required to have, operating permits and reclamation plans to ensure that gravel extraction is conducted in a manner consistent with the other state standards for protection of coastal resources.

Subsistence (6 AAC 80.120)

Under this subsistence standard, state agencies and districts, in conjunction with Native corporations and any other persons or groups, could designate areas as subsistence zones in which subsistence uses and activities have priority over all non-subsistence uses and activities. Before any potentially conflicting activity could be authorized within these designated areas, a study of the possible adverse im

pacts of the proposed potentially conflicting use or activity upon subsistence usage must be conducted and appropriate safeguards to assure subsistence usage must be provided (6 AAC 80.120 [d]).

Alternative A would include construction of roads and bridges connecting the proposed satellites to the existing Alpine facilities. Construction of these roads could provide more efficient access to subsistence hunting and/or fishing sites or could potentially affect subsistence resources through potential changes to habitat use and resource abundance resulting from increased foot and vehicular traffic in developed areas. The potential for impact to subsistence from the proposed development is discussed in more detail in Section 4A.4.3. Development within the NPR-A would occur under a number of stipulations designed to reduce the potential for impacts on subsistence resources near proposed facilities, and would include limits on activities during various time periods and restrictions on development within areas with high subsistence resource values. The proposed development includes development of a production pad, road, and pipeline within the buffer area near Fish Creek.

Habitats (6 AAC 80.130)

The ACMP standard for habitats identifies eight habitat types and calls for management of these habitats to maintain or enhance their biological, physical, and chemical characteristics that contribute to their capacity to support living resources. In particular, the habitat standard calls for management of wetlands and tide flats to assure adequate water flow, nutrients, and oxygen levels, and to avoid adverse effects on natural drainage patterns, destruction of important habitat, and discharge of toxic substances. Rivers, streams, and lakes must be managed to protect natural vegetation, water quality, important fish and wildlife habitat, and natural water flow. Uses that do not meet these standards must meet a three-pronged test: (1) there must be a significant public need for the use or activity; (2) there must be no feasible prudent alternative to meet the need that would conform to the standards; and (3) all feasible and prudent steps to maximize conformance must be taken.

Because of the extent of wetlands, lakes, rivers, and tidal areas throughout the ASDP Area, development of oil production and transportation facilities cannot avoid these habitats. The proposed project, which calls for development of oil production and transportation facilities to bring Alaskan oil resources to the market, would meet the three-pronged test. The project would provide a significant public benefit to the state in terms of economic benefits and to the nation in terms of increasing the domestic oil supply. There is no feasible way to develop the oil resources within the NPR-A and the Colville River Delta without affecting these habitats. Finally, development proposed under Alternative A has been designed to maximize conformance with the habitat standards for wetlands, tidal areas, creeks and lakes, to the extent feasible. Development within areas designated as resource buffer areas would be limited to one production pad and a supporting road and pipeline. Roads, bridges, pipelines, and production pads are designed to minimize changes to natural drainage patterns and to migration of fish and wildlife. The potential for releases of toxic substances would be reduced using the leak detection equipment and secondary containment for fuel storage facilities.

Air, Land and Water Quality (6 AAC 80.140)

The ACMP standards for air, land, and water quality incorporate reference to all the statutes, regulations, and procedures pertaining to those resources as enforced by the ADEC.

The ADEC regulates air and water quality as well as discharges of toxic substances to land and water. The ADEC regulates air emissions for industrial operations under the Clean Air Act. The proposed production pads would require review by the ADEC to address air emissions and to ensure that emissions associated with the proposed development would not result in any violations of national ambient air standards. The existing processing facility at CD-1 operates under an Air Quality Construction Permit and a Title V operating permit, which would need revision to address any projected increase in air emissions associated with increased processing volumes under CPAI's proposed plan. Water quality regulations include the ADEC stormwater pollution prevention plans for construction and opera

tion, as well as the U.S. Environmental Protection Agency's (USEPA) National Pollutant Discharge Elimination System (NPDES) permitting requirements. Wastes disposed of through the annulus of production wells are regulated by the USEPA's Underground Injection Control program and the Alaska Oil and Gas Conservation Commission (AOGCC). No Class I wells are anticipated to be required under CPAI's proposed plan. The ADEC also regulates hazardous substance releases to both land and water and requires approval of an Oil Discharge Prevention and Contingency Plan (ODPCP) for new production pads to ensure that best efforts are taken to minimize the potential for spills and that adequate spill response equipment and personnel are available to respond to spills in a timely manner. No new landfills are anticipated to be constructed under CPAI's proposed plan. Solid wastes generated at the proposed sites would be managed according to approved plans as described in Section 2.

Compliance with ADEC and USEPA regulations would ensure conformance with this coastal management standard for the proposed CPAI scenario.

Historic, Prehistoric, and Archaeological Resources (6 AAC 80.150)

As stated in this ACMP statewide standard, "districts and appropriate state agencies shall identify areas of the coast which are important to the study, understanding, or illustration of national, state, or local history or pre-history (6 AAC 80.150)."

A review of the potential for cultural resources to be found within proposed development areas and the potential for adverse effects to cultural resources from facility development under Alternative A are discussed in Section 4A4.5. In addition to the regulations associated with Section 106 of the NHPA, stipulations on development within the NPR-A include requirements to identify the potential for adverse effects on cultural and traditional land use resources before development, avoidance or mitigation of these effects, and training for staff about cultural resource concerns during employee orientation. Compliance with these measures would ensure that the development under Alternative A would meet this coastal standard.

North Slope Borough Coastal Management Program

For the NSB, the primary goal of the District's Coastal Management Program (CMP) Enforceable Policies is to ensure that development activities do not substantially interfere with subsistence activities or jeopardize the continued availability of subsistence resources (NSB 1998). Relevant policies include *Standards for Development*, *Required Features for Applicable Development*, *Best Effort Policies*, and *Minimization of Negative Impacts* (NSB CMP 2.4.6). Many of these policies are consistent with the standards of the ACMP discussed above.

The NSB *Standards for Development (*NSB CMP 2.4.3*)* require development to maintain subsistence resources at a level that meets local subsistence needs and to allow for continued access to those subsistence resources. The standards also call for protection of known and unrecorded cultural and historic sites through avoidance or consultation where resources cannot be avoided. Traditional activities at cultural and historic sites should not be adversely affected. Finally, the standards also call for compliance with all federal land, air, and water quality standards and regulations.

As discussed under CPAI's proposed plan, subsistence resources and access to these resources are addressed through stipulations restricting development areas, timing of activities, and design measures to ensure minimal impact to fish and wildlife movements, as well as stipulations requiring continued access to local subsistence users for traditional activities. Potential effects to cultural resources are being addressed in compliance with Section 106, and avoidance or mitigation of these effects would occur in consultation with local and state officials. Proposed facilities and activities would be required to comply with all federal and state environmental regulations to protect public lands, air, and waters.

CPAI's proposed plan would be expected to comply with these standards through application of best effort policies as discussed in the following section.

The CMP *Required Features for Applicable Development* (NSB CMP 2.4.4) calls for restrictions on vehicle and aircraft activities in areas where wildlife species are sensitive to noise and movement during certain times. Required features also include compliance with state and federal regulations on water and air emissions, as well as solid waste facilities, and development of central sewage systems to process effluent to state and federal standards. Finally, fuel storage facilities with a capacity of more than 660 gallons must have an impermeable lining and be diked.

The BLM stipulations on development within the NPR-A specifically identify areas and seasons where vehicular and aircraft movements must be limited to address sensitive wildlife resources. As discussed previously in this section, the proposed developments would be required to comply with all federal and state regulations on air, water, wastewater, and solid waste discharges. Development under the proposed plan would be expected to address restrictions needed to minimize effects to wildlife and would acquire all required ADEC reviews and permits on air, water and waste discharges.

The NSB *Best Effort Policies* (NSB CMP 2.4.5) reflect criteria similar to the three-pronged test under the ACMP. Development that cannot comply with all of the resource protection policies addressed previously could still be allowed if a significant public need exists for the development, if all feasible and prudent alternatives have been explored, and if all feasible and prudent steps have been taken to avoid the adverse effects that the resource protection policies were intended to prevent. This section of the CMP (NSB CMP 2.4.5.1) also requires minimization of impacts on subsistence resources and access, minimization of impacts to wildlife migration from transportation facilities (including pipelines), elimination of duplicative transportation corridors to proposed sites, and siting of structures to avoid flood and geohazard effects. Further requirements on applicable development (NSB CMP 2.4.5.2) include measures to reduce the environmental impacts of mining activities in coastal areas and floodplains; to locate, design and maintain facilities to prevent significant adverse effects on fish and wildlife and their habitat, including drainage patterns; to locate all non-essential facilities at compact designated service bases and to share these facilities to the maximum extent possible; to consolidate transportation and utility facilities to the maximum extent possible; to minimize interference with use of traditional land use or subsistence areas; and to comply with the habitat standard of the ACMP.

These issues have been addressed above in the ACMP discussion. The proposed development meets an important public need, no feasible inland alternatives to development of the proposed facilities exist, and stipulations have been placed on the development to ensure maximum conformance with the coastal management standards of both the ACMP and the CMP. Subsistence resources and access are protected through restrictions on development areas and activity timing. The processing and employee facilities at the existing Alpine facility would be used to support the satellite developments. Roadways and pipelines have been collocated where possible and are designed to minimize effects to natural drainage patterns and to wildlife movements. Therefore, development of the proposed project under Alternative A is expected to comply with the NSB CMP standards.

The NSB CMP also contains standards for *Minimization of Negative Impacts* (NSB CMP 2.4.6). These standards include requirements for transportation facilities, including airstrips, to be sited, designed, constructed, and maintained to minimize adverse effects to wildlife and their migration, as well as minimizing effects on water courses and wetlands. Permafrost is to be maintained in developed areas and development must be sited, designed, and constructed to minimize the potential for loss of life or property from flooding, icing, erosion, and storms.

The proposed development under Alternative A FFD includes design measures to protect permafrost and to address geophysical hazards as discussed above under the ACMP. Transportation facilities have been sited and designed to preserve existing drainage patterns and to minimize effects on fish

and wildlife migration. The proposed development is expected to be consistent with these CMP standards.

North Slope Borough Land Management Regulations

Most of the land within the NSB is zoned as Conservation, with the exception of some village sites and the existing oilfields at Prudhoe Bay and Alpine. The NSB's Resource Development zoning classification covers areas designated for oil development activities. Alternative A development east of the NPR-A in the Colville River Delta would require a rezoning of the development areas to the Resource Development classification.

4A.4.6.2 Alternative A – FFD Plan Impacts on Land Uses and Coastal Management

Land Ownership and Uses

Plans for Alternative A FFD would mean that the proposed facilities would be on lands owned by the federal government and the state, as well as on Native-selected land. Native-selected and Kuukpik land selections, however, are administered by the BLM until patented by selected individuals. Implementation of CPAI's proposed plan under Alternative A FFD would not change ownership status on lands within the ASDP Area, but would occur under negotiated leases.

Development of the FFD scenario would result in development occurring throughout the ASDP Area, with an additional 22 satellite production pads and associated roads, pipelines, and an airstrip totaling an approximate impact area of 1,400 acres. The FFD scenario would result in a substantial increase in the area developed and would provide additional access to areas farther west and north of the Plan Area. Access would remain limited to oil industry personnel and local subsistence users. Effects on subsistence resources and recreation for FFD are discussed in Sections 4A.4.3 and 4A.4.7.

In the areas of BLM-designated Special Areas, SMZs, and LUEAs within the NPR-A, Alternative A FFD would include development of a production pad, road, and pipeline within these LUEA buffer areas, SMZs, and Special Areas. The FFD of a production pad and associated pipeline in the area near the Kogru River designated for no surface activities would require an exemption from the surface use restrictions for this area. It also requires approval for additional development within the Fish Creek buffer area, Sensitive Consultation areas, and the special caribou stipulation area.

The potential impacts to fish resources and subsistence activities from construction of oil and gas facilities adjacent to Fish Creek are discussed in detail in Sections 4A.3.2 and 4A.4.3, respectively.

Coastal Management

Development proposed under Alternative A FFD includes construction and operation of 22 satellite production pads, two additional processing facilities, as well as roadways, pipelines, and an airstrip. As with Alternative A, the majority of these facilities are proposed on federal lands within the NPR-A; however, additional development would also be on lands outside the NPR-A within the coastal zone. Development on federal lands is required to comply with coastal programs to the extent possible; thus, this section evaluates proposed FFD against the state and local district coastal zone standards, regardless of whether the development occurs on federal lands. Standards of the ACMP include statewide standards found in regulations (6 AAC 80.040 – 6 AAC 80.150) and the enforceable policies of the affected coastal district, the NSB.

Alaska Coastal Management Program

As previously stated, the ACMP provides standards and guidance for development occurring within the coastal zone to ensure that a balance exists between development and the protection of valuable

coastal resources. The state requirements in 6 AAC 80 address, but are not limited to, coastal development, recreation, development of energy facilities, transportation and utility routes, mining and mineral processing, habitats, preservation of historical resources, air and water quality, and solid-waste disposal. Effects of FFD under the listed state requirements are provided in the following section. The standard itself is stated under the effects of proposed Alternative A development.

Coastal Development (6 AAC 80.040)

The Alternative A FFD scenario proposes construction of additional oil production and transportation facilities throughout the ASDP Area, both within the NPR-A and outside the NPR-A in the Colville River Delta. Many of the proposed production sites under the FFD scenario are much closer to the coast, particularly at the northern coast of the Kalikpik-Kogru River Sub-Area of NPR-A and in the Colville River Delta. Development of access roads has been restricted in many of these areas, with airstrips included at the production sites for access. Again, development of potential oil reserves in these areas requires the development of production and transportation facilities near the oil reserves. Development of these facilities would require careful design to minimize potential effects to coastal resources.

Geophysical Hazard Areas (6 AAC 80.050)

Development of facilities under the FFD scenario would be required to meet the same design standards to protect permafrost and to reduce the potential for damage to structures or personnel from floods and other severe weather events.

Recreation (6 AAC 80.060)

Development of facilities under the FFD scenario would be required to comply with the same stipulations regarding continued access for subsistence and recreation activities within the NPR-A.

Energy Facilities (6 AAC 80.070)

Alternative A FFD would consolidate facilities to the extent possible; however, additional processing facilities beyond the existing Alpine facility would be required. Roadways, pipelines, and other structures would be designed to minimize potential adverse effects on coastal resources to the greatest extent possible.

Transportation and Utilities (6 AAC 80.080)

The FFD scenario calls for additional roads, bridges, and pipelines throughout the ASDP Area. Roads and pipelines serving each production site would be collocated, and regional processing facilities would be constructed in the vicinity of the production pads. The proposed coastal production site near the Kogru River and the production sites proposed in the lower Colville River Delta would be accessed by air to avoid road construction in the areas closest to the coast.

Mining and Mineral Processing (6 AAC 80.110)

Alternative A FFD would likely require gravel resources beyond those currently identified. Any new gravel mining operation within the coastal zone would be required to receive a permit, which would ensure compliance with state coastal management standards and protection of coastal resources.

Subsistence (6 AAC 80.120)

Development of the FFD scenario would result in more widespread development of roads, bridges, and pipelines through the ASDP Area. The FFD would result in construction of facilities within the

Fish Creek LUEA buffer area, within the buffer area on the upper Colville River, within a high-value caribou area within the Kalikpik-Kogru Rivers Facility Group, within an area restricted to surface development near the Kogru River, and throughout the lower Colville River Delta. Production sites in the lower Colville River Delta and other coastal areas would not be accessible by road and would require airstrips for access. Construction and operation of these facilities would be required to comply with the stipulations outlined in the Northeast NPR-A ROD (BLM and MMS 1998b) to ensure effects to subsistence are minimized to the greatest extent possible. Potential effects on subsistence from development under the FFD scenario are discussed further in Section 4A.4.3.

Habitats (6 AAC 80.130)

The FFD would result in additional impacts to the habitats identified above. Again, the development would be expected to meet the three-pronged test of serving an important public need, having no feasible inland alternative to development in these habitats, and being designed to maximize conformance to the standards through design and operations measures to minimize potential environmental impacts. As the FFD scenario does not specify exact locations of facilities, it is expected that the exact layout would be adjusted based on field studies to maximize conformance with the coastal standards.

Air, Land, and Water Quality (6 AAC 80.140)

Oil production and transportation facilities proposed under the FFD scenario of Alternative A would likely require new Title V permits to address air emissions from the proposed new production and processing facilities. Stormwater pollution prevention plans and additional NPDES permits might be required to address potential water quality effects from the proposed facilities. Additional ODPCPs would be required to address prevention and spill response for the new facilities. The need for an additional landfill for solid wastes has not been determined at this point; however, any new landfill would be required to meet the ADEC solid waste permitting requirements. Compliance with ADEC and EPA regulations would ensure conformance with this coastal management standard for the Alternative A FFD scenario.

Historic, Prehistoric, and Archaeological Resources (6 AAC 80.150)

Under the FFD scenario, development would be spread over a much wider area and would be anticipated to encounter more cultural resources. As discussed above, adverse effects to any cultural resources identified through an inventory would require avoidance through siting refinements or mitigation through data recovery or other means. Potential effects on cultural resources from FFD are addressed further in Section 4A.4.5. NPR-A stipulations and Section 106 regulations would ensure that cultural resources would be protected in accordance with the coastal management standard.

North Slope Borough Coastal Management Program

As previously stated, for the NSB, the primary goal of the District's CMP Enforceable Policies is to ensure that development activities do not substantially interfere with subsistence activities or jeopardize the continued availability of subsistence resources (NSB 1998). For FFD under Alternative A, the *NSB Standards for Development* (NSB CMP 2.4.3) requires that development would be expected to comply with these standards through application of best effort policies as discussed below.

Development under the Alternative A FFD scenario would be expected to address restrictions needed to minimize effects to wildlife and would acquire all required ADEC reviews and permits on air, water, and waste discharges as required under the CMP *Required Features for Applicable Development* (NSB CMP 2.4.4).

As addressed previously in the evaluation of Alternative A, the NSB *Best Effort Policies* (NSB CMP 2.4.5) reflect criteria similar to the three-pronged test under the ACMP. As compared to Alternative A,

the FFD scenario increases the extent of development throughout the ASDP Area. Major facilities, such as processing facilities, would still be proposed to be shared by multiple production sites to the extent feasible. Additional roadways and pipelines would be constructed and would require attention to potential effects on fish and wildlife habitat and movements. Many of the proposed sites, particularly in the Colville River Delta, would be limited to access by air. The FFD would be expected to meet the CMP standards for public need, lack of alternatives, and minimization of adverse effects.

The NSB CMP also contains standards for *Minimization of Negative Impacts* (NSB CMP 2.4.6). These standards include requirements for transportation facilities, including airstrips, to be sited, designed, constructed, and maintained to minimize adverse effects to wildlife and their migration, as well as minimizing effects on water courses and wetlands. Permafrost is to be maintained in developed areas and development must be sited, designed, and constructed to minimize the potential for loss of life or property from flooding, icing, erosion, and storms. The proposed development under FFD for Alternative A includes design measures to protect permafrost and to address geophysical hazards as discussed previously under the ACMP. Transportation facilities have been sited and designed to preserve existing drainage patterns and to minimize effects on fish and wildlife migration. The proposed development is expected to be consistent with these CMP standards.

North Slope Borough Land Management Regulations

Most of the land within the NSB is zoned as Conservation, with the exception of some village sites and the existing oil fields at Prudhoe Bay and Alpine. The NSB's Resource Development zoning classification covers areas designated for oil development activities. Development to the east of NPR-A in the Colville River Delta under FFD would require a rezoning of the development areas to the Resource Development classification.

4A.4.6.3 Alternative A – Summary of Impacts (CPAI and FFD) on Land Uses and Coastal Management

Construction and operation of the CPAI-proposed Alternative A is not anticipated to result in adverse effects to existing land use and ownership. A direct impact, however, would be the increase in the acres of developed land. Implementation of the Proposed Plan would result in quadrupling the total number of acres developed for oil production within the ASDP Area. Additional impacts of concern for Alternative A to special use areas include the construction and operation of facilities within the designated Fish Creek Buffer Zone. Construction of CD-6 and associated roads and pipeline requires approval of minimal development within Fish Creek buffer area. CPAI would have to obtain a waiver of the no-permanent-facilities restriction from BLM. Approval for minimal development within the Fish Creek buffer area would be necessary for CPAI to implement the proposed plan. The FFD of a production pad and associated pipeline in the area near the Kogru River designated for no surface activities would require an exemption from the surface use restrictions for this area. Adoption of other elements of the FFD also would require approval for additional development within the Fish Creek buffer area, Sensitive Consultation areas, and the special caribou stipulation area.

Coastal and land management developments are not anticipated to have adverse effects. Under the NSB Land Management Regulations, however, the rezoning of land under the NSB from Conservation to Resource Development would be required for implementation of CPAI's proposed plan.

4A.4.6.4 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Land Uses and Coastal Management

No mitigation measures have been identified for Alternative A or Alternative A FFD.

4A.4.7 Recreation Resources

Potential effects on recreation from the proposed projects were assessed by determining the various types of recreational uses occurring in the Plan Area. These uses were then evaluated to determine their sensitivity to the short-term and long-term effects of the projects. This assessment used both the results of discussions with outfitter-guides operating in the Plan Area and previous knowledge of the Plan Area's natural resources.

4A.4.7.1 Alternative A – CPAI Development Plan Impacts on Recreation Resources

As noted in Section 3.4.7 the Plan Area is characterized by vastness, very low evidence of the presence of human activity, and abundant wildlife resources. Much of the recreational activity in the Plan Area is along the Colville River, with most organized recreation occurring or originating in the vicinity of Umiat to the south and Nuiqsut to the north. Most of the recreation in the project area occurs from May through September.

Most construction features associated with the proposed alternatives such as roads, pipeline construction, and gravel pad construction would occur during the winter months to minimize effects to the tundra environment. Very little organized recreation occurs during these harsh winter months, and only limited recreation occurs in the area during the summer months, as described in Section 3.4.7.

Potential effects on recreation from Alternative A will likely include a loss of opportunities to experience naturalness and solitude, as well as a loss of area available for recreation because of development related activities (construction and operations). As explained in Section 3.4.7, the Plan Area provides opportunities for recreational visitors to experience naturalness and solitude associated with the semi-primitive motorized (SPM) recreation opportunity spectrum (ROS) class. The area also provides areas for wildlife viewing and limited fishing and hunting opportunities. Some opportunities for recreation would likely be reduced and some recreationists displaced (through loss of acreage available for recreational use) if the additional five satellites are developed. Under FFD, the effects are expected to be similar, but larger in scope.

Although the quality of the recreational experience in the Plan Area could also be indirectly affected through short- or long-term changes in ambient conditions, such as noise, interruption of views, or dust and odor, these issues are evaluated in detail in other sections of this document.

During construction, the estimated 100 to 150 summer recreation users, as well as the few winter recreation users (no specific numbers on winter recreationists are available) of the ASDP Area could be affected by noise, marred views, and disturbance to birds (affecting birdwatchers) and game and fish (affecting hunters and anglers). During the operations phase of the project**,** these effects would be lower in intensity, but they would be long-term in duration (over the life of the facility).

Long-term potential effects are expected to be greatest within 2 miles of the production pads, an area measuring approximately 8,000 acres per site. As a result, the CPAI proposal to develop five pads could potentially affect the recreational experience, including values of solitude, quietude, naturalness, and wilderness, over approximately 40,000 acres. However, the recreational use of the Plan Area is very low, and most recreation occurs directly along the Colville River corridor where activities associated with Nuiqsut already have decreased the values of some of these recreational activities.

Therefore, actual effects to the recreational experience would be minor and would primarily be limited to activity associated with development across the Nigliq Channel, where there would be a decrease in opportunities associated with solitude, quietude, naturalness, and wilderness. Recreational opportunities in the Plan Area would remain consistent with the BLM's SPM classification.

4A.4.7.2 Alternative A – FFD Plan Impacts on Recreation Resources

Under the FFD alternative, the effects on hunting, fishing, and birding opportunities and the qualities of solitude, quietude, naturalness, and wilderness would be the same as those described for Alternative A, as described above. However, the potential for such effects would increase under this alternative as a result of the increased geographic scope of development. In addition to the potential effects on approximately 40,000 acres from CPAI'S development project, the recreational opportunities on up to an additional 192,000 acres could be affected if as many as the 24 proposed processing or production pads were developed.

Actual effects to users would be greatest from the development of production pads, such as hypothetical pads CD-15 and CD-18, near the Colville River. Pads projected under FFD, particularly near the Colville River, and especially those near or above Nuiqsut, would increase the potential for indirect, short-term effects to recreation. These effects would mainly be from increased noise disturbance by aircraft traveling to and from the pad locations.

The noise associated with aircraft could alter wildlife movement, affecting hunting and bird-viewing opportunities in the Plan Area, specifically near CD-15 and CD-18. Because the species sought by big game hunters tend to roam over large areas within and near the Plan Area, and because the number of big game hunters visiting the Plan Area is small, no long-term effects on hunting under this alternative would be expected. However, there would likely be long-term effects to the solitude, quietude, naturalness, and wilderness (birding opportunities) values within approximately 2 miles of new facilities.

Overall, potential effects on recreation in the Plan Area would be localized (near new facilities), and no regional effects above current conditions would be expected.

4A.4.7.3 Alternative A – Summary of Impacts (CPAI and FFD) on Recreation Resources

Construction and operation of the facilities proposed under Alternative A and Alternative A FFD in the Plan Area are not expected to result in more than local adverse effects to the lightly used recreational resources of the Plan Area.

4A.4.7.4 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Recreation Resources

No mitigation measures for recreation have been identified.

4A.4.8 Visual Resources

4A.4.8.1 Visual Analysis Methodology

The visual analysis methodology includes three elements: (1) definition of management distance zones, which relates to how close or distant features are to likely viewers; (2) contrast ratings, or how much change results from new features in the visual landscape; and the (3) photographic simulations of typical views without and with the proposed project facilities.

Visual Resource Management Distance Zones

Distance from an object affects how well elements of a landscape are perceived, with visible details of a particular object decreasing with increasing distance. The VRM system recognizes three distance zones:

- **Foreground and Middle-Ground Zone**. This is the area that can be seen from a travel route for a distance of up to 5 miles. The outer boundary of this distance zone

is defined as the point where the texture and form of individual plants are no longer apparent in the landscape.

- **Background Zone.** This is the remaining area that can be seen from a travel route to approximately 15 miles. It does not include areas in the background that are so far distant that the only thing discernible is the form or outline. To be included within this distance zone, vegetation should be visible at least as patterns of light and dark.

- **Seldom-Seen Zone**. These are areas that are not visible within the foreground and middle ground and background zones and areas beyond the background zones.

Contrast Ratings

For the ASDP, a visual effect is considered adverse if a proposed project element (such as a drill rig) creates a strong contrast with the elements of the natural landscape. The BLM defines contrasts in the following manner.

- **None.** The element contrast is not visible or perceived.

- **Weak.** The element contrast can be seen but does not attract attention.

- **Moderate.** The element contrast begins to attract attention and begins to dominate the characteristic landscape.

- **Strong.** The element contrast demands attention, will not be overlooked, and is dominant in the landscape.

For the following analysis, major infrastructure elements associated with the proposed developments were evaluated for the amount of contrast with the elements of the natural landscape. To aid in this assessment six visual simulations of different infrastructure elements were conducted.

Simulations of Potential Contrasts

Key observation points (KOP) are the most likely locations (communities, cabins, travel routes) where viewers would be able to observe the proposed project and would be visually affected by its presence. Initially, 24 KOPs located throughout the Plan Area were considered for preparation of visual simulations. From those 24, 6 KOPs (3, 12, 14, 18, 20, and 21) dispersed across much of the Plan Area and considered to be most representative of existing visual conditions were selected. For each of these six KOPs, visual simulations were prepared and evaluated for the amount of visual contrast within the characteristic landscape. Table 4A.4.8-1 lists the six representative KOPs and their distance from each of the proposed five production pads and proposed structures associated with FFD. Most of the viewing distances are in the background or seldom-seen zone. However, the town of Nuiqsut (KOP No. 12) has four views of proposed developments in the foreground and middle-ground zone, and KOPs Nos. 20 and 21 each have seven views within 5 miles or less of their locations.

In accordance with BLM Visual Manual Section 8400, analyses of the visual effects of the applicant's proposed action were completed using photosimulations. Visual simulations used photographs of major oil- and gas-related structures, photographs of existing site conditions, and a digital terrain model with x, y, and z coordinates to generate photo-realistic depictions of how proposed oil and gas satellites appear to observers. Major drilling equipment and facilities necessary for development of each oil and gas satellite were photographed during the July 2003 site visit. Photographs were taken with a digital camera and represent what the unaided human eye would see. Engineering drawings and specifications for these equipment types and facilities were used to accurately model or "size" each structure before placing in it in the digital terrain model. Image editing software was used to blend the computer renderings of various structures with the photographs taken at KOPs.

View from the Confluence of Colville and Itkillik Rivers (KOP No. 3)

KOP No. 3 is near the confluence of the Colville and Itkillik rivers close to water level, below the level of the surrounding terrain (N 70.13623º, W 150.98245º WGS84). While viewer numbers are small (fewer than 100 per month), the importance of a natural landscape to the viewers is reflected in the VRM Class II designation. As displayed in Table 4A.4.8-1, KOP No. 3 is approximately 20 miles from CD-3, 11 miles from CD-4, 14 miles from CD-5, 16 miles from CD-6, and 17 miles from CD-7.

All of the proposed facilities for the CPAI Development Plan are in the background or seldom-seen zones. While vertical contrast would be visible, the viewing distance creates a weak contrast in that the facilities can be seen but do not attract attention. Simulation of a drill rig and pipeline at CD-4 shows that these features would be barely noticeable at this distance. The drill rig would appear as an indistinct red structure contrasting with the greens, browns, and grays of the stream corridor, while the vertical lines of the drill rig would contrast with the flat, horizontal landscape. The pipeline would appear as distinct horizontal and vertical lines, partially blending with the predominantly horizontal landform, but noticeable because of the contrast between the gray metal and more muted greens and browns of the vegetation and the evenly spaced vertical supports. The overall contrast of these facilities with the natural landscape elements of form, color, line, and texture would be weak in that the facilities can be seen but do not attract attention. CD-3 could be within the same view; however, the viewing distance to CD-3 (20 miles) is so great that it would probably not be visible from this location. Under the FFD alternatives, hypothetical CD-16 would be located in the foreground-middleground zone.

TABLE 4A.4.8-1 VRM CLASSES FOR PROPOSED FACILITIES AND DISTANCES FOR REPRESENTATIVE KOPS

Proposed Facility	VRM Class	KOP # 3	KOP # 12	KOP# 20	KOP # 21	KOP # 18	KOP # 14
CD-1	II	*15*	*9*	**4**	5	*6*	24
CD-2	II	*15*	*8*	**2**	4	3	22
CD-3	II	20	*13*	*8*	5	*9*	26
CD-4	II	*11*	**4**	2	*7*	**4**	22
CD-5	II	*14*	*8*	3	5	**1**	18
CD-6	III	16	*13*	*12*	*13*	*10*	*9*
CD-7	III	17	16	17	19	15	*6*
CD-8	III	16	*10*	*8*	*9*	*6*	*13*
CD-9	III	19	18	19	21	17	5
CD-10	III	17	*11*	*6*	**5**	**4**	17
CD-11	II	12	*6*	4	*8*	*6*	24
CD-12	II	17	*11*	**5**	**1**	**5**	22
CD-13	II	*9*	**3**	**5**	*10*	5	18
CD-14	II	18	*11*	*7*	5	*8*	26
CD-15	II	*6*	2	*7*	*13*	*8*	23
CD-16	IV	**4**	**5**	*11*	16	*11*	19
CD-17	III	20	21	24	27	22	*11*
CD-18	II	*10*	*13*	16	21	16	*15*
CD-19	II	20	*15*	*11*	*11*	*13*	32
CD-20	II	24	18	*14*	*12*	16	33
CD-21	II	24	20	16	*15*	18	36

TABLE 4A.4.8-1 VRM CLASSES FOR PROPOSED FACILITIES AND DISTANCES FOR REPRESENTATIVE KOPS

Proposed Facility	VRM Class	KOP # 3	KOP # 12	KOP# 20	KOP # 21	KOP # 18	KOP # 14
CD-22	IV	23	18	*15*	*12*	*13*	*13*
CD-23	III	25	23	24	25	22	4
CD-24	III	29	29	30	31	28	*10*
CD-25	III	28	25	23	23	21	5
CD-26	III	32	33	35	37	33	17
CD-27	III	35	33	32	32	30	*12*
CD-28	IV	39	35	32	29	30	19
CD-29	IV	*6*	31	27	22	25	21
APF-2	III	37	34	32	30	30	*14*
APF-3	IV	21	19	19	20	17	2

Notes:

Distances are reported in miles.

Distances highlighted in bold represent the foreground-middle-ground zone.

Distances highlighted in italics represent the background zone.

Views from Village of Nuiqsut (KOP No. 12)

KOP No. 12 is on the north side of the village of Nuiqsut (N 70.23092°, W 151.01349° WGS84). While viewer numbers are small (fewer than 200 per month), the importance of a natural landscape to the viewers is reflected in the VRM Class II designation. As displayed in Table 4A.4.8-1, KOP No. 12 is approximately 13 miles from CD-3, 4 miles from CD-4, 8 miles from CD-5, 13 miles from CD-6, and 16 miles from CD-7. CD-3, CD-4, and CD-5 could be within the same view, with the closest viewing distance being 4 miles (CD-4), while the farthest viewing distance would be 13 miles (CD-3). However, the viewing distance to CD-3 (13 miles) is far enough that it would probably be viewed as a blurry image from this location. CD-4 and CD-5 would probably be discernable as structures at these distances. These facilities would begin to dominate the landscape and result in a moderate contrast rating. For the CPAI Development Plan alternatives, the proposed facilities would be scattered in an almost 180-degree view.

Under the FFD alternatives, there would be an additional three production pads in the foreground-middle-ground zone. Drill rigs associated with the three pads and pipeline are 4 miles (foreground-middle-ground zone) from the KOP. The road would appear as a distinct gray line, contrasting in color and texture with the natural landscape. The drill rigs would appear as distinct orange structures contrasting with the greens, browns, and grays of the stream corridor, and its vertical lines would contrast with the flat, horizontal landscape. The pipeline would appear as distinct horizontal and vertical lines, partially blending with the predominantly horizontal landform, but more noticeable because of the contrast between the gray metal and more muted greens and browns of the vegetation and the evenly spaced vertical supports. The overall contrast of these FFD elements with the natural landscape would be strong, since the elements would demand attention and could not be overlooked.

View from Nigliq Channel (KOP No. 20)

KOP No. 20 is near the Nigliq Channel (N 70.31232°, W 151.03888° WGS84). This KOP represents views from water level and not from the uplands. (For a view from an upland area, see Figure 3.4.8.3-

1, displaying CD-2 from approximately 5 miles.) While viewer numbers are small (fewer than 200 per month), the importance of a natural landscape to the viewers is reflected in the VRM Class II designation. As displayed in Table 4A.4.8-1, KOP No. 20 is approximately 8 miles from CD-3, 2 miles from CD-4, 3 miles from CD-5, 12 miles from CD-6, and 17 miles from CD-7. Under the FFD alternatives, CD-11, CD-12, and CD-13 would be located in the foreground-middle-ground zone. Vertical contrast would be visible and would result in strong contrast to the landscape characteristics. None of the proposed facilities would be within the same view, but the five proposed facilities would be scattered in an almost 360-degree view.

A drill rig and pipeline at CD-4 would be visible at a distance of approximately 2 miles**,** contrasting with the surroundings such as those simulated for KOP No. 12. The overall contrast of these facility elements with the natural landscape elements of form, color, line, and texture would be strong.

View of Nigliq Channel with View of Cabins (KOP No. 21)

KOP No. 21 is near the Nigliq Channel in view of cabins on the west side of the channel (N 70.39138°, W 151.08667° WGS84). This KOP is situated along the uplands above river level. As displayed in Table 4A.4.8-1, KOP No. 21 is approximately 5 miles from CD-3, 7 miles from CD-4, 5 miles from CD-5, 13 miles from CD-6, and 19 miles from CD-7. Vertical contrast is visible and would create a moderate contrast in that the facilities begin to dominate the landscape. CD-5, CD-6, and CD-7 could be within the same view, though the viewing distance to CD-7 (19 miles) is so great that it would probably not be visible from this location. The proposed structures of the CPAI Development Plan alternatives would be scattered in an almost 180-degree view. Under the FFD alternatives there would be an additional three production pads in the foreground-middle-ground zone.

The drill rig and pipeline at CD-3 would be very noticeable from KOP No.21**,** contrasting with the surroundings in a manner similar to that described for KOP No. 12. The overall contrast of these facility elements with the natural landscape elements of form, color, line, and texture would be moderate in that they would begin to attract attention and begin to dominate the characteristic landscape.

View near Subsistence Cabin near CD-5 (KOP No. 18)

KOP No. 18 is near a cabin at N 70.31593°, W 151.35501° WGS84. As displayed in Table 4A.4.8-1, KOP No. 18 is approximately 4 miles from CD-4, 1 mile from CD-5 within the foreground-middle-ground zone and 9 miles from CD-3, 10 miles from CD-6, and 15 miles from CD-7, all within the background zone. Under the FFD alternatives there would be three additional production pads within the foreground-middle-ground zone. The five proposed facilities of the CPAI Development Plan alternatives would be scattered in an almost 360-degree view.

The drill rig and pipeline at CD-5 would be noticeable from KOP No. 18**,** contrasting with the surroundings in a manner similar to that described for KOP No. 12. The overall contrast of these facilities with the natural landscape would be strong.

View from Confluence of Fish and Judy Creeks (KOP No. 14)

KOP No. 14 is near the confluence of Fish and Judy creeks (N70.24977°, W 151.90631° WGS84). It is 9 miles west of CD-6 and 6 miles west of CD-7. While viewer numbers are small (fewer than 50 per month), the importance of a natural landscape to the viewers is reflected in the VRM Class II designation. Vertical contrast is visible, but the viewing distance creates a weak contrast in that the facilities can be seen but do not attract attention. CD-3, CD-5, and CD-6 could be within the same view; however, the viewing distance to CD-3 (26 miles) and CD-5 (18 miles) could mean that CD-3 would probably not be visible and CD-5 (18 miles) would probably not be noticeable. The proposed facilities would be scattered in about a 90-degree view. Under the FFD alternatives there would be three additional production pads within the foreground-middle-ground zone.

The drill rig and pipeline for CD-6 would be barely noticeable from KOP No. 14. Under the CPAI Development Plan alternatives, the overall contrast of these facilities with the natural landscape would be weak in that they can be seen but do not attract attention. However, for the FFD alternatives the contrast would be stronger because of the closer viewing distances to this KOP.

Determination of Impacts

Impacts to visual resources were determined by evaluating whether VRM objectives were met. Table 4A.4.8-1 shows VRM class objectives for all proposed facilities**.** The majority of the facilities are in Class II or Class III areas. In VRM Class II areas, the level of change to the natural landscape should be low, while for Class III areas the level of change should be moderate. A strong contrast rating would not meet the intent of the objectives associated with Class II and III areas.

4A.4.8.2 Alternative A – CPAI Development Plan Impacts on Visual Resources

Construction Period

Under the applicant's proposed action, the presence of drill rigs (approximately 208 feet in height) would be the most noticeable effect of construction. Since drilling would be present and operational during the summer season at all but CD-3, the drill rigs would create a strong contrast when viewed in the foreground zone, resulting in an adverse impact. The summer season represents the time of year when viewers would be traveling through the Plan Area. Drill rigs would introduce vertical lines and dominate the landscape. Other activities such as pad construction and road construction would have a negligible impact because the construction activities would occur in winter when viewer sensitivity is not an issue.

Operation Period

Facilities associated with operation of the production pads would introduce a strong contrast with the natural landscape. Most of the buildings associated with the proposed action are less than three stories high (less than 60 feet), while communications towers could be up to 200 feet high. These vertical structures would then be 200 feet higher than the surrounding landform and would contrast with the predominant horizontal line of the surrounding landform. Power poles (limited to the area between CD-6 and CD-7) would be spaced 250 feet apart and would add vertical contrast to the natural landscape, though they would not be as noticeable communication towers. Bridges across water bodies, especially the Nigliq Channel, would repeat the horizontal line of the landform but would contrast with the colors of the surrounding landscape. Emergency spill response containers located along channels also can contrast with the colors of the surrounding landscape. Pipelines would be elevated 5 feet above the ground surface and would follow the horizontal landform of the landscape.

Buildings, drill rigs, and communication towers also would contrast in color with the dominant vegetation. Roads would contrast with much of the surrounding vegetation colors, but would not dominate views with distances of more than one mile, since they would only be 5 to 10 feet higher than the tundra. When viewed from more than 1 mile away, roads (and airstrips) would appear as an elevated horizontal line. Vehicle traffic on roads, and aircraft take-offs and landings, would be noticeable for short durations primarily from the creation of fugitive dust. Because of the nature of gravel mining, only stockpiled material would be visible. Lighting of facilities for night operations and the burn-off flare associated with drill rigs would produce sky glow in an otherwise dark landscape.

4A.4.8.3 Alternative A – Full Field Development Plan Impacts on Visual Resources

Both construction and operation of multiple production pads would introduce numerous strong contrasts with the natural landscape. Under FFD, viewers would more likely be able to see evidence of

construction or operation of production pads. The addition of two more central processing facilities would introduce a strong visual contrast with the natural landscape, resulting in an adverse impact.

4A.4.8.4 Alternative A – Summary of Impacts (CPAI and FFD) on Visual Resources

Under Alternative A and Alternative A FFD, construction and operation would result in adverse effects to visual resources. The presence of drill rigs would be the most noticeable effect of construction. Other activities such as pad and road construction would have negligible impacts because the construction activities would occur in winter when viewer sensitivity is much less of an issue. The facilities and structures associated with operation would introduce contrast with the natural landscape. When viewed from the foreground-middle-ground zone, these structures would produce a strong contrast with the natural landscape.

4A.4.8.5 Alternative A – Potential Mitigation Measures (CPAI and FFD) for Visual Resources

Potential mitigation measures for visual resource impacts would include:

1. All structures**,** or all permanent structures, would be painted to blend into the natural environment. All colors would be pre-approved by the AO. This includes emergency spill containers located along watercourses.

2. Except for safety lighting, illumination of all structures, drilling structures, production facilities, or buildings shall be designed to direct artificial exterior lighting inward and downward, rather than upward and outward.

4A.4.9 Transportation

Potential effects to transportation resources include changes to traffic volume and circulation on existing and proposed roads, airports, marine, and rail facilities. Increased traffic volumes are assessed to determine whether they would exceed transportation facility capacities, or adversely affect traffic flow and safety. Potential secondary effects associated with provision of new transportation resources and increased access to formerly remote areas include adverse effects on wildlife, recreation, and subsistence from increased activity levels in areas that are currently difficult to access. These impacts are discussed in their respective sections.

Because proposed development would occur in an area with no public transportation infrastructure and no public information on traffic volumes by type of transportation, the applicant's proposed action does not lend itself to quantification of traffic impacts. Professional transportation planning judgment was applied to reach reasonable conclusions about the potential effects on transportation resources.

4A.4.9.1 Alternative A – CPAI Development Plan Impacts on Transportation

Roadways

Alternative A would result in the construction of one new airstrip at CD-3, 25.8 miles of new gravel roads, and 35.5 miles of pipelines within the Plan Area. Use of the roadways and airstrip would be restricted to oil industry personnel and contractors and residents of the village of Nuiqsut.

Construction Period

Construction activities proposed under Alternative A would occur in phases during the next several years. The construction workforce would range from 60 to 600 personnel during various construction seasons. Nonlocal construction personnel would likely travel to the North Slope by jet and then travel to their assigned housing locations by smaller air transport or by road. Personnel transport to specific

construction sites would rely on either road or air, depending on the season and the stage of construction. Personnel transport associated with construction activities would occur primarily within the Plan Area. No adverse effects on any public roadways are anticipated.

Construction material would likely be transported by road, sea, and air, depending on the season and the stage of construction. Most freight and materials delivered to the North Slope are delivered by truck along the Dalton Highway. Traffic on the Dalton Highway is well below the roadway capacity, averaging fewer than 300 vehicle trips per day in 2002. Truck traffic on the highway would increase during construction, raising the percentage of trucks beyond its current 40 percent. The increased truck traffic on the road would be similar to construction traffic peaks that have occurred during previous oilfield construction periods on the North Slope and are not expected to adversely affect traffic flows on the Dalton Highway.

Transport of materials from the oil industry roadway system at the North Slope to construction sites within the Plan Area would primarily occur over ice roads during winter construction periods until the proposed gravel roads and bridges have been constructed. These ice roads and gravel roads would be designed specifically to provide construction and operations access to production sites and are expected to provide the required capacity for transport of construction materials throughout the construction period.

Construction traffic would vary by season, with close to 18,600 round trips per month anticipated during the initial winter construction season in 2004–2005. Because most of this construction traffic would occur on industry-constructed roadways with no public access. No adverse effects on public roadway systems are anticipated.

Operation Period

Operation of the facilities proposed under Alternative A for the applicant's proposed action would result in a much lower level of traffic than is anticipated during construction. Road traffic within the Plan Area would be limited to transport of employees and operating supplies from the Alpine processing facility to the other production sites on the gravel roads connecting four of the sites to the existing facilities. Much of the supply transport from outside the Plan Area would occur by truck on the Dalton Highway to the North Slope. During winter, supplies would be transported into and within the Plan Area by using low-ground-pressure vehicles or truck transport on ice roads. High-value, low-weight supplies or other essential supplies that cannot wait until winter could be shipped in by air to the existing facility and transported to the production sites by air (particularly for CD-3) or by ground. As described above, the oil industry roads on the North Slope have limited access. The increased truck traffic on the Dalton Highway resulting from operation of the five proposed pads is expected to be well within the capacity of the road. Likewise, increased traffic on oil industry roads during operations would be far less than during construction and should not result in any adverse effects on ongoing traffic operations of the North Slope oilfield.

Construction of the roads and bridges linking the existing Alpine facility to production pads west of Nigliq Channel would result in the first year-round road access to areas west of the channel. These proposed roadways would provide additional access for Nuiqsut residents to areas within the Fish-Judy Creeks Facility Group that are currently difficult to access during the summer months. This additional access would result in more human activity in these areas related to operation of the production pads during summer months. Although the proposed roads would provide new access to these areas, the potential effects would be lessened somewhat because the proposed roads would not provide direct access to Nuiqsut, the oil industry roads east of the Plan Area, or the Dalton Highway. Potential effects to subsistence resources from this increased access are addressed in Section 4A.4.3 and Section 4A.3.

Railroad Transportation

Under Alternative A, some construction materials from outside Alaska would likely be transported from Alaska ports of entry to Fairbanks by railroad and then transferred by truck to the North Slope. The Alaska Railroad Corporation has provided these services as required during previous oil industry construction activities on the North Slope. The railroad is expected to have sufficient capacity to accommodate construction and operations transport needs for the applicant's proposed action.

Marine Facilities

Marine transportation of heavy construction equipment or other materials with a low value-to-weight ratio could occur by barge under proposed Alternative A. Marine transportation would likely play a role in movement of construction material from the Lower 48 to Alaska and from Anchorage to the North Slope. Alaska ports and marine transport firms have historically provided sufficient capacity during previous construction activities on the North Slope and are expected to have sufficient capacity to meet any demands for marine transport associated with construction activities during the next 10 years.

Transport of supplies during normal operations does not typically involve marine transport. Therefore, operation of the facilities proposed under Alternative A would not affect marine transport facilities.

Aviation Facilities

Shared Services Aviation currently transports approximately 20,000 passengers per month. Because the maximum estimated aviation support needed to transport the entire workforce within 1 month over this 1-year construction season would require approximately 700 landings by small aircraft (CASA or Twin Otter) for personnel, 250 landings for cargo aircraft (DC-6), and 20 landings by Hercules helicopters, the resulting effects on Shared Services Aviation would be an increase of approximately 5 percent of current passenger loads. This minor level of increase occurring in conjunction with proposed Alternative A would not be expected to have an adverse effect on aviation facilities and services to the North Slope.

Shared Services Aviation transports personnel within the North Slope area with the use of Twin Otters and CASAs. These aircraft currently provide as many as nine daily flights into the Alpine facility. Construction operations for the applicant's proposed action are expected to require as many as 1,700 one-way aircraft flights per month. It is expected that Shared Services Aviation would provide additional flights into and within the Plan Area as required during construction.

Pipelines

There would be no effects on existing pipeline facilities during the construction phase.

The existing 14-inch pipeline from the Alpine processing facility to Kuparuk currently carries approximately 100,000 barrels of oil per day to Kuparuk and then on to TAPS Pump Station 1 for transport to Valdez. Production from the applicant's proposed action would be phased in over time as production decreases at the existing Alpine well sites. Production flows under proposed Alternative A would be managed to remain within the capacity of the existing sales oil pipeline from the Alpine facility to Kuparuk.

TAPS was designed to accommodate a maximum throughput of 2.2 million barrels per day. Currently the year-to-date average oil throughput of TAPS is 995,000 MMbbl per day, or less than 50 percent of capacity. The increase in oil throughput associated with the facilities for the applicant's proposed action during the production period is expected to be offset by decreasing output from older, established

North Slope facilities; therefore, the projected increase in throughput to TAPS is expected to remain well within the capacity of the pipeline.

4A.4.9.2 Alternative A – FFD Plan Impacts on Transportation

Roadways

Construction impacts to roadways from the FFD Plan under Alternative A would be similar to those identified above. The Dalton Highway would be expected to see increased truck traffic associated with transport of construction materials and supplies. Although no construction schedule has been identified for FFD, it is likely that construction of these facilities would occur incrementally over a long time. Because of the low traffic volumes on the Dalton Highway, it is likely that the highway could accommodate the increase in truck traffic for FFD with little adverse effect on highway traffic.

Operations traffic associated with FFD would be substantially higher than that associated with the CPAI Development Plan. The affected roads would be industry roads specifically designed to accommodate construction equipment and commercial truck traffic. No public access would be allowed on the proposed roads, other than for residents of Nuiqsut.

Railroad Transportation

Development of the production and processing facilities proposed for the FFD Plan would be expected to occur in a phased manner over a long time. The Alaska Railroad Corporation would be expected to play a role in transporting project construction materials and operating supplies. The demands on the railroad for construction and operation of FFD have not been estimated; however, it is likely that the Alaska Railroad Corporation could meet the construction and operation needs without adversely affecting ongoing railroad operations.

Marine Facilities

Phased construction of the FFD Plan would likely occur over many years. Although the demand for marine transport has not been quantified, it is assumed that existing marine support services could accommodate the construction and operations demand associated with the FFD Plan.

Aviation Facilities

The FFD Plan would require additional air support during construction and operations, especially for construction of the production pads in the lower Colville River Delta, where no roads are proposed for construction. Although transport of personnel from Anchorage or Fairbanks to Deadhorse, Kuparuk, or both is not expected to result in a substantial change in jet flights to the North Slope, the demand for flights from Kuparuk to the facilities proposed to be located throughout the Plan Area could change substantially, increasing an estimated 40 percent.

Pipelines

Under the FFD Plan, depending on the amount of oil produced and the timing when that new oil is produced, construction of a new crude oil product pipeline could be necessary to transport product to Kuparuk and into TAPS. The new pipeline would be sized to accommodate production from FFD, taking into account the phasing on production sites being brought online and the production curves associated with the existing and proposed new facilities. Because oil production from existing North Slope fields continues to decline, the capacity of TAPS is expected to be adequate to transport oil from the FFD Plan.

4A.4.9.3 4A.4.Alternative A – Summary of Impacts (CPAI and FFD) On Transportation

Construction and operation of the facilities proposed under Alternative A CPAI Development Plan and FFD Plan in the Plan Area are not expected to result in adverse effects to transportation resources. Existing and proposed roads, airstrips, and pipelines are expected to adequately transport personnel, materials, and product throughout the Plan Area and into statewide transportation systems. Both local and statewide transportation systems are considered to have adequate capacity to accommodate the level of activity anticipated during construction and operation of the facilities.

4A.4.9.4 Alternative A – Potential Mitigation Measures (CPAI and FFD) For Transportation

No mitigation measures have been identified.