

Chapter 2

Introduction - This chapter describes and compares the alternatives considered by the ID team for the Katalla project. It includes a description of items common to all alternatives, how alternatives were developed, alternatives analyzed in detail, alternatives considered but not analyzed in detail, and a comparison of the alternatives by issue. Mitigation and monitoring requirements for the project are also summarized. Chapter 2 is intended to present the alternatives in comparative form, sharply defining the issues and providing a clear basis for choice among options by the decision maker and the public (40 CFR 1502.14). For a better understanding of the effects of the alternatives, see Chapter 3.

Items Common to All Alternatives - All alternatives are consistent with the Revised Forest Plan. All applicable forest-wide standards and guidelines are incorporated. The Forest Service uses many mitigation and preventive measures in the planning and implementation of projects. The application of these measures begins during the planning and design phases of a project. Additional direction comes from applicable Forest Service manuals, and handbooks.

Operations under Alternatives 2, 3 and 4 would be conducted in accordance with an approved Plan of Operations; the approval includes requirements that the operations adhere to provisions of the 1982 CNI Settlement Agreement, Onshore Oil and Gas Order No. 1, Forest Service Regulations (228.108 Surface use requirements), applicable Standard Lease Stipulations (BLM Form 3100-11 Offer to lease and lease for oil and gas), State and Federal required permits, and Forest Service Conditions of Approval (including applicable Best Management Practices).

Monitoring will be done at startup and throughout the operations to ensure that operations are conducted according to the approved Plan of Operations. Specific direction regarding the role of the Forest Service in monitoring activities during project operations (Section 6.J. of the 1982 CNI Agreement⁵), are as follows:

“the Secretary of Agriculture or other authorized government official may suspend or modify all or some operations under the following situations where the Secretary or his representative knows or has cause to know that:

- (a) CNI or other operator is acting contrary to the operating plan or special use permit; or,*
- (b) CNI or other operator is acting in violation of any applicable Federal, state, or local law, regulation, or permit, for the abatement of air or water pollution, or for the protection of the land, fish or wildlife; or,*
- (c) The operations are determined to be causing or pose an immediate threat of damage to multiple use resources of the Katalla Area or other public lands; or,*

⁵ Page 33-34 of the 1982 CNI Settlement Agreement.

(d) *The operations are determined to pose a threat to worker or public safety.*”

Operations Description - Under Alternatives 2, 3 and 4, operations would continue for up to two years. The drilling operations will occur on private land and overseen by State of Alaska officials. The Forest Service must approve the Plan of Operations and assure that it meets Forest Service standards. The Region 10 Forest Service Handbook includes a number of “Best Management Practices” (BMPs), which relate to the use and maintenance of the temporary road and drilling operations. The Handbook requires that projects have a contingency plan for oil, fuel, or other hazardous substance spills and the necessary equipment for containing them (FSH 2509.22.12_9). BMPs for fuel tanks, fueling and maintenance of vehicles, and other related activities are listed in FSH 2509.22.12_9. Wastes will be incinerated on site or shipped out to the appropriate disposal facility (FSH 2509.22.12.16).

An ocean going barge would make approximately 20 to 25 round trips to off load equipment and supplies at a site on the west side of the Katalla River on State of Alaska land (see Appendix A, Map 2). Up to 2.5 acres of storage area may be required to temporarily store equipment and supplies until it can be hauled up the Katalla River by a shallow draft small barge. Brush clearing will be required to remove small diameter recent growth from the storage area. A 50-foot buffer will be left along the bluff above the Katalla River to reduce crosswinds on the airstrip; and a 100-foot buffer will be maintained along Irish Creek at the southwest end of the area for riparian protection. Occasional helicopter and/or small plane flights will provide for personnel access, and deliver equipment and supplies to an existing airstrip located on State of Alaska land near Katalla (see Appendix A, Map 2). Drilling equipment, materials, supplies and personnel will be transported from the storage area by shallow draft barge upstream about 1.5 miles at high tide (12-foot or higher) and off loaded at an access ramp constructed on National Forest System lands, or at the new temporary roads constructed in Alternatives 3 and 4. Approximately 50 to 60 small barge trips would be needed during the initial mobilization stage and two to three barge trips per week after that for the duration of the project.

There are seasonal timing considerations that could affect pink salmon spawning, migratory birds, and guided hunters and anglers. The Alaska Department of Fish and Game has proposed restricting barge activity when pink salmon are spawning, approximately from the beginning of August to possibly mid September. If the Plan of Operations and permits are approved, CEC has proposed conducting the mobilization phase (which would include the greatest amount of barge traffic, the brush clearing and road building) in the winter of 2002-2003. Migratory birds and the guided hunters and anglers would not be present then.

Another activity common to Alternatives 2, 3 and 4 is the use of an old roadway constructed for operations at the Katalla oil field, and reconstructed in 1981 to provide access for drilling on private lands. An active special use permit for the road has been in effect from 1992 to the present⁶. The old roadway is located on a topographically high area which is an uplifted beach that consists of well-drained, stable sand and beach gravel. It is the most direct route and there were no other routes that would provide for a stable route and offer less surface disturbance. The BMPs relating to road construction and maintenance are found in FSH 2509.22.12 and 14. A list of specific BMPs are listed under mitigation measures in this chapter.

⁶The permit is held by the land owner and expires December 31, 2002.

All action alternatives would require barging equipment up the Katalla River and trucking the equipment to the drilling site. In Alternative 2, the barge landing site would be near the end of the old roadway (see Appendix A, Map 2); in Alternative 3 it would be one-half mile downstream (see Appendix A, Map 3); and in Alternative 4 it would be about 550 feet downstream. Unloading the barges could take a few hours or longer depending on size and number of items and the complexity of the task. Except at the Alternative 2 landing site, the barges would need to go dry during the low tides and leave on the following high tide, when the unloading takes more than a few hours. The barges are designed to do this. No adverse effects to the channel or fish habitat are anticipated.

Alternative Development Process - Cassandra Energy proposes to drill for oil and gas on private land, within the old Katalla oil field. Numerous shallow wells have been drilled in this area prior to 1933; 18 of them produced oil. A deeper exploratory well was drilled in 1985-6. This proposed well would be drilled within 40 feet of the 1985-6 well and will utilize the existing drill pad. Currently there is an existing temporary roadway on National Forest System lands that provides access to the now abandoned crew camp and drill site on private lands⁷. The roadway is not part of the Forest's Transportation System although the route is still intact. In the Plan of Operations that Cassandra Energy submitted, they propose to use and maintain the temporary access road⁸, use the existing crew camp footprint⁹, and use the existing drill site footprint¹⁰. Both camp and drill site are on private land. Maintenance of the existing roadway would consist of removal and clearing of small diameter trees and brush that have grown since 1988, and removal of old bridges and placement of seven temporary prefabricated steel bridges over stream crossings. Alternatives were heavily influenced by the presence of an existing roadway.

In the original Plan of Operations that Cassandra submitted, they proposed construction of approximately 0.5 mile of additional temporary road on the east side of the Katalla River to allow access to the old roadway. This was because it was uncertain whether a barge could navigate further up the Katalla River through some shallow water to directly access the old roadway. Through a depth survey of the Katalla River, it was determined they can access the old roadway directly and there is no need to construct the 0.5 mile of additional temporary road on the east side of the river. The original proposal became Alternative 3 because it avoids some pink salmon spawning areas, avoids some sportfishing areas and provides for barge access at lower tides, thus providing more times available for barge access and addressing several of the key issues raised during the scoping process.

On April 30, 2002, the Environmental Assessment was released for a 30-day public

⁷ The camp was last used during the drilling of an exploratory well in 1985-6.

⁸ Also called the "old roadway". The existing road is a temporary road as defined in Forest Service Manual 7700: Roads authorized by contract, permit, lease, other written authorization, or emergency operation not intended to be part of the forest transportation system and not necessary for long-term management (36 CFR 212.1).

⁹ The footprint means the 1985-6 cleared and disturbed area. The old structures are not usable and must be replaced.

¹⁰ The footprint means the 1985-6 clearing and disturbed area. The proposed well would be drilled just 40 feet from the 1985-6 well using rig matting laid down for that operation.

review and comment period as per 36 CFR 215.3. During the review period, Cassandra Energy Corporation sought review with the State of Alaska under the Coastal Management Program. In this review, the Alaska Department of Fish and Game objected to Alternative 2, and suggested a modification of the Alternative. The modified Alternative is now Alternative 4. The Forest Service decided to revise the EA rather than supplement the existing EA, to avoid confusion and clarify information in the first EA.

Alternatives Analyzed in Detail - Four alternatives are analyzed in detail:

Alternative 1. No Action. The proposed action of drilling on private land, via the use and maintenance of an existing temporary road and a barge landing area is not authorized. Sportfishing and hunting would continue, the holder of the current road use permit would request renewal of the permit, and activity on the private land would continue. CAC's rights under the 1982 CNI Settlement Agreement would continue until December 31, 2004, and they would likely submit an additional Plan of Operations. It would not provide employment estimated at up to 66 people at peak times, and 44 to 48 jobs at other times, for the duration of the project, about two years. The oil and gas potential of the area would not be further evaluated at this time.

Alternative 2 (Appendix A, Map 2). An ocean going large barge would off load equipment and supplies at a site on the west side of the Katalla River on State of Alaska land (see Appendix A, Map 2). Up to 2.5 acres of storage area may be required to temporarily store equipment and supplies until it can be hauled up the Katalla River by a shallow draft small barge. A 50-foot buffer will be left along the bluff above the Katalla River to reduce crosswinds on the airstrip; and a 100-foot buffer will be maintained along Irish Creek at the southwest end of the area for riparian protection. Occasional helicopter and/or small plane flights will provide for personnel access, and deliver equipment and supplies to an existing airstrip located on State of Alaska lands near Katalla (see Appendix A, Map 2). Under this alternative, drilling equipment, supplies, and other materials would be barged 1.5 miles up the Katalla River to a landing site near the end of an old 2.5-mile existing roadway, which leads to the camp and drilling site. The river is shallow in places, so even a shallow-draft barge will need a 12-foot tide or greater to access the site. At the landing site, the riverbank will be graded to create a 25 by 25-foot access ramp (Appendix C) to transport supplies from the barge to the end of the old roadway.

A staging area of up to two acres of National Forest System lands would be cleared of trees and vegetation along the roadway about 200 yards east of the river. Rig matting (Appendix D) would be placed on the cleared area to protect the soil. Slash and stumps would be stored along the edge of the clearing and then scattered back over the area when the project is completed (FSH 2509.22.14.19). The area is flat, therefore the debris would not be transported to streams or other areas where it would cause erosion or flow problems.

On the old roadway, fallen trees and brush would be cleared, minor grading would be done, and seven temporary pre-fabricated bridges would be installed over stream crossings. The operator will not disturb the streambanks, alter the channels, or have equipment in the streams to install the bridges. No culverts would be installed; existing culverts and ditches would need to be maintained. No sand, gravel or rock (mineral materials) would be required.

The drilling activity would take place on private land and would use land that was cleared in 1985-6. A few buildings are still intact; however there will be a need to construct a crew camp, a drill pad, storage facilities, and other support facilities. The buildings and tent platforms that comprise the existing crew camp would be cleared and a new camp constructed. Water for the camp and operations will be taken from Arvesta Creek at the rate of 31,700 gallons per day. The drill pad and storage area for hazardous wastes will be designed to prevent soil and water contamination if there are spills or leaks.

Alternative 3 (Appendix A, Map 3). Alternative 3 is similar to Alternative 2, except that the operator would build a 0.5-mile new temporary road running from the end of the old roadway to a point one-half mile downstream on the east bank of the Katalla River. Barges would then travel only 1.0 mile upstream and could use 11-foot tides. This road would require crossing the upstream end of a 40-foot wide slough with either a bridge or multiple culverts. A staging area up to two acres would be cleared at the downstream landing site using the methods described above. An additional 900 feet of new road would also be built along the old roadway to create a detour around an eagle nest tree. The proposed road construction would require mineral materials either from a quarry on private land or shipped in from elsewhere.

Alternative 4 (Appendix A, Map 4). This alternative was proposed by the State of Alaska during the Coastal Zone Consistency review process. Alternative 4 is similar to Alternative 2, except that the operator would build approximately 550 feet of new temporary road extending from the end of the old existing roadway to a gravel bar downstream on the east bank of the Katalla River. The (shallow) barge landing point or entry point leading to the existing old roadway on the Katalla River for Alternative 4 is approximately 550 feet downstream from the Alternative 2 landing.

The river bank above the gravel bar is a gradual slope that would not require any excavation for an access ramp. It is covered with young alder and appears to have been used as an access point and staging area during the 1985-86 activities. An area about 100 by 100 feet (0.2 acres) would be needed for an access road and a turning area for trucks and other equipment. Rig matting would be used in this area to protect the soil from erosion. A 30-50 foot vegetation buffer would be left next to the river to prevent any sediments from being washed into the river.

After the slope area the road would run about 250 feet over an old uplifted flood channel vegetated with young Sitka spruce. The soils consist mainly of gravels and sand, and rig matting may be laid on the cleared surface. There are four shallow channels that have water in them at various times of the year. These would be crossed with temporary bridges.

The final 300 feet of road would cross through a dense stand of young Sitka spruce (150 feet) and then over a sphagnum moss wetland area with small spruce and some alder patches (150 feet). The soil here has a layer of marine clays and sediments overlying the previously mentioned gravel. Rig matting will be required, with logs and brush or other materials for additional support in the wetter areas.

For Alternative 4, a road and staging area have been flagged, 550 ft long and 20 feet wide. This area is 0.5 acre. CEC would need an area at least 100 feet wide at the stream

entry point in order to turn equipment around. A two-acre staging area at the old roadway as proposed in Alternative 2 would be also be needed.

Alternatives Considered but Eliminated from Detailed Study Five additional alternatives were considered during the analysis, but not studied in detail. These are described below, along with the reasons for not considering them further.

1. Possible ice road in winter. This was eliminated from detailed study because of the relatively warm maritime climate of the area. It might be possible to build an ice road in the winter during cold spells, but warmer periods occur in the winter that would destabilize an ice road. Additionally, there is an old roadway in the area that provides access, which is stable and usable with some maintenance required.
2. Direct barge access to the west side of the Katalla River. The work would involve constructing 0.5 miles of temporary road on the west side of the Katalla River, a bridge across the river, and use and maintenance of the 2.5 miles of the old roadway. Equipment would be transported to a crew camp and drill site on private land. This was eliminated from detailed study because of the presence of an old roadway on the east side of the river and the presence of extensive wetlands on the west side of the river. This would be nearly identical to Alternative 3 with the exception that a major bridge across the Katalla River would be constructed. It was not apparent how construction of a major bridge would reduce environmental consequences, given the additional impacts to the wetlands and disturbance associated with bridge construction.
3. Use of helicopters to deliver drilling equipment and materials. This alternative would require conveying large pieces of equipment to the drilling sites, including drilling rigs, trucks, pumps, and other large pieces of equipment. Frequent storms in the winter and rainy or foggy weather in the summer make it difficult to get helicopters to the site safely on a regular basis. A large landing area would need to be cleared for helicopters to land equipment. This was eliminated from detailed analysis because of the presence on an old roadway and the weather. Given the high cost and likely downtime due to weather this alternative was not considered in detail.

The following two additional alternatives were proposed in the public review and comment period of April 30, 2002:

1. Construct a new road from the Strawberry Point area along the coast directly to the private land where the drilling is proposed. This would avoid barging equipment and materials on the Katalla River. This would involve construction of approximately two miles of new temporary road. This was eliminated from detailed study because of the presence of an existing old roadway on the east side of the Katalla River, and the presence of extensive wetlands between Strawberry Point and the private land. It was not apparent how construction of approximately two miles of new temporary road would reduce environmental consequences, given the additional impacts to the wetlands and disturbance associated with construction. It would result in less disturbance to spawning gravels and recreation associated with the Katalla River. In the event a discovery of oil and gas is made this could be a viable alternative for long-term access.

2. Utilize the Katalla Slough to barge drilling equipment and supplies to the private land. This would avoid the Katalla River, and avoid use and maintenance of the existing old roadway; as the slough extends from the river to close proximity to the private land. This was eliminated from detailed study because Forest Service measurements of the channel depths show that the slough is too shallow for barging equipment and supplies. To be a viable alternative approximately two miles of the slough would have to be dredged and a road would have to be built across wetland areas. It was not apparent how this would have less disturbance than barging on the Katalla River and utilizing an existing old roadway.

Comparison of Alternatives Considered in Detail The proposed action (Alternative 2) and three alternatives are considered in detail. Alternative 1 is the no-action alternative, under which the Plan of Operations would not be approved and no drilling would take place at this time. The other alternatives represent different means of satisfying the purpose and need by responding with different emphases to the key issues discussed in Chapter 1. Maps of all alternatives considered in detail are provided in the map packet.

Alternative 1 (No Action).

The Plan of Operations would not be approved at this time. It does not preclude re-submitting a Plan of Operations for other areas, or for the same project area at some time in the future. The Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14d) requires that a "no action" alternative be analyzed. This is also in accordance with Section 6-A of the CNI Settlement Agreement, in which the United States has a reserved right to limit or prohibit operations, and Section 6-B, which states, "the United States reserves all authorities to regulate all and prohibit any particular surface occupancies within the Katalla Area". This alternative represents the existing condition against which the other alternatives are compared.

Resource Outputs - The No Action Alternative would not provide Cassandra Energy the opportunity to further evaluate the oil and gas potential of the Katalla area and would not allow CAC to exercise their rights under the 1982 CNI Settlement Agreement. The economic and social benefits that could be derived from these resources would be foregone. Selection of the No Action Alternative would not necessarily violate the presidential Executive Order 13212: Actions to Expedite Energy-Related Projects, which emphasizes, "The increased production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people." This alternative could be selected if this analysis were to find that the project could not be done in a safe or environmentally sound manner.

Economic Effects - There were a number of public comments asking about the economic effects of the alternatives, particularly to the local economy. Cordova is the closest community and is presumed to be the "local" economy. The economic effects can be divided into those derived from the proposed exploratory drilling activities and those that would ensue if payable quantities of oil and gas were found. For the exploratory phase, the No Action alternative would not provide the estimated employment of up to 66 people at peak times, and 44 to 48 people at other times for the duration of the project - about two years. The applicant said that he hoped to hire CAC shareholders for at least 10% of the jobs, some of whom could be from Cordova, Tatitlek, and Chenega areas.

The No Action alternative would forego the air, boat, and lodging services, and some miscellaneous supplies that would be obtained in Cordova, and the lodging services that the Katalla lodges could provide to oil workers and government employees.

The No Action alternative would prevent any adverse effects the drilling activities might have on the guided hunting and fishing businesses in the Katalla area. Barge traffic (two to three barges per week) could disturb guided anglers on the Katalla River for about two weeks of the eight-week coho salmon fishing season, or perhaps 20 of the 80 annual clients. Disturbances to hunters would be less, since they could hunt in areas away from the river. It is hard to quantify how many clients would cancel or not return because of the presence of barges, but some loss would be expected. Air services that fly clients from Cordova to Katalla or other businesses that benefit from the anglers and hunters would not be affected under the No Action alternative.

Since it is not known if there are payable quantities of gas and oil, the economic effects of the production phase cannot be quantified. We can only say that the No Action alternative would preclude the possible royalty income from gas and oil for CAC shareholders. The economy of Cordova would not receive the stimulus that might occur with development. Conversely, the No Action alternative would preserve the economic benefits of the current hunting and fishing services. It might also be said that the No Action alternative would prevent the adverse effects an oil spill or other catastrophe associated with development might have on the commercial fishery, which is the mainstay of the Cordova economy.

Environmental Consequences - A summary of the effects of implementing Alternative 1 by key issue is presented below:

Issue 1: Effects on fish and wildlife and historic resources. None.

Issue 2: Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil. How will drilling fluids, cuttings or hazardous materials be disposed of? There would be no risk of spills.

Issue 3: Effects on recreational users. None.

Issue 4: Consider the proposal in the context of the Roadless Area Conservation Rule. There would be no change in the Bering River Roadless area.

Issue 5: Monitoring: both of resources, e.g. water quality and oversight of operations. None required.

Alternative 2 (Proposed Action, Appendix A, Map 2).

Resource Outputs - This alternative would provide Cassandra Energy the opportunity to further evaluate the oil and gas potential of the Katalla area and would allow CAC to exercise their rights under the 1982 CNI Settlement Agreement. In the event oil and gas are discovered in paying quantities, this project could contribute to the nation's oil and gas supply, and provide for royalty income to CAC shareholders and other Native Corporations. This would be in keeping with the presidential Executive Order 13212: Actions to Expedite Energy-Related Projects, which emphasizes, "The increased production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people."

Economic Effects - The economic effects for all of the action alternatives would be fairly similar, since the project would be implemented, and would essentially be the opposite of the effects described in the No Action alternative.

The proposed exploratory drilling could provide up to an estimated 66 people at peak times, and 44 to 48 jobs during the normal operations. The project is estimated to last two years. The applicant says he hopes to hire at least 10% CAC shareholders, some of whom could be from the Cordova, Tatitlek, and Chenega areas. The applicant expects to use some air, boat, and lodging services in Cordova and to make some purchases of supplies there. Lodge owners in Katalla could provide cabins to oil workers until the camp is established, and for government employees throughout the project.

The proposed barge activities, two to three barges per week, could disturb guided anglers on the Katalla River for about two of the eight weeks of the coho salmon season, or perhaps about 20 of the 80 clients per season. If clients cancel reservations or do not return, the guides, air services, and other businesses would be affected.

Since it is not known if there are payable quantities of gas and oil, the economic effects of production cannot be quantified. We can only say that production would provide royalty income from gas and oil for CAC shareholders. Goods and services obtained in Cordova would provide revenues for the local economy. Full oil and gas production would be likely to mar the wilderness-like quality that guided hunters and anglers seek in the area. Oil development also introduces the risk of oil spills and other environmental damage that could affect the commercial fisheries and other environmentally dependent industries. The magnitude of the effects would depend on a number of specific circumstances, so it would be speculative to say much except that spills and negative economic effects would be possible.

Environmental Consequences - A summary of the effects of implementing Alternative 2 by key issue is presented below. A full discussion of the effects follows in Chapter 3.

Issue 1: Effects on fish, wildlife and historic resources. No effects on fish and wildlife populations are anticipated, and only minimal effects on individual species are anticipated provided avoidance and mitigation measures are implemented. Barge and truck traffic may frighten or displace individuals, but the effects would only be temporary. Barges would travel across one-half mile of pink salmon spawning area. This should have no effect on pink salmon spawning since the spawners would only be disturbed for several minutes while barges pass. Construction of the barge access-landing ramp could further destabilize the banks of the Katalla River. As in Chapter 3, aerial photographs taken in 1974 and 1993 show that large sections of the riverbank and valley floor have eroded and have been washed away. Since the spawning areas are not highly sedimented, it is felt that the river flows are sufficient to transport most of the fine materials out of the system. Surveys of the channel cross-sections by the Alaska Department of Fish and Game and the Forest Service show that shallow draft barges (two-foot draft) can navigate the river with a foot of clearance at a 12-foot tide. With this clearance the propellers are not expected to disturb eggs buried in the gravel. Deeper draft barges would only be permitted by special permits from ADF&G Habitat Division. Barge traffic would not be permitted by ADF&G when pink salmon are spawning. Aquatic habitats will not be altered. The National Marine Fisheries Service (NMFS) has been consulted in regard to the effects on regulated fish species and Essential Fish

Habitat (EFH) as defined in the Magnuson-Stevens Fishery Conservation and Management Act. NMFS has provided conservation recommendations on the staging of spill response equipment, disposal of drilling cuttings, and monitoring of the guidelines in the state permits to prevent adverse effects to EFH.

Some alteration of terrestrial habitat would occur, but the habitat areas are relatively small compared to the amounts of similar habitat available in the area. Habitat would revegetate naturally after the project is over and roads are obliterated. The U.S. Fish and Wildlife Service stated that migratory bird nests, eggs, and young could be harmed by brush clearing during nesting season, approximately April 15 to July 15. Depending on the timing of the Plan of Operations and permits, CEC proposes to begin work in the winter of 2002-2003, which would prevent adverse effects to nesting migratory birds. The Historic resources would not be adversely affected, as activities on the existing roadway and in the Claim No.1 area are restricted to the existing cleared land.

A bald eagle nest tree is located about 20 feet from the existing road, which would be used under this alternative. A variance from F&WS for activities less than 330 feet from an eagle nest is required.

Issue 2: Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil (Disposal of drilling fluids, cuttings or hazardous materials). Best Management Practices (BMPs), and other standards for handling and storage of fuels and other hazardous materials will minimize risks of spills. Spill contingency plans and proper containment equipment will lead to minimal consequences of spills. Containment equipment will be stored at the drilling area and also at the down river staging area, to take care of spills in the river and slough areas. Hazardous materials, cuttings, or fluids that cannot be incinerated or otherwise taken care of properly on site will be stored in suitable hazardous material storage areas and then shipped to appropriate disposal sites.

Commenters also asked that the effects of an oil spill be described. It should be noted here that the proposed activities do not include the building of oil pipelines, large oil storage facilities, or transporting oil in tankers. Within the scope of the proposed actions, major (greater than 1,000 barrels, or 42,000 gallons) spills of crude oil would only occur if there were a well blowout. This could occur if the drills hit high pressure pockets of gas and/or oil and the pressure could not be controlled through the hydrostatic pressure of the drilling muds, through the blowout prevention equipment, or other means. The detailed description of how these measures work and the responses that would be taken are discussed in detail in the discharge prevention and contingency plan. A Canadian environmental effects assessment estimated the possibility of a major blowout as one in 2,600 annually (Husky Oil Operations Limited, 2001). The Division of Oil and Gas, Alaska Department of Natural Resources (2000) reports, "There has never been an oil spill from a platform blowout in Alaska." The Oil Discharge Prevention and Contingency Plan (ODPC plan) for this project does state that there have been blowouts when pockets of high pressure gas were encountered, but these did not contain significant amounts of oil.

If a blowout were to occur, the ODPC plan estimates that oil could be carried up to 6,000 feet from the drill site, using the maximum flows presented in models by Belore et al. (1997). This is about the distance to the open ocean at its closest point. Within this

6,000 ft. radius, approximately 58% of the area (1,500 acres) is in the Katalla Slough watershed and the remaining area (1,100 acres) is in the Redwood Creek and Strawberry Harbor drainages. Hills to the north, east, and south could help to confine oil to the Katalla Slough drainage. The ODPC plan states that equipment staged on the Katalla River would be used to contain oil in the slough. Booms and other equipment would need to be flown by helicopter to contain oil in streams in the other drainages.

Effects would be dependent on the amount of liquid oil released, accompanying gas pressure, weather, tides, and other factors. In a worst case scenario where the entire area within 6,000 feet in all directions were oiled, some of the effects would be: 2,600 acres of land contaminated; direct loss of fish and wildlife in this area; contamination of most of the 12.9 miles of stream in the Katalla Slough drainage, 2.5 miles of stream in the Redwood Bay area, one mile of stream in the Strawberry Harbor drainage; lingering effects of oil in the soil and streams, and other effects. Effects to commercial fisheries and other areas would depend on the amount of direct contamination of the ocean and the ability to contain oil within the inland streams. Chapter 3 has a more detailed discussion.

Issue 3: Effects on recreational users. Presence of barges in the river, truck and occasional helicopter/small plane (weekly) noise, and expected competition for fishing areas between guided anglers and drilling workers, could temporarily diminish the recreational experience for coho anglers. Guides and lodge owners say that their clients are seeking quiet, solitude, and a wilderness-like experience. This experience could be diminished along the lower 1.5 miles of the river where the equipment is stored and barges travel, and for a certain distance upstream from the landing site where truck noises may still be discernible. One of the best fishing sites is a pool where the barges would anchor to unload equipment. Since barge traffic would be limited in the river when pink salmon are spawning (August to mid-September), the effect on coho salmon anglers would be reduced to the last few weeks of September. Guided hunters are usually flown to more remote locations so the effects would not be as great for them. However, when they are in camp, they would also hear the truck and helicopter noise at times when those activities occur.

Issue 4: Consider the proposal in the context of the Roadless Area Conservation Rule. The proposed temporary road would affect 742 acres of the 1,032,730-acre Bering Lake Roadless area, based on 2.5 miles of road and an influence zone of up to one-quarter mile on each side of the road. The effect would be temporary and upon completion of the project it would revert back to the current condition. Should oil and gas be discovered this would be a long-term effect and would be subject to additional disclosure under NEPA prior to field development.

Issue 5: Monitoring, both of resources, e.g. water quality, and oversight of operations. A Forest Service inspector will monitor the road maintenance to ensure it is maintained according to Forest Service standards and guidelines, BMPs, and all conditions as described in the Special Use Permit. These will include CEC's assurance that no equipment will work in streams and streambanks are not disturbed along the old roadway. The inspector will ensure that an Erosion Control Plan has been developed and implemented and that there are no problems with sedimentation of streams.

A Forest Service biologist will monitor the effects of barge traffic passing over pink salmon spawning areas to ensure there are no adverse effects due to turbulence from

propellers. A biologist will also monitor harvest of coho salmon by providing voluntary harvest reports to guided clients and drilling workers. Site visits will be made to corroborate the information. If there are escapement concerns, visual counts of the spawners in the Katalla system will be conducted.

The State of Alaska will issue permits for drilling operations and will be responsible for seeing that the terms of those permits are implemented. These terms will include, among others, safe storage and handling of fuels, drilling wastes, and hazardous materials. Minimum flow levels in Arvesta Creek, which is the proposed water supply for the camp and drilling operations, will be monitored.

Alternative 3, (Appendix A, Map 3).

Resource Outputs - This would provide Cassandra Energy the opportunity to further evaluate the oil and gas potential of the Katalla area and would allow CAC to exercise their rights under the 1982 CNI Settlement Agreement. In the event oil and gas are discovered in paying quantities could contribute to the nation's oil and gas supply, and provide for royalty income to CAC shareholders. This would be in keeping with the presidential Executive Order 13212: Actions to Expedite Energy-Related Projects, which emphasizes, "The increased production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people."

Economic Effects - The economic effects for all of the action alternatives would be fairly similar, since the project would be implemented, and would essentially be the opposite of the effects described in the No Action alternative.

The proposed exploratory drilling could provide up to an estimated 66 people at peak times, and 44 to 48 jobs during the normal operations. The project is estimated to last two years. The applicant says he hopes to hire at least 10% CAC shareholders, some of whom could be from the Cordova, Tatitlek, and Chenega areas. area. The applicant expects to use some air, boat, and lodging services in Cordova and to make some purchases of supplies there. Lodge owners in Katalla could provide cabins to oil workers until the camp is established and for government employees.

The proposed barge activities, two to three barges per week, could disturb guided anglers on the Katalla River for about two of the eight weeks of the coho salmon season, or perhaps about 20 of the 80 clients per season. If clients cancel reservations or do not return, the guides, air services, and other businesses would be affected.

Since it is not known if there are payable quantities of gas and oil, the economic effects of production cannot be quantified. We can only say that production would provide royalty income from gas and oil for CAC shareholders. Goods and services obtained in Cordova would provide revenues for the local economy. Full oil and gas production would be likely to mar the wilderness quality that guided hunters and anglers seek in the area. Oil development also introduces the risk of oil spills and other environmental damage that could affect the commercial fisheries and other environmentally dependent industries. The magnitude of the effects would depend on a number of specific circumstances, so it would be speculative to say much except that spills and negative economic effects would be possible.

Environmental Consequences - A summary of the effects of implementing Alternative 3 by key issue is presented below. A full discussion of the effects follows in Chapter 3.

Issue 1: Effects on fish and wildlife and historic resources. No effects on fish and wildlife populations are anticipated, and only minimal effects on individual species are anticipated provided avoidance and mitigation measures are implemented. Barge and truck traffic may frighten or displace individuals, but the effects would only be temporary. Barges would travel over 100 yards of pink salmon spawning area and anchor in the deeper part of the channel at the off-loading site adjacent to the spawning area. Although the barges may be anchored there for several hours to a day, the spawning salmon should not be affected since they would be spawning in the shallow areas, not the deep channel at the site. Barges would not be permitted in river when pink salmon are spawning. As the barges travel to the site, they may pass over shallow spawning areas. Channel surveys show that shallow draft barges (two-foot draft) could reach this area with about two feet of clearance on a 12-foot tide. With this clearance the turbulence from the propellers is not expected to disturb eggs buried in the gravel. The National Marine Fisheries Service (NMFS) has been consulted in regard to the effects on regulated fish species and Essential Fish Habitat (EFH) as defined in the Magnuson-Stevens Fishery Conservation and Management Act. NMFS has provided conservation recommendations on the staging of spill response equipment, disposal of drilling cuttings, and monitoring of the guidelines in the state permits to prevent adverse effects to EFH.

Alteration of habitat would be greater in Alternative 3. The new road could alter about 800 square feet of slough, which could provide rearing habitat for juvenile coho salmon. There are about 3.6 miles of slough habitat in the area, so the relative amount of altered fish habitat is small. About 4.25 acres of various terrestrial habitats would be altered, but the habitat areas are relatively small compared to the amounts of similar habitat available in the area. Habitat would revegetate naturally after the project is over and roads are obliterated. The U.S. Fish and Wildlife Service stated that migratory bird nests, eggs, and young could be harmed by brush clearing during nesting season, approximately April 15 to July 15. Depending on the timing of the Plan of Operations and permits, CEC proposes to begin work in the winter of 2002-2003, which would prevent adverse effects to nesting migratory birds. The historic resources would not be adversely affected, as activities in the Claim No.1 area (private land) are restricted to the existing cleared land. The area along the east bank of the Katalla River, where a road and staging area would be built, has been determined to have a low probability of having historical or cultural artifacts (Shaw, 2001).

Issue 2: Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil (Disposal of drilling fluids, cuttings or hazardous materials). Alternative 3 would involve trucking the hazardous materials for a slightly longer distance than in Alternative 2, but the increase in risk is negligible. BMPs and other standards for handling and storage of fuels and other hazardous materials will lead to minimal risk of spills. Containment equipment will be stored at the drilling area and also at the down river staging area, to take care of spills in the river and slough areas. Spill contingency plans and proper containment equipment will minimize consequences of spills. Hazardous materials, cuttings, or fluids that cannot be incinerated or otherwise taken care of properly on site will be stored in suitable hazardous material storage areas and then shipped to appropriate disposal sites.

Commenters also asked that the effects of an oil spill be described. It should be noted here that the proposed activities do not include the building of oil pipelines, large oil storage facilities, or transporting oil in tankers. Within the scope of the proposed actions, major (greater than 1,000 barrels, or 42,000 gallons) spills of crude oil would only occur if there were a well blowout. This could occur if the drills hit high pressure pockets of gas and/or oil and the pressure could not be controlled through the hydrostatic pressure of the drilling muds, through the blowout prevention equipment, or other means. The detailed description of how these measures work and the responses that would be taken are discussed in detail in the discharge prevention and contingency plan. A Canadian environmental effects assessment estimated the possibility of a major blowout as one in 2,600 annually (Husky Oil Operations Limited, 2001). The Division of Oil and Gas, Alaska Department of Natural Resources (2000) reports, "There has never been an oil spill from a platform blowout in Alaska." The Oil Discharge Prevention and Contingency Plan (ODPC plan) for this project does state that there have been blowouts when pockets of high pressure gas were encountered, but these did not contain significant amounts of oil.

If a blowout were to occur, the ODPC plan estimates that oil could be carried up to 6,000 feet from the drill site, using the maximum flows presented in models by Belore et al. (1997). This is about the distance to the open ocean at its closest point. Within this 6,000 foot radius, approximately 58% of the area (1,500 acres) is in the Katalla Slough watershed and the remaining area (1,100 acres) is in the Redwood Creek and Strawberry Harbor drainages. Hills to the north, east, and south could help to confine oil to the Katalla Slough drainage. The ODPC plan states that equipment staged on the Katalla River would be used to contain oil in the slough. Booms and other equipment would need to be flown by helicopter to contain oil in streams in the other drainages.

Effects would be dependent on the amount of liquid oil released, accompanying gas pressure, weather, tides, and other factors. In a worst case scenario where the entire area within 6,000 feet in all directions were oiled, some of the effects would be: 2,600 acres of land contaminated; direct loss of fish and wildlife in this area; contamination of most of the 12.9 miles of stream in the Katalla Slough drainage, 2.5 miles of stream in the Redwood Bay area, one mile of stream in the Strawberry Harbor drainage; lingering effects of oil in the soil and streams, and other effects. Effects to commercial fisheries and other areas would depend on the amount of direct contamination of the ocean and the ability to contain oil within the inland streams. Chapter 3 has a more detailed discussion.

Issue 3: Effects on recreational users. The presence of barges in the river, truck and helicopter noise, and expected competition for fishing areas between guided anglers and drilling workers, could diminish the recreational experience for coho anglers. Guides and lodge owners say that their clients are seeking quiet, solitude, and a wilderness like experience. Since barge traffic would be limited in the river when pink salmon are spawning (August to mid-September), the effect of barges on coho salmon anglers would be limited to the last few weeks of September. Interruption of sportfishing by barges would be lower in Alternative 3 since the barges would only travel 1.0 mile up the river instead of 1.5 miles. The last half-mile is where the river narrows, pools are more accessible, and much of the sportfishing takes place. Since barges could travel at lower tides, traffic may be spread out over time and may not be as intense on a given day. Barges would have longer working times and may not have to go dry and be present all

day as frequently. Truck noises would still be audible over the last one-half mile, however, since the new road would parallel the river until it joins the old roadway. Guided hunters are usually flown to more remote locations so the effects would not be as great for them. However, when they are in camp, they would also hear the truck and helicopter noise and there would be noise from the equipment storage area.

Issue 4: Consider the proposal in the context of the Roadless Area Conservation

Rule. The proposed temporary road would affect 1,045 acres of the 1,032,730-acre Bering Lake roadless area, based on 3.2 miles of road and an influence zone of up to one-quarter mile on each side of the road. The effect would be temporary and upon completion of the project it would revert back to the current condition. Should oil and gas be discovered this would be a long-term effect and would be subject to additional disclosure under NEPA.

Issue 5: Monitoring, both of resources, e.g. water quality, and oversight of operations.

A Forest Service inspector will monitor the road maintenance to ensure it is maintained according to Forest Service standards and guidelines, BMPs, and all conditions described in the Special Use Permit. These will include the operator's assurance that no equipment will work in streams and stream banks are not disturbed along the old roadway. The inspector will ensure that an Erosion Control Plan has been developed and implemented and that there are no problems with sedimentation of streams.

A Forest Service biologist will monitor the effects of barge traffic passing over pink salmon spawning areas to ensure there are no adverse effects due to turbulence from propellers. A biologist will also monitor harvest of coho salmon by providing voluntary harvest reports to guided clients and drilling workers. Site visits will be made to corroborate the information. If there are escapement concerns, visual counts of the spawners in the Katalla system will be conducted.

The State of Alaska will issue permits for drilling operations and will be responsible for seeing that the terms of those permits are implemented. These terms will include, among others, safe storage and handling of fuels, drilling wastes, hazardous materials and maintaining minimum flow levels in Arvesta Creek, which is the proposed water supply for the camp and drilling operations.

Alternative 4, (Appendix A, Map 4).

Resource Outputs - This would provide Cassandra Energy the opportunity to further evaluate the oil and gas potential of the Katalla area and would allow CAC to exercise their rights under the 1982 CNI Settlement Agreement. If oil and gas are discovered in paying quantities, they could contribute to the nation's oil and gas supply, and provide for royalty income to CAC shareholders and other Native Corporations. This would be in keeping with the presidential Executive Order 13212: Actions to Expedite Energy-Related Projects, which emphasizes, "The increased production and transmission of energy in a safe and environmentally sound manner is essential to the well-being of the American people."

Economic Effects - The economic effects for all of the action alternatives would be fairly similar, since the project would be implemented, and would essentially be the opposite of the effects described in the No Action alternative.

The proposed exploratory drilling could provide up to an estimated 66 people at peak times, and 44 to 48 jobs during the normal operations. The project is estimated to last two years. The applicant says he hopes to hire at least 10% CAC shareholders, some of whom could be from the Cordova, Tatitlek, and Chenega areas. The applicant expects to use some air, boat, and lodging services in Cordova and to make some purchases of supplies there. Lodge owners in Katalla could provide cabins to oil workers until the camp is established, and for government employees.

The proposed barge activities, two to three barges per week, could disturb guided anglers on the Katalla River for about two of the eight weeks of the coho salmon season, or perhaps about 20 of the 80 clients per season. If clients cancel reservations or do not return, the guides, air services, and other businesses would be affected.

Since it is not known if there are payable quantities of gas and oil, the economic effects of production cannot be quantified. We can only say that production would provide royalty income from gas and oil for CAC shareholders. Goods and services obtained in Cordova would provide revenues for the local economy. Full oil and gas production would be likely to mar the wilderness like quality that guided hunters and anglers seek in the area. Oil development also introduces the risk of oil spills and other environmental damage that could affect the commercial fisheries and other environmentally dependent industries. The magnitude of the effects would depend on a number of specific circumstances, so it would be speculative to say much except that spills and negative economic effects would be possible.

Environmental Consequences - A summary of the effects of implementing Alternative 4 by key issue is presented below. A full discussion of the effects follows in Chapter 3.

Issue 1: Effects on fish and wildlife and historic resources. No effects on fish and wildlife populations are anticipated. Barge and truck traffic may frighten or displace individuals, but the effects would only be temporary. Barges would travel over 700 yards of pink salmon spawning area before reaching a gravel bar about 550 feet downstream from the existing road. Channel surveys show that a shallow draft barge can float over the downstream end of the gravel bar, which, being dry at low tides, is not a spawning area. Matt LaCroix (ADF&G biologist, personal communication) stated that the substrate is more highly sedimented downstream from the gravel bar and no fish were spawning there. The barges would go dry on the gravel bar without resting on spawning areas. Equipment would be driven from the gravel bar to the beginning of the road on the river bank. As the barges travel to the site, they may pass over shallow spawning areas, but there will be at least a foot of clearance. Given this clearance the turbulence from the propellers is not expected to disturb eggs buried in the gravel. The National Marine Fisheries Service (NMFS) has been consulted in regard to the effects on regulated fish species and Essential Fish Habitat (EFH) as defined in the Magnuson-Stevens Fishery Conservation and Management Act. NMFS has provided conservation recommendations on the staging of spill response equipment, disposal of drilling cuttings, and monitoring of the guidelines in the state permits to prevent adverse effects to EFH.

Alteration of habitat would be less than in Alternative 3. The landing area would remove about 0.2 acres of alder, while the road would remove about 0.2 acres of young Sitka spruce and 0.1 acre of sphagnum moss with scattered small spruce, alder, and willow. A staging area along the existing road would clear up to 2.0 acres of Sitka spruce. The amounts of these habitats are relatively small compared to the amount of similar habitat available in the area. Habitat would revegetate naturally after the project is over and roads are obliterated. The U.S. Fish and Wildlife Service stated that migratory bird nests, eggs and young could be harmed by brush clearing during nesting season, approximately April 15 to July 15. Depending on the timing of the Plan of Operations and permits, CEC proposes to begin work in the winter of 2002-2003, which would prevent adverse effects to nesting migratory birds. The historic resources would not be adversely affected, as activities in the Claim No. 1 area (private land) are restricted to the existing cleared land. The area along the east bank of the Katalla River, where a road and staging area would be built, has been determined to have a low probability of having historical or cultural artifacts (Shaw, 2001).

A bald eagle nest tree is located about 20 ft. from the existing road, which would be used under this alternative. A variance from F&WS for activities less than 330 feet from an eagle nest is required.

Issue 2: Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil (Disposal of drilling fluids, cuttings or hazardous materials). Alternative 4 would involve having the hazardous materials being trucked for a slightly longer distance than in Alternative 2, but the increase in risk is negligible. BMPs and other standards for handling and storage of fuels and other hazardous materials will lead to minimal risk of spills. Spill contingency plans and proper containment equipment will minimize consequences of spills. Hazardous materials, cuttings, or fluids that cannot be incinerated or otherwise taken care of properly on site will be stored in suitable hazardous material storage areas and then shipped to appropriate disposal sites.

Commenters also asked that the effects of an oil spill be described. It should be noted here that the proposed activities do not include the building of oil pipelines, large oil storage facilities, or transporting oil in tankers. Within the scope of the proposed actions, major (greater than 1,000 barrels, or 42,000 gallons) spills of crude oil would only occur if there were a well blowout. This could occur if the drills hit high pressure pockets of gas and/or oil and the pressure could not be controlled through the hydrostatic pressure of the drilling muds, through the blowout prevention equipment, or other means. The detailed description of how these measures work and the responses that would be taken are discussed in detail in the discharge prevention and contingency plan. A Canadian environmental effects assessment estimated the possibility of a major blowout as one in 2,600 annually (Husky Oil Operations Limited, 2001). The Division of Oil and Gas, Alaska Department of Natural Resources (2000) reports, "There has never been an oil spill from a platform blowout in Alaska." The Oil Discharge Prevention and Contingency Plan (ODPC plan) for this project does state that there have been blowouts when pockets of high pressure gas were encountered, but these did not contain significant amounts of oil.

If a blowout were to occur, the ODPC plan estimates that oil could be carried up to 6,000

feet from the drill site, using the maximum flows presented in models by Belore et al. (1997). This is about the distance to the open ocean at its closest point. Within this 6,000 foot radius, approximately 58% of the area (1,500 acres) is in the Katalla Slough watershed and the remaining area (1,100 acres) is in the Redwood Creek and Strawberry Harbor drainages. Hills to the north, east, and south could help to confine oil to the Katalla Slough drainage. The ODPC plan states that equipment staged on the Katalla River would be used to contain oil in the slough. Booms and other equipment would need to be flown by helicopter to contain oil in streams in the other drainages.

Effects would be dependent on the amount of liquid oil released, accompanying gas pressure, weather, tides, and other factors. In a worst case scenario where the entire area within 6,000 feet in all directions were oiled, some of the effects would be: 2,600 acres of land contaminated; direct loss of fish and wildlife in this area; contamination of most of the 12.9 miles of stream in the Katalla Slough drainage, 2.5 miles of stream in the Redwood Bay area, one mile of stream in the Strawberry Harbor drainage; lingering effects of oil in the soil and streams, and other effects. Effects to commercial fisheries and other areas would depend on the amount of direct contamination of the ocean and the ability to contain oil within the inland streams. Chapter 3 has a more detailed discussion.

Issue 3: Effects on recreational users. The presence of barges in the river, truck and helicopter noise, and expected competition for fishing areas between guided anglers and drilling workers, could diminish the recreational experience for coho anglers. Guides and lodge owners say that their clients are seeking quiet, solitude, and a wilderness-like experience. Since barge traffic would be limited in the river when pink salmon are spawning (August to mid-September), the effect from barges on coho salmon anglers would be limited to the last few weeks of September. Guided hunters are usually flown to more remote locations so the effects would not be as great for them. However, when they are in camp, they would also hear the truck and helicopter noise and there would be noise from the equipment storage area.

Issue 4: Consider the proposal in the context of the Roadless Area Conservation

Rule. The proposed temporary road would affect 833 acres of the 1,032,730-acre Bering Lake roadless area, based on 2.6 miles of road and an influence zone of up to one-quarter mile on each side of the road. The effect would be temporary and upon completion of the project it would revert back to the current condition. Should oil and gas be discovered this would be a long-term effect and would be subject to additional disclosure under NEPA.

Issue 5: Monitoring: both of resources, e.g. water quality and oversight of

operations. A Forest Service inspector will monitor the road maintenance to ensure it is maintained according to Forest Service standards and guidelines, BMPs, and all conditions described in the Special Use Permit. These will include the operator's assurance that no equipment will work in streams and stream banks are not disturbed along the old roadway. The inspector will ensure that an Erosion Control Plan has been developed and implemented and that there are no problems with sedimentation of streams.

A Forest Service biologist will monitor the effects of barge traffic passing over pink salmon spawning areas to ensure there are no adverse effects due to turbulence from propellers. A biologist will also monitor harvest of coho salmon by providing voluntary

harvest reports to guided clients and drilling workers. Site visits will be made to corroborate the information. If there are escapement concerns, visual counts of the spawners in the Katalla system will be conducted.

The bald eagle nest along the existing road will be monitored to determine if the nest is active. Measures will be taken to minimize disturbance.

The State of Alaska will issue permits for drilling operations and will be responsible for seeing that the terms of those permits are implemented. These terms will include, among others, safe storage and handling of fuels, drilling wastes, and hazardous materials. Minimum flow levels in Arvesta Creek, which is the proposed water supply for the camp and drilling operations, will be monitored.

Comparison of Alternatives by Issue - Table 1 provides a comparison of the alternatives focusing on the key issues. For more detailed descriptions of the affected environment and the environmental consequences of the alternatives, refer to Chapter 3.

Table 1, Comparison of Alternatives by Issue.

Alternative	1-No Action	2	3	4
Issue				
Effects on fish.				
Barge/landing craft traffic.	No Effects	Temporary disturbance of fish in 1.5 miles of river; temporary disturbance of 0.5 mile of pink salmon spawning area.	Temporary disturbance of fish in 1.0 miles of river; temporary disturbance of 100 yards of pink salmon spawning area.	Temporary disturbance of fish in 1.4 miles of river; temporary disturbance of 0.4 mile of pink salmon spawning area.
Use and maintenance of the temporary road.	No effects			
New temporary road and barge access ramp construction.	No Effects	Minor amount of sedimentation associated with construction of barge access ramp and staging area.	Minor amount of sedimentation associated with construction of barge access ramp and staging area. Loss of 800 sq. ft. of salmon rearing habitat from construction of approximately 0.5 miles of new temporary road. No effects to populations foreseen.	Minor amount of sedimentation associated with construction of the road up the river bank, disturbance of the gravel bar.

Alternative	1-No Action	2	3	4
Issue				
Fuel spills or accidents involving hazardous materials.	No Effects	If there were spills at unloading site, 1.75 miles of river and tidal areas possibly contaminated. Unloading site is 100 yards upstream from spawning area. Containment equipment to be stored at the drill site and downstream storage area to reduce spread to streams, river, or to ocean.	If there were spills at unloading site, 1.75 miles of river and tidal areas possibly contaminated. Unloading site immediately adjacent to spawning area. Containment equipment to be stored at the drill site and downstream storage area to reduce spread of materials to streams, river, or to ocean.	
Harvest of fish.	No Effects	Up to 66 drilling workers fishing for two fishing seasons, plus 80 guided anglers. Applicant states that he will try to limit number of workers fishing at any one time, will not have freezer space for fish so workers will mostly practice catch and release, work to protect resource. Guided anglers mostly catch and release. Increased human presence and fishing pressure will increase harvest. Harvest will be monitored, ADF&G consulted to determine any need for closures.		
Use of water from Arvesta Creek on private land.	No Effects	No adverse effects foreseen. State Department of Natural Resources and ADF&G Habitat will issue permit and determine minimum flow levels in creek that must be maintained. NMFS says State standards will prevent effects to Essential Fish Habitat.		
Effects on Wildlife.				
Human disturbance.	No Effects	Temporary displacement of wildlife along roadway during use. Presence of bald eagle nest will invoke terms of MOU between USFS and USFWS. Possible abandonment of nest or premature fledging.	Temporary displacement of wildlife along roadway during use. Construction of road detour around nest may cause disturbances even though it is beyond the 330-foot buffer. Possible blow down of timber from temporary road.	Temporary displacement of wildlife along roadway during use. Presence of bald eagle nest will invoke terms of MOU between USFS and USFWS. Possible abandonment of nest or premature fledging.

Alternative	1-No Action	2	3	4
Issue				
Alteration of habitat.	No Effects	<p>Clearing of up to 2.5 acres of small diameter trees and brush for equipment storage could displace migratory birds, considered negligible effect because of abundance of habitat.</p> <p>Removal of up to 2.0 acres of old growth Sitka Spruce habitat and 625 sq. ft. of riparian vegetation. No effect on species that require old growth habitat. Riparian vegetation would be re-established upon completion of the project.</p>	<p>Clearing of up to 2.5 acres of small diameter trees and brush for equipment storage could displace migratory birds, considered negligible effect because of abundance of habitat.</p> <p>Removal of up to 2.4 acres of beach rye grass/lupine habitat, 0.46 acres of old growth Sitka Spruce, 0.6 acres of young spruce forest, 0.5 acre western hemlock/Sitka spruce forest, (this is included in the 2.4) 0.14 acres of wetland, and 0.1 acre of alder and other brush species. No effect on species that utilize habitat. Rye grass/lupine and young Sitka spruce habitats would be re-established when the project is completed.</p>	<p>Clearing of up to 2.5 acres of small diameter trees and brush for equipment storage could displace migratory birds, considered negligible effect because of abundance of habitat.</p> <p>Removal of up to 2.0 acres of Sitka spruce for a staging area, 0.2 acre of alder, 0.2 acre of young Sitka spruce, and 0.1 acre of sphagnum moss with scattered spruce, alder, and willow. Less than 0.1 acre of wetland covered by road. No effect on species that require old growth habitat. Vegetation along 550-ft road would be re-established when project is finished and rig matting is removed.</p>
Effects on migratory birds.	No effects	Brush clearing will occur outside of the nesting season, so no young will be endangered. Loss of habitat is relatively minimal and the effect on populations is negligible.		
Increased human presence.	No Effects	Up to 66 drilling workers in camp. Main concern of commenters was the effect of workers hunting bear. Applicant states that no bear hunting would be allowed for those people at the camp. No unauthorized firearms would be allowed in camp. Some species would avoid camp area due to human presence.		

Alternative	1-No Action	2	3	4
Issue				
Defense of life and property, (DL&P).	No Effects	Incineration of garbage, bear-proof containers and storage areas would prevent bear attraction to camp and keep bear encounters and DL&P takings to a minimum. Conflicts would be negligible or low.		
Effects on TES Species.				
Dusky Canada geese.	No Effects	Possible temporary disturbance by passing barges to dusky Canada geese, which could feed along lower river. Negligible to low effect because this would only cause them to fly away and temporarily disrupt feeding. No habitat or nesting area would be disturbed.		
Trumpeter Swan.	No Effects	No effect to trumpeter swans because none are known to nest in the area. Barge traffic would be screened from possible nesting areas by the riverbanks and riparian vegetation.	No effect to trumpeter swans because none are known to nest in the area. Road along Katalla river may be more visible to areas where trumpeter swans could nest. No swans known to nest in affected area.	
Effects on Historic Resources.	No Effects	No adverse effect, survey completed, historic and cultural resources avoided.		
Risk of natural hazards of earthquakes and storms with respect to spills of drilling materials, fuel, any produced water or oil. Disposal of drilling fluids, cuttings or hazardous materials.	No risk	Operational delays likely due to storm events. Spills unlikely, as hazardous materials and fuels will be stored in lined, diked areas to contain spills. Low probability of large earthquake. Unlikely to be affected by tsunami or seiches. Drilling mud, cuttings will be reinjected, incinerated, or shipped to an appropriate waste disposal site. Wastes that cannot be incinerated will be shipped to an appropriate waste disposal site.		
Effects of Blowouts.	No Effects	Low probability of major blowout. Odds estimated as 1 in 2,600 annually. Effects dependent on numerous factors. The worst case would be contamination of 2,600 acres, 16.4 miles of stream, direct mortality of fish and wildlife, lingering effects on soil and water.		
Effects on recreational users.				
Equipment storage, truck and barge	No Effects	Equipment storage would be	Equipment storage would be	Equipment storage would be a visual

Alternative	1-No Action	2	3	4
Issue				
activity.		a visual intrusion. Barge traffic could temporarily interrupt sportfishing up to roadway and detract from the sense of serenity and remoteness. Truck noises could be heard along river up to the old roadway.	a visual intrusion. Barge traffic could temporarily interrupt fishing to a point one-half mile downstream from existing road and detract from the sense of serenity and remoteness. Truck noises could be heard along river up to the old roadway.	intrusion. Barge traffic could temporarily interrupt fishing to a point 550 feet downstream from existing road and detract from the sense of serenity and remoteness. Truck noises could be heard along river up to the old roadway.
Helicopter noise.	No Effects	Helicopter noise clearly audible. Minor, occasional noise from drilling activity.		
Barge noise.	No Effects	More barge noise up river to old roadway. Main barge activity proposed outside of peak fishing season.	More barge/truck noise along river with proposed road. Main barge activity proposed outside of peak fishing season.	
Recreation conflicts with drilling workers.	No Effects	Up to 66 drilling workers could be present. Fishing areas may become overcrowded, remote fishing experience temporarily lost.		
Changes in visual quality.	No change	No change	Temporary change from very high to high Scenic Integrity Objective to low, in areas adjacent to Katalla River.	
Changes in ROS.	No change			
Effect on cabin owners/outfitter-guide business.	No Effects	The downstream unloading site proposed in Alternative 3 may be somewhat less disruptive to anglers, but overall, the combination of noise, traffic, and the loss of the ambience of a wild setting could temporary diminish the recreational experience.		
Roadless Area Conservation Rule.	No change	No effects. Recent interim direction by the Chief of the Forest Service has reserved authority for allowing activities within roadless areas where road access is needed pursuant to reserved or outstanding rights or as provided by statute or treaty, to the Regional Forester, (USDA Forest Service, 2001a).		
Reduction in roadless acres.	No change	Temporary reduction of 742 acres, reduced by 2.5 miles of temporary road, 1/4 mile on each side affected	Temporary reduction of 1,045 acres, reduced by 3.2 miles of temporary road, 1/4 mile on each	Temporary reduction of 833 acres, reduced by 2.6 miles of temporary road, 1/4 mile on each side affected.

Alternative	1-No Action	2	3	4
Issue				
		side affected.	1/4 mile on each side affected.	
Monitoring, both of resources, e.g. water quality, and oversight of operations.	None	A Forest Service inspector will monitor the use and maintenance of the temporary road. A Forest Service fish biologist will monitor the effect of barge traffic on spawning gravels. Harvest levels of coho salmon will be monitored to determine whether the run is being overfished.		

Mitigation Measures - The analysis documented in this EA discloses the possible adverse impacts that may occur from implementing the actions proposed under each alternative. Measures have been formulated to mitigate or reduce these impacts. These measures were from the Revised Forest Plan, previously described, public comments and Forest Service concerns. Regulations found at 36 CFR 228 Subpart E, Oil and Gas Resources, set the standards for surface use for oil and gas operations. Adherence to these standards is a Condition of Approval (COA).

Region 10, Best Management Practices (BMPs) relating to road construction and maintenance are found in FSH 2509.22.12 and .14. They require that the use of equipment in streams be minimized, disturbed surfaces are revegetated, culverts and road ditches are maintained to reduce erosion, fish passage is maintained, an erosion control plan in place, and riparian stream buffers are preserved. The Proposed Plan of Operations already addresses some of these issues. The operator will place bridges across streams to maintain fish passage and eliminate the need to place roadfill in streams. The operator will not need to have equipment in the streams, disturb the stream banks, or alter the stream channels along the old roadway. The operator, in accordance with the BMPs, will do maintenance of existing culverts and ditches. Mitigation as outlined in applicable BMPs will be included as Condition of Approvals, and attached to the approved plan. A list of specific BMPs are addressed below:

Oil pollution prevention and servicing/refueling. Approval of a spill contingency plan is required by the State of Alaska, Department of Environmental Conservation, and by the Environmental Protection Agency. No fuels will be stored and no servicing/refueling will be done on National Forest land, per COA, as outlined in BMP 12.8.

Control of solid waste disposal. A permit is required by the State of Alaska for onsite disposal or storage of drill cuttings. Injection of ground up drill cuttings require approval of AOGCC. The Plan of Operations states as follows: 1) cuttings will be temporarily stored onsite¹¹, and then either hauled out, incinerated onsite or injected; 2) the existing septic system will be enlarged according to ADEC standards (18 ACC 72), and 3) garbage will be incinerated. No solid

¹¹ Onsite means the activity is on private land known as Claim No. 1.

waste will be stored or disposed of on National Forest land.

Revegetation of disturbed areas (using native seed sources). This is addressed as a Condition of Approval (COA), attached to the Plan of Operations.

Stream channel protection and Riparian stream buffers. The Plan of Operations states that the stream banks will not be disturbed except for excavation of a ramp at the small barge off loading site. Additionally, some brush clearing for the 2-acre staging area will be allowed adjacent to the stream. This will be flagged on the ground prior to activities commencing (addressed in COAs as outlined in BMP 13.16). The ramp must be permitted by the Corp of Engineers (COE). There is no stream buffer established for this project. The ground will be protected from erosion and rutting at the ramp and staging area by rig matting. Revegetation will occur when the rig matting is removed.

Erosion control plan. This is addressed as a COA, attached to the approved Plan of Operations.

Control of in-channel operations (e.g., grounding of barges). Possible grounding of barges is addressed as a mitigation measure, below (Mitigation for Effects on Fish, Barge Traffic). Otherwise, there is no need for in-channel operations. Temporary prefab bridges will be placed over stream crossings on the roadway. No in-channel work is proposed in the Plan of Operations.

Measures to minimize surface erosion and drainage control to minimize erosion and sedimentation. This is addressed as a COA as outlined in BMP 14.9 and 14.8, attached to the approved Plan of Operations.

Control of excavation and side cast. This is addressed as a COA as outlined in BMP 14.12, attached to the approved Plan of Operations. The activity where this is applicable is the excavation of the ramp at the small barge landing, which requires a COE permit. The permit will carry stipulations.

Development and rehabilitation of gravel sources and quarries. Alternative 3 requires gravel fill. The source of the gravel will not be on National Forest System lands. Any site would be rehabilitated according to the requirements of the owner.

Disposal of construction slash and stumps - addressed as design requirement.

Management of off highway vehicle (OHV) use - OHVs are not permitted on or off the road. This is addressed in COAs, attached to the approved Plan of Operations. OHVs could only go a few hundred yards before hitting brush or sloughs.

Mitigation for Effects on Fish:

Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat: Under this act, federal agencies are required to consult with the National Marine Fisheries Service (NMFS) if federal actions may cause adverse effects to regulated species of fish or Essential Fish Habitat (EFH). NMFS provided several conservation

recommendations that will help meet the requirement that there be no adverse effects to EFH. These include pre-staging of spill containment equipment to protect biologically important areas, reinjecting drill cuttings, and incorporating State permit standards and restoration plans into the Plan of Operations.

Barge traffic: Permits from the Alaska Department of Fish and Game Habitat Division will require the use of shallow draft barges (two-foot draft) to access landing areas. Barge traffic would be limited when pink salmon are spawning (approximately August 1 to September 15). Alternative 3 would have less potential to cause an adverse effect since the barges would not travel over as much spawning area.

Temporary Roads: Sedimentation from the existing or proposed roads is not expected to be a problem. The operator will not work in the streams or disturb banks along the old roadway. All disturbed surfaces, other than the road bed, will be revegetated with native grasses to hold the soil. The road surfaces, stream crossings, and ditches will be monitored to determine whether any erosion problems develop which could affect the streams. Upon completion of use, the access ramp and staging area will be obliterated. The holder of the road use permit will have the option of maintaining the temporary road and structures in a state to prevent resource damage, or decommission the temporary road including removal of structures and terminating the permit.

Fuel or other hazardous material spills: During transport, all hazardous or toxic materials shall be in containers approved by the Department of Transportation and secured in a stable position. The State permits require that hazardous materials are stored in a lined, diked area so spills will be contained. Emergency spill plans and equipment are required. No fueling nor vehicle or equipment maintenance will be performed on National Forest System lands. No fueling nor vehicle or equipment maintenance will be performed adjacent to the river or streams. One place for fueling vehicles and equipment and performing vehicle and equipment maintenance will be developed on private lands. The NMFS has recommended pre-staging spill containment equipment to protect Essential Fish Habitat. This has been proposed in CEC's spill contingency plan, which is being reviewed by the Alaska DEC.

Harvest of fish: Guided anglers and drilling workers will be encouraged to practice catch and release methods. Educational material will be made available explaining the need and the proper techniques. We will ask for voluntary harvest reports from guides and workers, with site visits to corroborate information. The applicant stated that he will not provide freezer space for workers to store fish, which should minimize harvest. He has also proposed limiting the number of workers fishing at any one time.

Use of water from Arvesta Creek: Minimum flow levels needed to protect fish and fish habitat will be determined and included in the terms of the permit from the Alaska Department of Natural Resources and ADF&G Habitat Division. The NMFS has stated that State standards will prevent adverse effects to Essential Fish Habitat.

Mitigation for Effects on Wildlife:

Human disturbance, alteration of habitat: These actions will have unavoidable negligible to low effects. No mitigation is anticipated.

Increased human presence: A major concern in the comments was that drilling workers would increase hunting pressure and kill too many bears. William Stevens, president of CEC, has stated that bear hunting would not be allowed for anyone staying at the camp. No unauthorized firearms would be permitted in camp.

Defense of life and property: Incinerating garbage and using bear-proof storage containers will prevent bears from associating the camp with food and will keep bears from being attracted to the campsite. Bear/human encounters and the taking of bears in defense of life and property would be minimized.

Disturbances to bald eagles: Under Alternative 2 and 4 the memorandum of understanding between the U.S. Forest Service and the U.S. Fish and Wildlife Service will be in effect. A variance to this MOU has been sought and received from the FWS. Under Alternative 3, a new section of road would be built to maintain a 330-foot buffer between truck traffic and the nest tree.

Mitigation for Effects on TES species:

Disturbances to dusky Canada geese: Barge traffic along the river could temporarily frighten geese away from feeding areas if they are present. This is an unavoidable, but negligible effect, because interruptions would be infrequent and geese could fly to nearby feeding areas. No habitat or nesting area would be disturbed, no mitigation required.

Effects on trumpeter swans: Under Alternative 3 and 4, the proposed road could be visible to swans nesting on the east side of the river. There is no record of swans nesting there. The effect is unavoidable, but negligible, no mitigation required.

Effects on nesting migratory birds: Under all of the action alternatives, vegetation would be removed for staging areas or temporary roads. If the project is approved, vegetation would be cleared when migratory birds would not be nesting. The U.S. Fish and Wildlife Service recommends clearing vegetation outside of the April 15 to July 15 period.

Mitigation for Risk of Natural Hazards:

Earthquakes, storms: Safe storage of hazardous materials in approved sites, and emergency spill plans and equipment, as required in state and federal permits, should prevent problems caused by most earthquakes. The danger of spills caused by shipping accidents during storms can be avoided by delaying shipping during severe storms.

Disposal of drilling fluids, cuttings, or hazardous materials: The cuttings will be stored in a hazardous waste area and then will either be transported back to Cordova for disposal, ground up and reinjected at the drill site, or incinerated for decontamination. Garbage and most wastes will be incinerated. Those wastes that cannot be incinerated will be stored and shipped to an appropriate disposal facility. Drilling fluids, cuttings, waste, or hazardous materials will not be disposed on National Forest System lands. Drilling fluids, cuttings, waste, or hazardous materials will not be disposed in river or streams.

Mitigation for Effects on Recreational Users:

Truck and barge activity: Use of the existing road will be restricted to commercial activity only, prohibiting the use of off-road vehicles or other motorized vehicles for recreational purposes or other uses not essential to drilling operations.

Noise: Truck and barge noise would be unavoidable. Helicopter noise will be partially mitigated by having helicopters fly offshore as safety permits away from the cabin and river area, and turn inland only when they are directly south of the drilling camp area. Some noise will still be audible.

Recreation conflicts with drilling workers: Some competition for fishing spots between drilling workers and guided anglers is unavoidable. Prohibition of non-commercial vehicle use along the existing road will reduce the number of drilling workers fishing along the river, since they would have to walk about five miles. William Stevens, president of CEC, has proposed limiting the number of workers fishing at the river at any given time.

Changes in visual quality: Changes in visual quality would be unavoidable. On completion of the project, restoration of the disturbed areas will restore the visual quality. Under Alternative 2, this will necessitate restoring the barge landing site and staging areas to their former contours and revegetating. Under Alternative 3, this will require removing the road fill and leveling the road area to match the surrounding terrain.

To minimize the potential conflicts between sportfishers and barge traffic: The Alaska Department of Fish and Game has proposed eliminating barge traffic when pink salmon are spawning (August to mid September). Since the pink salmon spawning seasons overlaps with the coho salmon fishing season, there would be no barges except during the last weeks of the coho season in late September. Barge traffic during this period should be light, two to three barges per week. CEC and guides could exchange information on the barge schedules to reduce conflicts.

Mitigation for Invasive Plant Species

Possibility of Transporting Exotic Plants (FSM 2080): CEC will clean equipment of dirt, vegetation, or other material that might carry non-native plant seeds or parts before transporting the equipment to Katalla.

Implementation Monitoring - Implementation monitoring assesses whether the project was implemented as designed. Chugach National Forest staff annually conducts a review of BMP implementation and effectiveness. The results of this and other monitoring are summarized in a Chugach National Forest Annual Monitoring and Evaluation Report. In addition, the following project specific monitoring is proposed:

Maintenance of Existing roadway, installation of temporary bridges and any New Temporary Road Construction: A Forest Service inspector will monitor the use and maintenance of the temporary road. The inspector will ensure that road safety and construction standards are met, bridges are placed as described in the Plan of Operations without disturbances to stream banks, an erosion control plan is developed and implemented, streams are protected from sedimentation, and all other requirements of the Special Use Permit are met.

Effect of Barge Traffic on Spawning Gravels: While it is thought that the spawning gravels in the Katalla River will not be disturbed by the thrust of the propellers of the barge motors, a Forest Service fish biologist will monitor the effect after barges have passed. The effects will be examined at the lower tide levels and occasionally throughout the mobilization period, since the thrust levels and water depths will vary among barge trips.

Harvest of Coho Salmon by Guided Anglers and Drilling Workers: Harvest levels of coho salmon will be monitored to determine whether the run is being overfished. Voluntary reporting by guides and workers will be used to estimate harvest. Site visits, observations, and interviews with anglers will be used to corroborate those reports.