



ALBERTA ENERGY COMPANY

**FUEL & OIL SPILL
CONTINGENCY PLAN**

for the

Kugmallit 2001

SEISMIC PROGRAM

2000-2001

FUEL AND OIL SPILL CONTINGENCY PLAN NORTHWEST TERRITORIES

INTRODUCTION

Purpose of Plan

The purpose of this plan is to provide a safe response strategy should a fuel or oil spill occur. This action plan provides a response to protect human life, to minimize the environmental effects, and to follow proper procedures of a cleanup operation.

AEC has contracted Veritas DGC Land, of Calgary, to conduct this seismic data acquisition program. Contact names and numbers listed in this document are primarily those of the prime contractor, Veritas.

The crew conducting this project is using approximately 10,000 litres per day. The fuel, which is carried in fuel sloops mounted on sleighs, moves with the crew from one location to another every 2-4 days. This document, including Appendix I, applies to this present method of conducting operations. In the event that a stationary camp is used, spill containment methods as described in Appendix II will be utilized.

Exploration and Support Program Description

Project Name: Kugmallit 2001

Base Camp

Stage Area: Veritas DGC Land facilities in Inuvik, NT

Location of Fuel

Transfer Sites: Latitude: N69° 05' 18"
Longitude: W134° 21' 47"

Latitude: N69° 05' 20"
Longitude: W134° 03' 23"

Fuel Delivery: Ongoing

Administration: Veritas DGC Land
2700 - 61st Ave S.E.
Calgary, Alberta
T2C 4V2

Phone: (403) 257-6700

FUEL AND OIL SPILL RESPONSE EQUIPMENT

SLEIGH CAMPS

The following small inventory of oil spill response equipment will be maintained at the sleigh camp locations and fuel transfer sites:

- 1 3" Fuel transfer pump c/w hoses, couplings, etc.
- 1 Roll of Sorbent Blanket
- 4 Non-steel scoop shovels
- 2 205 litre empty drums with lids off

Logistic Support

Crew Equipment:

- 4 x Caterpillar D7 Dozers
- 3 x Caterpillar D6M Dozers
- 1 x Caterpillar Challenger Dozer
- 1 x Caterpillar 977 Utility Dozer
- 3 x Nodwell FN 60
- 8 x Nodwell FN 110
- 1 x Chieftan Recording Unit
- 2 x Foremost Delta 3 (1 fuel hauling unit only, 13,600 litre capacity)
- 5 x Vibrator Units
- 4 x Fuel sleighs, each equipped with two, 10,000 litre tanks. A spill containment tub has been constructed below the tanks with a capacity of 110% of the total volume.
- 1 x 60-man Camp
- 6 x Snowmobiles

Fuel Delivery and Transfer Description

The fuel will be trucked from Inuvik to the fuel transfer site via the winter road. Bulk fuels will be off-loaded by means of a hydraulic pump and a hose between the fuel truck and the fuel transfer sleigh or Delta 3. The fuel is transported to the camp by the Delta 3.

- Delivery:
- 1 16,000 liter Fuel Truck transporting fuel from Inuvik to Fuel Transfer Point.
 - 1 Foremost Delta 3, Super Terra Tire Units, weight 15,000 Kg., ground bearing pressure 8 lbs. Per square inch, transporting fuel from Fuel Transfer Point to camps.

CONTACT LISTS

Government

GNWT(RWED)	24 Hour Spill Line	(867) 920-8130
ILA	Tuktoyaktuk Hans Arends <i>Land Administrator</i>	(867) 977-2202
DIAND	Inuvik Rudy Cockney <i>District Manager</i>	(867) 777-3361
DIAND	Inuvik Rob Walker <i>Resource Management Officer</i>	(867) 777-3361
GNWT	Yellowknife <i>Environment Protection Services</i>	(867) 873-7654
N.E.B.	Bruce Moores Environmental Specialist John Korec Environmental Assessment Officer	(403) 299-3926 (office) (403) 201-3765 (home) (403) 292-6614 (office) (403) 275-6256 (home)

Alberta Energy Company (AEC)- Calgary

<u>Position</u>	<u>Person</u>	<u>Location</u>	<u>Phone Number</u>
Project Manager	John Duckett	Calgary	(403) 261-2569
Senior Geoph.	Dave Baer	Calgary	(403) 261-2578

Veritas DGC Land - Calgary/Inuvik

<u>Position</u>	<u>Person</u>	<u>Location</u>	<u>Phone Number</u>
Crew Supervisor	Alan Wong	Calgary	(403) 257-6758 (403) 257-6801 fax (403) 605-7094 cell
Base Manager	Wayne Ross	Inuvik	(867) 777-3493 (867) 777-3521 fax
Crew Manager	Dwayne Meyer	Field Camp	(600) 701-4160 (403) 813-5798

SCOPE OF SPILLS

Foremost or Fuel Sleigh

Diesel fuel spill on frozen ground, snow or ice from a vehicle accident or valve or tank leak while transporting fuel from Inuvik to Fuel Transfer Location or from the Fuel Transfer Location to field equipment.

Vehicle Fuel Transfer

Diesel fuel spill on frozen ground, snow or ice while transferring fuel from fuel truck to Foremost or fuel sleigh and from Foremost or fuel sleigh to field vehicles.

Industry Operators

Petro Canada Swimming Point

Ray Adams (Senior Logistics Supervisor)

(867) 777-4942

(867) 777-6103 (cell)

Petro Canada has agreed to provide assistance and equipment for any serious spills, 24 hours a day.

Equipment for Spill Response

A list of additional spill recovery equipment, available from Petro Canada at Swimming Point, is attached in Appendix I of this document. In addition to the equipment listed in Appendix I, the seismic crew will have access to a large container, in the event of larger spills. The size of the container is approximately 3.04m wide x 4.88m long x 2.44m high. (~36,000 litres)

INITIAL RESPONSE ACTIONS

Upon discovery of a spill, the first person on the scene:

- Protects the safety and lives of anyone in the spill area.
- Isolates or removes any potential ignition sources if safe and possible.
- Locates likely source or cause of spill and stops flow or release (do not take unnecessary risks).
- Assess the likely size, extent and conditions of spill.
- Notifies immediate supervisor with information.*
- Controls access to area until assistance arrives.
- Attempts to contain spread of spill, using available equipment and materials.
- Records all relevant information for reporting purposes.

* Upon notification that a spill has occurred, the supervisor will notify DIAND @ 24 hour Spill Number (867) 920-8130, and N.E.B. (403) 299-3868.

SPILL RESPONSE COUNTERMEASURES

Seismic operations will be conducted during the winter months only. Countermeasure procedures have, however, also been included to cover a spill during the summer months.

Winter Spills on Land

Detection

Areas are usually snow covered and limits are highly visible.

Probing will locate spill area under a depth of snow.

Containment

Build frozen snow dikes to contain spill.

Use plastic sheeting to line face of dike.

Recovery

Pump liquid product into empty drums or tanks for future acceptable disposal.

Transportation

TDG waste manifest if necessary.

Contaminated Snow Cleanup

Use mechanical and hand equipment to scrape up product-in-snow mixture and load into dump trucks or other suitable container.

Haul product-in-snow mixture to a suitable site with disposal or container facilities. Eg. MATCO in Inuvik.

Caution

If terrain conditions indicate long term terrain damage may result by bulldozer scraping, then hand cleanup may be necessary with a final cleanup done as the snow melts and the terrain surface starts to thaw.

Burning

If a spill is moving toward a higher environmental or safety concern, an immediate burning may be desirable i.e. creek, open water or residences. This decision will be made by the Field Supervisor or Party Manager. Every effort will be made to protect the spill area from other combustible materials before burning. All residue after the burn is to be picked up and disposed of in accordance to applicable laws.

Winter Spills on Ice

Caution

Be sure to check ice thickness for load bearing capacity.

Detection

Determine perimeter of spill area.

Burning

If the spill is moving towards cracks in the ice or open water then an immediate burning may be desirable. This decision will be made by the Field Supervisor or Party Manager. All residue after the burn is to be picked up and disposed of in accordance to applicable laws.

Containment

Construct frozen snow dikes or ice trenches around perimeter of spill for containment.

Prevent escape of product into cracks

- dike off
- seal with snow\water mixture.

Transportation

TDG waste manifest if necessary.

Recovery

Recover pumpable product and store in steel drums or tanks for future disposal.

Cleanup

Pick up contaminated snow using mechanical equipment or hand labour.

Store in steel drums for future disposal or transport by means of dump truck to a disposal site.

Use sorbent to clean up remaining contained product.

Recover sorbents used and place into steel drums for future disposal.

Summer Spills in Water

Recovery-Skimmer

Use an oil spill skimmer to recover spilled fuel, if spill is too large to recover with sorbents.

Store recovered small volumes of fuel and water in steel drums.

Store larger volumes or recovered fuel and water in empty fuel tank on barge for transfer to a remote recycling or acceptable disposal site. If necessary, a TDG waste manifest may be required.

Summer Spills on Land

Containment

Construct dikes or drainage trenches to prevent fuel spills from migrating (particularly into water).

Recovery

Pump liquid product into empty drums or tanks for future acceptable disposal.

Transportation

TDG waste manifest if necessary.

Clean-up

Use sorbents to clean up remaining surface oil and fuel. Recover sorbents used and place into steel drums for future disposal.

Burning

Immediate burning may be desirable to prevent the spread of fuel as decided by Field Supervisor or Party Manager. Pick up residue after burn has been completed.

Soil Removal

Contaminated soil may be removed to storage for acceptable disposal. In most cases, however, contaminated soil should be left in place and the hydrocarbon contaminant allowed to biodegrade. Enhancement of this process through use of amendments may also be warranted.

GNWT Department of Renewable Resources recommends that use of this method be done in consultation with DIAND, MACA & GNWT.

Disposal

The following are a number of methods available in the project area for the disposal of oil spill products. All methods will be in accordance to Land Use Permit conditions.

1. In-Situ Burning at Spill Site

In the case of a major spill, some of the fuel released at the site may be disposed of through in-situ burning. Precautions must be taken to ensure fire cannot burn back to fuel storage tanks.

2. Waste oil may be transported to disposal facilities in Inuvik. MATCO Transportation owns and operates an oil burning furnace.

SPILL REPORTS

- 1) Any spill which is a violation, or
- 2) Any spill reported to a government agency, or
- 3) Any oil spill (not otherwise reportable) which is greater than 0.15 m³ (1 barrel) in size, or
- 4) Any spill which has received or may receive public news media attention, **MUST BE REPORTED**.
- 5) Any hazardous occurrence (i.e. spills that can or do adversely affect the environment) **MUST BE REPORTED** to the NEB, regardless of size.

Diaries of the on-site personnel are the primary sources of information. The accounting group provides the summary analysis and cost breakdown of the cleanup operation. The report should include the following:

- Analysis of events leading up to the spill, cause of the spill, type of oil or fuel spilled, duration of spill, chronological description of all areas contaminated by the spill and extent of contamination.
- Cleanup procedures utilized in each area, including duration of activities, number of personnel involved in the cleanup, days and number of equipment employed.
- Description of weather conditions, and river currents and how they affected the movement of the spill and the cleanup conditions.
- Analysis of the success of cleanup in each area contaminated, and evaluation of equipment used.
- Description of environmental protection measures and their success.
- Initial statement of environmental impacts.
- Statement of property damage.
- Summary of total volume of the spill and volume recovered, and estimates of the fate of the oil lost including approximate amount lost to each natural process.
- Statement of damage to company property as well as damage to others' property, including details of cause, type and content of damage.
- Salvage operations and their success (if applicable).

- A list of all government personnel and other authorities contacted including date, time and title.
- If news released, government communications and records of interviews
- Summary cost breakdown of cleanup, including equipment, manpower, materials, accommodation, transportation, claims.
- Summary of injuries or deaths caused by the spill or occurring during cleanup
- Suggestions to improve cleanup operations during future responses
- Summary analysis of what went right and what went wrong including reporting procedures.
- All spills or potential spills of petroleum products or other hazardous material must be reported to the 24-hour Spill Report Line to ensure that an investigation is undertaken by the appropriate government authority.
- Any hazardous occurrences, i.e. spills that can or do affect the environment, and lost-time incidents must be reported to the NEB (OSH regulations).

SPILL REPORTING PROCEDURE

1. Fill out "**SPILL REPORT**" form as completely as possible before making the report.
2. Report **IMMEDIATELY** to Yellowknife using the 24-hour Spill Report Line.

24-HOUR SPILL REPORTING LINE (867) 920-8130

NOTE: Telephone calls can be made collect by informing the Operator that you wish to report a spill.

RCMP Communications may be used if other means are not available.

Additional Information or Assistance

Government of Northwest Territories
Environmental Protection Services

Phone: (867) 873-7654
Fax: (867) 873-0221

Department of Indian Affairs and
Northern Development Water Resources
Yellowknife

Phone: (867) 920-8240
Fax: (867) 669-2716

Environment Canada
Environmental Protection Branch

Phone: (867) 669-4710
Fax: (867) 873-8185

National Energy Board
Exploration and Production Team
Calgary

Phone: (403) 299-3926
Phone: (403) 292-6614
Fax: (403) 292-5876

APPENDIX 'I'

**FUEL & OIL SPILL
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for the

Kugmallit 2001

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APPENDIX 'II'

**FUEL & OIL SPILL
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APPENDIX II

Arctic Spill Control Containment and Recovery General Guidelines

Following are a number of guidelines for oil spill containment in the Arctic. These guidelines are not specific but rather are of a general nature. Included is a description of the techniques employed for the construction of snow and ice containment dikes.

A. PRINCIPLE OF CONTAINMENT

1. Confine spill to smallest manageable area possible.
2. Channel flow to containment area (e.g., figure A1 & A2).
3. Keep spill out of running water.
4. Location and size of the containment area must be decided before the time of the event in contingency planning considering:
 - the safety of personnel.
 - the safety of the rig, camp, etc.
 - the scope of the spill.
 - the condition of the ice or tundra surface.
5. The following table will serve as a guide for the size of containment areas.

AREA OF CONTAINMENT IN SQUARE METERS
FOR INDICATED DEPTH OF FLUID

<u>Volume in M3</u>	<u>0.15m</u>	<u>0.30m</u>	<u>0.46m</u>
160	1040	520	340
320	2030	1040	700
760	5200	2600	1700
1600	10400	5200	3500
3200	20800	10400	7000
7600	52000	2600	17300
16000	104000	5200	34700

B. CONTAINMENT

1. Snow dikes can temporarily contain oil spill on ice
2. Good unbroken ice will support oil in depths as follows:

<u>Ice Thickness</u>	<u>Oil Depth</u>
0.5 meters (1.5 ft.)	0.15 meters (0.5 ft.)
1.0 meters (3.3 ft.)	0.30 meters (1.0 ft.)
1.5 meters (5.3 ft.)	0.45 meters (1.5 ft.)

The size of the containment area and depth of liquid becomes dependent upon ice thickness.

3. If ice thickness is inadequate to support construction equipment for spill containment, a spill will be left undisturbed and will be cleaned up as soon as ice conditions permit.

C. SNOW DIKE CONSTRUCTION ON ICE

The ice surface inside the dike area should be scraped clean of snow if possible. Oil mixed with snow produces a mulch which makes disposal difficult.

1. Establish and stake perimeter of area to be diked.
2. Windrow snow approximately 1 (one) meter high with Cats and Graders onto the staked dike perimeter in the same fashion as snowplowing a road, utilizing snow from both sides of the dike. Cats must use an angled blade for this type of work.
3. Spray water onto the windrow at a rate of approximately 14 cubic meters (3,000 gallons) per 200 meters of windrow.
4. Level windrow with Cat using a straight blade and pack snow with tracks, establishing the first layer or first 0.3 meters (1 ft.) of dike.
5. Re-water the dike and pack with cat tracks, water at approximately the same rate as before or until the snow packs well. Underwatering will cause the snow to stay loose. This may be corrected by adding more water. Over watering will cause the cat tracks to sink into the mash snow. This may be corrected by dozing and mixing loose snow into the mash until the material will pack.

6. For the second layer or second 0.3 meters (1 ft) of dike, doze or grade 0.5 meters (1 foot) of dike, doze or grade 0.5 meters (1 ½ ft.) of snow onto the existing dike and water at the same rate as before.
7. Level top of dike, re-water and pack with cat tracks.
8. Steps 6 and 7 are to be carried on until the desired height has been reached.
9. The final finishing of the dike will be done by a grader using a snow-wing to cut a 2:1 backslope, rolling surplus material to the top of the dike where it will be leveled by the Cat.
10. A final spray of water over the top and the slopes of the dike will consolidate the material and prevent wind erosion.

The estimated time to build a dike as described above 1 meter high and 4.5 meters wide, is approximately three hours per bulldozer for 30 meters (100 feet) of dike, providing that snow and equipment are readily available.

D. SURFACE PREPARATION FOR DIKE CONSTRUCTION ON TUNDRA

1. Clean and smooth the tundra surface at least 15 meters (50ft) wide by snow to both sides of the perimeter of the area to be diked.
2. Spray water onto the cleared area, starting at the highest point, as a certain amount of water will migrate under the tundra toward the lower area. Allow water to freeze and re-water as required to transform the active layer into solid ice.
3. Blade snow in thin, 3 cm to 8 cm (1-3") layers over the area utilizing the snowbanks from both sides, water the snow and blade and pack this water saturated material over the area to obtain a proper seal across the rough tundra. The amount of water required to prepare the tundra surface will depend on the depth and on air voids present in the active layer. Time required will depend on frost conditions.
4. After the first section of the surface cover is completed, dike construction can proceed as outlined in Section C.

E. POLYTHENE DIKE LINER INSTALLATION

1. Cut V shape slot 30 cm deep and 15 cm wide into ice with powersaws or ditch witch on the dozed inside of dike, as close to the base of dike as possible.
2. Remove any loose ice or snow from the slot.
3. Lay polythene over dike as shown on Figure A-3 making sure that the sheeting will fit into the V slot and extend 30 cm to 45 cm beyond the slot.
4. Install one 5 meters x 30 meters polythene sheet at a time. (Each sheet should cover a minimum of 3 meters with next sheet.)
5. Backfill the V slot with water and loose snow and freeze the liner into position.
6. Cover the polythene liner with loose snow at a 4 to 1 slope to prevent wind damage. This is to be done very carefully and the operator should be assisted by a man on the ground to prevent damaging the liner.
7. After the liner has been covered sufficiently, the backslope is to be sprayed lightly with water to consolidate the snow and thus prevent wind erosion.

SPILL REPORT

(Oil, Gas or Other Materials, i.e. Hazardous Chemicals, etc.)

24 hour Report Line

Phone 867-920-8130

A	Report Date	Date and Time of Spill, if known	
B	Location and Map Coordinates (if known) and Direction if Moving		
C	Party Responsible		
D	Product Spilled and Estimated Quantities (Provide Metric Volumes / Weights if Possible)		
E	Cause of Spill		
F	Is Spill Terminated or Continuing		
G	Extent of Contaminated Area		
H	Factors Affecting Spill or Recovery - Temperature, Wind, Snow, Ice, Terrain, Buildings, etc.		
I	Containment - Naturally, Booms, dykes or Other, No containment		
J	Action, if any, Taken or Proposed to Contain, Recover, Clean-up or Dispose		
K	Do you require Assistance	If so, What Form	
L	Hazard to Persons or Property or Environment - Fire, Drinking Water, Threat to Fish or Wildlife		
M	Comments and/or Recommendations		
	Reported by:	Position, Employer, Location	Telephone
	Reported to:	Position, Employer, Location	Telephone



MACKENZIE DELTA PROJECT EMERGENCY RESPONSE PLAN

SECTION 7.0 EQUIPMENT LISTS

2000-12

SPILL CLEAN UP KITS (continued)

Equipment List - Winter based major spill response	Comments
Large truck based	For responding to a larger spill in winter
12 Aluminum shovels (scoop)	
Chain saw (18")	
Portable lights (See light kit list)	
3 Portable generators (5000 watt or larger)	
Fuel in CSA approved portable containers	
Safety kit (equipment as listed below)	
Sorbent -- socks (15 bale /bbl)	
Sorbent -- pad (25 bale /bbl)	
Sorbent -- loose (10 bale/bbl)	
Two - 1 Cubic metre totes	
2 Pick axes	
4 Large impervious tarps	
Tool box	
8 Boxes of XXL Disposable coveralls	
Documentation kit	
5 Boxes of vitron or nitrile gloves (winter lining)	
Diesel Herman Nelson heater	
Lubes	

Notes:

- Tool Box should include: 3/8 socket set, crescent wrench (8" and 10"), multi-tip screwdriver, pliers, utility knife, wire cutters flat file, hack saw, claw hammer, ball peen hammer, chainsaw file and screwdriver, pipe wrench (18", 24"), tin snips, allen wrench set, duct tape, tie wire, electrical tape.



MACKENZIE DELTA PROJECT EMERGENCY RESPONSE PLAN

SECTION 7.0 EQUIPMENT LISTS

2000-12

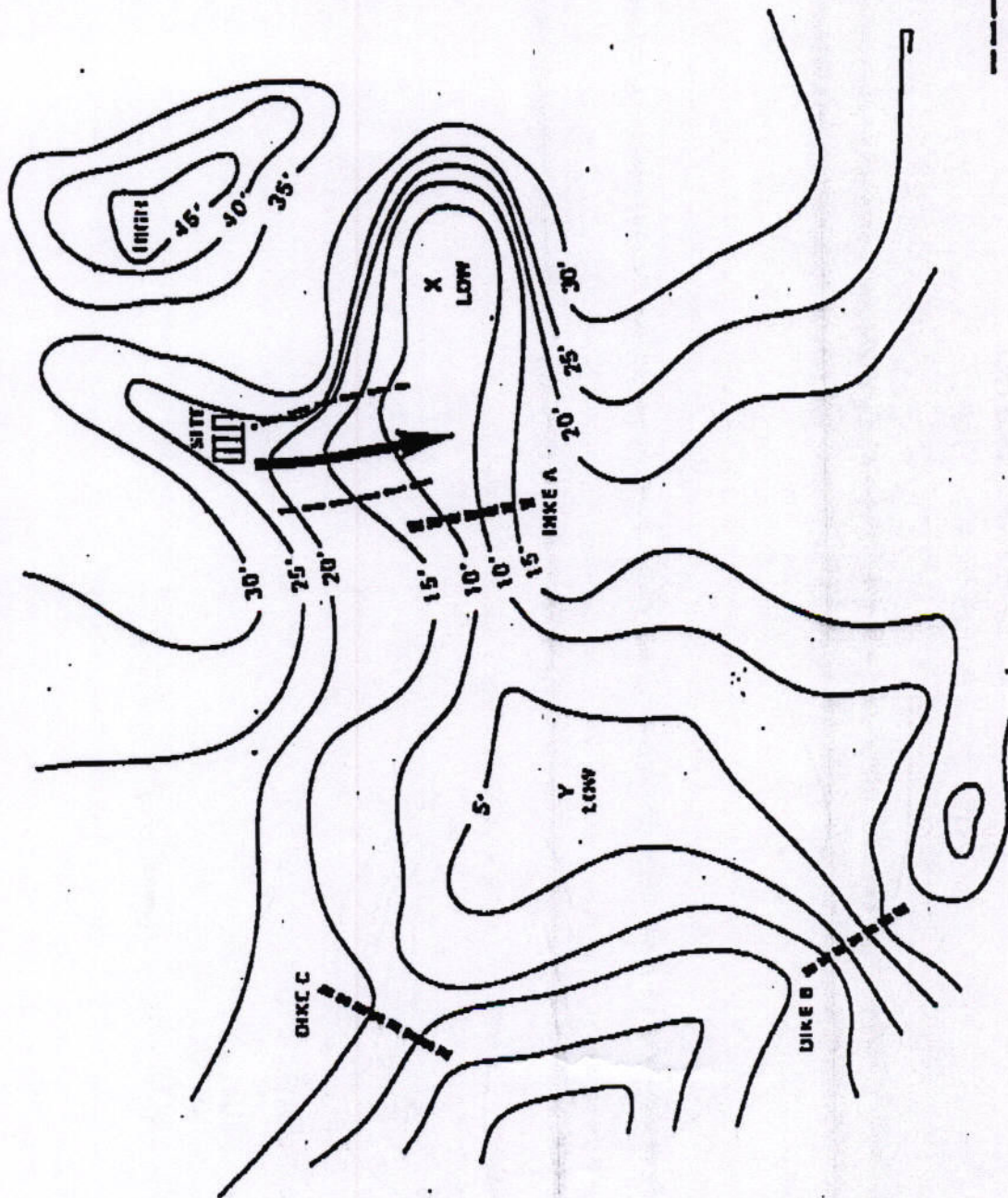
- **Safety Kit**

	Winter
Blankets	6
Chainsaw chaps	1
First aid kits	10 men
Highway vests	10
Highway cones	12
Emergency winter clothing	8 insulated coveralls

- **Light Kit**

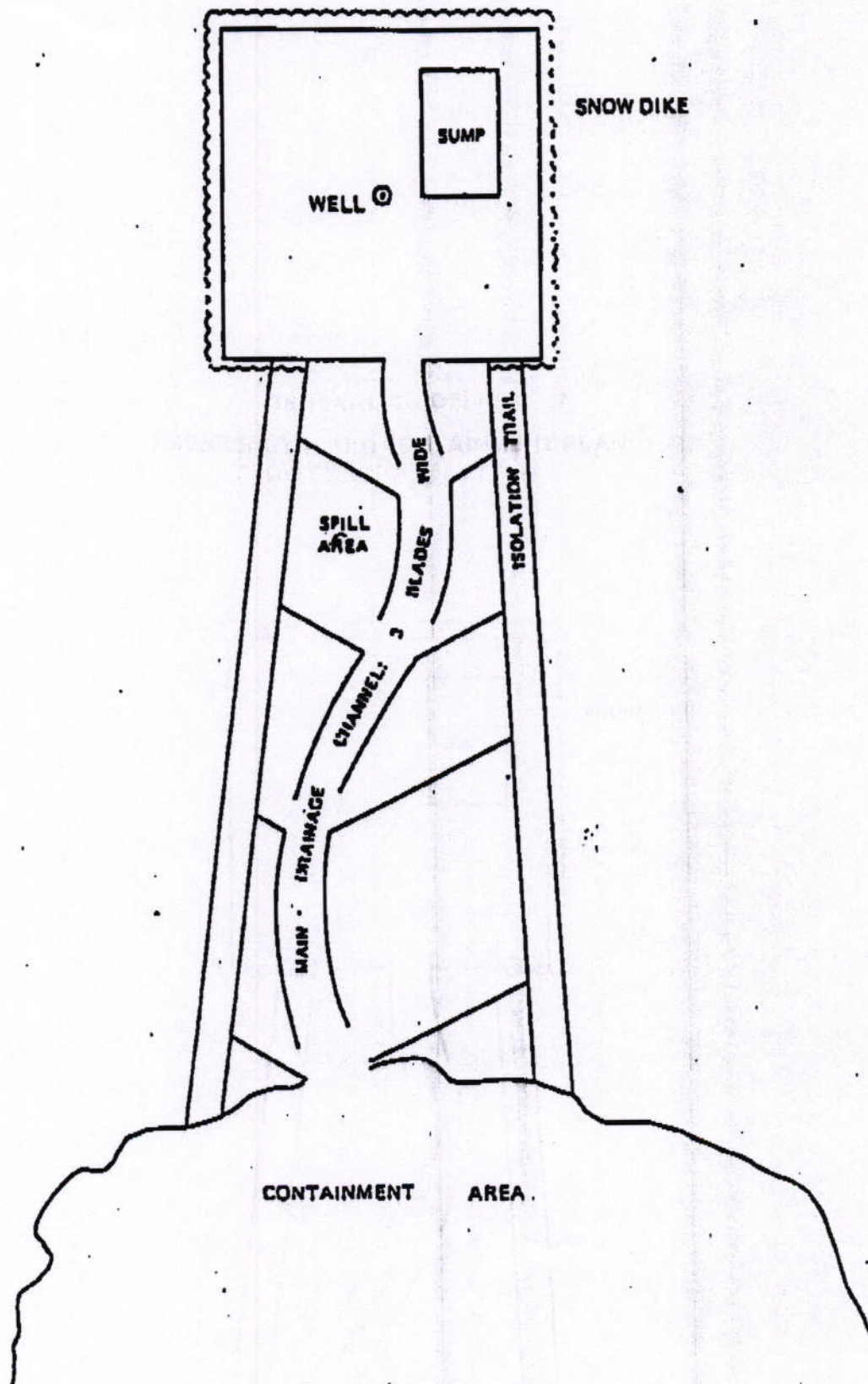
	Winter
Extension cords 30 amp -100 feet - yellow	2
Extension cords 15 amp -100 feet - yellow	6
Extension cords 30 amp -50 feet - yellow	4
Flood lamps (500 watt)	6
Flood lamp stands	4
Flood lamp bulbs spare	6
Flashlights - x-proof	12
Spare batteries	12
Flares	12

**FIGURE A1:
GENERAL GUIDELINE
CHANNEL FLOW FOR FLUID CONTAINMENT**



- SMALL DAMS TO GUIDE FLOW
- ➔ MAIN FLOW
- DIKES
- X Y FIRST AND SECONDARY COLLECTING AREAS

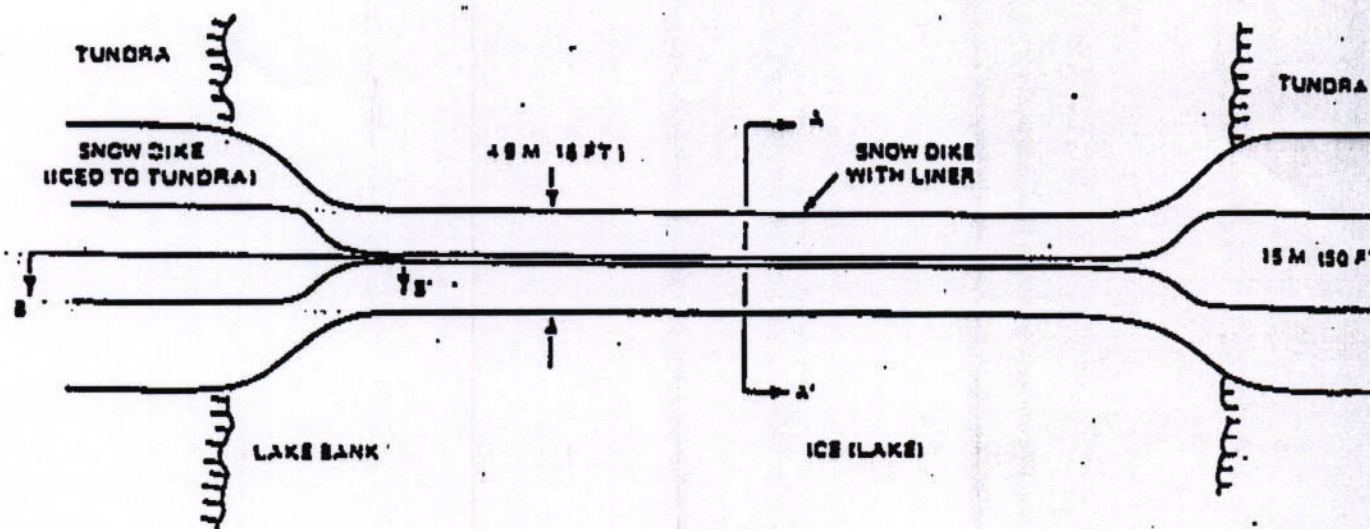
Figure 1
GENERAL GUIDELINE
EMERGENCY FLUID CONTAINMENT PLAN
FLOW CONTROL PATTERN



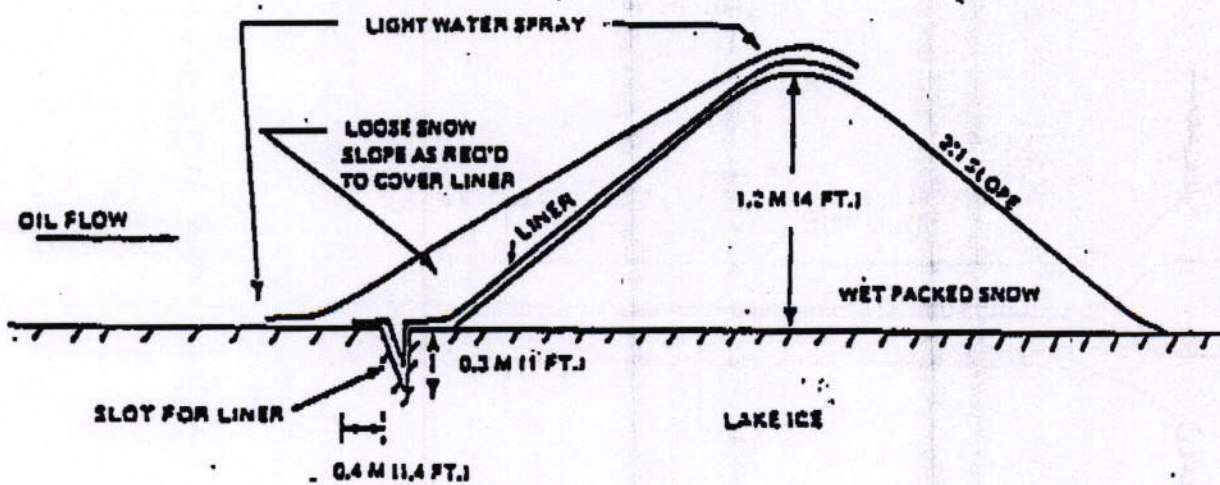
NOT TO SCALE

FIGURE A3:
GENERAL GUIDELINE
OIL SPILL CONTAINMENT PLAN • DIKE DESIGN

PLAN VIEW



SECTION A-A'



SECTION B-B'

