

**PROJECT DESCRIPTION  
FOR THE PROPOSED ANADARKO CANADA CORPORATION  
IMMERK WINTER 2001/2002 2D SEISMIC PROGRAM**



**Prepared for:**

**Anadarko Canada Corporation  
Calgary, Alberta**

**Prepared by:**



**Calgary, Alberta and Inuvik, Northwest Territories**

**October 2001  
Project #5022-01**

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PROJECT DESCRIPTION  
FOR THE PROPOSED ANADARKO CANADA CORPORATION  
IMMERK WINTER 2001/02 2D SEISMIC PROGRAM

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## EXECUTIVE SUMMARY

Anadarko Canada Corporation (Anadarko) is proposing to conduct a seismic program to delineate areas of interest on Exploration License 407 (EL 407), which Anadarko holds in the northern Mackenzie Delta. The licence area includes the northern part of the Kendall Island Bird Sanctuary, and extends north of Pelly Island around the Beluga 1A Special Management Zone.

Anadarko intends to conduct an approximately 417 km 2D seismic program on Crown land both onshore and in the near-shore areas of Mackenzie Bay. The program is primarily on EL 407, but also extends onto adjacent exploration and significant discovery licence areas. The 2D seismic program is intended to better detail areas of potential hydrocarbon accumulations, which Anadarko will explore more fully in future years through additional seismic work.

Pending regulatory approval, the program will be conducted in the winter of 2002 and is expected to be complete within 90 days. Anadarko has contracted Delta Trace to conduct the seismic operations. Delta Trace currently plans to begin access construction for the program in January, data acquisition in February and finish the program by 15 April 2002.

Inuvialuit Environmental & Geotechnical Inc. (IEG) has been commissioned by Anadarko to prepare this project description for the Anadarko Canada Corporation Immerk Winter 2001/02 2D Seismic Program. The project description has been prepared to meet the requirements of Indian and Northern Affairs Canada (INAC) and the Canadian Wildlife Service (CWS) and fulfill the Operating Guidelines and Procedures of the Environmental Impact Screening Committee (EISC).

The winter seismic program has been developed with the consideration of minimizing impacts on the environment and land users. In planning the program, Anadarko recognized the Beluga Management Zone 1A that extends between Pelly, Kendall and Garry Islands. Anadarko planned the program to clearly avoid any activity within the zone. The potential exists for temporary alteration of mature vegetation and wildlife habitat; elevated noise, emissions and traffic levels resulting in short-term wildlife displacement; temporary disruptions to traditional land use in the vicinity of the project and disturbance to permafrost. Anadarko is committed to employing a variety of mitigation techniques to minimize disturbance. Techniques include the use of tracked vehicles over frozen, snow-covered ground to minimize impacts to vegetation communities. Program activities will be completed prior to the arrival of the majority of the migratory bird species and will also be completed expeditiously to minimize impacts to resident wildlife. An environmental and wildlife monitor will provide supervision to ensure mitigation measures are implemented and environmental and wildlife concerns are addressed as encountered throughout the program. Anadarko and its contractors are committed to following these measures in order to minimize the risk of potential environmental impacts and disturbance of culturally and historically significant areas.

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## 2.0 REGULATORY APPROVALS

Anadarko Canada Corporation (Anadarko) is applying to conduct a seismic program in the Mackenzie River Delta region of the Northwest Territories during the winter of 2002. The proposed 2D program is on Crown land in the vicinity of the Kendall Island Bird Sanctuary (see Figure 1) and will include twelve seismic lines for a total line length of approximately 417 km. The primary agencies with jurisdiction over the project include the Canadian Wildlife Service (CWS), Indian and Northern Affairs Canada (INAC) and the National Energy Board (NEB).

Other agencies with regulatory interest in the approval process include: Fisheries and Oceans Canada (DFO) with reference to potential effects on fish and fish habitat; the Government of the Northwest Territories (GNWT) Resources, Wildlife and Economic Development (RWED), regarding wildlife and associated habitat; the Prince of Wales Northern Heritage Centre (PWNHC) for an archaeological and historical resources review and Environment Canada (EC) in regard to pollution prevention. The Environmental Impact Screening Committee (EISC) is an advisory committee responsible for screening all proposed projects on Crown Land. When a screening occurs, the EISC's responsibilities are set out in clause 11(13) of the Inuvialuit Final Agreement (IFA), which reads:

11(13). On receipt of a project description, the Screening Committee shall expeditiously determine if the proposed development could have a significant negative environmental impact and shall indicate in writing to the government authority competent to authorize the development that, in its view:

- a) the development will have no such significant negative impact and may proceed without environmental impact assessment and review under this Agreement;
- b) the development could have significant negative impact and is subject to assessment and review under this Agreement; or
- c) the development proposal has deficiencies of a nature that warrant a termination of its consideration and the submission of another project description.

Should the EISC determine that the project may have a significant negative impact, the Project Description will be referred to the Environmental Impact Review Board (EIRB) or other equivalent environmental review process for a public assessment and review pursuant to clause 11(24).

The NEB is the governmental authority competent to authorize the development within the meaning of the IFA. The NEB is also required to conduct an environmental screening of the project pursuant to the *Canadian Environmental Assessment Act* (CEAA), and to consider environmental impacts under its jurisdiction to approve the development under the *Canada Oil and Gas Operations Act* (COGOA) and applicable regulations.

Approvals required for this project are summarized in Table 1 and copies of the appropriate licence applications are in Appendix A. Anadarko will contact the agencies listed as appropriate, and will satisfy any requirements they may have in their respective areas of jurisdiction.

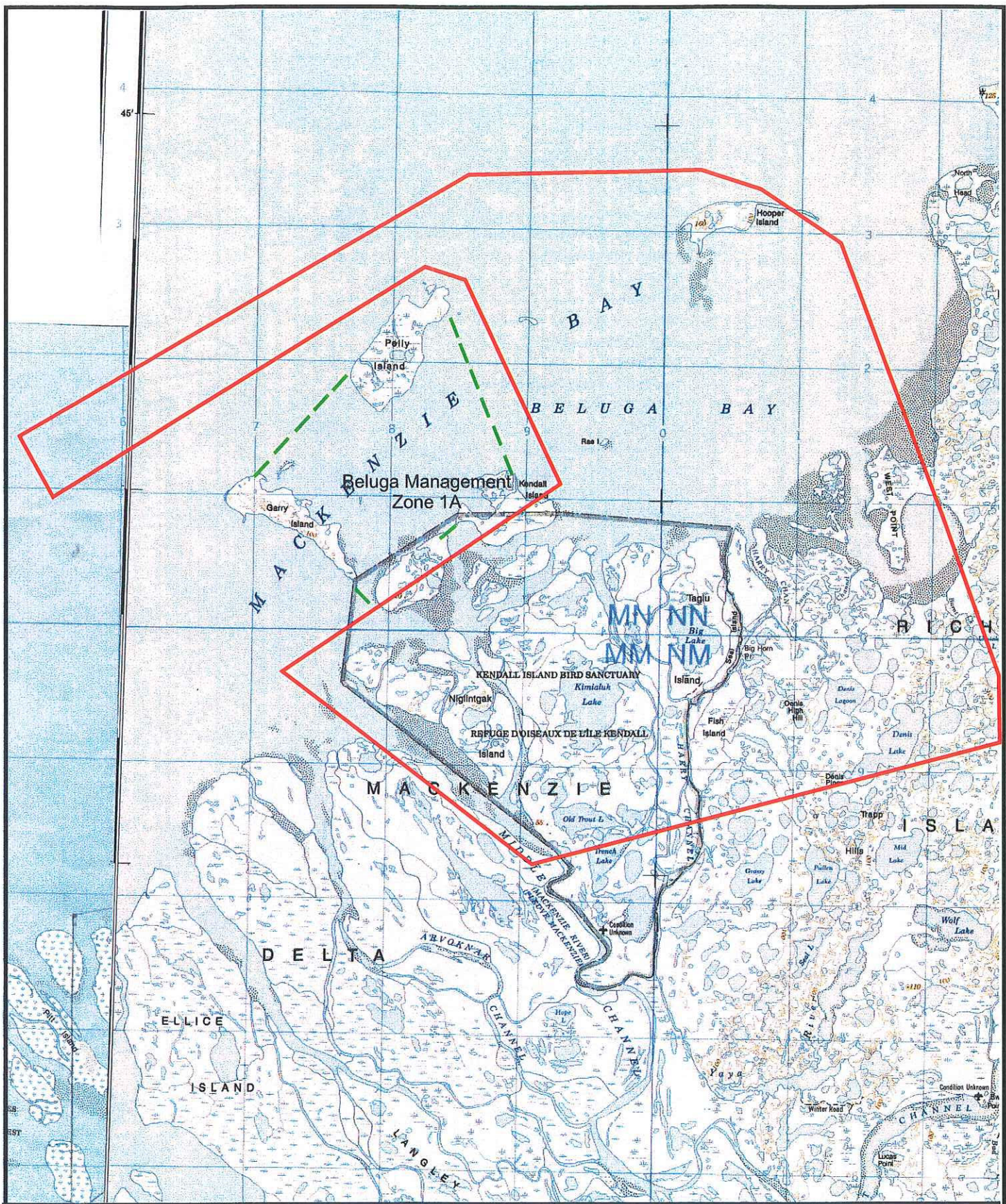
**Table 1**  
**Approvals Required**

Agency	Approval Required/ <i>Governing Legislation</i>	Status
Rudy Cockney District Manager, North Mackenzie Indian and Northern Affairs P.O. Box 2100 Inuvik, NT X0E 0T0	Land Use Permit  <i>Territorial Lands Act</i> <i>Territorial Land Use Regulations</i>	Submitted on or before 2 November 2001
Paul Latour Habitat Biologist, Western Arctic Canadian Wildlife Service 2 <sup>nd</sup> Floor Diamond Plaza 5204-50 <sup>th</sup> Avenue Yellowknife, NT X1A 2R2	Bird Sanctuary Permit  <i>Migratory Birds Convention Act</i> <i>Migratory Birds Sanctuary Regulations</i>	Submitted on or before 2 November 2001
Linda Graf Secretary Environmental Impact Screening Committee P.O. Box 2120 Inuvik, NT X0E 0T0	Approval on Project Description  <i>Inuvialuit Final Agreement</i>	Submitted on or before 2 November 2001
Terry Baker Environmental Assessment Officer National Energy Board 444 - 7th Avenue SW Calgary, AB T2P 0X8	Geophysical Operation Authorization  <i>Canadian Environmental Assessment Act</i> <i>Canada Oil and Gas Operations Act</i>	Submitted on or before 2 November 2001

### 3.0 TITLE

Anadarko Canada Corporation Immerk Winter 2001/02 2D Seismic Program





**Proposed Anadarko Immerk  
2D Seismic Program**



Source: Mackenzie Delta, 107C

**LEGEND**

- Extent of Proposed 2D Seismic Program Area
- Exclusion Zone for All Activities



5022-01

October 2001

Figure 1



## 4.0 DEVELOPMENT SUMMARY

### 4.1 Project Scope

Anadarko is proposing to conduct a 2D seismic program in the northern portion of the Kendall Island Bird Sanctuary and extend it onto the near-shore area in Mackenzie Bay. The goal of the winter seismic program is to further delineate areas of interest on EL 407. The program includes twelve seismic lines for a total proposed line length of approximately 417 km on Crown land (Table 2 and Figure 2).

Delta Trace Ltd., a geophysical survey company, will conduct the program for Anadarko. Delta Trace Ltd. will provide the geophysical survey team and equipment required to conduct the seismic program. Access construction for the program will begin in January and data acquisition in early February 2002. The program should be complete by April 15, 2002.

Approximately 100 people will be involved in the various phases of this seismic operation. One 120-person camp will be operated on the program. The camp is designed to have minimal impact on the environment. All wastewater will be collected and trucked to an approved municipal facility for disposal. An agreement has been established with the Town of Inuvik for Delta Trace to use water from, and return wastewater to, municipal facilities. Garbage will be incinerated and/or will be hauled to the landfills in Inuvik and Tuktoyaktuk for disposal.

Tracked vibroseis equipment will be used as the primary energy source on the program. To minimize environmental impacts, the use of standard, high ground pressure wheeled vehicles will be restricted to ice roads, wherever feasible. Tracked and low pressure tire vehicles, like Delta III units, will be allowed on the seismic lines over tundra areas. These vehicles exert minimal pressure on the tundra. Vibroseis will be used on land and on lakes and marine areas with bottomfast ice. Smaller waterbodies not frozen to the bottom will have cables and geophones laid across the ice. Vibrator source points will then be 'stacked', offset or detoured, around the waterbody if distances allow.

Dynamite will be used on larger waterbodies where there is water under the ice and data cannot be collected using the vibroseis techniques outlined above. The charges will be drilled with a 3-way seismic drilling unit and placed in accordance with DFO guidelines and offset distances (see Section 4.3.5). Techniques used to mitigate disturbance to fish and fish habitat within waterbodies during the course of the program are outlined in Section 12.0.

Table 2

## Seismic Line Set Details

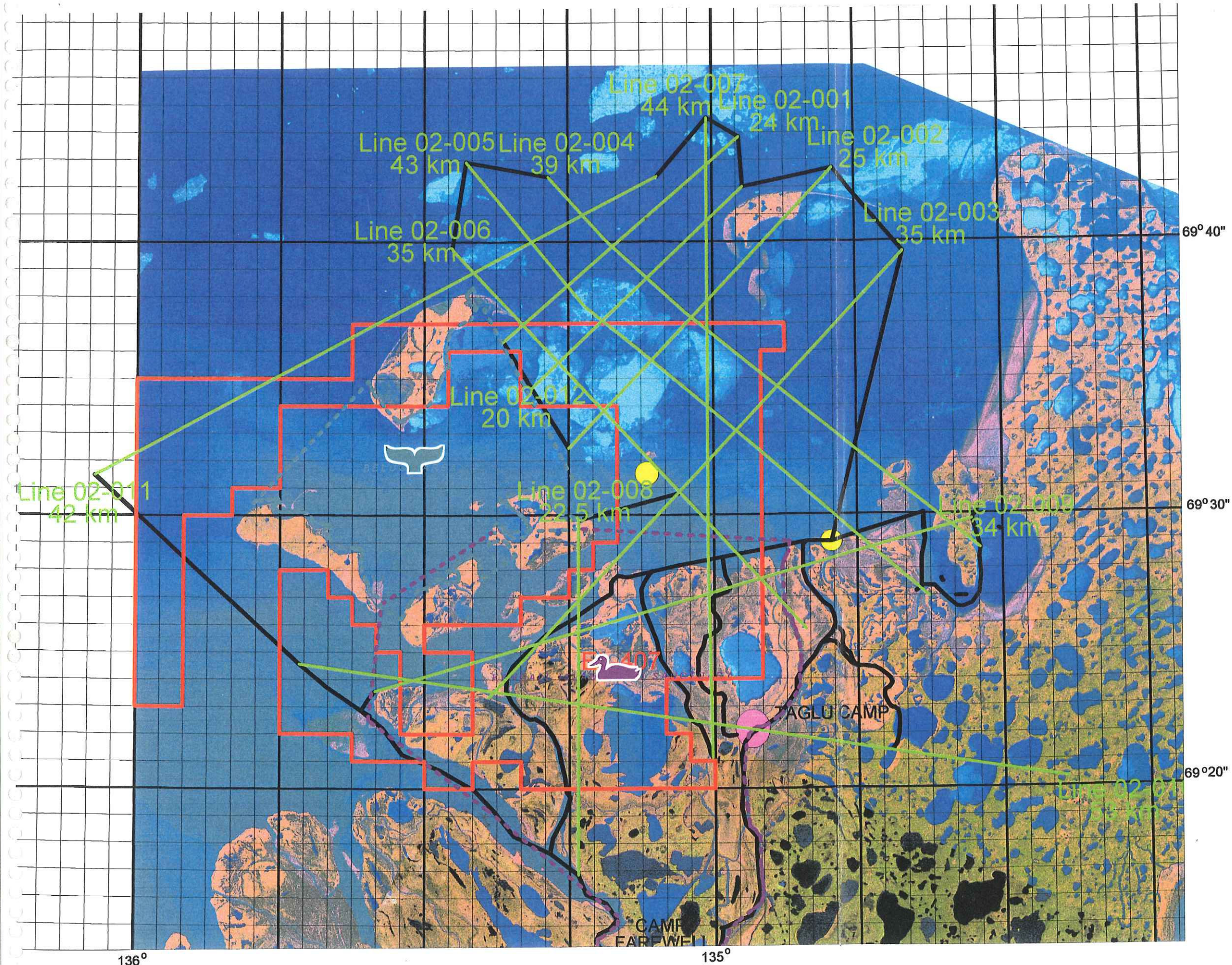
Line	Length (km)	Area (ha)
02-001	24.0	19.2
02-002	25.0	20.0
02-003	35.0	28.0
02-004	39.0	31.2
02-005	43.0	34.4
02-006	35.0	28.0
02-007	44.0	35.2
02-008	22.5	18.0
02-009	34.0	27.2
02-010	53.0	42.4
02-011	42.0	33.6
02-012	20.0	16.0
<b>TOTALS</b>	<b>416.5</b>	<b>333.2</b>

#### 4.2 Field Reconnaissance

A field reconnaissance of the proposed Immerk 2D area was conducted by IEG on 6 August 2001 on behalf of Anadarko. Most of the proposed program area is on relatively flat terrain (Plate 1), though gently rolling slopes of up to 15% may be found northwest of Kimialuk Lake. Some patterned ground can be found in higher areas (Plate 2). Vegetation is primarily low, with some shrub cover along the edge of waterbodies (Plate 3). Particular care will be taken to ensure the vegetative mat is undisturbed by the operations. Most of the channels have level banks and should not constrain the program. Should an offline detour be required to avoid a cut bank, the detour should be no greater than 150 m off of the original line. A pingo was located southwest of Big Lake during the reconnaissance and the point was geo-referenced. Pingos will be avoided by a minimum of 150 m.

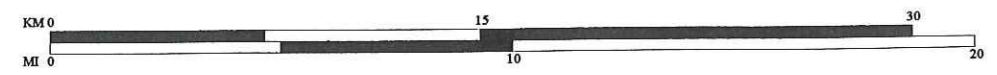
Anadarko (Charlie Trefanenko, Terry Forkheim), together with Delta Trace (Brett Cameron, Bill Busby, Doug Newman), conducted a helicopter aerial reconnaissance survey on 2 October 2001. Representatives from the Aklavik (Pat Kasook) and Inuvik Hunters and Trappers Committees (Shelley Gordon) and IEG also participated in the scouting survey. Kevin Allen participated as a wildlife monitor. The participants scouted the area to confirm that selected camp locations and access routes will minimize potential impacts and also scouted the seismic lines proposed by the geophysicists, to more accurately determine appropriate line routes that avoid environmentally and culturally sensitive sites. The survey participants used the geo-corrected locations for heritage sites located by the heritage resources survey in the summer of 2001. Anadarko chose to run the survey in early October to minimize potential disturbance to migrating waterfowl in the Kendall Island Bird Sanctuary. When the field survey was conducted, most migratory species had left the program area. The reconnaissance was conducted under CWS Permit NWT-MBS-01-09, dated 1 October 2001.





**Anadarko**  
Canada Corporation

- Semi-Permanent Seismic Camps
- Base Camps
- EL 407
- Beluga Management Zone
- Kendall Island Bird Sanctuary
- Immerk 2002 Proposed Seismic
- Access Roads





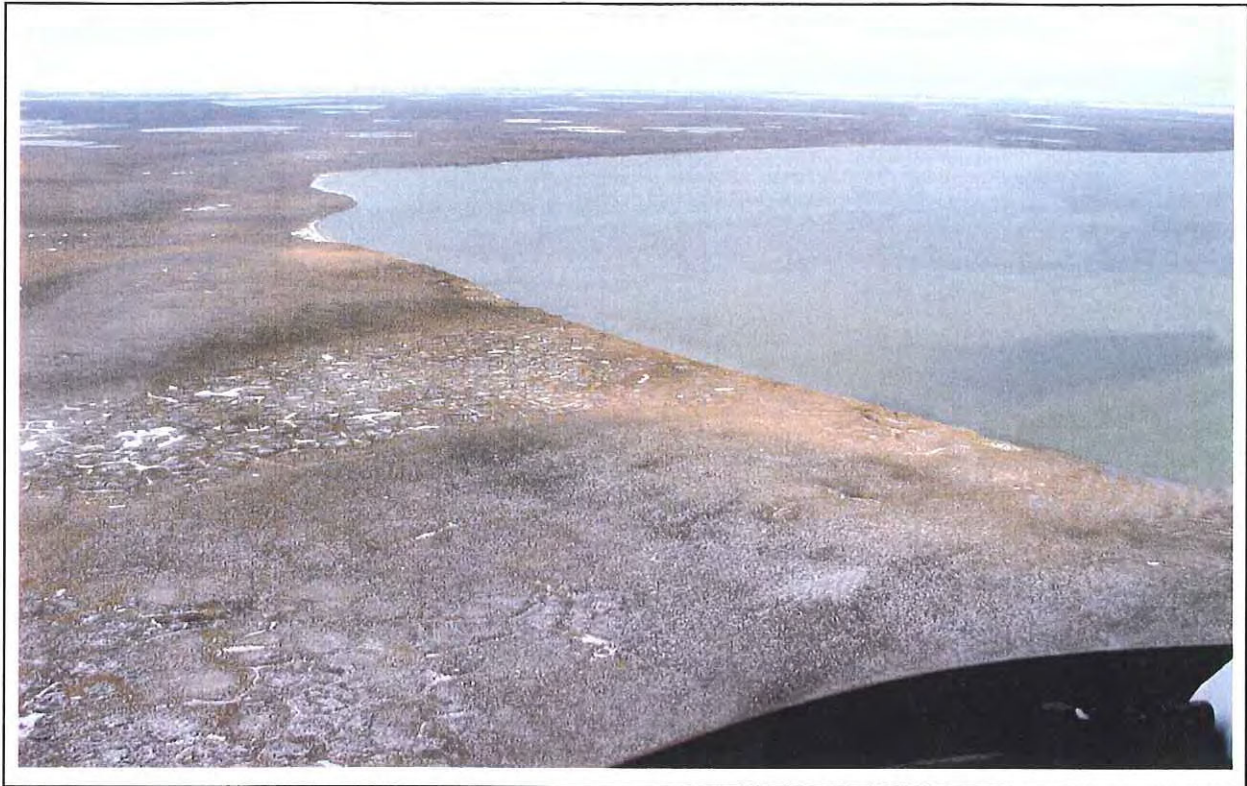


Plate 1: Terrain of proposed Immerk seismic program area is relatively flat (69° 20' 45.3" N, 134° 34' 1.1" W).



Plate 2: Patterned ground visible in program area (69° 21' 9.8" N, 134° 40' 57" W).





Plate 3: Shrub cover present adjacent to waterbodies (69° 25' 43" N, 135° 11' 27.2" W).

### 4.3 Seismic Program Description

#### 4.3.1 Line and Access Route Selection

The location of the program was based on the interpretation of seismic and subsurface well data previously acquired in the area and overlaps the Mackenzie River Delta Winter 2001 Regional Seismic Acquisition Program conducted by Explor Data Ltd. The intent of overlapping the programs is to further delineate potential hydrocarbon prospects. Line locations will avoid cabin locations, known heritage sites and environmentally sensitive areas, such as steep slopes and areas identified in the biophysical studies completed during the summer of 2001.

To the extent feasible lines will be straight with offsets (detours) or skidding used to avoid sensitive areas. Delta Trace will conduct the line surveying using global positioning system (GPS) navigation that will allow Anadarko to choose the path of least disturbance along the line. Areas of sensitivity and paths of least disturbance will be identified through air-photo interpretation and will be ground-truthed using on-the-ground surveys during program planning.

Access to the program will be primarily on the ice along the route used by Burlington Resources Canada Energy Ltd. (Burlington) to conduct their Mackenzie Delta 2000/2001 Winter Seismic Program. A single route into the vicinity of the program area will be shared with Japex Canada Corporation (Japex),

Chevron Canada Resources Ltd. (Chevron) and AEC West Ltd. (AEC). Sharing the access route will minimize the footprint required for access to all of the program areas. Access route locations are identified on Figure 2.

The criteria used for temporary winter access route selection includes:

- utilizing the Inuvik to Tuktoyaktuk winter road as primary access;
- utilizing the Mackenzie River and its associated channels for ice access;
- utilizing the seismic lines for any overland access required within the program area;
- utilizing the sea ice for access to the northern section of the program area;
- working with other operators to minimize the number of roads constructed; and
- minimizing disturbance to sensitive wildlife habitat, soil, hydrological and vegetated areas.

#### **4.3.2 Access Route Construction**

Ice roads will be constructed primarily on lakes, river channels and marine areas in the vicinity of the project. Surface preparation will consist of clearing snow from the ice. Where lakes, river channels and marine areas do not provide access to the project area, or where ice cover is insufficient to support the weight of the equipment, overland access routes may be required. Construction of overland access routes will consist of snow compaction, and watering or icing, along the routes chosen. Ground depressions encountered along the access routes may be filled with snow, and iced over, to smooth the surface. Dozer blades will be equipped with mushroom shoes to elevate the blade, leaving a minimum of 20 cm snow cover on the access route to prevent disturbance of the organic layer.

If thickening of ice on access routes is required, water will be withdrawn from large waterbodies, channels and marine areas to flood the route. Water withdrawn from marine areas will only be used on the marine ice. Water withdrawal methods will meet all regulatory guidelines (Section 4.4.3). Access will be over ice and snow where ice thickness is sufficient to safely carry equipment loads and overland sections will be kept to a minimum.

Both electronic and physical ice thickness profiling will be employed during the construction and use of access routes to evaluate ice conditions for safe travel. Access routes will be selected where slopes are minimal. Where slopes are unavoidable and high banks (>1m) hamper access, snow and/or ice ramps made of clean snow and water will be constructed to prevent erosion and disturbance by equipment. Ice ramps will be constructed using water withdrawn from large waterbodies and channels.

#### **4.3.3 Line Production**

Anadarko has used satellite images during the planning stages of line construction. Survey crews have also been deployed to the field during the planning stages to accurately determine appropriate line routes that avoid environmentally and culturally sensitive sites. In terms of culturally sensitive sites, data collected during the summer and fall 2001 heritage resources field survey was used. Once the routes have been determined, the lines will be surveyed using a combination of GPS and conventional survey systems. Survey crews will proceed down the lines identified by the geophysicists using GPS receivers

mounted on Nodwell FN60's and snowmobiles. To the extent feasible lines will be straight with offsets or skidding used to avoid lakes or channels with water under the ice, as well as environmentally sensitive areas identified by the Environmental Monitor.

Energy source points (vibroseis and dynamite) will be positioned at intervals of 25, 50, 75 or 100m. The source point interval to be used will be established through on-site testing early in the program. Line width will average 8m.

Along the lines, source and receiver points will be marked with a wooden lath to denote each point and line for that portion of the program. Wooden lath and flagging will be retrieved at the end of operations and will be recycled where possible, incinerated or disposed in the Inuvik landfill. An inspection of the program area will be conducted in the summer of 2002 to ensure all debris has been removed. The area within the Kendall Island Bird Sanctuary will not be inspected until the migratory bird species have left the area, approximately 15 September 2002.

Ice profiling will be used throughout the program on the seismic lines to calculate ice thickness and to determine if the ice is bottom-fast. In areas frozen to the bottom, the line will continue over the ice and be completed as designed.

#### ***4.3.4 Line Clearing***

Minimal line clearing will be required for the program. A snowmobile or FN60 Nodwell will be used to set out the line. Lath will mark the line at 50 m intervals. The tracked units will pack the snow on the lines and little clearing or plowing should be required. If plowing is required in areas that have drifted deeply, a minimum 20 cm of snow will be left on the line to avoid disturbance of the organic layer.

#### ***4.3.5 Energy Source/Shooting***

Anadarko is proposing to use tracked vibroseis equipment as the primary energy source. Tracked vehicles were selected for the program to minimize potential environmental impacts. The tracked vehicles will be mobilized to the program area approximately 20 January 2002. These units are currently stored in Inuvik.

Vibroseis will be used on land, on lakes frozen to the bottom and in marine areas frozen to the seabed. Waterbodies not frozen to the bottom will have source points stacked around the edges, if distances allow. On waterbodies that are undershot, receiver cables and geophones will be laid across the ice. The vibroseis units are diesel fuelled vibrators, equipped with large-footprint, low ground pressure, belting and steel-barred tracks, to minimize impacts on the tundra. Each unit has a metal pad that is extended down to the ground and positioned over each of the shot points along the line. The energy is then transmitted by exerting variable pressure on the metal pad, which is held against the ground by the weight of the vehicle.



Dynamite will be used on larger waterbodies and areas of the near-shore, not frozen to the bottom, where data cannot be collected using the vibroseis techniques outlined above. All larger waterbodies, including the near-shore, will be drilled using a 3-way seismic drill rig. The drilling procedure is as follows:

The preferred drilling method uses a cased-system with reverse auger flighting, as described below. A demonstration of the drilling rig was conducted for DFO and DIAND on 20 October 2001 to their satisfaction.

A 12.5 cm (5") hole will be drilled through the ice. A 10 cm (4") casing will then be lowered through the ice and water to the lake, channel or seabed. The casing will be firmly pushed into the consolidated material in the lake bottom or seabed. A drill pipe is then run down through the casing. Auger flighting on the pipe spins in a reverse direction, pushing the cuttings down and to the side of the hole. The drill bit is about 9.4 cm (3 3/4") and the outer diameter of the drill pipe is approximately 8.8 cm (3 1/2"). Minimal amounts of water will be used to keep the drill bit clean, without carrying cuttings to the top of the hole. The hole will be drilled to 9.5m, or as otherwise agreed to with DFO. The drill pipe will be removed, and the charge will be loaded into the hole. The cap lead will be attached to a soft rubber doughnut that will keep it from falling through the casing as the casing is removed from the hole.

When drilling below waterbodies, drillers will be instructed to attain a minimum depth of 9.5 m below the consolidated material or hardpan at the bottom of the waterbody, or as otherwise agreed to with DFO. A maximum 2 kg charge will be placed below waterbodies. To increase the energy source, and ensure high quality data, Anadarko may consider drilling a pattern of between 2 to 5 holes per source point. Each source point may contain 1, 2, 3, 4 or 5 holes with a 2 kg charge in each hole. The number of holes per shot point will be established through on-site testing. This combination of charge size and placement depth exceeds the requirements of DFO as shown in Table 3. The charge will be weighted in the hole by a "sandpoint" tip that is screwed on to the charge. Once the drill casing is removed the surrounding sediment will slump into the bore hole, over the charge. A drill log record will be kept of each drilled shot point noting the location, depth reached, size of charge and other pertinent details. A copy of the drill logs will be kept by Anadarko and Delta Trace and a monitoring plan, acceptable to both Anadarko and DFO, will be arranged prior to start-up.

Dynamite may be used on land to repeat vibrator energy source points, for purposes of phase matching, on lines on either side of waterbodies or where access with the tracked vibrators is not possible. Dynamite use on land is expected to be infrequent. The use of dynamite on land will not occur with the Kendall Island Bird Sanctuary. A maximum 20 kg charge will be placed 18 m below the ground surface. Charges will be setback minimum of 50 m from inland waterbodies not frozen to the bottom.

Table 3

**Setback Distance (M) From Centre Of Detonation Of An Explosive To Fish Habitat To Achieve  
100Kpa Overpressure Guideline (Wright And Hopky 1998)\***

Substrate Type	Weight of Explosive Charge (kg)							
	0.5	1	2	5	10	25	50	100
Rock	3.6	5.0	7.1	11.0	15.9	25.0	35.6	50.3
Frozen Soil	3.3	4.7	6.5	10.4	14.7	23.2	32.9	46.5
Ice	3.0	4.2	5.9	9.3	13.2	20.9	29.5	41.8
Saturated Soil	3.0	4.2	5.9	9.3	13.2	20.9	29.5	41.8
Unsaturated Soil	2.0	2.9	4.1	6.5	9.2	14.5	20.5	29.0

\* Setback distances were revised by DFO on December 6, 2000

### Testing Energy Source Options

To date, high quality data has not been collected in the Delta comparing the results of using vibroseis, instead of dynamite, on lakes, channels and marine areas without bottomfast ice. Prior to, and during various phases of recording operations, Anadarko will conduct a series of tests to evaluate the quality of data obtained using vibroseis versus dynamite. The data will take several months to evaluate, but if the tests are favourable, Anadarko may be able to use vibroseis equipment in a broader range of areas in future years.

#### 4.3.6 Laying-out Lines

The primary mode of cable layout and retrieval will be line crew personnel supported by tracked line units. Cable and geophones will be laid along the side of the tracked lines. Geophones will be placed at 25 m intervals on the lines.

#### 4.3.7 Recording

The recording unit (doghouse) will be positioned on a Nodwell or similar vehicle, and will travel down the line, hooking up to the cable at the appropriate locations. This unit records information collected by the geophones and writes the information to tape. The unit records information as the vibrators input a signal at each source point on the source line. If dynamite recording is used, a shooter will travel down the source line, connect cap leads to the shooting unit, and detonate the charges for recording. The recording crew should average a minimum of 90 source points of production per day depending upon weather and access conditions and recording parameters.



#### 4.3.8 Personnel Required\*

Inuvik Base Manager	1	Line Truck Drivers	5
Project Manager	1	Vibrator Operators	5
Surveyors/chainers	10	Shooters	2
Cat/loader Operators	8	Troubleshooters	2
Ice Profilers	6	Recording Crew Helpers	14
Drillers and Helpers	14	Cable Repair Technician	1
Drill Push	1	Camp and Catering Staff (max)	10
Drill Mechanic	1	Delta III Operators	2
Advance Clerk	1	Water/Vac Truck Operators	2
HSE Advisor	1	Paramedic	2
Recording Crew Manager	1	Fuel Truck Driver	1
Recording Crew Clerk	1	Fuel Sloop Manager	1
Observers	2	Client Representative	1
Vibrator Technicians	2		
Mechanics	3	<b>Total</b>	<b>101</b>

Note: not all personnel will be on site for all phases of the operation.

#### 4.4 Equipment Required

The specific seismic survey equipment is provided by Delta Trace Ltd. as part of their contract with Anadarko. Subcontractors provide the remainder of the equipment, with the majority of the equipment coming from Inuvialuit contractors.

##### Advance Equipment

FN60 Ice profiling units	2
Tandem Water Truck	1
Delta III Water Unit	1
D6M Bulldozers	2
Snowmobiles	6
Crew cab Trucks	2
Sno-cat Plow	1

##### Survey & Recording Equipment

FN110 Recording Unit	1
FN110 Line Trucks	5
TerraFlex 300 Tracked Vibrators	5
FN110 Mechanical Support Units	2
FN60 Mechanical Support units	1
FN110 Vibe Crew picker unit	1
FN 60 Managers Unit	1
FN 60 Survey units	6
Snowmobiles	10
Crew cab pick-ups	12
Line Crew Bus	1

##### Support Equipment

D6M Bulldozers	3
Delta III (fuel/water)	2
Loader 950G	1
FN110 water truck	2
Fuel sleighs (3000 gallon capacity)	8
Emergency Transportation Vehicle	1

##### Drilling Equipment

FN110 Nodwell top-drive seismic drills	2
Comtrex LIS Avoidence seismic drills	3
FN60 Nodwell with mounted heli type drills	2
FN110 Nodwell support shop unit	1
Crew cab support trucks	3

##### Ground Support Equipment based out of Inuvik

Crew cab flat deck support truck	2
Extended cap trucks	1
Food delivery truck	1

## 4.5 Camp

A maximum 120-person stationary camp will be constructed at the north end of Harry Channel approximately 69°29' north and 134°48' west. Alternately, the camp may be located near Rae Island approximately 69°32' north and 135°07' west. Depending on ice conditions, other locations may need to be considered. This will be evaluated on-site during the program start-up. A pre-program scout in January will finalize the location based on factors related to safety and the environment. The regulator agencies will be contacted when the final location is known. The camp will be situated on marine ice. The camp site will be flooded if required prior to camp mobilization. No clearing of vegetation is expected. Temporary airstrips will be cleared and maintained in close proximity to the camps, on the marine ice for medi-vac, safety and emergency response purposes.

The 120 person skid mounted camp will consist of 2 – 60 person dorms (2 persons/room), with central wash facilities, a new 7 trailer Kitchen/dinner/washcar/recreation unit, an office/first aid trailer, 1 water and sewage storage unit, 1 generator unit with two 250 kW generators and an incinerator unit.

As the crew size will be a maximum of 100 workers extra bunks will be available in case of emergencies.

### 4.5.1 Fuel Storage

Fuel storage for the camp and field machinery will be in eight sleigh mounted 11 340 litres (3000 gallon) fuel sloops with secondary containment. Tank sizes range from 1 890 litres to 5 670 litres (500 gallon to 1500 gallons) per tank. Total sleigh mounted storage on the program site will be 90 720 litres (24,000 gallons). Two 1 890 litre (500 gallon) tanks will contain gasoline, the remainder will be diesel. Approximately ten barrels of gasoline will be on the job sites and ten barrels of Jet B fuel will be stored to meet any unanticipated or emergency requirements.

A fuel manager will be responsible for filling all tanks and ensuring proper drip containment is used. All tanks and fuelling procedures will adhere to safety standards outlined within the Delta Trace Ltd. Fuel and Oil Spill Contingency Plan (Appendix B). Each sloop is equipped with spill response equipment. Electric pumps and fire fighting equipment will be present at all times.

The power generation skid will contain its own fuel storage. The capacity of this unit is currently unknown. The skid will be fully lined to contain any accidental fuel leaks.

### 4.5.2 Wastewater Treatment and Disposal

All sewage and grey water will be collected in a holding tank and transported to a suitable treatment facility in Inuvik. Solid refuse will be incinerated and/or transported to suitable licensed landfill.

Delta Trace Ltd. will track all waste produced during operations as part of regular safety reporting procedures.

### 4.5.3 Water Use

Utility water will come from local fresh water channels of the Mackenzie River and large lakes. Potable water will be trucked from Inuvik, with permission from municipal officials through a bulk water agreement. Water required for ice access and building snow ramps will be obtained from large lakes, channels and marine areas. Water withdrawn from marine areas will only be used in marine areas. No water will be taken from a land-locked waterbody where drawdown and related fisheries concerns may be an issue.

Total water withdrawal rates are expected to be less than 75 m<sup>3</sup> per day over the course of the project. Water will be extracted at a point where a seismic line or access road intersects with the river, and intake hoses will be screened in accordance with DFO's *Freshwater Intake End-of-Pipe Fish Screen Guideline*.

## 5.0 ALTERNATIVES

The proposed 2D program has been located to maximize the quality and location of the seismic data collected. The program areas were positioned using existing data from the 2D program conducted by Explor Data in 2000/2001, as well as past seismic programs and geological data from exploratory wells in the project area. Alternative locations will not fulfil the geophysical survey requirements of the program. However, the positioning of the seismic lines may be adjusted as necessary to mitigate any potential impact identified prior to or during the program operations.

Helicopters will only be used if the program is delayed and the final stages need to be completed quickly in April. Helicopters will not be used in the Bird Sanctuary. They will strictly be used to move people and equipment. This situation is not expected. If heli-portable operations become mandatory the recording instruments would be mounted in a portable recording box and moved into position with a helicopter.

If ice formation in the fall is poor and the ice road north from Inuvik on the Mackenzie Channel cannot sustain heavy load limits, Delta Trace and Anadarko will consider alternatives. If load limits required to move the tracked vehicles from the staging area in Inuvik are not sufficient, then an overland route may be used to Lucas Point. The overland route would be shared with other operators in the area. A new route would not be built. The route would follow the access proposed by Conoco Canada Resources from Inuvik north to Parsons Lake, known as the 'Pole Road' and west to Lucas Point via the Pete's Creek overland access.

## 6.0 CUMULATIVE EFFECTS

Cumulative effects refers to environmental and socio-economic impacts that occur when activities or disturbances overlap in time or space. It is now recognized that the combined effects of unrelated individual projects or activities can result in an accumulation of human caused changes that may be different in nature or extent from the effects of the individual activities (MacDonald 2000, Ormerod and

Watkinson 2000). Potential cumulative effects pertinent to the Anadarko Immerk winter 2D seismic program include cumulative habitat alteration in the study region, disturbance of wildlife species causing wildlife to avoid areas, and the disturbance of resource harvesting activities during the winter 2001/2002 period.

Potential cumulative effects were assessed qualitatively by relating the proposed program to other activities in a region that encompasses all current lease holdings (Figure 6). The regional cumulative effects assessment area was chosen to reflect both regional spatial requirements of some of the key VECs and the interests of current exploration and development initiatives. The significance, extent, duration, magnitude, and residual effects criteria used in this section are defined in Section 12.0, Proposed Mitigation and Anticipated Environmental Impacts.

Analyses of cumulative effects in this screening document are qualitative. Discussions regarding cumulative effects assessment are currently ongoing between the Joint Secretariat and industry representatives, on how best to determine cumulative impacts of development within the Mackenzie River Delta on a regional scale over a longer time frame. The EIRB and EISC are cooperating with Kavik Axys Ltd. to prepare guidelines for assessing cumulative effects (Chernoff, Pers. Comm.).

### 6.1 Past, Current, and Imminent Activities

Since the 1960s, the most extensive, industrial land use in the study region has been seismic exploration. The Joint Secretariat obtained and mapped data from the National Energy Board to depict historic seismic activity throughout the Mackenzie Delta, nearby islands and the Beaufort Sea for the period of 1965 through to 1992. Seismic activity between 1992 and 2000 has not been compiled and mapped. Last year's programs within the proposed program area include the AEC West Ltd. Mackenzie Delta Winter 2000/2001 Seismic Program, Explor Data Mackenzie River Delta Seismic Program and Burlington Resources Canada Energy Ltd. Mackenzie Delta 2000/2001 Winter Seismic Program.

A quantitative means for evaluating relative intensity of past seismic has been developed and is summarized in Table 4. The proposed program lies within a region of low intensity seismic exploration. Spatial and/or temporal overlap of past activities and planned projects of known location are shown in Figure 3.

**Table 4**

#### **Intensity Of Past Seismic Activity**

<b>Intensity</b>	<b># lines/10km<sup>2</sup></b>
Low	0-25
Moderate	25-50
High	50-75
Extreme	75-Undefined

All activities defined as current have already received approval from the EISC whereas imminent programs are still awaiting approval from the EISC as of November 2. Spatial and/or temporal overlap of the projects identified below is summarized in Table 5.

Current activities that could contribute to cumulative habitat alteration and loss are the AOGS Swimming Point Lease Extension and Airstrip Expansion, the AOGS Lucas Point Staging Area, the Petro-Canada Swimming Point Quarry, the Japex Taglu Staging Area, Shell's Camp Farewell, the Japex Winter Drilling Program on the west side of Mallik Bay, the Shell West Channel Remediation Program, the seismic activities of AEC and Chevron, and the drilling activities of Petro-Canada. Other approved activities that could occur during the winter 2001/2002 period within the study region include a Cape Bathurst Caribou Study and a Grizzly Bear Denning Study that are being conducted by RWED.

Imminent programs that could occur during the winter 2001/2002 period include the seismic activities of AEC, Anderson, Conoco, Petro-Canada and Shell, and the drilling activities of Anderson and Petro-Canada. Trails and winter roads required for access to development sites are also considered to be part of the cumulative disturbance in the study region.