Supporting Documentation for Alpine Satellite Development Program

Introduction and Project Description

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1.0 INTRODUCTION

Phillips Alaska, Inc. (PAI) initiated the process to permit two satellite oil and gas accumulations in the Colville River Unit (CRU), CD North (Fiord) and CD South (Nanuq), in November 2000. Those projects remain under review by agencies issuing permits or commenting.

Subsequent to initiating this permitting process, on May 21, 2001 PAI announced several discoveries of oil and gas accumulations on its leases in the northeast planning area of the National Petroleum Reserve-Alaska (NPR-A) west of the Alpine Facility (Alpine). Additional information has since been gathered from the NPR-A discoveries and PAI is now in the process of determining the commerciality of these prospects. The three NPR-A prospects are known as Alpine West, Lookout, and Spark. These prospects are all located within approximately 20 miles of the existing Alpine Central Processing Facility (CPF). If found to be commercial, these prospects, just like CD North and CD South, would transfer produced fluids to the Alpine CPF for processing and distribution through the Alpine pipeline, Kuparuk pipeline, and eventually down the Trans Alaska Pipeline System (TAPS).

As part of our overall analysis of the above accumulations, PAI is considering combining the permitting for both processes. This report is in support of this concept and summarizes the current project and environmental information that is available for the NPR-A satellites, and provides an overview of the CRU satellites. Detailed information on the CRU satellites can be found in the *Colville River Unit Environmental Evaluation Document* (PAI 2002).

For the purposes of this document, the five satellites are referred to as CD North (Fiord, CD-3), CD South (Nanuq, CD-4), Alpine West (CD-5), Lookout (CD-6), and Spark (CD-7), and when discussed as a whole, as the Alpine Satellite Development Program. These locations are presented in Figure 1.1.

Although not of much significance to this report, we also wish to note that some of the waterway nomenclature on the United States Geological Survey (USGS)-based maps in this report, and in other referenced reports, is not consistent with traditional knowledge of local communities. The USGS has agreed to begin working with communities to revise the maps.

1.1 Purpose and Need

PAI is analyzing the commercial viability of the potential development of up to five satellite oil and gas fields in the CRU and the NPR-A, including the transportation of the oil and gas to Alpine for processing. Development of these resources helps satisfy the purpose of the Naval Petroleum Reserves Production Act of 1976 (NPRPA) to explore and develop oil and gas resources within the NPR-A. It also helps to satisfy the demand for a continued supply of domestic oil and decrease the dependence of the United States on foreign oil imports.

Should PAI choose to move forward with these projects, this report is intended to provide the U.S. Department of Interior, Bureau of Land Management (BLM) preliminary information that can be used to prepare for public scoping of the project and preparation of the National Environmental Policy Act (NEPA) documentation. The report is not intended to be a comprehensive analysis of the satellites or their potential impacts.

Figure 1.1 Alpine Satellite Development Program Location Map

1.2 Report Format and Objectives

Report Format

This report has been organized to introduce and describe the project satellites. A second report will be submitted in the near future that discusses preliminary alternatives, potential impacts to be analyzed, and environmental conditions. A list of references and acronyms has also been included. The discussions, where appropriate, have been segregated into Alpine West (CD-5), Lookout (CD-6), and Spark (CD-7) for review. Information has also been provided on the CRU satellites for the Alpine Satellite Development Program. This report incorporates the results of recent studies (including field studies) of the physical, biological, and human environments (where available).

1.3 Background Information

History and Exploration Activities in the National Petroleum Reserve–Alaska

The Naval Petroleum Reserve Number 4, also know as Pet-4, was created in Northern Alaska by President Warren G. Harding in 1923. Both the federal government and private industry have completed numerous exploration drilling and seismic programs in NPR-A since 1940. Previous activities in this area included over 16,000 line miles of seismic survey and 28 exploration wells (BLM 2001).

President Gerald Ford signed the NPRPA to develop Pet-4 in 1976. The law transferred management of Pet-4 to the Secretary of the Interior and renamed it the National Petroleum Reserve-Alaska. The law prohibited petroleum production in the NPR-A until authorized by Congress, which occurred in 1980. The BLM leased tracts in the NPR-A in 1982 and 1983 (all now expired) but did not receive any acceptable bids in a lease sale in 1984 (BLM 1998a). In 1998, BLM published an Integrated Activity Plan (IAP)/Environmental Impact Statement (EIS) which, again, made much of the Northeast Planning Area available to oil and gas leasing. An exploration program was authorized by BLM in January 2000 for up to 8 wells under the leases issued to ARCO Alaska, Inc. (now known as PAI) in NPR-A.

PAI, and its partner Anadarko Petroleum Company (Anadarko) own 126 oil and gas leases in NPR-A as of June 03, 2002. A total of 12 wells have been drilled in the NPR-A over the last three years by either PAI, Anadarko, or BP Exploration (Alaska) Inc. (BP) (BLM 2001). PAI has been performing environmental studies in the NPR-A since 1999.

Northeast National Petroleum Reserve–Alaska Integrated Activity Plan/Environmental Impact Statement and Record of Decision

The BLM prepared the Northeast NPR-A, Final IAP/EIS to determine the multiple-use management of the 4.6 million acre area. The BLM focused on the northeastern portion of the NPR-A since it is of greatest interest for oil and gas development and also is the area encompassing some of the highest value of surface resources of the Reserve. The northeastern area is also the closest to the existing petroleum infrastructure (BLM 1998a).

The Secretary of the Interior filed a Record of Decision (ROD) which adopted the IAP/EIS in October 1998 and made eighty–seven percent of the Northeast NPR–A available for oil and gas leasing. The IAP/EIS analyzed six alternative future management plans for public comment, including the Preferred Alternative, which was adopted with clarifications and modifications as discussed in Appendix A of the ROD. The IAP/EIS emphasizes restrictions on surface activities, consultation with local residents, and coordinated scientific studies to protect wildlife habitat, subsistence use areas, and other resources. The ROD includes 79 stipulations as special mitigation measures governing activity on oil and gas leases under the IAP. The ROD fulfills the NEPA requirements associated with the management planning on the Northeast NPR-A public lands, including making decisions on what lands to make available for oil and gas lease sales. The ROD specified that the BLM would conduct the appropriate additional NEPA analysis, tiering from the IAP/EIS (if appropriate) prior to authorizing future site-specific activity on these lands or conducting additional lease sales. The ROD also specified that some of the 79 stipulations could be modified in the future when looked at for potential development (BLM 1998b).

CRU Development

Development in the CRU recently began with the Alpine CD-1 and CD-2 drilling sites and associated facilities. Oil production from CD-1 commenced in November 2000, and from CD-2 in November 2001. Future oil and gas activities in the CRU were anticipated during permitting of the Alpine Development Project (ADP), and were planned to be developed as satellites (CD North [CD-3] and CD South [CD-4]) to the ADP (ARCO et al. 1997). Alpine West (CD-5), Lookout (CD-6), and Spark (CD-7) were identified as reasonably foreseeable satellites or stand-alone oil and gas developments in the revised CRU Environmental Evaluation Document (EED) (PAI 2002).

Land Use and Ownership

Proposed satellites Lookout (CD-6) and Spark (CD-7) are located on federal lease tracts owned by PAI and Anadarko and under the jurisdiction of the BLM. Proposed satellite Alpine West (CD-5) is located on lease tracts owned by PAI and Anadarko on Native land within the NPR-A. Access to the satellites would cross BLM and Native land in the NPR–A and State of Alaska and Native land outside the NPR–A. The State of Alaska and Kuukpik Corporation have surface ownership of CD North (CD-3) and CD South (CD-4), respectively. The State of Alaska and Arctic Slope Regional Corporation (ASRC) have subsurface ownership for resource development at CD North (CD-3) and CD South (CD-4). All satellites lie within the North Slope Borough. None of the satellites or access routes would cross Native Allotments or Traditional Land Use Sites (BLM 2001).

Related Environmental Reports

Some of the general science and background information for this report references the substantial detailed discussions presented in the Northeast NPR–A, Final IAP/EIS (BLM 1998a) and in the CRU EED (PAI 2002). Other reports with pertinent information that should be reviewed include:

- Alpine Development Project Environmental Evaluation Document, September 1997 (ARCO et al. 1997).
- Record of Decision for the Northeast National Petroleum Reserve–Alaska, Final Integrated Activity Plan/Environmental Impact Statement. October 1998 (BLM 1998b).

- Environmental Assessment EA: AK-020-00-011 for the 1999–2000 Winter Exploration Drilling Program National Petroleum Reserve-Alaska (NPR–A), January 2000 (BLM 2000a).
- Environmental Assessment EA: AK-023-01-003 for the 1999–2000 National Petroleum Reserve–Alaska (NPR-A) Exploration Program, Winter Drilling 2001–2006, December 2000 (minor revision 03/01) (BLM 2000b).
- Environmental Assessment EA: AK-023-02-005 for the National Petroleum Reserve–Alaska (NPR-A) 2001–2006 Exploration Drilling, December 2001 (BLM 2001).
- 2001 Hydrologic Assessment Fish Creek, Judy Creek, and the Ublutuoch River, North Slope, Alaska (URS Corporation 2001).
- Fish Utilization at lakes in Eastern National Petroleum Reserve-Alaska (NPR-A) 1999-2001. Final Data Report. (MJM Research 2001).
- 2001 Water Surface Profiles for Selected Flood Peak Discharges on Fish Creek, Judy Creek, and the Ublutuoch River, North Slope, Alaska. (URS Corporation 2002).
- Wildlife Studies in the Northeast Planning Area of the National Petroleum Reserve - Alaska, 2001. (ABR, Inc. 2002).
- Geomorphology of the NPR-A Study Area, Northern Alaska. First Annual Report. (ABR, Inc. 2002).

Environmental study reports for the 2002 season are currently under preparation by PAI's contractors. These reports will be completed by early January 2003 and will include information on existing environmental conditions in NPR-A and the CRU. Additional confirmation data will be gathered during the summer of 2003.

2.0 PROJECT DESCRIPTION

In oil and gas terminology, a "satellite" is a smaller hydrocarbon accumulation that cannot be reached through directional drilling and which itself cannot economically support separate processing facilities. Therefore, the satellite is a drill site production pad that flows recovered hydrocarbons to another facility for processing. Satellite development is consistent with previous North Slope expansion, although the footprint for these facilities has been significantly reduced by innovation and technological advancements over the past twenty years. PAI proposes to maximize oil and gas production in the CRU and NPR-A by constructing satellite drilling and production pads at various positions optimizing recovery from smaller associated hydrocarbon accumulations. Several of the current satellites being considered for such development are described in the following sections (see Figure 2.1).

CRU Satellites

2.1 CD North (Fiord, CD-3)

The CD North (CD-3) satellite is proposed to be located on Alaska Department of Natural Resources (ADNR) Oil and Gas Leases 54-372104 and 54-372105 in Sections 4 and 5 of Township 12N, Range 5E of the Umiat Meridian. The pipeline corridor for CD North (CD-3) would be located on ADNR Oil and Gas Leases 54-372107, 13-25538, 13-25558, 54–372104, and 54–372105 in Sections 4, 5, 8, 9, 16, 17, 20, 21, 29, and 32 of Township 12N, Range 5E. The site would be located between West Ulamnigiaq and East Ulamnigiaq channels. CD North (CD-3) exploratory wells were drilled in that area in 1992 and 1998. A CD North (Fiord, CD-3) Site Map is provided as Figure 2.2.

The CD North (CD-3) satellite would consist of the construction of a stand-alone drilling pad (12.6-acres) that would connect to an airstrip (15.2-acres) and apron/taxiway (1.1 acres) by an access road (1.7-acres). Alpine-based operators would access the CD North (CD-3) pad for regular daily operational activities via small aircraft or helicopter utilizing the all weather gravel airstrip.

This satellite would require placement of approximately 252,000 cubic yards of gravel over approximately 30.6 acres. Oil produced from CD North (CD-3) would be transported via pipeline to Alpine for processing. CD North (CD-3) pipelines and utility lines would be supported on new Vertical Support Members (VSM) spaced 55 feet apart for an approximate length of 6.5 miles. CD North (CD-3) would be serviced and maintained by a crew based at Alpine. Up to 32 wells would be drilled from the gravel pad (PAI 2002).

A Winter Development Drilling Program is proposed to avoid impacts to wildlife and subsistence activities during summer months. This unique winter drilling program would require a minimum of 100 days per season to meet the project objectives and would also allow a relief well access via ice road. The drilling rig would be transported, before break-up, to other sites for use during the summer. It would require three to five winter drilling seasons from January until May to complete the development program at CD North (CD-3).

Figure 2.1 **CD North (CD-3), CD South (CD-4), Alpine West (CD-5), Lookout (CD-6), and Spark (CD-7) Alpine Satellite Development Program Site Map**

Figure 2.2 CD North (Fiord, CD-3) Site Map

2.2 CD South (Nanuq, CD-4)

The CD South (CD-4) satellite is proposed to be located on ADNR Oil and Gas Leases 75-380077 and 75A-384211, in Section 24 of Township 11N, Range 4E of the Umiat Meridian; and Section 19 of Township 11N, Range 5E of the Umiat Meridian. The pipeline and road corridor for CD South (CD-4) would be located on ADNR Oil and Gas Leases 13-25558, 13-25559, 54-372097, 75-380075, 75–380077, and 75–384211 in Sections 1, 12, 13, and 24 of Township 11N, Range 4E of the Umiat Meridian; Sections 5, 6, 7, and 19 of Township 12N, Range 5E of the Umiat Meridian; and, Section 32 of Township 12N, Range 5E of the Umiat Meridian. The site would be located west of the existing Alpine Sales Oil Pipeline corridor and east of the Nigliq Channel of the Colville River. CD South (CD-4) exploratory wells were drilled in 1996, 2000, and 2002. A CD South (Nanuq, CD-4) Site Map is provided as Figure 2.3.

The CD South (CD-4) satellite would include construction of a 9.3 acre gravel pad, which supports drilling and production facilities connected to the existing Alpine by a 3.6 mile, all weather gravel road. The gravel road would begin 600 feet west of the south end of the Alpine airstrip. This satellite would require placement of approximately 300,000 cubic yards of gravel over approximately 33.3 acres.

Oil produced from CD South (CD-4) would be transported via a new pipeline supported by new VSMs to Alpine for processing. These lines would proceed east from the drilling pad for approximately 2,500 feet, then north parallel to the existing Sales Oil Pipeline to Alpine. CD South (CD-4) utility lines (power and communications) would be mounted on a cable tray adjacent to the pipelines on VSMs. CD South (CD-4) would be serviced and maintained by crews based at Alpine. The CD South (CD-4) development-drilling program would consist of up to 32 wells advanced on a schedule that includes a seasonal compliment to the proposed CD North (CD-3) program (PAI 2002).

NPR-A Satellites

As noted earlier in this report, the NPR–A satellites are in the early stages of planning. Therefore, all estimates of gravel volumes and lengths of roads and pipelines are approximate at this time. For each of the NPR-A satellites, utility lines (power and communications) would be suspended on the VSMs or buried in the gravel road; however, local power generation may be used at Lookout (CD-6) and Spark (CD-7). The satellites would be serviced and maintained by crews based at Alpine, and 20 to 30 wells would be drilled at each location.

2.3 Alpine West (CD-5)

The Alpine West (CD-5) satellite is proposed to be located on Arctic Slope Regional Corporation (ASRC) Oil and Gas Lease NPR1, in Section 8 of Township 11N, Range 4E of the Umiat Meridian. The pipeline and road corridor for Alpine West (CD-5) would be located on ADNR Oil and Gas Leases 13–025559, 75-380075, 13–025530, 86A–387212, 86A-387207, and ASRC NPR1 in Sections 1, 2, 3, 4, 5, 8, and 9 of Township 11N, Range 4E of the Umiat Meridian; Sections 34 and 35 of Township 12N, Range 4E of the Umiat Meridian; and Section 6 of Township 11N, Range 5E of the Umiat Meridian. The site would be located approximately six miles south-southwest of Alpine and west of the Nigliq Channel of the Colville

River. One Alpine West (CD-5) exploratory well was drilled from the CD-2 pad in 2001. An Alpine West (CD-5) Site Map is provided as Figure 2.4.

The Alpine West (CD-5) satellite would include construction of an approximately 10 acre gravel pad, which would support drilling and production facilities connected to Alpine by an approximately 3 mile, all weather gravel road and a vehicle-capable bridge across the Nigliq Channel. The gravel road would begin near CD-2 on the existing gravel road that connects CD-2 with Alpine. This satellite would require placement of approximately 341,000 cubic yards of gravel over approximately 38 acres.

Oil produced from Alpine West (CD-5) would be transported via a new pipeline supported by new or existing VSMs to Alpine for processing.

2.4 Lookout (CD-6)

The Lookout (CD-6) satellite is proposed to be located on BLM Oil and Gas Lease AA081819 in Section 25 of Township 11N, Range 2E of the Umiat Meridian. The pipeline and road corridor for Lookout (CD-6) would be located on BLM Oil and Gas Leases AA081742, AA081817, AA081818, and AA081819, and ASRC Oil and Gas Leases NPR1 and NPR4, in Section 25 of Township 11N, Range 2E of the Umiat Meridian; Sections 13, 23, 24, 25, 26, 27, 28, 29, and 30 of Township 11N, Range 3E of the Umiat Meridian; and Sections 7, 8, 17, 18, and 19 in Township 11N, Range 4E of the Umiat Meridian. The site would be located approximately 15 miles southwest of Alpine. Lookout (CD-6) exploratory wells were drilled in that area in 2000 and 2001. A Lookout (CD-6) Site Map is provided as Figure 2.5.

The Lookout (CD-6) satellite would include construction of an approximately 9 acre gravel pad, which would support drilling and production facilities connected to the proposed Alpine West (CD-5) satellite by an approximately 10 mile, all weather gravel road. This satellite would require placement of approximately 886,000 cubic yards of gravel over approximately 104 acres.

Oil produced from Lookout (CD-6) would be transported via a new pipeline supported by new VSMs that would connect to the Alpine West (CD-5) pipeline and then to Alpine for processing.

2.5 Spark (CD-7)

The Spark (CD-7) satellite is proposed to be located on BLM Oil and Gas Lease AA081802 in Sections 16, 17, 20, and 21 of Township 10N, Range 2E of the Umiat Meridian. The pipeline and road corridor for Spark (CD-7) would be located on BLM Oil and Gas Leases AA081819, AA081801, and AA081802 in Sections 2, 3, 10, 15, and 16 of Township 10 N, Range 2E of the Umiat Meridian; and in Sections 25, 35 and 36 of Township 11N, Range 2E of the Umiat Meridian. The satellite would be located approximately 20 miles southwest of Alpine. Spark (CD-7) exploratory wells were drilled in that area in 2000 and 2001. A Spark (CD-7) Site Map is provided as Figure 2.6.

The Spark (CD-7) satellite would include construction of an approximately 9 acre gravel pad, which would support drilling and production facilities connected to the Lookout (CD-6) satellite by an approximately 6 mile, all weather gravel road. This satellite would require placement of approximately 513,000 cubic yards of gravel over approximately 59 acres.

Figure 2.3 CD South (Nanuq, CD-4) Site Map

Figure 2.4 Alpine West (CD-5) Site Map

Figure 2.5 Lookout (CD-6) Site Map

Figure 2.6 Spark (CD-7) Site Map

Oil produced from the Spark (CD-7) satellite would be transported via a new pipeline supported by new VSMs that would connect to the Lookout (CD-6) pipeline and then to Alpine for processing.

The following sections include information primarily on the NPR-A satellites. Refer to the EED for similar information on the CRU satellites.

2.6 Access

Access to the proposed NPR–A satellites would be via a segmented road. The road would connect all three satellites to CD–2 and include a vehicle capable bridge across the Nigliq Channel. The length of the gravel road is estimated at approximately 20 miles and would be approximately 30 feet wide. The proposed gravel access road for the NPR-A satellites is presented in Figure 2.1.

2.7 Preliminary Development Schedule

Each satellite may be constructed simultaneously or independently. Under a typical satellite schedule (Table 2.1), construction of an ice road, the access road, drilling pad and pipelines would be completed in the first and second winters after permit approval for each individual satellite. After gravel placement, development drilling and work over operations would continue intermittently throughout the life of the field. Construction, including final road compaction and grading, and some facilities installation would be completed during the third year of activities. Final installation of facilities, pipeline, and utilities and oil production start-up would begin in the third year.

Table 2.1 Typical Satellite Development Schedule

Timeframe	Task
PRE-CONSTRUCTION	Environmental Studies Permitting Engineering
PERMITS APPROVED - "Time 0"	
1-2 YEARS	Ice Road Gravel Pad and Road Placement Delineation / Development Drilling Pipeline Construction
2-3 YEARS	Facility Construction Delineation / Development Drilling Production Start-Up
3-8 YEARS	Development Drilling

2.8 Facilities

Typical pad facilities for the NPR-A satellites would include 20-30 wells and associated equipment for lighting, heat, surveillance, and emergency power generation. Facility upgrades would be required at

Alpine to process fluids from these satellites. All produced fluids would be transported to Alpine for processing. No significant hydrocarbon processing facilities would be located at Alpine West (CD-5), Lookout (CD-6), or Spark (CD-7). The majority of fuels and chemicals would be stored and handled at Alpine or contained in small aboveground storage tanks at the satellites. Any aboveground storage tanks would comply with appropriate regulations including secondary containment requirements.

2.9 Pipelines and Routes

Pipelines for the NPR-A satellites would likely consist of a 24-inch diameter three-phase (oil, water, and gas) non-common carrier production line, a 10-inch diameter gas (miscible injection) line, a 14-inch diameter seawater injection line, and possibly a 2-inch diesel line. The new VSM supported pipelines would be constructed so that the pipe would be a minimum of five feet above the tundra. Vibration dampeners would be added where necessary to minimize wind–induced stress. Figure 2.1 presents a scenario for the pipeline route. The initial design phase would include studies of channel stability at river crossings and cross-drainage along the pipeline route.

2.10 Utilities

Electrical power to the NPR-A satellites would be provided by Alpine or generated onsite. Facility upgrades would be required at Alpine to provide power to the satellites. These upgrades may include additional gas-fired turbo-generation. During construction and drilling, temporary power would be provided by portable generators as necessary.

Communications systems between the satellites and Alpine would include fiber optic cable and wireless systems. The utility cables would be suspended on the new VSMs or buried in the gravel road.

2.11 Material Sites

Potential gravel sources for the project are the ASRC/Kuukpik Gravel Mine Site and the Clover Materials Site. The ASRC/Kuukpik Gravel Mine Site is located approximately 6 miles southeast of the proposed CD South (CD-4) facilities. The Clover Material Site is located on the distal western edge of the Colville Delta, approximately 10.8 miles southwest of Alpine and 7.4 miles southwest from the proposed CD South (CD-4).

The use of these sites would require developing and transporting the gravel by ice roads and pads. A detailed geotechnical analysis of the fill material would be performed to delineate areas of different material size and moisture content and quality. The ASRC/Kuukpik Mine Site is already permitted with an approved reclamation plan. The Clover Material Site would require a separate permit and reclamation plan.

2.12 Water Supply

Fresh water supplies and water flooding sources for the NPR-A satellites are discussed below.

Drilling and Ice Roads

Fresh water will be required for construction of an ice road system to support placement of the gravel fill and pipelines during the winter and for drilling operations and road maintenance. Approximately 1 million gallons of water is typically used to construct one mile of ice road. Approximately 50,000 gallons/day of water will be required to support drilling operations at each satellite location. Once drilling is completed, water needs will be less than 10,000 gallons per day for dust suppression and other operational uses. PAI currently has numerous temporary water use permits for lakes in the NPR-A that are available as temporary water sources. PAI will apply for water rights for longer-term water sources.

Water Flooding

Water flooding for the satellites would be provided from the existing water line at Alpine. The water line carries treated seawater from the Kuparuk Seawater Treatment Plant (STP) and is supported on the Alpine Sales Oil Pipeline VSMs.

2.13 Waste Management

Drilling wastes (i.e. mud and cuttings) could be managed by a combination of methods: annular disposal into permitted development wells onsite; transport and injection into the approved Class II disposal well at the Alpine CPF or Kuparuk, or at a new Class II disposal well at one of the NPR-A satellites; and reapplication of washed/tested gravels onto pad and/or road surfaces. All well work waste materials will be managed according to the Alpine Waste Management Plan or a plan approved by the BLM. All other solid waste and sanitary sewage waste will be transported to the Alpine CPF or to a Class I disposal well at one of the NPR-A satellites for handling according to the procedures in Alaska Waste Disposal and Reuse Guide developed by PAI and BP.

2.14 Support Facilities

No permanent camp facilities are required at any of the satellites because production processing would be performed at Alpine. Emergency quarters may be installed, depending on distance from Alpine. Construction crews would be housed at Alpine, Kuparuk Operations Center, the village of Nuiqsut, or at temporary camps. Small temporary camps may be used during drilling to support 24-hour drilling operations.

2.15 Operation and Maintenance

All personnel will likely be based at Alpine. Drill sites will be manned on a part time basis with visits to the site as dictated by the activity level or spill prevention requirements. Personnel would travel via the all weather gravel road to CD South (CD-4), Alpine West (CD-5), Lookout (CD-6), and Spark (CD-7). Operation and maintenance of CD North (CD-3) would be performed remotely from Alpine, periodically visiting the satellite via aircraft or ice road.

Operation and maintenance responsibilities would include monitoring of the wells, pumping and metering units, monitoring of the pipelines, potential initial spill response, and routine operation and maintenance. Operations would use well work equipment on CD South (CD-4), Alpine West (CD-5), Lookout (CD-6),

and Spark (CD-7) that is shared with Alpine operations. Only crucial remote maintenance services would be performed at the satellites. Warehousing and repair shops would be located at Alpine.

2.16 Spill Prevention, Detection, and Response

Spill Prevention

PAI would implement a spill prevention, detection and response program for the satellites. An updated Oil Discharge Prevention Contingency Plan (ODPCP) addressing oil spills from Alpine has been submitted for renewal by the regulating agencies. The plan may be amended to incorporate the NPR–A and CRU satellites and incorporate the Alaska Clean Seas (ACS) Technical Manual by reference. The equipment, personnel and tactics applicable for spill response will be listed in the ODPCP.

Access to satellites for oil spill responses would be available by several means. Vehicles from Alpine would have access to the satellites when ice roads are serviceable (usually from January to May) and year-round for those satellites with gravel road access. Helicopters and small cargo aircraft (CASA) would have year-round access to Alpine and CD North (CD-3) airstrips when visibility permits. Helicopters can sling limited loads rapidly (weather permitting) anywhere in the Delta. Larger tundra travel vehicles under permits, such as Rolligons or Tuckers, would also have access to the satellites from Alpine, except during high water. The satellites would also have access to existing response vessels staged at Alpine. Shallow draft ACS response workboats and airboats can typically access larger river channels within a few hours, depending on the location and channel characteristics. Primary spill responders would be from Alpine, with additional resources available from Kuparuk, the Nuiqsut Village Response Team, and mutual aid providers.

Control valves may be used on pipelines, which would be shut in manually or by remote control. Workers could reach manually controlled valves by use of a helicopter, all terrain vehicle (ATV), snowmachine, boat, etc.

Blowout Control/Well Relief

PAI has precautions in place that minimize the potential for a loss of well control. If an uncontrolled flow occurs at the surface, safety procedures would be employed to protect personnel, stop the spill, protect the environment, and protect the equipment. PAI has provisions in place for drilling a relief well as required in ADEC regulation 18 AAC 75.445(d)(2).

Specialized personnel and the equipment needed for well control are available on the North Slope through mutual agreement and can be mobilized within 24 to 48 hours of notification (Alpine ODPCP, In Progress).

Well Capping

PAI considers mechanical surface control methods such as well capping the Best Available Technology versus relief well drilling for well source control. Over the past decade, well capping techniques have been developed and proven to be efficient and effective in regaining control of damaged wells and in reducing associated environmental impacts. Well capping response operations are highly dependent on

the severity of the well control situation. PAI has the ability to mobilize specialized personnel and equipment (capping stack, cutting tools, etc.) to a North Slope location within 24 to 48 hours of notification.

Spill Response Training

PAI would provide training to its employees on the importance of avoiding oil or hazardous material spills, and spill response. PAI would also provide new employee orientation, annual environmental training seminars, and appropriate certification classes. Safety meetings are held on a regular basis, which include training for spill prevention and response. Phillips Incident Management Team would also participate in scheduled training programs and would conduct spill response drills. These training programs are a regular feature of Alpine, and the satellites project personnel would receive training through that established curriculum.

Spill Detection Methods

The primary methods for leak detection would be pipeline pressure monitoring and visual inspection. A component of the leak detection and spill prevention program could include the use of "smart pigs." These sophisticated instruments would be inserted in and retrieved from the multiphase production lines to measure the integrity of the pipe (wall thickness, areas of corrosion damage, paraffin build-up, etc.) to pinpoint potential locations where a leak might occur.

All pipelines would be visually inspected on a regular schedule by: (1) aircraft overflight observations; (2) use of the Forward Looking Infrared Radar (FLIR) monitoring system operated from aircraft (Twin Otter); and/or, (3) by ground observations from vehicles traveling on an access road.

Controlling Oil Spill Movement

Field studies have been conducted in the Colville River Delta region since 1995 to develop recommendations for the prevention, control, and response to potential oil spills. Polaris Applied Sciences and PAI are currently conducting field studies to provide recommendation for environmental protections during operation of the NPR-A satellites. Recommendations will include procedures for minimizing the effects of possible oil spills, defining potential oil transport pathways in nearby waterways, selecting and recommending control points for oil interception, and creating a knowledge base on the physical environment to support spill response planning, decisions and operations. Field studies in NPR-A during the summer of 2001 included videotaping moving water bodies during a low altitude helicopter/aerial survey to capture existing conditions. Field studies for 2002 include ground truthing the aerial surveys performed in 2001 and collecting information on channel morphology and bathymetry. A technical report summarizing the 2001-2002 field studies is currently in preparation (Ed Owens, Personal Communication, 2002).

Objectives of the 2002 fieldwork include selecting tactical points for spill control and pre-staged equipment near the NPR-A satellites. These locations can provide control points to minimize the potential spread of an oil release, and thereby minimize the size of the potential affected area from a release.

More details on oil spill response planning in the region are available in the Spill Prevention and Response section in the Northeast NPR-A, Final IAP/EIS (BLM 1998a) and the Alpine ODPCP. Some oil spill response equipment will be stored at the individual satellites. Equipment is also stored at Alpine and can be transported to the satellites via the access road to assist any response effort. Oil spill response equipment may also be deployed using helicopters and vessels.

2.17 Future Projects

Although not being proposed for development at this time, it is likely that additional discoveries will be found and proposed for development in the CRU and northeast NPR-A areas in the future. In general, three such types of discoveries could lead to future project development: (1) additional satellite oil discoveries that flow back to Alpine for processing; (2) oil discoveries with stand-alone processing; and (3) natural gas discoveries and the associated pipeline. Before such discoveries can be known, PAI must first undertake additional exploration and delineation drilling, production testing, and detailed engineering. If such discoveries do occur and are proposed for development, separate NEPA documents would be prepared that may tier to the document for the projects described in this report.

First, potential future development of additional satellite fields would be similar to the projects discussed in this document; i.e., would consist of gravel roads, pads, and airstrips, with pipelines feeding back to Alpine for processing. At this time it is estimated that up to ten such satellite discoveries, in addition to the five discussed in this document, may be developed in this manner. The precise location of these discoveries is not known at this time but would generally be within approximately 30 miles of Alpine due to engineering constraints.

Second, it is also possible that sufficient reservoirs of oil and gas may be discovered at a location that would justify construction of a separate processing facility. The location and details of such a facility are not known at this time but would likely be similar to Alpine. If developed, additional satellite discoveries located close in proximity to these new stand-alone facilities would feed oil and gas directly to that facility. Although this scenario is not being proposed for any location at this time, with continuing exploration activity in the NPR-A it is possible that such a facility could be constructed in the future, most likely beyond the 30-mile radius around Alpine.

A third category of project ties to the potential construction of a gas pipeline to carry gas from the North Slope to markets elsewhere. If such a gas pipeline were to be constructed, gas reserves in the NPR-A may be developed to provide gas for this pipeline. In such a scenario, gas processing facilities and pipelines could be constructed in the NPR-A.

Figure 2.7 depicts a cluster of both (1) announced discoveries within the former Kuukpik Unit approved by the State of Alaska, and (2) the surface locations in the CRU and Northeast NPR-A where PAI has drilled an exploration well since 1999 or has permission to do so in the next few years.

Figure 2.7 **1999-2002 PAI Exploration Locations, Colville River Unit and National Petroleum Reserve-Alaska**

3.0 References

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4.0 Acronyms

ACS	Alaska Clean Seas
ADNR	Alaska Department of Natural Resources
ADP	Alpine Development Project
ASRC	Arctic Slope Regional Corporation
ATV	All Terrain Vehicle
BLM	Bureau of Land Management
CPF	Central Processing Facility
CRU	Colville River Unit
EA	Environmental Assessment
EED	Environmental Evaluation Document
EIS	Environmental Impact Statement
FLIR	Forward Looking Infrared Radar
IAP	Integrated Activity Plan
NEPA	National Environmental Policy Act
NPR-A	National Petroleum Reserve-Alaska
NPRPA	National Petroleum Reserves Production Act
ODPCP	Oil Discharge Prevention and Contingency Plan
PAI	Phillips Alaska, Inc.
ROD	Record of Decision
STP	Seawater Treatment Plant
TAPS	Trans-Alaska Pipeline System
USGS	United States Geological Survey
VSM	Vertical Support Member