

## **Appendix 1**

### **Environmental Protection Plan**



**ENVIRONMENTAL PROTECTION PLAN  
FOR  
APACHE CANADA LIMITED**

**NOGHA/TUNAGO SETTLEMENT LANDS  
PROPOSED 2003/2004 DRILLING PROGRAM  
Nogha B-23, West Nogha K-14, and North Tunago E-44 Locations**

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**For Submission to the Sahtu Land and Water Board**

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## 1 Introduction

Apache Canada Ltd. (Apache) is planning to drill three exploratory wells, Nogha B-23 (66°32'06.1", 125°49'40.3"), West Nogha K-14, (66°33'39.5", 126°03'09.9") and North Tunago E-44 (66°23'19.7", 125°54'07.4"), on the Nogha Settlement Lands located between 54km and 73km south of Colville Lake, NWT. The locations have been selected based upon a review of seismic surveys that have been conducted in the area and follow up on a two well drilling program conducted in the area in 2002/03.

In accordance with the Mackenzie Valley Resource Management Act (MVRMA) and the requirements of the Sahtu Land and Water Board (SLWB), Northern EnviroSearch Ltd. (NESL) was retained by Apache to examine the effects that this drilling program may have on the environment and the social, economic and cultural well-being of the residents and communities.

## 2 Methodology

This Environmental Protection Plan (EPP) was initiated in July, 2003. It consisted of a field assessment, research, and discussions with community members and local land use regulators.

Community meetings were held in Colville Lake on August 6, 2003, Fort Good Hope on July 29 & September 25, 2003, and Norman Wells on July 29, 2003. Additional consultations were held in Calgary with representatives of the community of Colville Lake on September 8-10. Representatives of Apache provided an overview of the program and answered questions posed by residents. The program area was scouted by helicopter on August 20 to 22, 2003. Traditional Environmental Knowledge (TEK) was gathered in conjunction with a community meeting in Fort Good Hope on September 25, 2003, by phone, and at Colville Lake trapper cabins on October 5 & 6, 2003.

## 3 Communication

The following people are associated with this protection plan. Any communications with respect to this protection plan may be referred to:

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## 4 Project Description

The Nogha drilling program is being proposed by Apache to assess the hydrocarbon potential on, Settlement Land Blocks M-11, M-16 and M-20. Locations were selected based on an assessment of available seismic data and follows the drilling of two sweet gas discovery wells drilled in the winter of 2002/03. This drilling project includes three well locations:



- Nogha B-23 (66°32'06.1", 125°49'40.3")
- West Nogha K-14, (66°33'39.5", 126°03'09.9")
- North Tunago E-44 (66°23'19.7", 125°54'07.4")

The purpose of this EPP is to identify, address, and mitigate the environmental issues associated with the conduct of the Nogha drilling project. As part of the EPP, the access and wellsite locations were scouted by helicopter on August 19 - 21, 2003. The scouting party consisted of:

- Bob Raina, NESL
- Jim Watson and Grant McLean, Trout Creek Consulting
- Wilbert Kochon, Colville Lake Band

The drilling program consists of the following components:

- Construction of approximately 131 kilometres of access utilizing existing cutlines
- Construction of three wellsites at Nogha B-23, West Nogha K-14 and North Tunago E-44, three sumps and a campsite.
- Moving drilling and support equipment to the wellsite
- Operation of road construction and drilling camps
- Drilling operations
- Completion and reservoir evaluation
- Waste management
- Demobilization of equipment
- Decommissioning/reclamation of the campsite, wellsites, sumps and access

#### 4.1 Timeline

Access and lease construction is planned to begin in December 2003 when suitable frozen ground conditions are present. Transportation of the drilling rig, set up and drilling is scheduled to take place in January 2004. Drilling is anticipated to be complete in late March 2004 and equipment will be moved off site and to Norman Wells by mid-April (see Table 1 below for the anticipated timeline for the project components).

**Table 1: Anticipated Timeline for the Apache 2004 Nogha/Tunago Winter Drilling Program**

Activity	Time Required	Estimated Dates
Access, lease and remote sump construction	45 days	November 20, 2003 - January 4, 2004
<b>First Well</b>		
Rig and drilling camp move-in	5 days	January 5-10, 2004
Drilling (Nabors Rig #62)	35 days	January 11 - February 15, 2004
Completion and evaluation	14 days	February 16-29, 2004
<b>Second Well</b>		
Rig move-in	5 days	February 16-20, 2004
Drilling (Nabors Rig #62)	35 days	February 21 - March 27, 2004
Completion and evaluation	14 days	March 28 - April 10, 2004
Demobilization to Norman Wells	5 days	April 7-11, 2004
Clean-up/decommission wellsites, remote sump and access	10 days	April 6-15, 2004



Activity	Time Required	Estimated Dates
<b>Third Well</b>		
Rig and drilling camp move-in	5 days	February 16-20, 2004
Drilling (Akita/Sahtu Rig #51)	35 days	February 21 - March 27, 2004
Completion and evaluation	14 days	March 28 - April 10, 2004
Demobilization to Norman Wells	5 days	April 7-11, 2004
Clean-up/decommission wellsites, remote sump and access	10 days	April 6-15, 2004
Reclamation	To be determined	Inspection in early summer

## 4.2 Access

West Nogha K-14, Nogha B-23 and North Tunago E-44 are located between 54 km and 73 km south of Colville Lake and between Lac Belot and Tunago Lake. The wellsites will be accessed using existing cutlines south from Colville Lake (see survey plan in Appendix 2). The total developed access from the Colville Lake-Fort Good Hope Winter Road is approximately 131 kilometres. The access traverses elevated, moderate to poorly drained boreal forest consisting of black spruce with an understory of bog birch, willow, lichens and other low bush shrub species. Exposures of bedrock and cliff faces are present increasing in occurrence southwards. Numerous shallow lakes of varying sizes are present along the access routes. Local detours for outcrops, sideslopes, steep terrain and water bodies have been established on the existing access. Seven stream crossings were noted during the field scout, two of which may require culvert installations to prevent overflow.

- **Km 0-13** The access begins at an intersection with the Fort Good Hope-Colville Lake Winter road 3 kilometres south and west of the community of Colville Lake (see Photo 1 in Appendix 1-A). It follows an existing southeast – northwest trending cutline south from the community of Colville Lake where it crosses elevated, relatively well drained terrain populated with boreal forest species. Local rock outcrops are present with existing detours. The access passes by the PetroCanada A-67 wellsite drilled in the 1980s (see Photo 2 in Appendix 1-A).
- **Km 13-23** The access continues southeast from the A-67 wellsites down and existing and open cutline. Minor detours have been created around water bodies and outcrops. At Km 23, the access intersects with an existing southwest trending cutline and follows it to the southeast corner of Lac Belot.
- **Km 23-42** The access continues southwest through poorly drained boreal forest with local outcrops of bedrock. The cutline passes near the north end of Tweed Lake. One stream crossing is present on an intermittent stream draining into Tweed Lake. At Km 42, the access turns southeast along an existing and open cutline. A cabin belonging to Gabe Kochon is located on the shores of Lac Belot within 1km of the intersection with a long southeast trending stretch of access.
- **Km 42-64** This cutline runs southeast to the three wellsites and is the main access for all three locations. Short access routes using existing cutlines to West Nogha K-14, Nogha B-23 and North Tunago E-44 branch off this main access.

- **Km 64-76** (Between access to West Nogha K-14 and Nogha B-23). The access continues through an old burn area. Exposed mineral soil is present in the burn area. Minor detours (existing) are required around small lakes and sand eskers.
- **Km 76-84** (Between access to Nogha B-23 and North Tunago E-44). This is an older section of cutline with significant regrowth (willow) and an increase in rock outcrops. An extensive boulder field (with detours) occurs at the south end of this section.
- **Km 84-94** Past the intersection with the access to North Tunago E-44, the route continues to the northeast side of Tunago Lake which will be used as a water source for drilling and road construction.
- **To West Nogha K-14** Access to West Nogha K-14 begins at Km 64 and runs southwest through areas of poorly drained boreal forest. This cutline is older with willow re-growth to 1.5metres. The route traverses through slightly rolling terrain and will require minor detours around lakes as there are several small waterbodies to the northeast of the wellsite.
- **To Nogha B-23** Access to Nogha B-23 begins at Km 76 and runs northeast. The route follows an existing seismic line with a number of detours for small lakes and steep side slopes associated with local glacial landforms. At 5km the route turns northwest for 2km through rolling terrain. A 1km detour for steep sideslopes will be required before the route turns southwest and follows an existing seismic-line to the wellsite. One creek crossing will be required along the detour. The route to the lease travels through an old burn area with little re-growth.
- **To North Tunago E-44** Access to North Tunago E-44 begins at Km 84 and runs southwest. This intersection is located in a boulder field and will require detours. The cutline is older with willow regrowth to 1.5metres. The route passes through an older burn area and will follow existing detours around a number of small lake

#### 4.2.1 Construction Methods

The access will be 10 metres wide to allow for the movement of heavy equipment and rig components. Some intersections will require additional clearing to allow large loads to maneuver around corners. There may be one tow hill on the access which will require up to 15 metres width to allow room for the tow cats to operate. Access will be cleared using bulldozers. To reduce the potential for damage to the vegetative mat, the blades of the bulldozers will be equipped with shoes to prevent ripping and tearing. Slash (and/or snow berms), if created, will be windrowed with 7-metre breaks every 300 metres, to permit the passage of wildlife, and at all existing cutlines, game trails and traditional trails to permit their continued use. The cleared access will be watered to provide a hard surface for the movement of heavy equipment. Culverts may be used where the access crosses local draws and minor streams and the potential for overflow conditions exists. The DFO in Inuvik will be consulted at (867) 777-7520 prior to culvert placement.



### **4.3 Water Supply**

Water will be required for ice bridge construction, road construction and drilling operations. Approximately 100m<sup>3</sup> of water will be required for each kilometre of access development. Access construction is estimated to require 13,100m<sup>3</sup>. Water volumes required for drilling (boilers, make up water for mud system, miscellaneous use) are estimated at 1,500m<sup>3</sup> (500m<sup>3</sup>/well). A potable water supply of 5m<sup>3</sup> per day will also be required for camp use. Water sources that have been identified include four unnamed lakes, Lac Belot, Tweed Lake and Tunago Lake along the access route and in the vicinity of the wellsites (see Appendix 1-B for maps indicating lakes identified as water sources). These lakes were sounded to obtain depth readings for calculation of water volumes and the potential impact water withdrawals would have on the lakes. Calculations of the effect of water withdrawal are based on the DFO Protocol for Water Withdrawal for Oil & Gas Activities in the Northwest Territories (current as of December 16, 2002). All intake hoses used to draw water will be appropriately screened to prevent the uptake of fish.

All water sources identified can be utilized for access and lease construction (see Appendix 1-C for letter to DFO including calculations and supporting information).

### **4.4 Air Strip**

Aircraft will be used for crew changes, supply flights and for med-evac, if required. Lakes located near potential campsites and having a length of 600m or more may be used as air strips. A lake SE of Lake 14 (see Appendix 1-B for Program Map) has been proposed as a likely location for the air strip. Lakes in the area may be used as required, provided that no new access is created and aircraft do not interfere with caribou herds. Storage of equipment or aircraft on the lakes will not be permitted. The air strip at Colville Lake may also be used to stage equipment and personnel.

### **4.5 Lease Construction**

For all three leases, the lease dimensions will be 120m x 120m and construction will involve the clearing of scrub spruce and shrubs, stripping of topsoil and levelling the lease. If feasible, the corners of the wellsites will be rounded to soften the appearance of the clearings. Topsoil will be removed as a single lift and conserved, where possible, for replacement during reclamation. Levelling of the lease will be performed with subsoil stripping. Water will be used to freeze the surface and create a stable platform for the rig. Sumps adjacent to the leases will be utilized to handle freshwater-based drilling fluids and cuttings.

#### **West Nogha K-14**

The K-14 wellsite is located on an old seismic line (see Photo 3 in Appendix 1-A and Survey Plan in Appendix 2). The site is poorly drained with typical boreal forest species including black spruce, Labrador tea, shrubs and lichens (see Section 6.2.1). The site is gently sloped to the northeast in the direction of a small pond approximately 75m from the boundary of the lease. Five test holes were dug and hand-augured to determine the nature of the soils at the site and to assess the permafrost conditions (see Pre-Disturbance Assessment in Appendix 1-D). The test



holes encountered a range of conditions from 10-40cm organic layer overlying a layer of 8-50cm of sandy clay. Permafrost was encountered approximately 75cm below ground level (bgl).

#### **Nogha B-23**

The B-23 wellsite is located on seismic line A00P-COL-18 (see Photo 4 in Appendix 1-A and Survey Plan in Appendix 2). The site is slightly hummocky and poorly drained with a gentle slope to the southeast. It consists of boreal forest species including black spruce, Tamarack, Labrador tea, shrubs and lichens (see Section 6.2.1) and has evidence of a past forest fire within the area. Five test holes were hand-augured to determine the nature of the soils at the site and to assess the permafrost conditions. The test holes encountered a 23cm organic layer overlying approximately 60cm of sandy clay. Permafrost was encountered approximately 85cm bgl.

#### **North Tunago E-44**

The E-44 wellsite is located on seismic line 8618 (see Photo 5 in Appendix 1-A and Survey Plan in Appendix 2). The site is poorly drained with typical boreal forest species including black spruce, Labrador tea, shrubs and lichens (see Section 6.2.1). It is slightly hummocky with gentle drainage to the southeast. Five test holes were hand-augured to determine the nature of the soils at the site and to assess the permafrost conditions. The test holes encountered a 25cm organic layer overlying 63 cm of clay. Permafrost was encountered approximately 88cm bgl.

### **4.6 Camps**

Crews involved in the construction of the access will be housed in the community of Colville Lake until they are far enough from Colville Lake to warrant a 25-man sleigh camp be brought in for accommodations.

#### **4.6.1 Sleigh Camp**

Once they are far enough from Colville Lake, the road construction crew will stay in a 25-man mobile sleigh camp that will be relocated every few days as the access is built. Campsites will be located at least 100m from any waterbody to prevent contamination of water resources. Camp sewage will be spread for disposal.

#### **4.6.2 Rig Camp (N 66° 30' 1.0" W 125° 51' 1.2")**

The drilling crew and support personnel will stay in a stationary camp located on the main access just west of the access to B-23 (see Program Map in Appendix 1-B). A 50-man camp will be utilized to accommodate fluctuating levels of personnel during various phases of the drilling operation. The camp will be powered by a diesel-electric gen-set. Water will be used to freeze down the site to create a level working surface for the placement of camp components. The campsite is located at least 100m from any water body to prevent contamination of water resources. Camp blackwater will be disposed in a sump. Solid waste and refuse will be incinerated. Non-combustible waste will be hauled to Norman Wells for disposal. Sumps will be fenced to protect wildlife. Personnel essential to the drilling operation (drilling supervisor, tool push, etc.) will be housed in trailer units on the lease.

The camp will utilize a natural or existing clearing if possible. The campsite will be approximately 60m x 60m in dimension but will be enlarged to accommodate a second rig camp



for Akita/Sahtu Rig 51 that is scheduled to drill North Tunago E-44. Upon completion of the drilling, a 65 man camp will be required to house the service rig crew and support personnel. The camp will be co-located with, or will replace one of the drilling rig camps.

## **4.7 Drilling**

Drilling will take place over an 80-day period. Drilling practices will be compliant with all requirements of the NEB Permit and Regulations.

### **4.7.1 Drilling Waste Management**

Two types of drilling fluid will be utilized for this project: freshwater-based gel-chem and mineral oil-based fluid. Although mineral oil-based fluid is preferable for drilling through salt formations, a salt-based drilling fluid may be used as a less desirable substitute if approval is not obtained for mineral oil.

#### **4.7.1.1 Freshwater Gel-Chem Fluid**

A drilling fluid consisting of freshwater and natural clays with conditioners will be used to drill the upper section of the well. Weight material in the form of calcium carbonate (limestone) may be incorporated as required. This non-toxic system will be used to ensure that any fresh groundwater zones are protected. As additional protection, the well will be cased and cemented to a depth of 550m to prevent fluids from deeper drilling entering formations containing potable water. Waste from this drilling fluid system will include freshwater, natural clays, rock cuttings, chemical stabilizers and conditioners, all at non-toxic levels. The 30m x 60m sumps adjacent to the leases will be excavated to a level below the permafrost. Upon completion of the drilling program, the freshwater drilling waste will be analysed and, if it meets the requirements of the Alberta Energy and Utility Board's G-50 Drilling Waste Management Guidelines, will be mixed, buried and covered and frozen into the permafrost in the sumps. The sumps will be covered with sufficient material (approximately 100cm) to allow for settling.

#### **4.7.1.2 Mineral Oil-Based Fluid**

Upon reaching the Saline River formation, a salt-containing geological sequence, a mineral oil-based drilling fluid will be employed. Salt-containing formations are subject to dissolution if freshwater drilling fluids are used. A mineral oil-based fluid will not react with the salt, and reduces the potential for drilling problems due to salt solution. The mineral oil is a low toxicity hydrocarbon. As with the freshwater gel-chem system, calcium carbonate will be used as a weight material. Lost circulation material (i.e. cellophane, sawdust, or walnut shells) will be available on site to be used if required.

The Material Safety Data Sheet (MSDS) information identifies the mineral oil as "Distillate 822", a complex mixture of petroleum hydrocarbons (C<sub>11</sub>-C<sub>18</sub>). It is "Practically Non-toxic for ingestion and skin contact" and "Moderately Toxic for inhalation" (see MSDS sheet in Appendix 1-E). Mineral oil-based drilling fluid has been selected because it is a more environmentally friendly alternative to salt-based drilling fluid. In the event of an accidental spill of mineral oil-based drilling fluid or wastes containing mineral oil, it is readily bio-degradable and will not be a



persistent contaminant in the environment. Spilled salt-based drilling fluids, or wastes containing salt, have the potential for longer term impacts to soil, groundwater and vegetation, requiring costly clean-up and long-term monitoring.

Mineral oil will be stored in two double-walled 400bbl tanks on lease that will be manifolded (tied-in) to the rig to reduce the potential for accidental spills. Drip pans will be employed under all valves.

Wastes associated with this drilling fluid system would include mineral oil, formation salt, and rock cuttings contaminated with salt and mineral oil. Solid waste, including rock cuttings from the drilling fluid system, will be centrifuged and transferred to a tank where it will be mixed with sawdust to prepare the waste for transport. Waste will then be transported by truck to a Class II Oilfield Waste Facility in Rainbow Lake, Alberta. Recovered mineral oil will be returned to the double-walled storage tanks. The mineral oil will be re-used for the other locations in this program and/or transported to Norman Wells for storage.

#### **4.7.1.3 Salt-based Drilling Fluid**

A less desirable alternative to the mineral oil-based system is a salt-based drilling fluid. This has been used successfully in past drilling programs in the area to control drilling through salt formations. Wastes consist primarily of salt contaminated drilling fluid and rock cuttings. However, difficulties occur with handling and disposal. Unlike mineral oil-based systems, salt is a persistent contaminant in the environment and is more problematic to remediate if accidentally spilled during handling. Although it is Apache's preference to employ a mineral oil-based drilling fluid, a salt-based fluid will be used if regulatory approval cannot be obtained for the use of mineral oil. Solid waste will be mixed with sawdust to stabilize any remaining liquids and hauled by truck to a Class II Industrial Landfill in Alberta for disposal. Salt containing liquids will be trucked to an approved facility in Alberta for downhole disposal.

#### **4.7.2 Fuel Storage**

All equipment will be fuelled with diesel to simplify fuel handling.

Fuel for the drilling rig will be stored in a double-walled 400-bbl tank on the lease and in a double-walled rig fuel tank. These tanks will be replenished from storage tanks in Norman Wells. The rig fuel tank will be manifolded (tied-in) directly to the rig to reduce handling and the potential for leaks and spills. Drip pans will be placed under all valves and spill kits will be available on site.

Construction equipment and vehicles will be fuelled from a fuel sloop that will be towed along by the access construction crew. The sloop will then be sited on the lease during drilling to provide fuel for support vehicles. Fuel for the camp will be stored in a fuel sloop. Fuel will be transported to the fuel sloop and the rig from the staging area in fuel trucks. Absorbent pads will be used to capture any minor spills and drips during vehicle refueling. Spill response equipment will be maintained on all fuel transfer vehicles and at storage locations. All personnel will be made aware of the Emergency Response Plan (ERP) and the site-specific Spill Response Plan (see Appendix 5).



#### **4.8 Completion and Evaluation**

A service rig will be utilized for completing the wells and any testing (logging and flow tests) that will be conducted. Completion operations depend on the logging results for each well. If further testing is required, or if the well has economic potential, a wellhead will be left in place. If the well is not economic, it will be abandoned. Casing will be cemented, surface equipment will be removed and the casing will be cut and capped below ground level.

Wells with commercial potential will be:

- logged - instruments are used to measure different physical characteristics of the casing cement and rock surrounding the wellbore;
- perforated - holes are made through the well casing at the zone(s) of interest;
- fractured using high pressure to increase the flow of gas into the wellbore;
- sand will be pumped into the fractures to prop them open; and,
- flow tested to measure the productivity of the reservoir rock

Once the evaluation is complete and the equipment will be moved off-site and a wellhead will be left in place.

#### **4.9 Clean-up**

Lease and access clean-up will take place after the service rig has been moved out.

- Debris will be cleaned up and the any slash will be spread on the lease.
- Topsoil will be replaced.
- The campsite will be cleaned up and the camp sump covered.
- Culverts will be removed from the access.
- Ice bridges will be notched to prevent damming during break up.
- Slash and snow berms on the access will be left windrowed so that the access can be used by local community members. 7-metre wide breaks will be left in the windrows every 300 metres and at all existing cutlines, game trails and traditional trails.

#### **4.10 Equipment Storage**

Upon completion of drilling, the rig and associated equipment will be moved to Norman Wells via the winter road.

#### **4.11 Remediation and Reclamation**

All slash not windrowed will be bucked to lie flat to the ground, thereby promoting decay and reducing the potential for erosion. The access and wellsites will be inspected in the late summer/early fall. Areas of ground disturbance will be repaired and reseeded with a seed mix approved by the Indian and Northern Affairs Canada (INAC) Resource Management Officer. Areas prone to erosion, such as steep slopes, will be stabilized through the spreading of slash.



## **5 Public Consultation, Project Scope and Cumulative Effects**

Apache has presented and discussed the Nogha/Tunago Drilling Program with the community members of Colville Lake, Fort Good Hope and Norman Wells as well as representatives of their respective land corporations and renewable resource councils. Workshops, meetings, and telephone calls have provided the opportunity to discuss project components, goods and service requirements and employment opportunities. Traditional Environmental Knowledge (TEK) consultation has been conducted over the project area and the results have been incorporated into this EPP.

### **5.1 Community Meetings**

Community meetings were held in Fort Good Hope, Colville Lake and Norman Wells to review the previous year's seismic program at Lac Maunoir and discuss the upcoming winter drilling program. Notices of the meeting were posted in the community at least one week prior to the meeting date (see Appendix 1-F for copies of the postings).

#### **5.1.1 Colville Lake Community Meeting, August 6, 2003**

A community meeting was held in Colville Lake on August 6, 2003 to discuss the 2002/03 drilling program and to present the proposed drilling programs for Maunoir Ridge and the Nogha Settlement Lands. The meeting was held in the school gymnasium and was attended by approximately 15 members of the community. Translation services were provided by Joseph and Wilbert Kochon.

Representatives of Apache and Paramount presented some preliminary results from last year's drilling program on the Nogha Settlement Lands and the proposed drilling program for the 2003/04 season was presented.

A significant concern that was raised by elders attending the meeting was the apparent effect of last year's activity on local caribou populations. It was suggested that Apache/Paramount should take a one-year hiatus to allow the wildlife to recover. It was alternatively suggested that local wildlife monitoring be conducted in an attempt to determine the effect, if any of drilling activity on wildlife populations or movement. There was agreement that some form of monitoring would be useful. Another concern was the effect that development would have on the community and the potential that traditional lifestyles would be lost to the youth when they found employment on exploration and development projects.

There was concern expressed over the amount of benefit that flowed to the community from the last winter's project. The community had an understanding that first consideration for employment and business opportunity would go to local individuals. Upon further discussion, it was recognized that, based on the size of the community, employment opportunities were limited by local capacity. It was requested that Apache/Paramount assist the community in developing business opportunities that would enable the community to provide services and not just employment opportunities to the projects.

Safety issues arose over the heavy truck traffic on the Colville Lake Winter Road. It was agreed that further discussion was required to address workable solutions which would also involve the NWT Department of Transportation.



### Calgary Meetings, September 8-10, 2003

Extensive meetings were held over three days in Calgary with representatives of the Colville Lake community and Apache/Paramount. Issues of concern that were identified in the community meeting of August 6 were further discussed and addressed to the satisfaction of the community.

- Apache/Paramount has agreed that an ongoing dialogue is necessary and will occur this year to further understand the potential effects of exploration activities on local wildlife populations. In particular, input will be received on an ongoing basis from the Colville Lake Elders;
- Business opportunities were discussed with respect to the proposed program and ways that the Colville Lake community could benefit were explored; and,
- Methods to manage truck traffic on the Fort Good Hope - Colville Lake Winter Road will be explored.

#### 5.1.2 Fort Good Hope Community Meetings

Community meetings were held in Fort Good Hope on July 29, and September 25, 2003 to discuss Apache's proposed drilling program including access routing, methods of construction and timing.

##### July 29, 2003

The meeting was held in the Band Office Complex and commenced at 1:20PM. Twenty members of the community attended including members of the Band Council and the Land and Financial Corporations. Two members of the Tulita District Land Corporation (TDLC) also were present as was one party from Tulita. Three staff members of the SLWB were in attendance as observers. David Calvert, representing Apache presented the upcoming proposed projects that were followed by discussion. The meeting was held to discuss the proposed drilling programs for the Lac Maunoir area (EL399), the Nogha Settlement Lands and the seismic and drilling programs for the Turton Lake (EL414) area. Three main topics were raised as concerns by the attendees and addressed by Apache: benefits plans and access agreements, socio-economic impacts, and Traditional Knowledge Consultation.

##### Benefits Plans and Access Agreements

The focus of the discussion and questions related primarily to the Benefits Plan for the proposed Turton Lake EL414 Seismic Program and questions surrounding the current Cooperation, Benefits and Access Agreement signed between Paramount Resources (Apache's 50% partner) and the various corporations of the K'ahsho Got'ine District covering the Settlement Lands and EL399.

With respect to the Turton Lake Program, concern was expressed by representatives of the TDLC regarding negotiation of the Benefits Plan. In response, Apache indicated that a proposed Benefits Plan has been prepared and delivered to the Tulita District Land Corporation for comment. A copy was also provided to the K'ahsho Got'ine District Land Corp. in Fort Good Hope and to Indian and Northern Affairs Canada in Yellowknife. Apache noted that a draft or "template" agreement that was to be provided to Apache by the TDLC in April, 2003 has, to date, not been provided and this led to some discussion regarding the need for further discussion and review of the proposed Benefits Plan. Apache informed the meeting that Paramount's





agreement for the Settlement Lands and EL399 was assignable and that they would be working to clarify this understanding with the signatory parties.

George Govier, Director of the SLWB was asked by Ronald Pierrot, Chief and Chairman of the meeting, to outline the responsibilities of the SLWB with respect to Benefits Plans. Mr. Govier indicated that the SLWB does not have jurisdiction over Benefit Plans and would not be evaluating the Land Use Permit application on the basis of any Benefit Plan. The review and recommendation process was also described.

#### Socio Economic Impacts

Apache described the bidding process for awarding of contracts on the proposed Turton Lake Program. With the exception of the seismic recording, all contracts were awarded to Sahtu District joint venture businesses representing \$1.6 million (approximately 650 man days of work) of the \$2.0 million project budget.

#### Traditional Knowledge

The issue of adequate Traditional Knowledge (TK) was raised. Apache indicated that all individuals identified by the Tulita District Land Corp, the Ernie Macdonald Land Corp., the Tulita and Norman Wells Renewable Resource Councils and Fort Good Hope Band Council members had been consulted. Apache indicated that they felt sufficient TK consultation had been conducted. In conversation with Gordon Yakeleya (President of the TDLC) after the meeting, Apache agreed to arrange for an over flight of the Turton Lake program area for two elders from Tulita. This has been arranged for Wednesday July 30, 2003 at 2:00PM.

#### Upcoming Programs

Apache also summarized preliminary plans for winter 2003/04 drilling programs on EL 399, EL414 and the Settlement Lands (Colville Lake area). It was stressed that any plans for winter drilling are at an early stage in planning and may change at any time.

The meeting ended at 4:20 PM

#### **September 25, 2003**

The meeting was held in the Band Office Complex and commenced at 2:00PM. Twenty-seven members of the community, 5 members of the Behdzi Ahda" First Nation, 1 staff member of the SLWB, and 11 company representatives (3 Apache, 1 Paramount, 3 Nabors, 3 Akita, and 1 Northern EnviroSearch) were in attendance. David Calvert, representing Apache, presented the upcoming proposed projects that were followed by discussion. The meeting was held to discuss the proposed drilling programs for the Lac Maunoir area (EL399) and the Nogha Settlement Lands. Four main topics were raised as concerns by the attendees and addressed by Apache: commitment and investing in communities, respect, winter road safety, and the environment (see Appendix 1-F for detail of discussion items).

#### Commitment and Investing in Communities

Frustration was expressed by some attendees that most of the economic benefit from the drilling projects appears to go to local contractors. A concern was that working relationships between the operators and the local employees and communities was less than ideal last year. People would like to see investment made in the community infrastructure.





## Respect

Some examples of disrespectful treatment of local employees and community members were given but related primarily to another operator from last year. Apache, Nabors and Akita/Sahtu are committed to respectful interactions this year.

## Winter Road Safety

Concern was expressed with respect to safe travel on the winter road during the drilling operations. It was pointed out by members of the community that winter road maintenance and operation was not the direct responsibility of the oil and gas companies. However, Apache confirmed that all contractors and services would be advised of strict speed limits and safe driving practices.

## Environment

Apache's winter work is located in fishing, trapping and caribou habitat. Monitors were requested by members of the community as was the need to compensate trappers for lost revenues. Apache will have local monitors on the projects, habitat protection will be addressed in the Environmental Protection Plan, and trapper compensation is part of the benefits agreement between Apache and the communities.

Apache explained the plan to use mineral oil-based drilling fluid that would replace the salt-based fluids used last year. This fluid presents less environmental problems than the use of salt and is bio-degradable if it is accidentally spilled. Representatives of Akita/Sahtu and Nabors (drilling companies) reviewed past activity and described the commitments to local employment.

### **5.1.3 Norman Wells Community Meeting, July 29, 2003**

The meeting was held in the Legion hall on July 29, 2003 and commenced at approximately 7:20PM. Five community members attended. The work plans for the Turton Lake 2D seismic program, and proposed drilling programs for EL399, EL414 and the Sahtu Settlement lands were presented by David Calvert of Apache. Brett Cameron of Trace Energy summarized the contracts awarded for the Turton Lake seismic program. Alternate winter access using the PetroCanada access road for the winter drilling programs was also briefly discussed. Some discussion took place surrounding traffic safety on winter roads with the increased traffic destined for drilling locations.

No concerns were expressed by the attendees and all expressed support for the proposed seismic program and the proposed winter drilling activity. The meeting ended at 7:50PM.

## **5.2 Field Scout**

Prior to the Traditional Environmental Knowledge (TEK) consultations in Colville Lake and Fort Good Hope, NESL conducted a helicopter scout of the proposed access and drilling locations on August 20-22, 2003. Wilbert Kochon, of Colville Lake, accompanied NESL to review the proposed access and wellsites and to assist in identifying any potential concerns. Wilbert stated that he had no major concerns with the program or access routes selected for the project.



### **5.3 Traditional Knowledge Consultation**

TEK consultation was held with the communities of Colville Lake and Fort Good Hope. These were conducted in order to gain an understanding of:

- Who uses what areas (individuals/families);
- Traditional boundaries;
- Topography - rough areas, wet/frozen areas, creek/river crossings;
- Soils - types and permafrost existence;
- Vegetation - uses (food/medicines), habitat (wildlife);
- Water use - potential impacts if quality or quantity changes. Stream flows - water crossing timing (freeze-up) and spawning areas (timing);
- Transportation routes (traplines & access);
- Land Uses (hunting/fishing/trapping/tourism);
- Burial sites/other significant historic sites;
- Other sources of information (people/books/stories/letters).

This knowledge will assist Apache in conducting their drilling program with the least impact on the land, the people who utilize this area, and their areas of cultural significance.

#### **5.3.1 Colville Lake Traditional Environmental Knowledge Consultation**

TEK was obtained by visiting trappers at their camps October 6 & 7, 2003. The following information was obtained during the TEK consultation:

- A number of burial sites were identified in the area to the east and north of Colville Lake. None will be impacted by the program.
- A number of the trappers use existing seismic cutlines as traplines and access in the area around the north flank of Maunoir Ridge.
- Three traditional trails were identified. One will not be affected by the project. One will cross the Maunoir access, and one trail utilizes portions of the cutline proposed as access for the Nogha drilling program.

#### **5.3.2 Fort Good Hope Traditional Environmental Knowledge Consultation**

TEK consultation was held September 25, 2003 in Fort Good Hope, September 29 and October 6 2003 by phone, and October 6, 2003 at Gabe Kochon's cabin. A posting notifying the community of the September 25 meeting was placed in the Band Office on its notification board and at the store (see Appendix 1-F for a copy of the posting).

The following information was obtained during the TEK consultation:

- Trapping concerns - people want compensation for damaged traps and lost income due to high industrial activity in traditional trapping areas.
- Caribou - migration routes are being disturbed by industrial activity in traditional hunting areas.
- Safety - travelling too fast for conditions on winter road and unsafe to pull-off when facing oncoming traffic due to tree stumps and sticks poking up.



- Spiritual/burial site at Tunago Lake - Sarah Kochon's father is buried here. The site is at the NE end of the lake marked by a tree with all the bark and branches peeled off and a wooden grave marker painted white and black with a tall cross on it.
- Gabe Kochon uses cutlines for trapping that are proposed to be used for access to the Nogha and Tunago wellsites. He and his son Earl plan to trap in the area from the beginning of November to the end of December. It is possible that they will also be trapping in January and February. There was some concern about the impact that the drilling program would have on their traplines. Information on burial sites, cabin locations, fish lakes, and big game areas were provided.

#### **5.4 Project Scope**

The drilling program consists of the following components:

- Construction of approximately 131 kilometres of access utilizing existing cutlines
- Construction of the wellsites at K-14, B-23, E-44, three sumps, and a campsite
- Moving drilling and support equipment to the wellsite
- Operation of road construction and drilling camps
- Drilling operations
- Waste management
- Demobilization of equipment
- Decommissioning/reclamation of the campsite, wellsites, sumps and access

It is anticipated that the project will take approximately 137 days from start to completion. Access from Colville Lake will be approximately 131km long and 10m wide, which allows calculation of the total land use (including 3 leases, 3 sumps, and camp) of approximately 136.7ha during this winter season.

#### **5.5 Cumulative Effects/Previous Activity**

At the time of writing the Sahtu Land Use Plan has not been approved and has only been published in Preliminary Draft form. Until a land use plan is approved, compliance of these activities with the plan cannot be determined.

Previous seismic and drilling activity has taken place in and around the program area. Two exploratory gas wells (C-49 and M-17) were drilled by Apache/Paramount during the 2002/03 winter season approximately 9km north of the Nogha B-23 location. Canadian Natural Resources also drilled two exploratory wells (O-52 and D-63) west of Lac Belot. Older drilling locations from the 1980s include Shell (L-75 and G-67) approximately 15km east of North Tunago E-44; Home Oil (J-47) approximately 20km northeast of Nogha B-23; PetroCanada/Canterra (O-47) approximately 10km north of Nogha B-23; and PetroCanada (A-67 and M-47) approximately 10 km south of the community of Colville Lake. Numerous seismic cutlines are present in the area from seismic programs conducted in the 1980s, and more recently in 2000/01. Existing lines remain open and are utilized by the people of Colville Lake and Fort Good Hope for access to their camps and for setting traps.

The immediate effect of this program will be minimized, since existing access and some existing lines will be utilized and there is little, if any, merchantable timber within the program area.



Drilling these three proposed wells may result in the following:

- Additional seismic programs
- Additional drilling locations
- Discovery of economic reserves of oil and/or gas
- Construction of gathering systems and access

## 6 Biophysical Component

The project area falls within the Colville Hills Ecoregion. The mean summer temperature is approximately 6.5°C and the mean winter temperature is -25.5°C. The mean annual precipitation ranges from 200-300mm and the Ecoregion is classified as having a high subarctic ecoclimate. The ecoregion lies north of the Smith Arm of Great Bear Lake and encompasses Aubry and Colville Lakes, Lac de Bois and Lac Maunoir. The area includes several ridges of carbonate strata that stand above the surrounding plains. Native vegetation consists of very stunted stands of black spruce and tamarack with secondary quantities of white spruce and a ground cover of dwarf birch, willow, ericaceous shrubs, cottongrass, lichen, and moss. Permafrost is continuous with a low to medium ice content. Characteristic wildlife includes caribou, moose, grizzly and black bear, wolf, red fox, snowshoe hare, beaver, muskrat, spruce grouse, raven, osprey, and waterfowl. Land uses include trapping, hunting, fishing, recreation, and tourism. The population of the Ecoregion is approximately 70.<sup>1</sup>

Potential impacts of this program and the environmental protection measures to be employed are summarized in the following subsections. The immediate effect of this project will be minimized through the use of existing trails and cut lines to access the wellsites.

### 6.1 Physical – Chemical Environment

This section examines the physical-chemical environment with respect to groundwater, surface water, noise, land, non-renewable natural resources, and air/climate/atmosphere and the potential effects of the drilling program and mitigative measures that will be in place.

The topography of the program area is generally flat to rolling apart from the drainage crossings along the access. There are many small lakes and low, wet areas within the program area. Lac des Bois to the W of the program area, Tweed Lake to the N of the leases, and Tunago Lake to the S are fish-bearing lakes. The predominant tree species is black spruce with an understory of muskeg, shrubs and lichens. The existing lines were generally in very good condition and should only require packing and freezing prior to use.

The permafrost in the project area is continuous (90% to 100%) with low to medium ice content (10% to 20%) in the upper 10 to 20m of the ground.<sup>2</sup> Permafrost measured at the wellsites ranged between 70 and 95cm below the surface. No topsoil disturbance will be necessary for construction of the access and it will be minimized at the leases. Dominant soils in the ecoregion are Organic and Turbic Cryosols and Dystric Brunisols.<sup>3</sup>

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<sup>1</sup> Environment Canada. Website URL: <http://www1.ec.gc.ca/~ecozones/default.htm>, 1997.

<sup>2</sup> National Atlas of Canada 5<sup>th</sup> Edition. Canada Permafrost Map, 1995.

<sup>3</sup> Environment Canada. Website URL: <http://www1.ec.gc.ca/~ecozones/default.htm>, 1997.



## Physical-Chemical Environment

<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Groundwater	Water quality changes	<ul style="list-style-type: none"> <li>Fuel caches will be set-back a minimum of 100m from the high water mark of any waterbody.</li> <li>Fuel storage tanks will be placed on liners within dikes to contain accidental releases.</li> <li>Fuel sleighs will be equipped with well-maintained hoses, nozzles and pumps to prevent accidental spillage. Pads will be used to catch drips during refueling.</li> <li>Apache has a spill contingency plan in place (see Appendix 5).</li> <li>Spill response equipment includes a fuel transfer hose, sorbent blanket, scoop shovels and 205 L empty drums.</li> <li>Should a spill occur, the NWT 24-hour spill line will be called.</li> <li>Drilling program to be conducted during winter conditions (frozen ground and snow cover) when spills are highly visible and can be cleaned-up before infiltration occurs.</li> <li>Sleigh camp sewage (blackwater and greywater) will be spread on surface, the drilling camp will utilize a sump.</li> </ul>
Surface Water	Flow or level changes	<ul style="list-style-type: none"> <li>Water for the camps will be taken from nearby lakes. The water will be tested and/or treated prior to use. Water intake hoses will be screened and kept off the bottom of the lakes to protect fish.</li> <li>Water for drilling purposes will be obtained from unnamed lakes within the program area.</li> </ul>
	Water quality changes – potential for contamination of surface water	<ul style="list-style-type: none"> <li>Fuel caches will be set-back a minimum of 100m from the high water mark of any waterbody.</li> <li>No materials will be stored on the surface ice of any waterbody or within 100m of the normal highwater mark (including the air strip location).</li> <li>Drilling program conducted during winter conditions (frozen ground and snow cover) when spills are highly visible and can be cleaned-up before infiltration occurs.</li> <li>Fuel sleighs will be equipped with well-maintained hoses, nozzles and pumps to prevent accidental spillage. Pads will be used to catch drips during refueling.</li> <li>Apache has a spill contingency plan in place (see Appendix 5).</li> <li>Spill response equipment includes a fuel transfer hose, sorbent blanket, scoop shovels and 205 L empty drums.</li> <li>Should a spill occur, the NWT 24-hour spill line will be called.</li> <li>Prior to crossing creeks or ponds with construction equipment, ice thickness will be tested to prevent sinking of vehicles.</li> <li>Camps will be set-back a minimum of 100m from the highwater mark of any waterbody to reduce the potential of infiltration of blackwater.</li> </ul>
	Water quantity changes	<ul style="list-style-type: none"> <li>Withdrawal volumes and rates will be established so as not to significantly affect lake levels.</li> </ul>
Noise	Noise increase	<ul style="list-style-type: none"> <li>Conducting the program during the winter will minimize activity during critical periods for wildlife (spring and fall).</li> <li>Noise will be limited to the access road and drill sites. Noise will be transient (along access) and local and temporary (access and wellsite).</li> </ul>



<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Land	Soil contamination	<ul style="list-style-type: none"> <li>• Fuel sleighs will be equipped with well-maintained hoses, nozzles and pumps to prevent accidental spillage. Pads will be used to catch drips during refueling.</li> <li>• Spill kits will be readily available during all fuelling operations and at all fuel storage sites.</li> <li>• Fuel will be stored in double-walled tanks.</li> <li>• Apache has a spill contingency plan in place (see Appendix 5).</li> <li>• Spill response equipment includes a fuel transfer hose, sorbent blanket, scoop shovels and 205 L empty drums.</li> <li>• Should a spill occur, the NWT 24-hour spill line will be called.</li> <li>• Project will be conducted during winter conditions (frozen ground and snow cover) when spills are highly visible.</li> </ul>
	Ground Disturbance	<ul style="list-style-type: none"> <li>• Access will be constructed using snow and ice that will create a protective layer for vegetation and reduce the risk of compaction.</li> <li>• Bulldozers will be equipped with shoes for the blades to prevent disturbance to soil and vegetation.</li> <li>• Removal of vegetation and soil will be restricted to the wellsites.</li> <li>• Apache may choose to drill only 1 well if the winter road will be closed prior to the anticipated completion of this year's work.</li> </ul>
	Destabilization and erosion (stream crossings)	<ul style="list-style-type: none"> <li>• Stream crossings will be at the most level location possible.</li> <li>• Stream crossings will be constructed using clean snow fill.</li> <li>• Stream crossings will be at 90 degrees to the banks to minimize disturbance of banks.</li> <li>• Bulldozers will have protective shoes to elevate the blade, leaving some snow cover to protect vegetative mat and, thereby, reduce potential for erosion.</li> <li>• Felled trees will be windrowed within the right-of-way.</li> <li>• Spreading of slash and seeding will be utilized to control erosion on slopes.</li> <li>• If ground disturbance does occur, it will be recontoured and reseeded with an approved mix immediately and inspected within one full growing season.</li> </ul>
	Permafrost regime alteration	<ul style="list-style-type: none"> <li>• Wherever possible, existing lines will be utilized for access to limit new clearing.</li> <li>• Frozen ground conditions will mitigate potential damage to surface soils and permafrost.</li> <li>• Cat blades will have protective shoes to elevate the blade, leaving some snow cover to protect vegetative mat and, thereby, reduce potential for erosion and damage to permafrost.</li> <li>• The camps will be located in existing clearings wherever possible to reduce the amount of new clearing required.</li> <li>• The access and wellsite will be monitored for melting permafrost from solar exposure and rutting in the unlikely event of warming conditions. Repairs will be made as required.</li> <li>• Drilling waste will be mixed-buried-covered and frozen into the permafrost in three sumps. The sumps will be buried with excess material placed on top to allow for settling</li> </ul>
Non-Renewable Natural Resources	Resource depletion	<ul style="list-style-type: none"> <li>• The conduct of this drilling program will not deplete local non-renewable natural resources.</li> </ul>



<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Air / Climate / Atmosphere	Greenhouse Gas Emissions	<ul style="list-style-type: none"> <li>• Vehicles, heavy equipment and drilling operations will emit greenhouse gases but are necessary to conduct the project.</li> <li>• Testing during drilling, may result in the flaring of natural gas. Flaring will be conducted in accordance with accepted and required testing practices and regulations.</li> <li>• Discoveries of natural gas may result in reduced dependence on less clean sources of energy.</li> </ul>

## 6.2 Biological Environment

This section examines the biological environment with respect to vegetation, wildlife, and fish and the potential effects of the drilling program and mitigative measures that will be in place.

### 6.2.1 Vegetation

During the site visit it was noted that the vegetative cover is predominantly black spruce with typical boreal shrub species as understory including Labrador Tea, blueberry, scrub birch, willow with muskeg and lichens. Species common to the area include:

Coyote willow	<i>Salix exigua</i>	Northern sweet vetch	<i>Hedysarum boreale ssp. mackenzii</i>
Grey-leaved willow	<i>Salix glauca</i>	Small-flowered paintbrush	<i>Castilleja parviflora</i>
Hoary willow	<i>Salix candida</i>	Mosses and bryophytes	<i>undifferentiated (Muskeg)</i>
Little tree willow	<i>Salix arguculoides</i>	Fireweed	<i>Epilobium angustifolium</i>
Red osier dogwood	<i>Cornus stolonifera</i>	Mall-flowered paintbrush	<i>Castilleja parviflora</i>
Black spruce	<i>Picea mariana</i>	Prickly rose	<i>Rosa acicularis</i>
Scrub birch	<i>Betulosa glandulosa</i>	Dwarf blueberry	<i>Vaccinium caespitosum</i>
Labrador tea	<i>Ledum groenlandicum</i>	Fuzzy-spiked wild rye	<i>Elymus innovatus</i>
Wood horsetail	<i>Equisetum sylvaticum</i>	Slender wheatgrass	<i>Agropyron trachycaulum</i>
Red swamp current	<i>Ribes triste</i>	Spike trisetum	<i>Trisetum spicatum</i>
Common horsetail	<i>Equisetum arvense</i>	Bluejoint	<i>Calamagrostis canadensis</i>
		Lichens	<i>undifferentiated</i>

### 6.2.2 Wildlife

The following may be found within or near the program area:

Woodland Caribou	<i>Rangifer tarandus caribou</i>	Lynx	<i>Lynx canadensis</i>
Black Bear	<i>Ursus americanus</i>	Marten	<i>Martes americana</i>
Grizzly Bear	<i>Ursus arctos</i>	Mink	<i>Mustela vison</i>
Moose	<i>Alces alces</i>	Muskrat	<i>Ondatra zibethica</i>
Wolf	<i>Canis lupus</i>	Otter	<i>Lutra canadensis</i>
Beaver	<i>Castor canadensis</i>	Wolverine	<i>Gulo luscus</i>
Fox	<i>Vulpes fulva</i>	Inconnu (Whitefish)	<i>Stenodus leucichthys</i>
Hare	<i>Lepus arcticus</i>	Arctic Grayling	<i>Thymalus arcticus</i>
Muskox	<i>Ovibus moschatus</i>		



The Committee on the Status of Rare and Endangered Wildlife Species in Canada (COSEWIC) list<sup>4</sup> was examined to determine the status of wildlife potentially existing in the project area. Three animal species were listed for the project area with the following risk categories:

- **Special Concern** (A species of special concern because of characteristics that make it is particularly sensitive to human activities or natural events.) - Grizzly Bear and Wolverine.
- **Threatened** (A species that is likely to become endangered if limiting factors are not reversed.) - Anatum Peregrine Falcon.

Mitigation of impacts on Grizzly bears revolves around the protection of denning sites and potential denning sites. Based on a study conducted in the summer of 1994 in the Lac de Gras region, Grizzly dens were found on eskers significantly more often than expected by chance. Dens tended to be on southern slopes, at sites that were significantly steeper, and where there was a relatively high amount of shrub cover.<sup>5</sup> Although unlikely to be present, during construction of the access, personnel should be directed to look for evidence of denning activity.

The major cause of decrease in Wolverine populations in Canada is intensive hunting of ungulates. To limit the direct effect of this project on Wolverine, Apache's corporate policy is that no personal firearms are permitted in camp. In the event that monitors are required for worker protection, they may be granted approval to carry firearms.

The major cause of decrease in the Peregrine Falcon populations has been the presence of agricultural pesticides and the destruction of breeding sites (cliff ledges, usually near wetlands). The conduct of this project will not involve disturbance on or near cliff ledges.

According to the 1976 Land Use Information Map, moose and caribou are found throughout the region; the riparian vegetation of the alluvial areas along the Mackenzie River and adjacent watersheds provides important winter range for moose. Some barren-ground caribou (part of the Bluenose herd) may winter south and west of this area (feeding on terrestrial and arboreal lichens). Only certain sections of the winter range may be used in any one year. Radio collar telemetry data provide by RWED for January, February and March for the years 1996-2002 (see map in Appendix 1-B) show caribou are typically NW of the program area between Colville Lake and Lac Belot migrating through to the muskeg area west of Lac Belot. Local knowledge suggests that caribou are common throughout the program area. Wolves are found throughout the winter range of the caribou. Lakes are important areas for domestic fishing and swans use some lakes as nesting sites during the summer.

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<sup>4</sup> Environment Canada. Website URL: <http://www.speciesatrisk.gc.ca/species/english/>, 2001.

<sup>5</sup> Environment Canada Species at Risk in Canada website: <http://www.speciesatrisk.gc.ca>.





## Biological Environment

<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Vegetation	Species introduction	<ul style="list-style-type: none"> <li>Care will be taken to clean all equipment prior to bringing into program area to limit the likelihood of introduction of non-native species.</li> </ul>
	Loss of timber along the access route	<ul style="list-style-type: none"> <li>Existing lines will be utilized for access. Clearing will primarily involve the removal of willows. Access widths will be maintained at 10m or less except on tow hills where 15m widths will be required.</li> <li>Leaners, in areas of larger trees, will be removed to eliminate the potential for future erosion around root balls.</li> <li>Any required seeding and/or follow-up inspections will be performed at the direction of INAC's Resource Management Officer.</li> </ul>
	Damage to ground vegetation and permafrost	<ul style="list-style-type: none"> <li>Frozen ground conditions will mitigate potential damage to ground vegetation.</li> <li>Cat blades will have protective shoes to elevate the blade, leaving some snow cover to protect vegetative mat and, thereby, reduce potential for erosion and damage to permafrost.</li> <li>Ice and snow will be used to build up the road base thus protecting the vegetative mat.</li> <li>Clearing of vegetation will be required at the wellsites to level the sites.</li> <li>Access will be monitored for rutting and damage during warming conditions.</li> </ul>
	Increased fire hazard potential due to windrowing of vegetation	<ul style="list-style-type: none"> <li>7m breaks in windrows will be made every 300m.</li> <li>Minimal slash is anticipated (using existing cutlines).</li> </ul>
Wildlife and Fish	Fish population changes	<ul style="list-style-type: none"> <li>Water supplies are of sufficient size that water removal will be less than 5% of the total under ice water volume.</li> <li>No materials, including fuel caches, will be stored on the surface ice of any waterbody or within 100m of the normal highwater mark (including the air strip location(s)).</li> <li>During refuelling, non-drip nozzles and absorbent pads will be utilized.</li> <li>Apache has a spill contingency plan in place (see Appendix 5).</li> <li>Spill response equipment includes a fuel transfer hose; sorbent blanket, scoop shovels and 205 litre empty drums.</li> <li>Should a spill occur, the NWT 24-hour spill line will be called</li> <li>Program conducted during winter conditions (frozen ground and snow cover) when spills are highly visible and less prone to infiltration.</li> <li>Creek crossings will be constructed of clean ice/snow and/or culverts. Culverts will be removed and ice/snow fills will be notched upon completion of the project. DFO will be consulted at (867) 777-7520 prior to placement of culverts.</li> <li>Water intake hoses will be screened to prevent uptake of fish.</li> <li>Operations will not be conducted within 30m of any waterbodies not being crossed.</li> <li>If any deleterious materials fall into a waterbody, it will be removed immediately.</li> </ul>
	Breeding disturbances	<ul style="list-style-type: none"> <li>Program conducted during winter conditions to avoid critical periods for wildlife (late spring and early fall).</li> </ul>



<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Wildlife and Fish	Habitat changes / effects	<ul style="list-style-type: none"> <li>No unusual wildlife concerns (endangered species or critical habitats) have been identified. However, caribou and fur-bearers are active in the area.</li> <li>Timing of program is later in the winter (caribou are typically between Colville Lake and Lac Belot migrating through to the muskeg area west of Lac Belot).</li> <li>Crews will be restricted to movement along access roads.</li> <li>No equipment will be used for purposes other than work.</li> <li>Slash will be windrowed with 7m breaks every 300m to allow passage of wildlife.</li> </ul>
	Game species effects	<ul style="list-style-type: none"> <li>The disturbance to game species is limited in that the activity is short in duration and localized.</li> <li>No firearms will be permitted during the conduct of this program. Local monitors will be dealt with on a case-by-case basis.</li> <li>Equipment will be speed limited to 40km/hr and will be required to slow down to allow safe passage when passing on-coming traffic.</li> <li>Breaks in windrows will allow passage of wildlife.</li> </ul>
	Forestry changes	<ul style="list-style-type: none"> <li>Windrows will have 7m breaks every 300m to allow passage by animals and reduce the potential of forest fires.</li> </ul>
	Wildlife may be attracted to garbage or harmed by debris from operations	<ul style="list-style-type: none"> <li>Garbage will be incinerated on site or hauled to Norman Wells.</li> <li>Sumps will be fenced-off.</li> </ul>

### 6.3 Interacting Environment

This section examines the interacting environment with respect to habitat and communities, social and economic issues, and culture and heritage and the potential effects of the drilling program and mitigative measures that will be in place.

Apache recognizes the opportunity for providing employment and business opportunities to First Nation Members.

The Sahtu Land Use Planning Board (SLUPB) Archaeological Sites Database<sup>6</sup> was consulted to determine if there were any known archaeological sites within the program area. The search found three sites near Colville Lake, north of the program area (see Recreation and Tourism Map and Culture and Infrastructure Map in Appendix 1-B). The report of the Sahtu Heritage Places and Sites Joint Working Group entitled "Rakekée Gok'é Godi: Places we take care of" lists three sites of importance in this region which appear to be consistent with the SLUPB Archaeological Sites Database:

- Colville Lake Trail
- The Underground River
- Lac des Bois

<sup>6</sup> Sahtu Land Use Planning Board Archaeological Sites Database (combination of Archaeological Sites from the Museum of Civilization and Land Use Information Series Archaeological Sites from Department of Indian and Northern Affairs), December 2001.



### 6.3.1 Colville Lake Trail

The Colville Lake Trail links Fort Good Hope and Colville Lake and was historically used every summer by the people from Colville Lake to walk back to Fort Good Hope. The last family to walk the trail in summer was the Oudzi family in 1965. In 1998, a group of people walked the trail as part of a cultural revival project. Apache's drilling program will not conflict with the historical or current trail use due to the winter timing of activity.

### 6.3.2 The Underground River

There is a story from ancient times which describes how the groups from around Colville area became aware of the people who lived further south. The underground river starts at the SW end of Lac Belot. As the story goes, two brothers were sucked into the river at Lac Belot and spilled out at the Hare Indian River. Apache's winter drilling program will not affect this site.

### 6.3.3 Lac des Bois

Lac des Bois is the home territory of the Tashin Got'ine regional group (Boucan, Oudzi, Orlias and Gully families) with several burials and cabins. It is an important fishing and trapping area and is on a caribou migration route. Apache's drilling program will not affect this site since it is located SW of Lac des Bois.

### Interacting Environment

<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Habitat and communities	Wildlife habitat / ecosystem composition changes	<ul style="list-style-type: none"> <li>Improved access through the area to hunting, fishing, and trapping sites will assist Colville Lake residents.</li> </ul>
	Reduction/removal of keystone or endangered species	<ul style="list-style-type: none"> <li>Caribou winter habitat has been identified W of the program area. Apache plans to conduct the program without disturbing the vegetative mat by leaving some snow on the access.</li> <li>Disturbance will be limited to the wellsites, sumps, camp and existing access.</li> <li>Workers should be aware of the potential for hunters in the area.</li> </ul>
	Removal of wildlife corridor or buffer zone.	<ul style="list-style-type: none"> <li>Windrows will have 7m breaks every 300m to allow passage of wildlife.</li> </ul>
Social and Economic	Increase in urban facilities or services	<ul style="list-style-type: none"> <li>Local personnel and businesses will be employed wherever possible.</li> </ul>
	Human health hazard	<ul style="list-style-type: none"> <li>The sleigh camp will be moved frequently and the sewage will be spread on surface (at least 100m from any watercourse) as one-time releases and part of the standard operating practices in the area to minimize permafrost damage.</li> <li>The drilling camp will be located on the main access near the access to B-23 and will utilize a sump for disposal of sewage. The sump will be located at least 100m from the high water mark of any water body.</li> <li>Fuel caches will be set-back a minimum of 100m from the high water mark of any waterbody.</li> <li>No materials will be stored on the surface ice of any waterbody or within 100m of the normal highwater mark.</li> </ul>

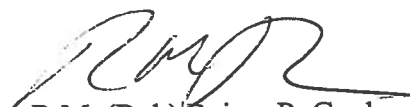


<i>Environmental Feature</i>	<i>Potential Impact</i>	<i>Proposed Environmental Protection and Mitigation Measures</i>
Social and Economic	Human health hazard	<ul style="list-style-type: none"> <li>• Program conducted during winter conditions (frozen ground and snow cover) when spills are highly visible and can be cleaned-up before infiltration occurs.</li> <li>• Garbage will be burned in barrels on site or removed from the program area to Norman Wells to an approved (by local government) disposal site.</li> <li>• Drilling will utilize two mud types: a non-toxic, freshwater-based drilling fluid which will be disposed in sumps adjacent to the leases using the mix-bury-cover method and a non-toxic mineral oil- or salt-based drilling fluid which will be stored in tanks and hauled to Alberta for disposal.</li> </ul>
	Quality of life changes	<ul style="list-style-type: none"> <li>• Access into the area will be improved.</li> <li>• Local personnel and businesses will be employed wherever possible.</li> <li>• An Access and Benefits Agreement has been signed which will contribute to the local economy through employment of personnel and businesses.</li> </ul>
Cultural and Heritage	Increased pressure on archaeological sites	<ul style="list-style-type: none"> <li>• There are no heritage sites within the drilling program area. Cabins and burial sites have been indicated on the Culture and Infrastructure Map in Appendix 1-B.</li> <li>• There are no known archaeological sites within the program area (according to the Canadian Museum of Civilization).</li> <li>• If a suspected site is discovered during the conduct of the drilling program, the workers will not disturb the site and the SLWB will be contacted for instructions.</li> </ul>
	Effects on aboriginal lifestyle	<ul style="list-style-type: none"> <li>• If any existing trails are crossed, a gap will be left in the windrow to allow access across the trails.</li> </ul>

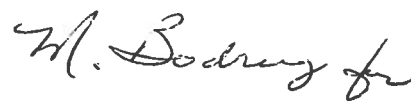
## 7 Conclusion

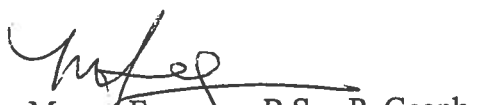
Northern EnviroSearch Ltd. has examined the impacts this program may have on the environment and is of the opinion that this program can take place with minimal long-term effects. Local, short-term effects can be easily mitigated through careful planning and reclamation of any impacts immediately following the program. We recommend that any reclamation work be inspected during the summer to ensure areas of concern have recovered.

Respectfully submitted,  
**NORTHERN ENVIROSEARCH LTD.**

  
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